



Technical Assistance Consultant's Report

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Mongolia: Updating the Energy Sector Development Plan

(Financed by the Japan Fund for Poverty Reduction)

Prepared by E. Gen Consultants Ltd. Bangladesh in association with MVV decon GmbH, Germany, and Mon-Energy Consult, Mongolia

For Ministry of Energy, Mongolia

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Asian Development Bank


Updating Energy Sector Development Plan

Project Number: TA No. 7619-MON

FINAL REPORT

PART B: Volume - III of X

ELECTRICITY LOAD FORECASTS



Prepared for
The Asian Development Bank
and

The Mongolian Ministry of Mineral Resources and Energy

Prepared by



e.Gen Consultants Ltd.

in association with



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ABBREVIATIONS

| | | |
|------|---|---|
| ADB | – | Asian Development Bank |
| AUES | – | Altai-Uliastai Energy System |
| C&LI | – | Commercial & Light Industry |
| CES | – | Central Energy System |
| CHP | – | Combine Heat Power |
| ERA | – | Energy Regulatory Authority |
| ERES | – | East Region Energy System |
| GDP | – | Gross Domestic Product |
| HOB | – | Heat Only Boilers |
| MOE | – | Ministry of Energy |
| MOF | – | Ministry of Finance |
| NDC | – | National Dispatch Center |
| NDIC | – | National Development and Innovation Committee |
| O&M | – | Operation and Maintenance |
| UB | – | Ulaanbaatar |
| WRES | – | Western Region Energy System |

UNITS OF MEASURE

| | | |
|-----------|---|--|
| BTU | - | British thermal unit |
| GCal | - | Gigacalorie (one million kilocalories) |
| GJ | - | Gigajoule (one thousand megajoules) |
| kJ | - | Kilojoule |
| kWh | - | Kilowatt-hour |
| MWh | - | Megawatt-hour |
| MWeI | - | Megawatt electric |
| MWth | - | Megawatt thermal |
| PJ | - | Petajoule |
| TSC (TPU) | - | Tons of standard coal |
| TJ | - | Terajoule |

WEIGHTS AND MEASURES

| | | |
|-----------------------|---|------------------------|
| GW (giga watt) | – | 1,000,000,000 calories |
| GJ (giga joules) | – | 1,000,000,000 joules |
| GW (giga watt) | – | 1,000,000,000 watts |
| kVA (kilovolt-ampere) | – | 1,000 volt-amperes |
| kW (kilowatt) | – | 1,000 watts |
| kWh (kilowatt-hour) | – | 1,000 watts-hour |

| | | |
|---------------|---|----------------------|
| MW (megawatt) | – | 1,000,000 watts |
| W (watt) | – | unit of active power |

CONVERSION FACTORS

| | | |
|--------|---|---|
| 1 GCal | = | 4.19 GJ |
| 1 BTU | = | 1.05506 kJ |
| 1 Gcal | = | 1.1615 MWh = 4.19 GJ = 1.75 steam tons/hour |
| 1 GJ | = | 0.278 MWh = 0.239 Gcal = 0.42 steam tons/hour |
| 1 MW | = | 0.86 Gcal = 3.6 GJ = 1.52 steam tons/hour |
| 1 TSC | = | 7 Gcal = 29.3 GJ = 8.15 MWh |

NOTE

In this report, “\$” refers to US dollars.

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I. EXECUTIVE SUMMARY

A. Demand Growth Scenarios

1. Electricity load forecasts are based on the following scenarios:-
 - i. A low forecast – this forecast includes ‘organic’ growth associated with existing domestic, commercial and industrial consumers. In the context of Mongolia’s current demand, Oyu Tolgoi (OT) and Tavan Tolgoi (TT) are significant large loads and forecasts with and without OT and TT have been prepared to understand the impact of these mines.
 - ii. A medium (bear) industrial forecast – this forecast builds on the low forecast; it is assumed that industrial development takes place over a 30 year period (from 2013), centred in three industrial zones – Northern zone (Erdenet / Darkhan), Central zone (Choir / Sainshand) and Southern zone (Dalanzadgad / TT / OT area).
 - iii. A high (bull) industrial forecast – this forecast builds on the low forecast consistent with the medium forecast; it is assumed that the industrial growth anticipated by the medium forecast takes place over a 20 year period.

B. General Comments

2. Load forecasts are presented as forecasts of consumer demand (unless otherwise indicated). Production forecasts have also been prepared allowing for station losses and T&D losses.
3. Total power losses in the Mongolian power system are currently high, of the order of 35%. New plant will result in a reduction of losses. Production forecasts in 2030 are estimated by adding 25 - 30%.
4. Load forecasts are based on the assumption that demand is realized when industrial facilities commence operation. This means that in the early years of the industrial zone growth forecast, demand growth appears to be low because it will take at least three to four years from today to establish major industrial facilities.

C. Whole of Mongolia

5. The forecast presented in Table I-1 includes OT and TT.

Table I-1: Electricity Forecast

| Whole of Mongolia Electricity Forecast (includes OT and TT) | | | | | | | | | |
|---|-------|--------|--------|--------|--------|--------|-------|--------|--------|
| | Low | | | Medium | | | High | | |
| | MW | GWh | AGR MW | MW | GWh | AGR MW | MW | GWh | AGR MW |
| 2011 | 774 | 3,846 | | 774 | 3,846 | | 774 | 3,846 | |
| 2012 | 916 | 4,784 | 18.4% | 916 | 4,784 | 18.4% | 916 | 4,784 | 18.4% |
| 2013 | 1,083 | 5,984 | 18.2% | 1,083 | 5,984 | 18.2% | 1,083 | 5,984 | 18.2% |
| 2014 | 1,184 | 6,287 | 9.4% | 1,184 | 6,287 | 9.4% | 1,244 | 6,916 | 14.8% |
| 2015 | 1,246 | 6,586 | 5.2% | 1,247 | 6,594 | 5.3% | 1,311 | 7,264 | 5.4% |
| 2016 | 1,650 | 8,987 | 32.5% | 1,663 | 9,065 | 33.4% | 1,760 | 10,054 | 34.3% |
| 2017 | 1,724 | 9,366 | 4.5% | 1,759 | 9,576 | 5.7% | 1,886 | 10,764 | 7.1% |
| 2018 | 1,954 | 10,695 | 13.3% | 2,021 | 11,108 | 14.9% | 2,198 | 12,662 | 16.5% |
| 2019 | 2,022 | 11,058 | 3.5% | 2,132 | 11,728 | 5.5% | 2,367 | 13,654 | 7.7% |
| 2020 | 2,240 | 12,335 | 10.8% | 2,404 | 13,336 | 12.7% | 2,717 | 15,803 | 14.8% |
| 2021 | 2,407 | 13,231 | 7.4% | 2,583 | 14,311 | 7.5% | 2,922 | 16,971 | 7.5% |
| 2022 | 2,574 | 14,128 | 6.9% | 2,763 | 15,287 | 7.0% | 3,126 | 18,139 | 7.0% |
| 2023 | 2,741 | 15,024 | 6.5% | 2,943 | 16,262 | 6.5% | 3,331 | 19,307 | 6.6% |
| 2024 | 2,908 | 15,920 | 6.1% | 3,122 | 17,238 | 6.1% | 3,536 | 20,475 | 6.1% |
| 2025 | 3,075 | 16,817 | 5.7% | 3,302 | 18,213 | 5.8% | 3,741 | 21,643 | 5.8% |
| 2026 | 3,274 | 17,844 | 6.5% | 3,517 | 19,334 | 6.5% | 3,985 | 22,983 | 6.5% |
| 2027 | 3,474 | 18,872 | 6.1% | 3,732 | 20,456 | 6.1% | 4,229 | 24,323 | 6.1% |
| 2028 | 3,674 | 19,900 | 5.8% | 3,947 | 21,577 | 5.8% | 4,473 | 25,663 | 5.8% |
| 2029 | 3,874 | 20,927 | 5.4% | 4,162 | 22,698 | 5.4% | 4,717 | 27,003 | 5.5% |
| 2030 | 4,073 | 21,955 | 5.2% | 4,377 | 23,820 | 5.2% | 4,961 | 28,343 | 5.2% |
| CAGR | | | 9.3% | | | 9.8% | | | 10.5% |
| Average | | | | | | | | | |
| MW added | 174 | | | 190 | | | 220 | | |
| p.a. | | | | | | | | | |

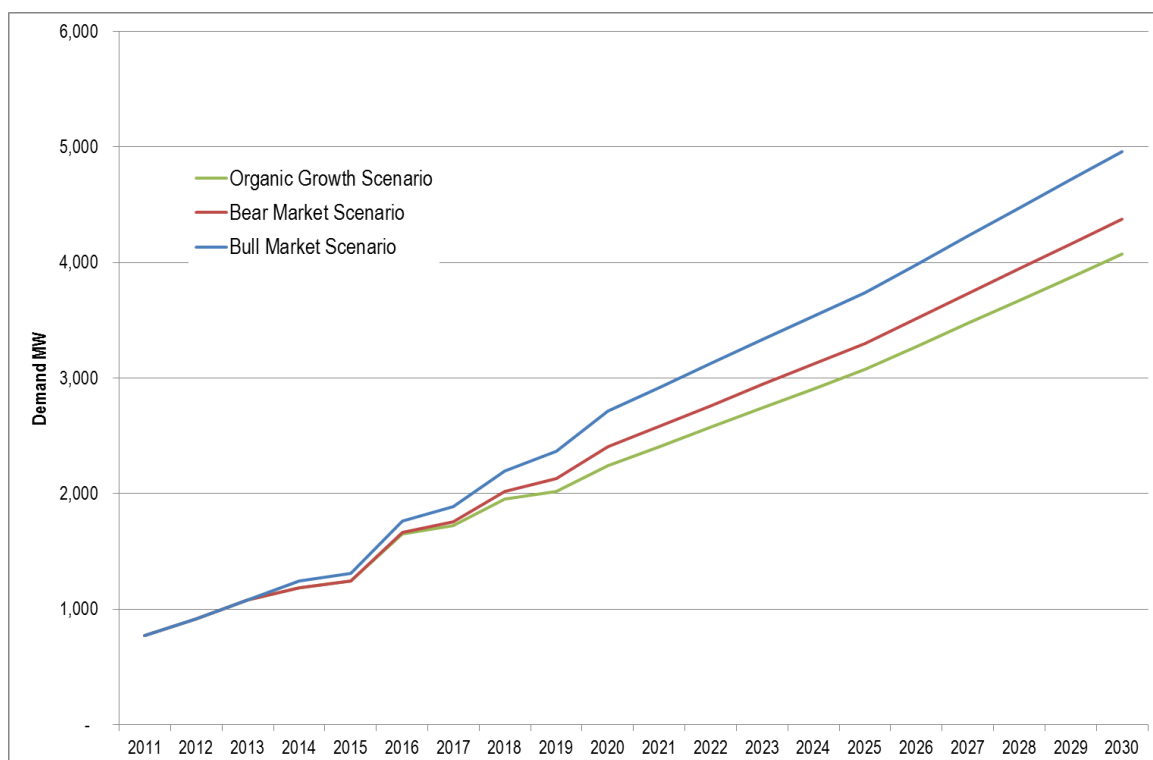
Source: Consultants' analysis

6. The growth rates are high by international standards, but consistent with an economic development strategy based on industrialization.

7. The demand growth can be understood as representing a need to add 200MW of supply capacity every year for the next 20 years.

8. The demand forecast for whole of Mongolia including OT and TT is shown in Figure I-2. The impact of OT and TT demand can be seen in 2015 and 2016.

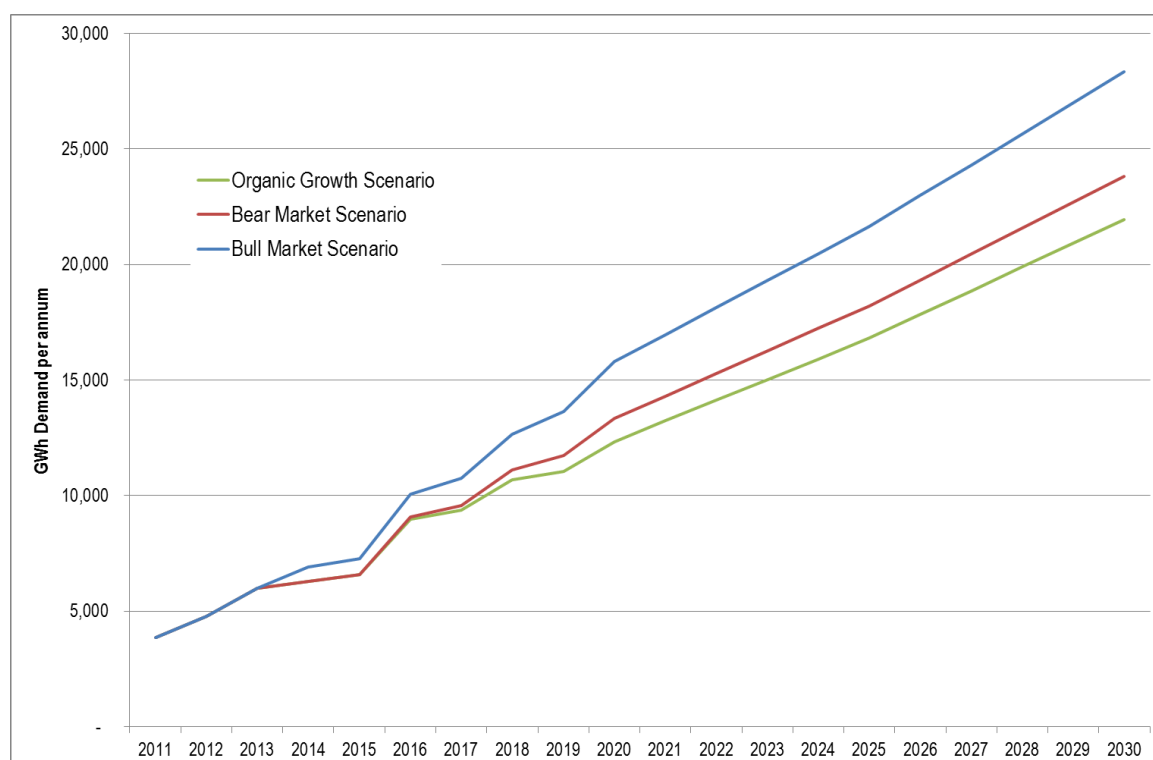
Figure I-2: Whole Mongolia Demand Forecast (MW)



Source: Consultants' analysis

9. The following energy consumption for whole of Mongolia, including OT and TT, is shown in Figure I-3.

Figure I-3: Whole of Mongolia Energy Consumption Forecast (GWh)



Source: Consultants' analysis

10. The growth can also be understood in terms of kWh / capita growth.

Table I-4: kWh / Capita Growth

| | kWh per Capita | | |
|------|----------------|--------|-------|
| | Low | Medium | High |
| 2012 | 1,738 | 1,738 | 1,738 |
| 2015 | 2,269 | 2,272 | 2,503 |
| 2020 | 3,914 | 4,232 | 5,015 |
| 2025 | 4,983 | 5,397 | 6,414 |
| 2030 | 6,124 | 6,644 | 7,906 |

Source: Consultants' analysis

11. The OT and TT demand increases the growth forecasts significantly. The following tables show the underlying growth for the three scenarios when OT and TT are excluded.

Table I-5: Electricity Forecast (excluding OT & TT)

| Whole of Mongolia Electricity Forecast (excludes OT and TT) | | | | | | | | | |
|---|-----|-------|--------|--------|-------|--------|------|-------|--------|
| | Low | | | Medium | | | High | | |
| | MW | GWh | AGR MW | MW | GWh | AGR MW | MW | GWh | AGR MW |
| 2011 | 689 | 3,417 | | 689 | 3,417 | | 689 | 3,417 | |
| 2012 | 746 | 3,742 | 8.3% | 746 | 3,742 | 8.3% | 746 | 3,742 | 8.3% |
| 2013 | 773 | 4,083 | 3.6% | 773 | 4,083 | 3.6% | 773 | 4,083 | 3.6% |

| Whole of Mongolia Electricity Forecast (excludes OT and TT) | | | | | | | | | |
|---|-------|--------|--------|--------|--------|--------|-------|--------|--------|
| | Low | | | Medium | | | High | | |
| | MW | GWh | AGR MW | MW | GWh | AGR MW | MW | GWh | AGR MW |
| 2014 | 874 | 4,386 | 13.1% | 874 | 4,386 | 13.1% | 918 | 4,825 | 18.8% |
| 2015 | 935 | 4,683 | 7.0% | 936 | 4,690 | 7.1% | 985 | 5,170 | 7.3% |
| 2016 | 1,016 | 5,096 | 8.6% | 1,029 | 5,175 | 9.9% | 1,094 | 5,774 | 11.1% |
| 2017 | 1,082 | 5,428 | 6.5% | 1,116 | 5,638 | 8.5% | 1,211 | 6,432 | 10.7% |
| 2018 | 1,150 | 5,767 | 6.3% | 1,217 | 6,179 | 9.0% | 1,354 | 7,241 | 11.8% |
| 2019 | 1,204 | 6,037 | 4.7% | 1,313 | 6,708 | 7.9% | 1,507 | 8,132 | 11.3% |
| 2020 | 1,253 | 6,282 | 4.1% | 1,416 | 7,283 | 7.9% | 1,680 | 9,145 | 11.5% |
| 2021 | 1,354 | 6,772 | 8.0% | 1,530 | 7,852 | 8.0% | 1,816 | 9,866 | 8.1% |
| 2022 | 1,454 | 7,263 | 7.4% | 1,643 | 8,422 | 7.4% | 1,951 | 10,588 | 7.5% |
| 2023 | 1,555 | 7,753 | 6.9% | 1,757 | 8,991 | 6.9% | 2,086 | 11,309 | 6.9% |
| 2024 | 1,656 | 8,244 | 6.5% | 1,871 | 9,561 | 6.5% | 2,222 | 12,030 | 6.5% |
| 2025 | 1,756 | 8,734 | 6.1% | 1,984 | 10,130 | 6.1% | 2,357 | 12,752 | 6.1% |
| 2026 | 1,909 | 9,470 | 8.7% | 2,152 | 10,960 | 8.4% | 2,551 | 13,771 | 8.2% |
| 2027 | 2,061 | 10,206 | 8.0% | 2,319 | 11,790 | 7.8% | 2,745 | 14,790 | 7.6% |
| 2028 | 2,213 | 10,942 | 7.4% | 2,487 | 12,619 | 7.2% | 2,939 | 15,809 | 7.1% |
| 2029 | 2,365 | 11,678 | 6.9% | 2,654 | 13,449 | 6.7% | 3,133 | 16,828 | 6.6% |
| 2030 | 2,517 | 12,414 | 6.4% | 2,821 | 14,279 | 6.3% | 3,327 | 17,848 | 6.2% |
| CAGR | | | 7.1% | | | 7.7% | | | 8.7% |
| Average | | | | | | | | | |
| MW added | 96 | | | 112 | | | 139 | | |
| p.a. | | | | | | | | | |

Source: Consultants' analysis

12. Excluding OT and TT, and adding power losses, the production of power is forecast to exceed 1,000MW in 2014.

13. The underlying growth rate of the organic growth scenario is 7.1%. This growth rate is consistent with the average growth rates in Mongolia in the past decade.

14. Again, the growth can be understood in terms of kWh / capita growth.

Table I-6: kWh / Capita Growth

| | kWh per Capita | | |
|------|----------------|--------|-------|
| | Low | Medium | High |
| 2012 | 1,359 | 1,359 | 1,359 |
| 2015 | 1,614 | 1,616 | 1,781 |
| 2020 | 1,994 | 2,311 | 2,902 |
| 2025 | 2,588 | 3,002 | 3,779 |
| 2030 | 3,463 | 3,983 | 4,978 |

Source: Consultants' analysis

15. The kWh / capita growth targets are consistent with an industrializing nation.

D. Central Energy System

16. The following demand forecast is for the Central Energy System (CES).

Table I-7: CES Electricity Forecast

| Central Energy System | | | | | | | | | |
|-----------------------|-------|--------|--------|--------|--------|--------|-------|--------|--------|
| | Low | | | Medium | | | High | | |
| | MW | GWh | AGR MW | MW | GWh | AGR MW | MW | GWh | AGR MW |
| 2011 | 640 | 3,243 | | 640 | 3,243 | | 640 | 3,243 | |
| 2012 | 697 | 3,542 | 8.9% | 697 | 3,542 | 8.9% | 697 | 3,542 | 8.9% |
| 2013 | 718 | 3,860 | 3.0% | 718 | 3,860 | 3.0% | 718 | 3,860 | 3.0% |
| 2014 | 815 | 4,144 | 13.5% | 815 | 4,144 | 13.5% | 815 | 4,144 | 13.5% |
| 2015 | 871 | 4,422 | 6.9% | 872 | 4,427 | 7.0% | 873 | 4,435 | 7.2% |
| 2016 | 948 | 4,817 | 8.8% | 956 | 4,807 | 9.6% | 966 | 4,864 | 10.6% |
| 2017 | 1,010 | 5,131 | 6.5% | 1,032 | 5,174 | 7.9% | 1,059 | 5,337 | 9.6% |
| 2018 | 1,074 | 5,452 | 6.3% | 1,117 | 5,596 | 8.3% | 1,169 | 5,913 | 10.4% |
| 2019 | 1,124 | 5,704 | 4.6% | 1,194 | 5,985 | 6.9% | 1,282 | 6,525 | 9.7% |
| 2020 | 1,169 | 5,932 | 4.0% | 1,275 | 6,429 | 6.8% | 1,407 | 7,236 | 9.7% |
| 2025 | 1,628 | 8,189 | 7.9% | 2,016 | 10,416 | 11.6% | 2,500 | 13,383 | 15.5% |
| 2030 | 2,309 | 11,516 | 8.4% | 3,161 | 16,583 | 11.4% | 3,734 | 20,097 | 9.9% |
| CAGR | | | 7.2% | | | 8.6% | | | 9.8% |
| Average | | | | | | | | | |
| MW added p.a. | 88 | | | 133 | | | 163 | | |

Source: Consultants' analysis

17. Given that strong growth is expected in the Central Energy System, the average growth rates are considered reasonable. Population growth in the CES is expected to continue at a high rate, increasing 17% by 2020.

18. The CES has two industrial zones envisaged by Worley Parsons, Northern in the Erdenet / Darkhan area, and Central in the Choir / Sainshand area.

19. The matching kWh / capita growth is as follows:-

Table I-8: kWh / Capita Growth

| | kWh per Capita | | |
|------|----------------|--------|-------|
| | Low | Medium | High |
| 2012 | 1,604 | 1,604 | 1,604 |
| 2015 | 1,868 | 1,871 | 1,874 |
| 2020 | 2,254 | 2,443 | 2,750 |
| 2025 | 2,877 | 3,659 | 4,701 |
| 2030 | 3,761 | 5,415 | 6,563 |

Source: Consultants' analysis

E. South Gobi

20. An industrial zone is envisaged in the area bounded by Dalanzadgad, Tavan Tolgoi and Oyu Tolgoi.

Table I-9: South Gobi Electricity Forecast

| South Gobi Energy System (includes OT and TT) | | | | | | | | | |
|---|------|-------|--------|--------|---------|--------|-------|---------|--------|
| | Low | | | Medium | | | High | | |
| | MW | GWh | AGR MW | MW | GWh | AGR MW | MW | GWh | AGR MW |
| 2011 | 3.2 | 11.9 | | 88 | 441.1 | | 88 | 441.1 | |
| 2012 | 3.4 | 12.7 | 6.6% | 173 | 1,055.1 | 96.6% | 173 | 1,055.1 | 96.6% |
| 2013 | 3.8 | 14.4 | 11.6% | 314 | 1,915 | 81.0% | 314 | 1,915 | 81.0% |
| 2014 | 4.1 | 15.8 | 8.5% | 314 | 1,917 | 0.1% | 314 | 1,917 | 0.1% |
| 2015 | 4.4 | 17.2 | 8.2% | 315 | 1,920 | 0.2% | 315 | 1,924 | 0.4% |
| 2016 | 4.8 | 18.6 | 7.8% | 639 | 3,909 | 103.1% | 644 | 3,941 | 104.3% |
| 2017 | 5.1 | 20.1 | 7.5% | 647 | 3,958 | 1.3% | 662 | 4,046 | 2.7% |
| 2018 | 5.5 | 21.7 | 7.2% | 809 | 4,950 | 25.0% | 837 | 5,118 | 26.5% |
| 2019 | 5.9 | 23.3 | 6.9% | 825 | 5,044 | 1.9% | 870 | 5,323 | 4.0% |
| 2020 | 6.3 | 25.0 | 6.7% | 993 | 6,078 | 20.5% | 1,063 | 6,505 | 22.2% |
| 2025 | 11.8 | 49.8 | 17.9% | 1,330 | 8,133 | 6.8% | 1,585 | 9,695 | 9.8% |
| 2030 | 26.8 | 118.4 | 25.3% | 1,583 | 9,659 | 3.8% | 1,891 | 11,552 | 3.9% |
| CAGR | | | 10.4% | | | 25.6% | | | 26.4% |
| Average MW | 1.2 | | | 79 | | | 95 | | |

Source: Consultants' analysis

21. Oyu Tolgoi and Tavan Tolgoi demands are included in the medium and high scenarios. They are excluded from the low scenario, partly to reveal the underlying growth and partly because both projects are currently on hold. However, as it is inconceivable that these projects would be on hold indefinitely, the low forecast scenario is considered as extremely unlikely.

22. Population growth in the Dalanzadgad area is expected to continue at a high rate, increasing 20% by 2020.

23. The matching kWh / capita growth of the underlying growth, excluding TT and OT, is as follows:-

Table I-10: kWh / Capita Growth

| kWh per Capita | |
|----------------|-------|
| 2012 | 200 |
| 2015 | 250 |
| 2020 | 323 |
| 2025 | 574 |
| 2030 | 1,229 |

Source: Consultants' analysis

F. Altai – Uliastai Energy System (AuES)

24. The following forecast is for the AuES.

Table I-11: AuES Electricity Forecast

| Altai-Uliastai Energy System | | | | | | | | | |
|------------------------------|------|------|--------|--------|------|--------|------|-------|--------|
| | Low | | | Medium | | | High | | |
| | MW | GWh | AGR MW | MW | GWh | AGR MW | MW | GWh | AGR MW |
| 2011 | 5.9 | 20.0 | | 5.9 | 20.0 | | 5.9 | 20.0 | |
| 2012 | 6.2 | 23.0 | 5.1% | 6.2 | 23.0 | 5.1% | 6.2 | 23.0 | 5.1% |
| 2013 | 6.2 | 22.9 | -1.1% | 6.9 | 25.4 | 9.8% | 8.2 | 30.5 | 31.8% |
| 2014 | 6.5 | 23.9 | 6.0% | 7.3 | 26.6 | 6.0% | 9.5 | 34.6 | 14.9% |
| 2015 | 7.0 | 25.7 | 6.7% | 7.8 | 28.6 | 6.7% | 10.9 | 40.1 | 14.9% |
| 2016 | 7.4 | 27.5 | 6.1% | 8.2 | 30.5 | 6.1% | 12.4 | 45.8 | 13.6% |
| 2017 | 7.8 | 29.1 | 4.9% | 8.6 | 32.4 | 4.9% | 13.8 | 51.8 | 11.9% |
| 2018 | 8.1 | 30.7 | 4.4% | 9.0 | 34.1 | 4.4% | 15.3 | 58.0 | 10.9% |
| 2019 | 8.4 | 32.2 | 4.0% | 9.4 | 35.8 | 4.0% | 16.9 | 64.4 | 10.1% |
| 2020 | 8.7 | 33.6 | 3.6% | 9.7 | 37.3 | 3.6% | 18.4 | 70.9 | 9.3% |
| 2025 | 11.8 | 46.6 | 7.1% | 13.1 | 51.8 | 7.1% | 25.0 | 98.4 | 7.1% |
| 2030 | 16.2 | 65.5 | 7.5% | 18.0 | 72.8 | 7.5% | 34.3 | 138.3 | 7.5% |
| CAGR | | | 4.9% | | | 5.9% | | | 12.5% |
| Average | | | | | | | | | |
| MW | 0.5 | | | 0.6 | | | 1.5 | | |
| added p.a. | | | | | | | | | |

Source: Consultants' analysis

25. The growth prospects in the AuES appear to be limited. The population is predicted to fall during the next 20 years to 90% of current population. There is a mine expected to develop at Bayan Irag (ultimate demand of 6MW) which is included in the high growth scenario.

26. The matching kWh / capita growth is as follows:-

Table I-12: kWh / Capita Growth

| | kWh per Capita | | |
|------|----------------|--------|-------|
| | Low | Medium | High |
| 2012 | 201 | 201 | 201 |
| 2015 | 237 | 264 | 369 |
| 2020 | 341 | 378 | 719 |
| 2025 | 520 | 578 | 1,098 |
| 2030 | 813 | 903 | 1,716 |

Source: Consultants' analysis

27. The kWh / capita growth is correspondingly low by comparison to the other energy regions.

G. Eastern Region Energy System (ERES)

28. The following forecast is for the Eastern Region Energy System.

Table I-13: ERES Electricity Forecast

| Eastern Region Energy System | | | | | | | | | |
|------------------------------|-----|-------|--------|--------|-------|--------|------|-------|--------|
| | Low | | | Medium | | | High | | |
| | MW | GWh | AGR MW | MW | GWh | AGR MW | MW | GWh | AGR MW |
| 2011 | 19 | 85.5 | | 19.2 | 85.5 | | 19 | 85.5 | |
| 2012 | 21 | 94.0 | 10.4% | 21.2 | 94.0 | 10.4% | 21 | 94.0 | 10.4% |
| 2013 | 21 | 91.9 | -2.3% | 23 | 102.1 | 8.6% | 33 | 112.3 | 53.9% |
| 2014 | 22 | 99.1 | 7.6% | 25 | 110.1 | 7.6% | 60 | 132.1 | 85.4% |
| 2015 | 24 | 106.0 | 6.9% | 26 | 117.8 | 6.9% | 86 | 176.6 | 42.2% |
| 2016 | 25 | 112.7 | 6.3% | 28 | 125.2 | 6.3% | 113 | 187.8 | 31.6% |
| 2017 | 27 | 119.2 | 5.7% | 30 | 132.4 | 5.7% | 115 | 198.6 | 2.0% |
| 2018 | 28 | 125.4 | 5.2% | 31 | 139.4 | 5.2% | 124 | 209.0 | 7.2% |
| 2019 | 29 | 131.5 | 4.8% | 33 | 146.1 | 4.8% | 146 | 219.1 | 17.7% |
| 2020 | 31 | 137.3 | 4.4% | 34 | 152.5 | 4.4% | 149 | 228.8 | 2.2% |
| 2025 | 46 | 203.9 | 9.6% | 51 | 226.5 | 9.6% | 169 | 339.8 | 2.6% |
| 2030 | 71 | 316.4 | 11.0% | 79 | 351.6 | 11.0% | 196 | 527.3 | 3.3% |
| CAGR | | | 6.3% | | | 7.3% | | | 23.5% |
| Average MW | 2.7 | | | 3.1 | | | 9.3 | | |

Source: Consultants' analysis

29. Growth is expected in the ERES due to planned light and heavy industrial development. Such development has been included in the high forecast given there is uncertainty associated with such development. The population is expected to fall by 10% between 2013 and 2020.

30. The matching kWh / capita growth is as follows:-

Table I-14: kWh / Capita Growth

| | kWh per Capita | | |
|------|----------------|--------|-------|
| | Low | Medium | High |
| 2012 | 697 | 697 | 697 |
| 2015 | 829 | 921 | 1,382 |
| 2020 | 1,184 | 1,315 | 1,973 |
| 2025 | 1,810 | 2,012 | 3,017 |
| 2030 | 2,895 | 3,217 | 4,825 |

Source: Consultants' analysis

H. Western Region Energy System (WRES)

31. The following forecast is for the Western Region Energy System.

Table I-15: WRES Electricity Forecast

| Western Region Energy System | | | | | | | | | |
|------------------------------|-----|-------|--------|--------|------|--------|------|------|--------|
| | Low | | | Medium | | | High | | |
| | MW | GWh | AGR MW | MW | GWh | AGR MW | MW | GWh | AGR MW |
| 2011 | 21 | 57.3 | | 21 | 57.3 | | 21 | 57.3 | |
| 2012 | 19 | 70.0 | -11.1% | 19 | 70.0 | -11.1% | 19 | 70.0 | -11.1% |
| 2013 | 19 | 73.6 | 3.2% | 21 | 82 | 14.7% | 24 | 90 | 26.1% |
| 2014 | 21 | 80.6 | 8.6% | 23 | 90 | 8.6% | 26 | 98 | 8.6% |
| 2015 | 23 | 87.6 | 7.9% | 25 | 97 | 7.9% | 28 | 107 | 7.9% |
| 2016 | 24 | 94.5 | 7.3% | 27 | 105 | 7.3% | 30 | 115 | 7.3% |
| 2017 | 26 | 101.4 | 6.8% | 29 | 113 | 6.8% | 32 | 124 | 6.8% |
| 2018 | 27 | 108.3 | 6.0% | 30 | 120 | 6.0% | 34 | 132 | 6.0% |
| 2019 | 29 | 115.1 | 5.7% | 32 | 128 | 5.7% | 112 | 619 | 234.5% |
| 2020 | 31 | 121.9 | 5.3% | 34 | 135 | 5.3% | 114 | 626 | 1.5% |
| 2025 | 47 | 194.7 | 11.0% | 53 | 216 | 11.0% | 133 | 707 | 3.3% |
| 2030 | 76 | 319.6 | 12.1% | 85 | 355 | 12.1% | 165 | 846 | 4.8% |
| CAGR | | | 5.7% | | | 6.8% | | | 26.9% |
| Average MW | 2.9 | | | 3.3 | | | 7.6 | | |

Source: Consultants' analysis

32. Growth prospects reported for the WRES were higher than for the ERES; the population is expected to remain at current level, falling only slightly by 2020. Electricity growth is mainly anticipated due to light industrial and agricultural activities.

33. The Asgat silver mine load of 80MW is included in the high growth scenario. It is only included in the high growth scenario due to the uncertainty associated with this mine.

34. The matching kWh / capita growth is as follows:-

Table I-16: kWh / Capita Growth

| | kWh per Capita | | |
|------|----------------|--------|-------|
| | Low | Medium | High |
| 2012 | 302 | 302 | 302 |
| 2015 | 380 | 422 | 465 |
| 2020 | 535 | 595 | 2,751 |
| 2025 | 854 | 949 | 3,102 |
| 2030 | 1,400 | 1,556 | 3,706 |

Source: Consultants' analysis

II. INTRODUCTION

I. General

1. Load forecasting methods include end-use and market survey approaches. The end use approach involves using trends in energy consumption and demand to make predictions regarding future growth. The market survey approach involves disaggregating the forecast into individual forecasts by market segment and geographic region, taking into account anticipated changes in the drivers of energy consumption. The 'bottom-up' method is a pre-requisite for supply capacity planning, particularly in Mongolia where load centres are widely dispersed across a large expanse of countryside.

2. A sound energy forecasting methodology relies on correct identification of the drivers of energy consumption, the availability of data concerning the drivers and projections or methods of projecting changes in measures that drive the growth in energy consumption. The key drivers of electricity consumption are shown in Table II-1.

Table II-1: Drivers of Electricity Consumption

| Sector | Customer Class | Driver | Growth Factors |
|-------------|-------------------------|---|-----------------------------------|
| Electricity | Residential | Customer | Customer Growth |
| | | | Population trend |
| | | | Appliance use |
| | Commercial / Government | Customers | Floor Space |
| | | | Opening Hours |
| | Industrial | Metals fabrication, mining, other heavy users of energy | Investment Climate, Market Survey |

3. The load forecasts presented in this report are based on key driver and associated growth factor data gathered from and through the Mongolian energy authorities, in the latter case from local authorities and from licensed operators of heat and power plants.

4. The validation of the electricity forecasts can be made by comparing the demand forecast (MW_e) against the trends in electricity consumption and demand growth measured at transmission grid bulk supply points, where peak demand is metered, and by comparing reported kWh sales of the distribution companies

5. Reconciliation can be made by comparing the forecasts to those developed according to GDP growth expectations (macro-economic analyses).

6. Finally, demand growth forecasts must be prepared on a sufficiently disaggregated basis that a supply plan can be developed according to the optimal energy supply mix for a given geographic region.

III. ENERGY DRIVERS

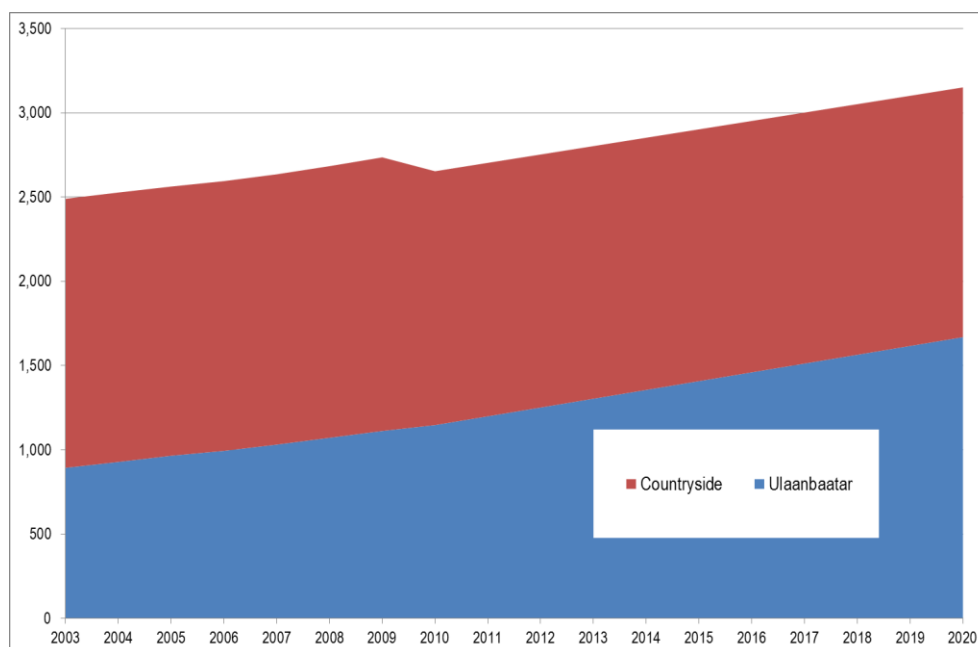
J. Population Trends

7. Population trends are of interest, along with changes in household size (persons per household), because these factors drive residential heat and power consumption.

8. The population of Mongolia has been considered according to a breakdown between Ulaanbaatar and the countryside areas, and a further breakdown between the urban / rural populations of the Aimags.

9. The historical and forecast rates of population growth in Ulaanbaatar and the countryside are reported by the Bureau of Statistics of Mongolia.

Figure III-1: Population ('000s)



Sources: Mongolian Bureau of Statistics

10. The rate of population growth is seen to be significantly higher in Ulaanbaatar than in the countryside. The historical and forecast populations for each year, in Ulaanbaatar and the countryside, are shown in Table III-2. The statistics show that the average birth rate for Mongolia was 1.6% from 2003 to 2012. A slight decrease to 1.4% is expected from 2013 to 2020.

Table III-2: Population Statistics

| | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|-------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ulaanbaatar | 1,460.1 | 1,495.6 | 1,543.4 | 1,579.5 | 1,600.9 | 1,659.3 | 1,713.2 | 1,751.2 | 1,817.1 |
| Countryside | 1,029.9 | 1,031.4 | 1,019.0 | 1,015.3 | 1,034.3 | 1,024.2 | 1,022.6 | 1,007.1 | 1,005.9 |
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Ulaanbaatar | 1,866.5 | 1,917.5 | 1,969.6 | 2,023.5 | 2,079.8 | 2,137.3 | 2,197.4 | 2,258.8 | 2,321.5 |

| | | | | | | | | | |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Countryside | 993.5 | 980.5 | 966.4 | 951.5 | 936.2 | 919.7 | 902.6 | 884.2 | 864.5 |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|

Sources: Mongolian Bureau of Statistics

11. The population growth rate by city and Aimag urban centre, net of the average birth rate for Mongolia, is shown in Table III-3.

Table III-3: Population Growth Rates

| Population Centre | Growth Rate 2003 - 2012 | Expected Rate 2013 - 2020 |
|----------------------|----------------------------|------------------------------|
| Bayan-Olgii | -16.0% | 1.3% |
| Govi-Altai | -15.5% | -10.3% |
| Zavkhan | -24.0% | -18.7% |
| Uvs | -9.0% | -5.1% |
| Khovd | -18.5% | -5.4% |
| Arkhangai | -14.5% | -7.1% |
| Bayankhongor | -7.3% | -5.1% |
| Bulgan | -17.1% | -8.5% |
| Orkhon | 16.6% | 17.4% |
| Ovorkhangai | -12.2% | -4.6% |
| Khovsgol | -5.5% | -0.7% |
| Govisumber | 6.2% | 7.1% |
| Darkhan-Uul | 4.1% | 6.8% |
| Dornogovi | 10.6% | 11.6% |
| Dundgovi | -25.5% | -11.0% |
| Omnogovi | 31.0% | 20.7% |
| Selenge | -6.6% | -0.6% |
| Tov | -9.4% | -9.0% |
| Dornod | 17.7% | -21.5% |
| Sukhbaatar | -10.6% | -4.5% |
| Khentii | -8.6% | -3.8% |
| Ulaanbaatar | 33.2% | 32.3% |

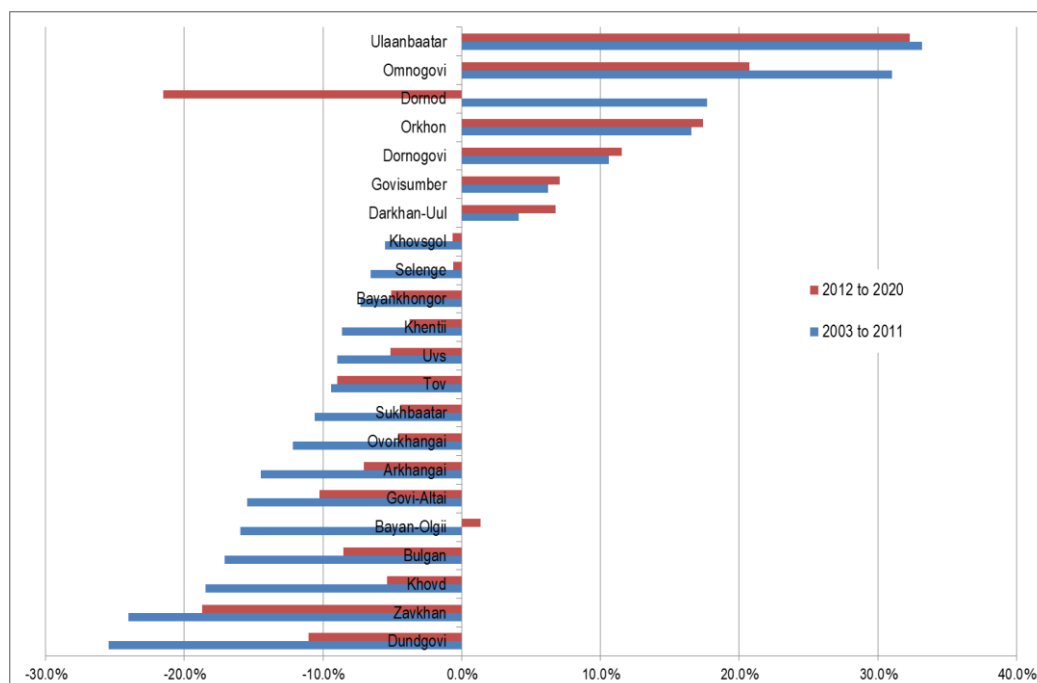
Sources: Consultants' analysis

12. The population growth rate, net of the birth rate, is a measure of the shift that has taken place over the last eight years as people have moved off the land to the town centres, in search of a reliable heat supply. Severe winters (Dzud) in the last decade have resulted in a large influx of

the rural nomadic population into town centres.

13. These population shifts are important to understand because the extent of the shift in Mongolia far outweighs the impact of underlying population growth, with obvious ramifications for heat and power supply capacity needs in a given area.

Figure III-4: Shifts in Aimag Population – Total % Increase Over 8 Year Periods



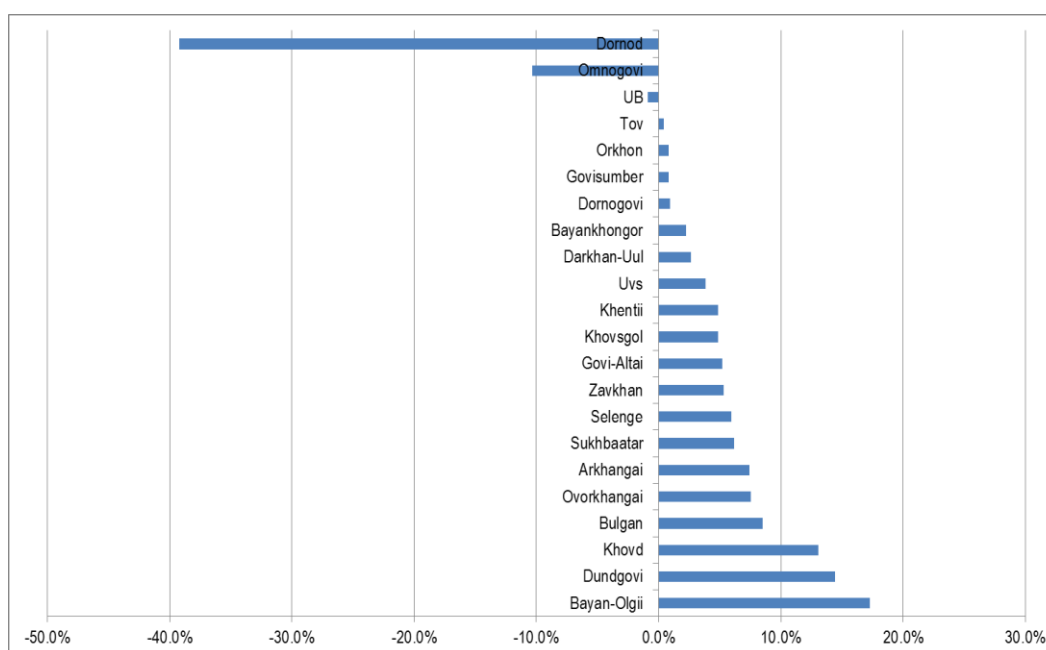
Sources: Consultants' analysis

14. Clearly the large population centers of Ulaanbaatar, Sainshand, Choir, Erdenet, Dalanzadgad and Darkhan have seen relatively large increases in population in the period 2003 to 2012. Uliastai, Tsetserleg and Altai have seen relatively large decreases.

15. Ulaanbaatar's population growth over the eight year period was around 34%. This is equivalent to 300,000 people, or 38,000 persons per annum entering mainly into the peri-urban Ger districts of UB. For the past eight years the average rate of arrival has been 730 persons per week.

16. Insofar as the population forecasts are concerned, clearly it is hoped that there will be a slowing down and reversal of population movements in the coming decade. As depicted in Figure III-5, Dornod, Ulaanbaatar and Omnogobi are expected to see a much reduced population growth rate with corresponding fall in the rate of population decline in the smaller Aimags.

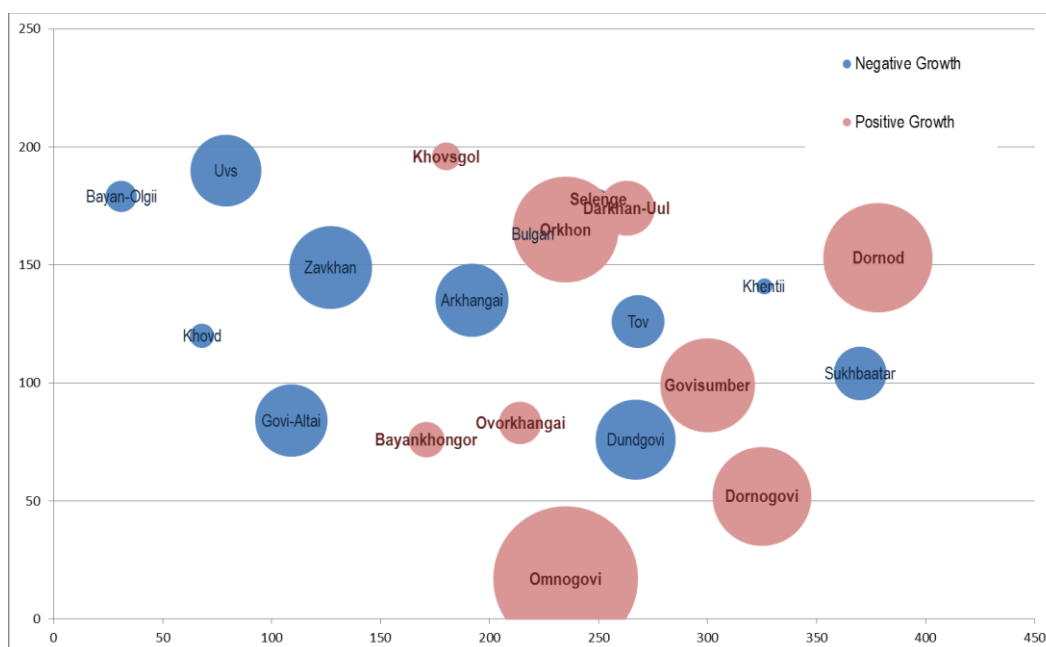
Figure III-5: Change Between Period 2003 – 2011 & Period 2012 – 2020



Sources: Consultants' analysis

17. Figure III-6 shows the shift that has taken place in the Aimag populations from 2003 to 2012, and Figure III-7 shows the shift that is expected to take place in the years from 2013 to 2020. These charts indicate the drift in population that is taking place from one Aimag to others.

Figure III-6: Shifts in Aimag Population from 2003 to 2012¹



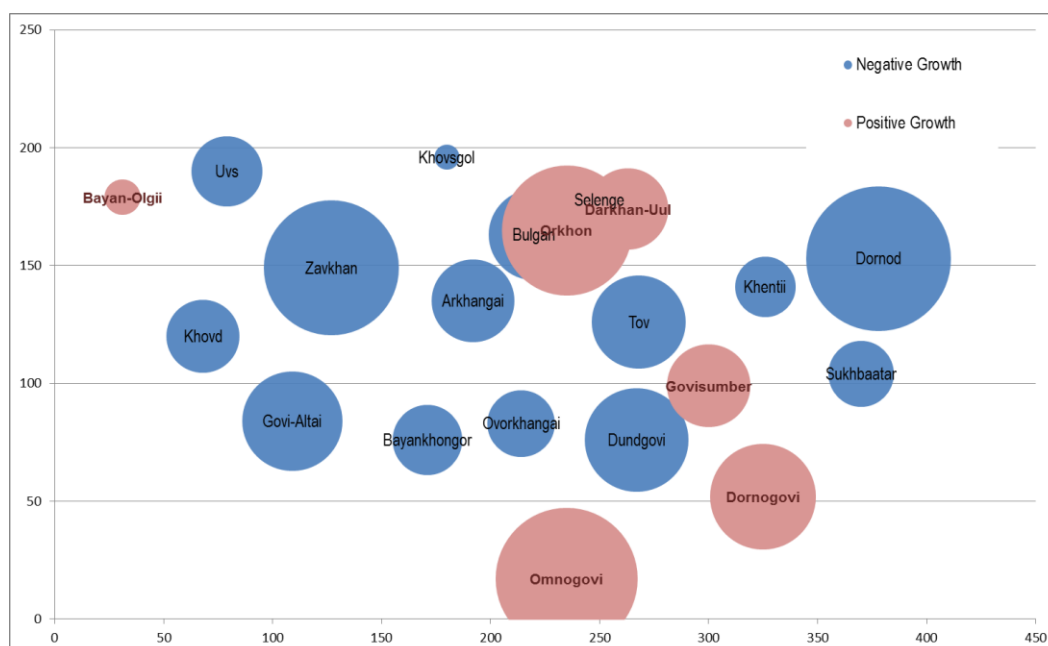
Sources: Consultants' analysis; Zavkhan growth for period -10% or average -1.1% per annum.

18. Clearly in the period 2003 to 2012, there has been a significant shift from the East and West into the Central and Southern regions. Significant growth is evident in the South-Gobi area as

¹ Axis indications are km.

mining developments continue to grow in pace.

Figure III-7: Shifts in Aimag Population Expected from 2013 to 2020



Sources: Consultants' analysis; Zavkhan growth rate for period -19% or average -1.7% per annum.

19. In the coming period it is anticipated that there will be significant movement of the working population from the North and North-East to the Gobi area as opportunities arise in minerals development. The population growth rate for the towns of Choir (Govi-Sumber) and Mandalgovi (Dornogovi) is expected to remain relatively high.

20. The UB growth rate however is expected to continue to be relatively high at 27% for the period (3.5% per annum).

21. The population trends are taken into account by the 'bottom-up' forecasting method.

K. Consumer (End-Use) Trends

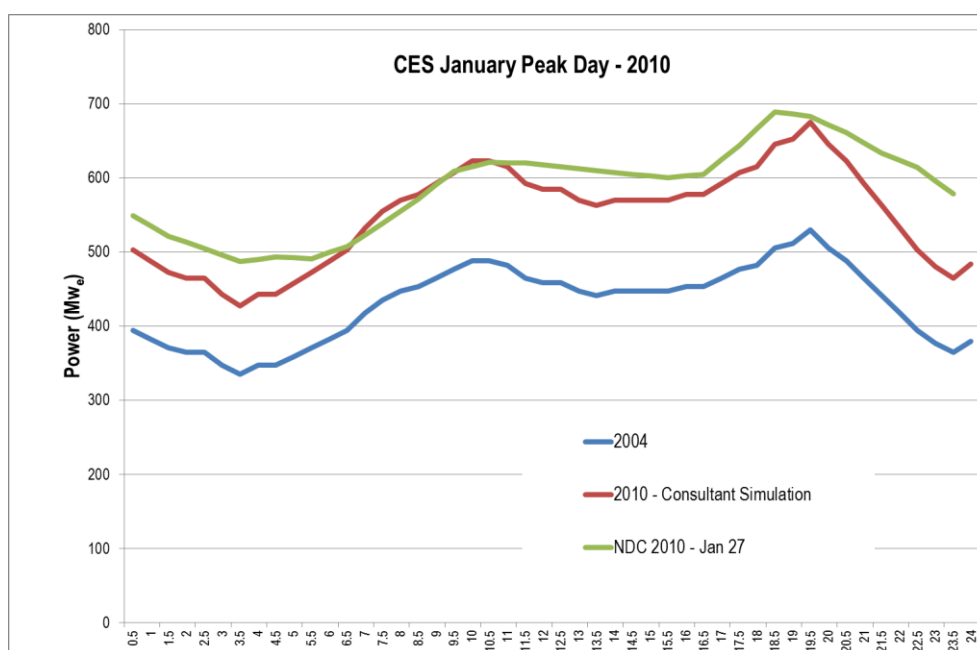
22. In the case of electricity, end-use trends can be observed as changes in the rates of electric appliance penetration, as increases or via substitution.

23. In Mongolia an appliance inventory is not available. Accordingly the application of an end-use model in forecasting is restricted to high-level energy consumption benchmarks at the level of individual consumers. Such an approach is not informative with regard to changes in end-use.

24. However, changes in end-use behaviour can be seen as changes in the daily electricity load profile over a period of years. For example, the increased penetration of air-conditioning used in summer will usually be observed as a 'needle' peak in the daily electricity demand profile in summer months, and similarly in relation to the use of electric heating in winter.

25. The daily electricity load profiles reported in 2004 and 2010, for the average January and average June day are charted as Figure III-8 and Figure III-9. The 2004 profile has been scaled for 2010 using a simulation, according to the reported growth in demand and maintaining the shape of the 2004 load profile.

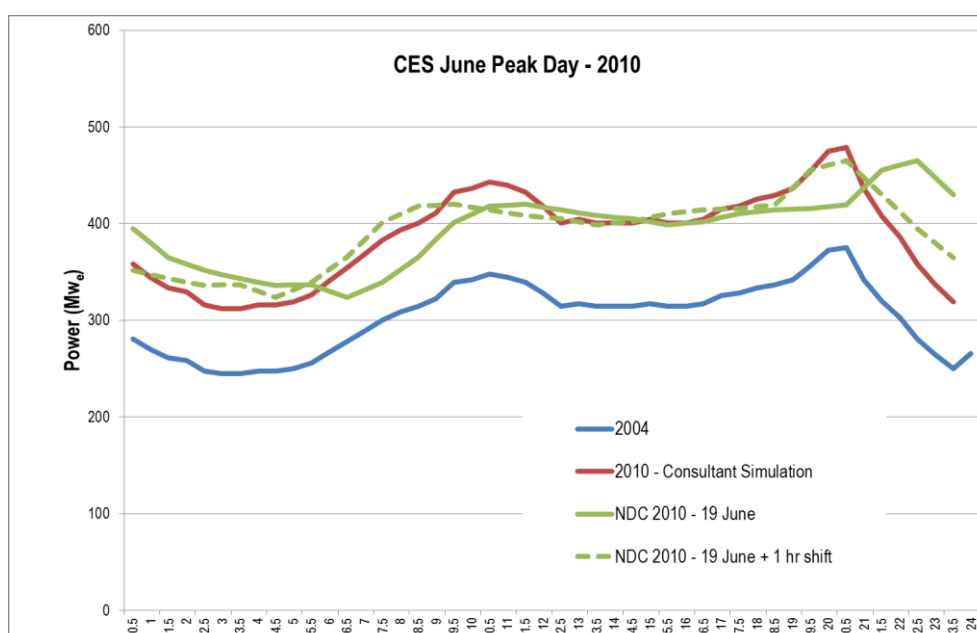
Figure III-8: Electricity Load Profile – January (Winter) 2004 and 2010



Sources: Licensees, EA data & Consultants' estimate

26. A comparison of the January 2010 peak day profiles shows no evidence of significant changes in consumer behaviour as the shape of the load profiles has remained constant.

Figure III-9: Electricity Load Profile – June (Summer) 2004 and 2010



Sources: Licensees, EA data & Consultants' estimate

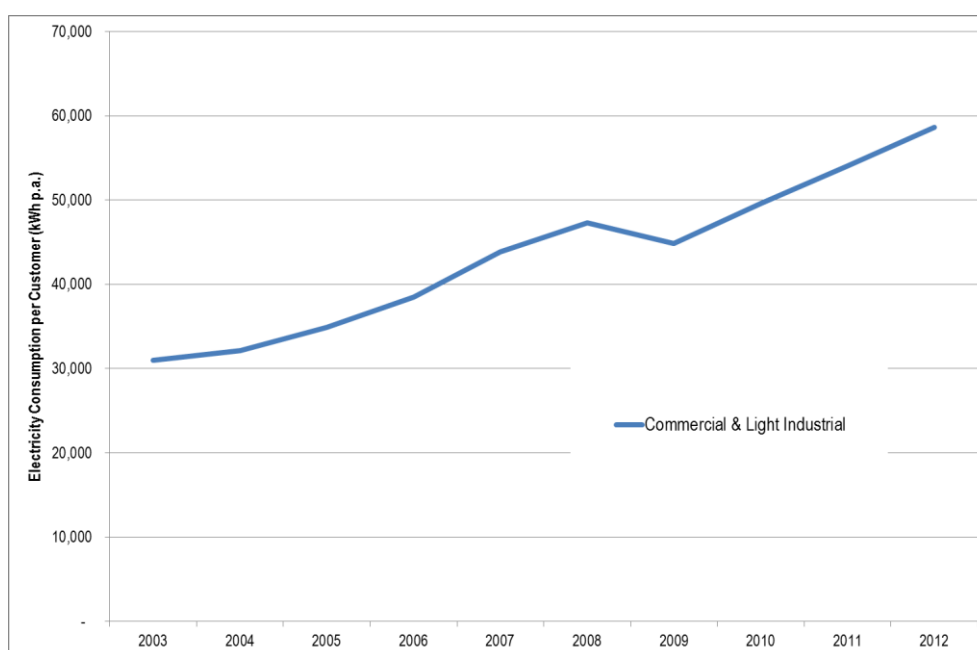
27. Again, a comparison of the June 2010 peak day profiles shows no evidence of significant changes in consumer behaviour as the shape of the load profiles has remained constant. Accordingly there is no evidence to support a change in the electricity consumption pattern, measured at a gross level as kWh per consumer.

L. Energy Efficiency (Demand-Side) Trends

28. Energy efficiency trends can be observed as a change to the customer's annual consumption of power.

29. In the case of electricity, the kWh per person or per household (as a proxy for a customer) is the measure of electricity consumption. Figure III-10 and Figure III-11 show the electricity consumption per customer for Commercial & Light Industrial and Residential consumer classes in CES Region.

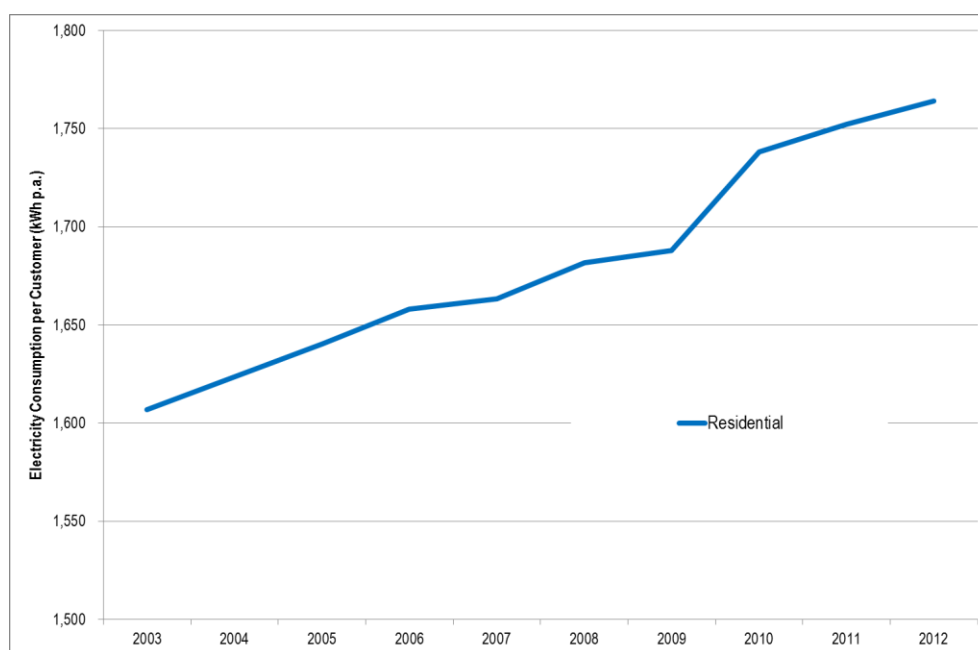
Figure III-10: CES Commercial & Light Industrial kWh per Customer



Sources: Consultants' estimate

30. In this example drawn for the CES region, the trend for the commercial and light industrial segment shows evidence of increasing consumption. This increase is expected given that GDP has increased over the period, and economic prosperity invariably results in increased electricity demand.

Figure III-11: CES Residential kWh per Customer



Sources: Consultants' estimate

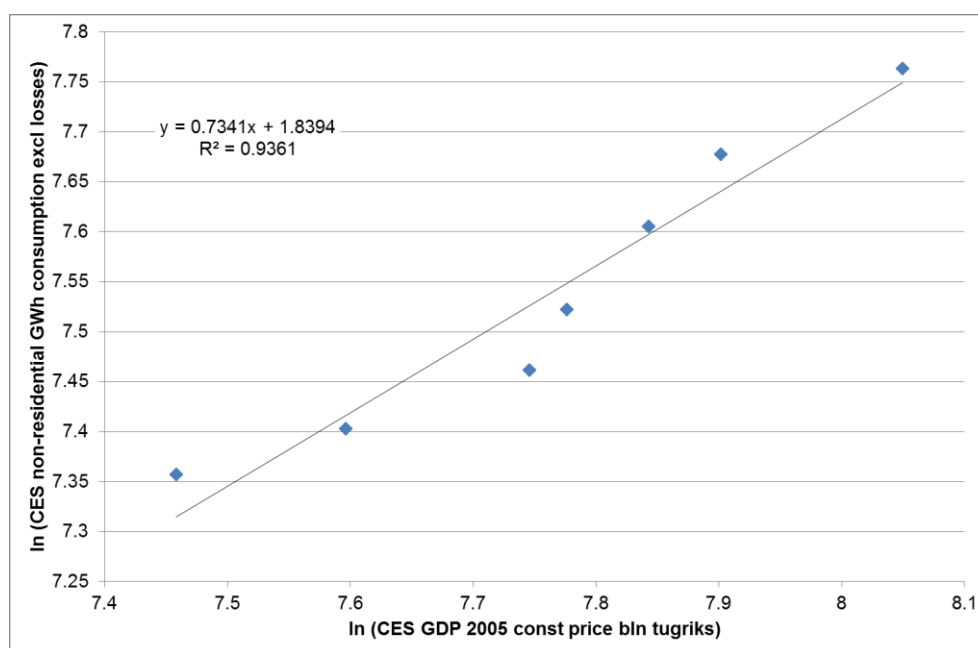
31. The change in consumption per customer for the residential segment shows a modest growth averaging 2.3% over a 9 year period.

M. Economic Trends

32. It is observed that in the non-oil producing countries, GDP and the growth in non-residential electricity consumption are strongly correlated. The relationship between the logarithm of GDP and the natural logarithm of GWh consumption is typically highly linear. However where oil and / or minerals make a high contribution to GDP, say greater than 40%, the relationship should be restricted to non-oil / non-minerals GDP.

33. Figure III-12 shows that the relationship of non-residential electricity consumption and GDP for the CES region; the relationship can be seen to be highly linear.

Figure III-12: CES In (GWh Consumption) vs. In (GDP)



Sources: Consultants' estimate

34. In the case of large electrical loads, for example Darkhan steel and Erdenet copper mines, the electricity load forecast is based on individual customer basis with due regard to commodity prices outlook and the anticipated impact on production quotas and therefore the impact on consumption.

N. Electricity Forecasting Approach

35. The methodology for preparing electricity forecasts was described above. Following on from the methodology, the forecasts are prepared according to the following approach:-

- Historical consumption and demand trends are examined;
- Electricity consumption is forecast using an 'end-use' engineering model based on the drivers of population and per consumer energy consumption benchmarks;
- A market survey was used as a check in establishing expected consumption and demand for commercial, light and heavy industry segments; and
- The market survey results are compared to the end-use forecast before reaching a final position with respect to the electricity forecasts for the region under consideration.

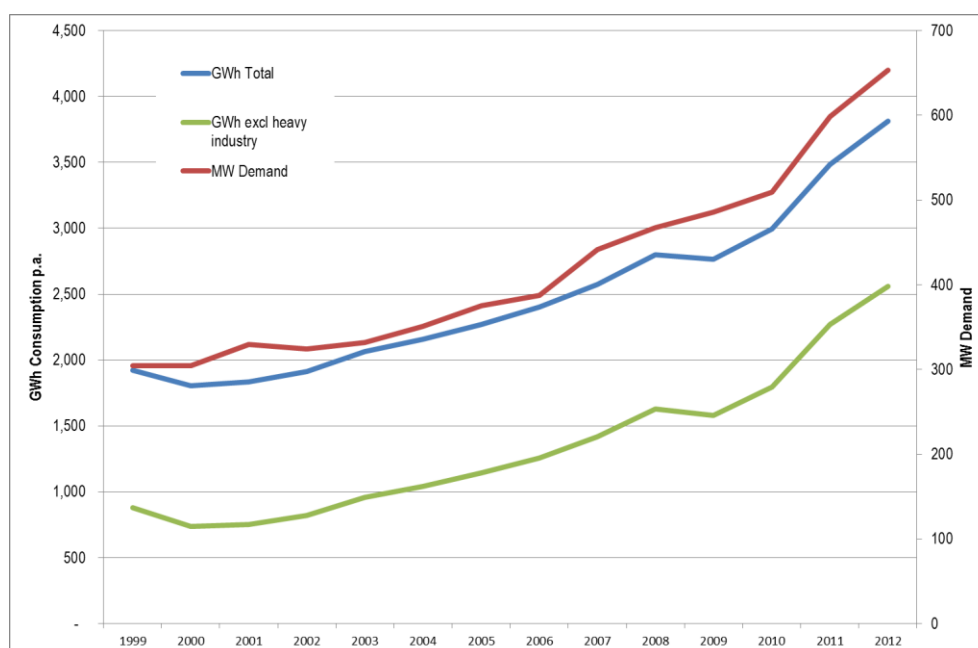
36. The final forecasts provide the basis on which to proceed with electricity supply planning.

IV. CES ELECTRICITY FORECASTS

O. Historical Electricity Consumption

37. Historical electricity consumption and demand figures have been provided by the Ministry of Energy.

Figure IV-1: CES Power Consumption Statistics

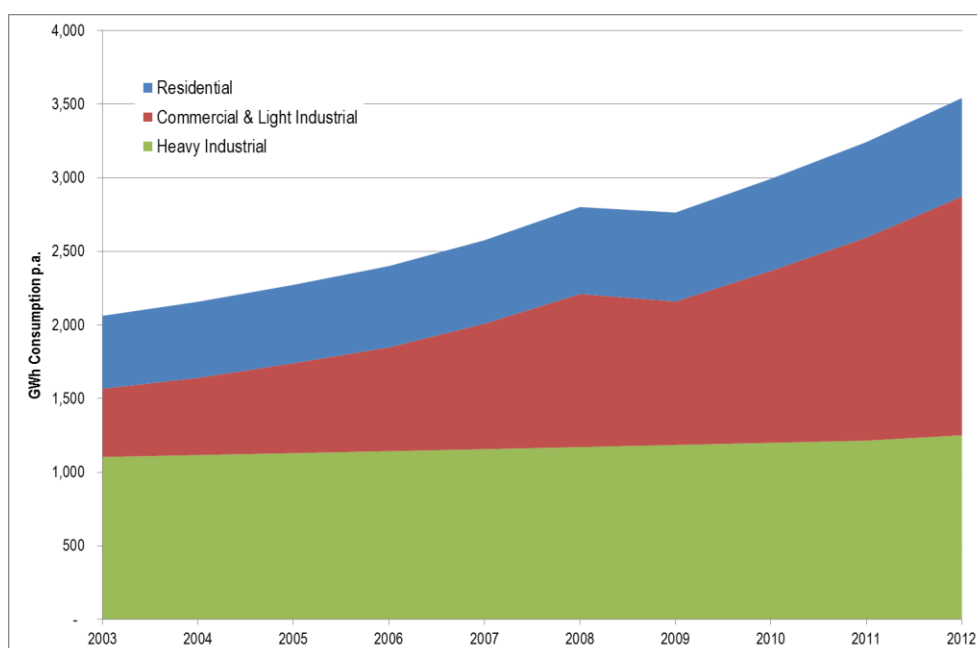


Sources: Licensees, EA & Consultants' estimate

38. Figure IV-2 and Figure IV-3 show the historical consumption and demand in total and by customer class.

39. The disaggregation into consumption by customer class is determined using an 'end-use' forecasting model applied to the historical total consumption and demand.

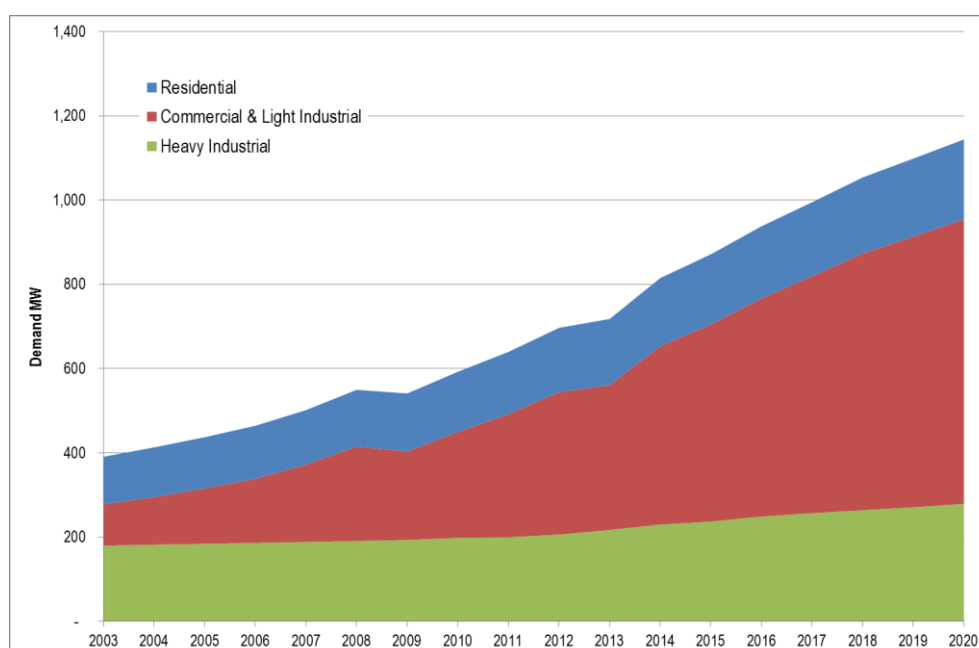
Figure IV-2: Historical CES Electricity Consumption GWh p.a. (cumulative)



Sources: Licensees, EA & Consultants' estimate

40. Figure IV-2 shows that the heavy industry sector is a major user of electricity in CES. This heavy industry load is predominantly associated with the Darkhan steel and Erdenet copper production facilities. The commercial and light industrial energy consumption has been growing at a relatively high rate, more than doubling over a decade. In contrast residential and heavy industrial load has not grown as significantly.

Figure IV-3: Historical CES Electricity Demand MW (cumulative)



Sources: Licensees, EA & Consultants' estimate

41. Figure IV-3 shows that commercial and light industrial demand MW's have been increasing

at a relatively high rate, expected as a result of the growth in consumption.

42. Table IV-4 provides estimates of the CES electricity consumption and demand disaggregated by residential, commercial and light industry, and heavy industry customer classes.

Table IV-4: Historical Electricity Consumption Statistics

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| GWh Residential | 517 | 532 | 552 | 567 | 590 | 604 | 626 | 648 | 669 |
| GWh C & LI | 524 | 611 | 705 | 852 | 1,040 | 974 | 1,167 | 1,379 | 1,622 |
| GWh Ind Large | 1,116 | 1,130 | 1,143 | 1,157 | 1,171 | 1,185 | 1,200 | 1,215 | 1,251 |
| GWh Total | 2,158 | 2,273 | 2,400 | 2,576 | 2,801 | 2,764 | 2,993 | 3,243 | 3,542 |
| MW Residential | 118 | 122 | 126 | 129 | 135 | 138 | 143 | 148 | 153 |
| MW Comm & I | 113 | 132 | 152 | 183 | 224 | 210 | 251 | 292 | 338 |
| MW Ind Large | 182 | 184 | 186 | 189 | 191 | 193 | 198 | 200 | 206 |
| MW Total | 413 | 437 | 464 | 502 | 550 | 541 | 593 | 640 | 697 |

Sources: Consultants' estimate

43. Note that the disaggregation provided in Table IV-4 was derived using an 'end-use' model and, as GWh electricity consumption was chosen as the basis for calibration, the total energy sales figures reported by the Ministry of Energy match with the figures determined by the model. The MW demand figures cannot be made to match perfectly as a result of the variation in the load factors of individual Aimags, between their urban and rural constituents, and due to the effects of averaging. The calibration of the model was effected to match the MW demands in the later years of the historical period 2003 to 2012.

44. Table IV-5 provides the historical CES electricity statistics reported by the Ministry of Energy.

Table IV-5: CES Electricity Statistics

| MONGOLIA | | CES ELECTRICITY STATISTICS | | | | | | | | | | | |
|--------------------|-----|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| CES REGION | | | | | | | | | | | | | |
| | | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| Peak Production | MW | 532 | 539 | 551 | 576 | 585 | 638 | 673 | 695 | 785 | 849 | 927 | 785 |
| Total gross output | GWh | 3,004 | 3,136 | 3,195 | 3,320 | 3,433 | 3,594 | 3,874 | 3,874 | 4,467 | 4,834 | 5,280 | 4,467 |
| Load factor | | 0.64 | 0.66 | 0.66 | 0.66 | 0.67 | 0.64 | 0.66 | 0.64 | 0.65 | 0.65 | 0.65 | 0.65 |
| Station loss | % | 21.0% | 20.0% | 19.0% | 18.0% | 18.0% | 16.0% | 16.0% | 16.0% | 16.0% | 15.6% | 15.6% | 16.0% |
| Station loss | GWh | 631 | 620 | 610 | 602 | 601 | 592 | 624 | 615 | 715 | 755 | 825 | 715 |
| Net | GWh | 2,373 | 2,516 | 2,585 | 2,718 | 2,832 | 3,002 | 3,250 | 3,259 | 3,752 | 4,079 | 4,455 | 3,752 |
| T&D loss | % | 23.0% | 22.0% | 20.0% | 20.0% | 18.0% | 17.0% | 17.0% | 18.0% | 17.0% | 17.3% | 17.3% | 17.0% |
| T&D loss | GWh | 571 | 578 | 550 | 561 | 541 | 543 | 566 | 594 | 759 | 836 | 913 | 759 |
| | | | | | | | | | | | | | |
| Total Sales | GWh | 1,910 | 2,062 | 2,158 | 2,273 | 2,400 | 2,576 | 2,801 | 2,764 | 2,993 | 3,243 | 3,542 | 2,993 |
| Erdenet Copper | GWh | 778 | 780 | 783 | 786 | 789 | 792 | 794 | 797 | 800 | 810 | 834 | 800 |
| Darkhan Steel | GWh | 313 | 323 | 333 | 343 | 354 | 365 | 376 | 388 | 400 | 405 | 417 | 400 |
| Heavy Industry | GWh | 1,091 | 1,104 | 1,116 | 1,130 | 1,143 | 1,157 | 1,171 | 1,185 | 1,200 | 1,215 | 1,251 | 1,200 |
| Other Sales | GWh | 819 | 959 | 1,041 | 1,143 | 1,257 | 1,419 | 1,630 | 1,579 | 1,793 | 2,028 | 2,291 | 1,793 |
| Total Demand | MW | 324 | 332 | 351 | 375 | 387 | 442 | 467 | 486 | 509 | 640 | 697 | 509 |

Sources: Ministry of Energy of Mongolia

P. CES Electricity Growth

1. Residential Sector

45. The drivers of growth in the residential sector are taken to be the population, the number of persons per household and the change in kWh consumption per customer.

46. The population growth and shifts are based on the population statistics provided by the Mongolian Bureau of Statistics.

47. The number of persons per household varies from urban to rural centre and by regional area. The following assumptions have been adopted based on household square meter data (collected for heat planning) and urban and rural population statistics.

Table IV-6: Mongolia Persons per Household

| Population Centre | Region | Urban | Rural |
|-------------------|--------|-------|-------|
| Arhangai | CES | 5.0 | 6.0 |
| Bayanhongor | CES | 4.0 | 5.0 |
| Bulgan | CES | 4.0 | 5.0 |
| Darkhan-Uul | CES | 4.0 | 5.0 |
| Dornogovi | CES | 3.5 | 4.5 |
| Dundgovi | CES | 5.0 | 6.0 |
| Govisumber | CES | 5.0 | 6.0 |
| Huvsgul | CES | 4.0 | 5.0 |
| Orkhon | CES | 4.0 | 5.0 |
| Seleng | CES | 5.0 | 6.0 |
| Tov | CES | 3.5 | 4.5 |
| Ulaanbaatar | CES | 4.0 | 5.0 |
| Uvurhangai | CES | 5.0 | 6.0 |

Sources: Consultants' estimate, Power System Masterplan 2004

48. Residential customer account statistics were determined from various reports².

49. The average growth in residential customer accounts from 2003 to 2012 was 2.5%.

Table IV-7: CES Residential Customer Accounts

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|-------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Customer Accounts | 318,473 | 324,563 | 333,157 | 340,872 | 351,016 | 358,031 | 359,943 | 370,114 | 379,195 |
| Growth | 3.4% | 1.9% | 2.6% | 2.3% | 3.0% | 2.0% | 0.5% | 2.8% | 2.5% |

Sources: Consultants' estimate

50. Table IV-8 shows that the average growth rate of the kWh per customer measure between 2004 and 2012 has been 1%.

² UBEDN Investment : World Bank (2010); Managing Urban Expansion in Mongolia: Best Practices in Scenario-Based Urban Planning: World Bank (2009); Improving sales revenue collection by reducing the losses in central regional electricity distribution networks: R. Ganjuur ERA (2005)

51. The load factor for the residential customer class is estimated to be 0.5.

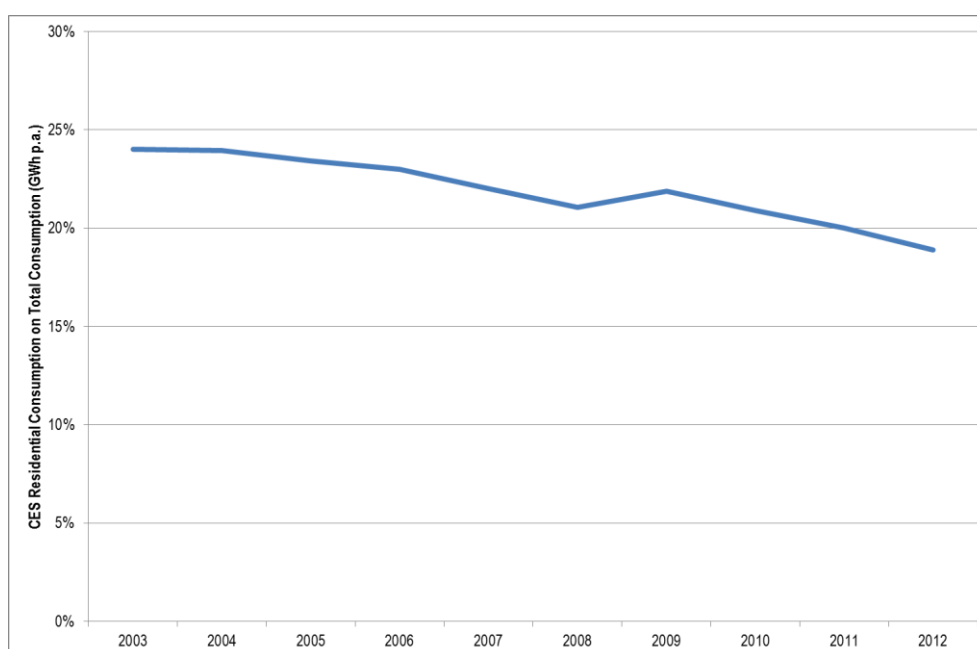
Table IV-8: CES Residential kWh per Customer (p.a.)

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| GWh | 517 | 532 | 552 | 567 | 590 | 604 | 626 | 648 | 669 |
| MW | 118 | 122 | 126 | 129 | 135 | 138 | 143 | 148 | 153 |
| LF | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| kWh per Customer | 1,624 | 1,640 | 1,658 | 1,663 | 1,682 | 1,688 | 1,738 | 1,752 | 1,764 |
| Growth | 1.04% | 1.03% | 1.07% | 0.34% | 1.09% | 0.36% | 2.98% | 0.80% | 0.68% |

Sources: Consultants' estimate

52. The residential load shown in Figure IV-2 and Figure IV-3 was estimated and validated according to statistics obtained from various reports³. The residential load as a percentage of the total load is shown in Table IV-9. It is observed that the fraction has fallen between 2003 and 2012 as commercial and light industrial load has grown at a faster rate.

Table IV-9: CES % Residential Load on Total (GWh p.a.)



Sources: Consultants' estimate

2. Commercial & Light Industry Sector (C & LI)

53. In Table II-1 it was shown that one of the drivers of commercial and light industrial energy consumption is floor space of public buildings. Floor space statistics have been gathered for floor space in the Aimags outside of Ulaanbaatar.

³ UBEDN Investment : World Bank (2010); Managing Urban Expansion in Mongolia: Best Practices in Scenario-Based Urban Planning: World Bank (2009); Improving sales revenue collection by reducing the losses in central regional electricity distribution networks: R. Ganjuur ERA (2005)

Table IV-10: Commercial / Light Industrial Floor Space ('000's m², year 2013)

| Floor Space | |
|-------------|----------------------|
| | 000's m ² |
| Arhangai | 72 |
| Bayanhongor | 109 |
| Bulgan | 13 |
| Darkhan-Uul | 109 |
| Dornogovi | 102 |
| Dundgovi | 55 |
| Govisumber | 31 |
| Huvsgul | 299 |
| Orkhon | 109 |
| Seleng | 174 |
| Tov | 238 |
| Uvurhangai | 26 |

Sources: Local Government Authorities, Consultants' Aimag heat surveys

54. Whilst the historical floor space statistics are considered valid, the forecasts for floor space are less certain given the population shifts that are expected and the potential impact on small to medium-sized business activity. As a consequence it is considered that the growth trends in customer accounts and kWh per customer are more suitable for forecasting purposes. This approach is supported by reliable data available for Ulaanbaatar. In the case of the Other CES customers (outside Ulaanbaatar), the public building floor space reported for 2013 has been used to allocate commercial and light industry consumption amongst the Aimags and major population centres.

55. Ulaanbaatar customer accounts have also been estimated based on historical consumption and information obtained from various reports⁴.

Table IV-11: Ulaanbaatar C & LI Customer Account Growth

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|----------|-------|-------|-------|-------|-------|-------|--------|--------|--------|
| Accounts | 7,362 | 7,885 | 8,259 | 8,755 | 9,791 | 9,796 | 10,622 | 11,514 | 12,481 |
| Growth | 9.2% | 7.1% | 4.7% | 6.0% | 11.8% | 0.1% | 8.4% | 8.4% | 8.4% |

Sources: Consultants' estimate

56. The average growth rate of commercial and light industrial customer accounts was 7%.

57. Table IV-12 shows that the average growth rate of the kWh per customer measure during the last eight years has been 7%. Overall the load factor for the commercial and light industrial customer class is estimated to be around 0.7.

⁴ UBEDN Investment : World Bank (2010); Managing Urban Expansion in Mongolia: Best Practices in Scenario-Based Urban Planning: World Bank (2009); Improving sales revenue collection by reducing the losses in central regional electricity distribution networks: R. Ganjuur ERA (2005)

Table IV-12: Ulaanbaatar C & LI Customer kWh per Customer

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------------------|--------|--------|--------|--------|--------|--------|---------|---------|---------|
| GWh | 493 | 571 | 658 | 792 | 956 | 903 | 1,082 | 1,277 | 1,500 |
| MW | 106 | 123 | 142 | 171 | 206 | 194 | 233 | 270 | 313 |
| LF | 0.60 | 0.61 | 0.64 | 0.66 | 0.69 | 0.72 | 0.70 | 0.72 | 0.74 |
| kWh per Customer | 66,925 | 72,400 | 79,699 | 90,443 | 97,632 | 92,161 | 101,826 | 110,904 | 120,156 |
| Growth | 1.1% | 8.2% | 10.1% | 13.5% | 7.9% | -5.6% | 10.5% | 8.9% | 8.3% |

Sources: Consultants' estimate

58. The Other CES C & LI customer accounts are simply the net difference between the total CES accounts and the Ulaanbaatar accounts.

Table IV-13: Other CES C & LI Customer Account Growth

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|----------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| Accounts | 9,598 | 10,053 | 10,658 | 12,192 | 11,925 | 12,930 | 14,016 | 15,194 | 16,470 |
| Growth | 7.1% | 4.7% | 6.0% | 14.4% | -2.2% | 8.4% | 8.4% | 8.4% | 8.4% |

Sources: Consultants' estimate

59. The average growth in commercial and light industrial customer accounts was 7%.

60. In order to determine the commercial and light industry electricity consumption of the Other CES Aimags (outside Ulaanbaatar), the consumption shown in Table IV-12 was netted from the total commercial and light industry load shown in Table IV-4.

61. Table IV-14 shows that the average growth rate of the kWh per customer measure for the CES Other sector during the last eight years has been 19%. The load factor for the Other CES commercial and light industrial customer class is assumed to be 0.55.

Table IV-14: Other CES C & LI kWh per Customer

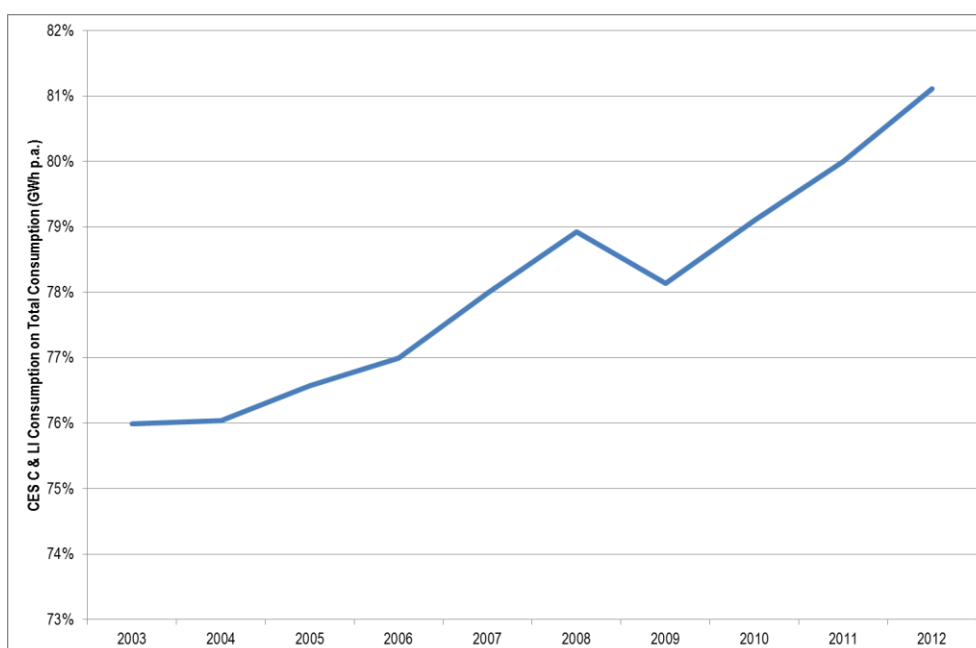
| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------------------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| GWh | 31.7 | 39.7 | 46.9 | 60.1 | 84.0 | 71.4 | 85.9 | 102.4 | 122.1 |
| MW | 6.8 | 8.6 | 10.1 | 12.9 | 18.1 | 15.4 | 18.5 | 21.6 | 25.4 |
| LF | 0.53 | 0.53 | 0.53 | 0.53 | 0.53 | 0.53 | 0.53 | 0.54 | 0.55 |
| kWh per Customer | 3,298 | 3,953 | 4,399 | 4,928 | 7,044 | 5,525 | 6,127 | 6,739 | 7,414 |
| Growth | 70.7% | 19.9% | 11.3% | 12.0% | 42.9% | -21.6% | 10.9% | 10.0% | 10.0% |

Sources: Consultants' estimate

62. The commercial and light industrial load shown in Figure IV-15 was estimated and validated according to statistics obtained from various reports⁵. This load as a percentage of the total load is shown in Table IV-14. It is observed that the fraction has increased significantly between 2003 and 2012 as commercial and light industrial load has grown relatively strongly.

⁵ UBEDN Investment : World Bank (2010); Managing Urban Expansion in Mongolia: Best Practices in Scenario-Based Urban Planning: World Bank (2009); Improving sales revenue collection by reducing the losses in central regional electricity distribution networks: R. Ganjuur ERA (2005)

Figure IV-15: CES Commercial & Light Industrial Load on Total (GWh p.a.)



Sources: Consultants' estimate

3. Large Industrial Sector

63. For the large industrial sector the driver of electricity consumption and demand is taken to be the specific needs of large customers, according to forecast demand capacity (kVA) requirements. In the case of large industrial plants the demand is determined and a load factor of 0.7 is assumed.

64. Heavy industry is considered as the Darkhan steel and Erdenet copper facilities. The size of these industrial complexes considerably outweighs other industrial activities.

Table IV-16: CES Heavy Industry Historical Electricity Usage

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|-----------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Darkhan Steel | | | | | | | | | |
| GWh | 333.2 | 343.5 | 354.1 | 365.1 | 376.4 | 388.0 | 400.0 | 404.7 | 417.0 |
| MW | 54.3 | 56.0 | 57.7 | 59.5 | 61.4 | 63.3 | 65.2 | 66.0 | 68.0 |
| Load Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Erdenet Copper | | | | | | | | | |
| GWh | 783.3 | 786.1 | 788.8 | 791.6 | 794.4 | 797.2 | 800.0 | 809.9 | 834.1 |
| MW | 127.7 | 128.2 | 128.6 | 129.1 | 129.6 | 130.0 | 133.0 | 134.0 | 138.0 |
| Load Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.69 | 0.69 | 0.69 |
| Total GWh | 1,116 | 1,130 | 1,143 | 1,157 | 1,171 | 1,185 | 1,200 | 1,215 | 1,251 |
| Total MW | 182 | 184 | 186 | 189 | 191 | 193 | 198 | 200 | 206 |

Sources: Consultant's estimate

65. In both the case of Darkhan and Erdenet, there has been a rise in electricity use between

2003 and 2012, particularly in the case of Darkhan.

Q. CES Consumption Forecasts by Class

4. Residential Class Forecasts

66. Residential class electricity consumption and demand has been modelled at the level of the Aimags and major towns, differentiated by urban and rural populations.

67. In the case of Ulaanbaatar city, there has been a marked population growth in the peri-urban area or 'ger areas'. There is an associated unmet demand for electricity. A World Bank sponsored survey found that the Ger area households gave a very high rating to access to electricity for heating. Around five percent of households were using low-cost electric stoves to supplement heat from their coal stoves. However, the additional load for heating ger area households has been estimated at roughly 600 megawatts, or equivalent to the existing generation capacity in the whole country. The cost to households for heating with electricity would be much higher than with coal stoves. Ger area households would need to at least double what they currently pay for heating using coal, and they would also need to buy electric heating stoves. On balance, it does not seem prudent to plan to accommodate Ger area heating loads using electricity.

68. In each case the persons per household and percentage electrification was used to estimate the number of urban and rural electricity customers. The person per household measure was assumed according to the figures in Table IV-6.

69. The following assumptions were made with regard to annual electricity consumption by dwelling type and according to the population size of the Aimag.

Table IV-17: Annual kWh Consumption per Customer & Aimag Size

| | Small | Large |
|------------------------------------|-------|-------|
| kWh Consumption per Apartment | 1,200 | 2,300 |
| kWh Consumption per Detached House | 1,300 | 2,400 |
| kWh Consumption per Ger | 450 | 500 |

Sources: Consultant's estimate, Ministry of Energy, World Bank

70. The growth in residential customer accounts is determined according to population movements and the average rate of growth in customer accounts between 2003 and 2012. The residential customer account forecast assumption is shown in Table IV-18.

Table IV-18: CES Residential Customer Account Forecast

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Accounts | 388,275 | 397,356 | 406,437 | 415,518 | 424,598 | 433,679 | 442,760 | 451,841 |
| Growth | 2.4% | 2.3% | 2.3% | 2.2% | 2.2% | 2.1% | 2.1% | 2.1% |

Sources: Consultants' estimate

71. The resulting end-use forecast for the residential customer class is shown in Table IV-19.

Table IV-19: CES Residential Load Forecast

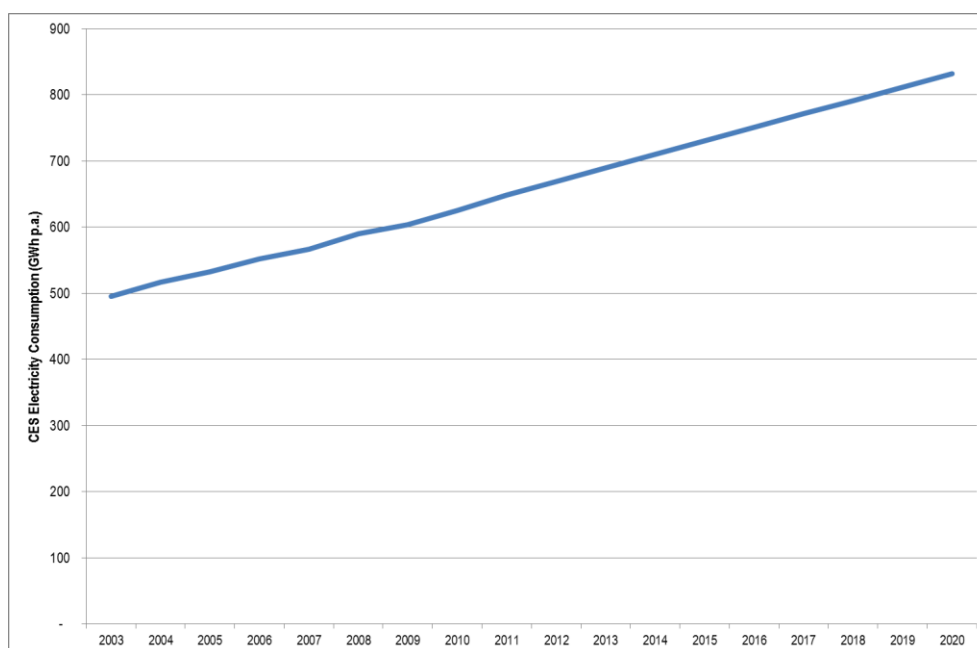
| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|-----|------|------|------|------|------|------|------|------|
| GWh | 689 | 710 | 730 | 751 | 771 | 792 | 812 | 832 |
| MW | 157 | 162 | 167 | 171 | 176 | 181 | 185 | 190 |

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| LF | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| kWh per Customer | 1,775 | 1,786 | 1,797 | 1,807 | 1,816 | 1,825 | 1,834 | 1,842 |

Sources: Consultants' estimate

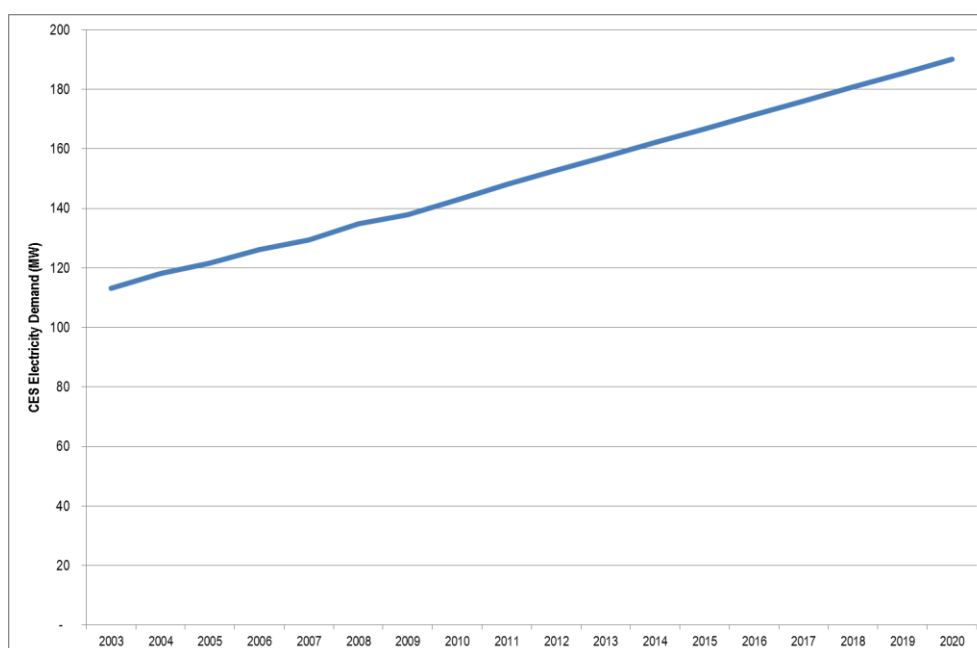
72. The historical consumption and forecast for the CES residential customer class is charted as Figure IV-20 and Figure IV-21.

Figure IV-20: CES Residential Consumption (GWh p.a.)



Sources: Consultants' estimate

Figure IV-21: CES Residential Demand (MW)



Sources: Consultants' estimate

73. The CES residential load forecasting outputs are provided as Appendix A to this report.

5. Commercial & Light Industrial (C & LI) Electricity Forecast

74. A forecast for electricity consumption for the commercial and light industrial customer class is based on the assumption that the growth in customer accounts will grow at 7.5% per annum.

Table IV-22: CES C & LI Customer Account Forecast

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|----------|--------|--------|--------|--------|--------|--------|--------|--------|
| Accounts | 30,000 | 32,520 | 35,251 | 38,424 | 41,882 | 44,688 | 47,682 | 49,351 |
| Growth | 8.4% | 8.4% | 8.4% | 9.0% | 9.0% | 6.7% | 6.7% | 3.5% |

Sources: Consultants' estimate

75. The resulting kWh per customer measure for the residential customer class is shown in Table IV-23. The load factor is assumed to remain constant at 0.55.

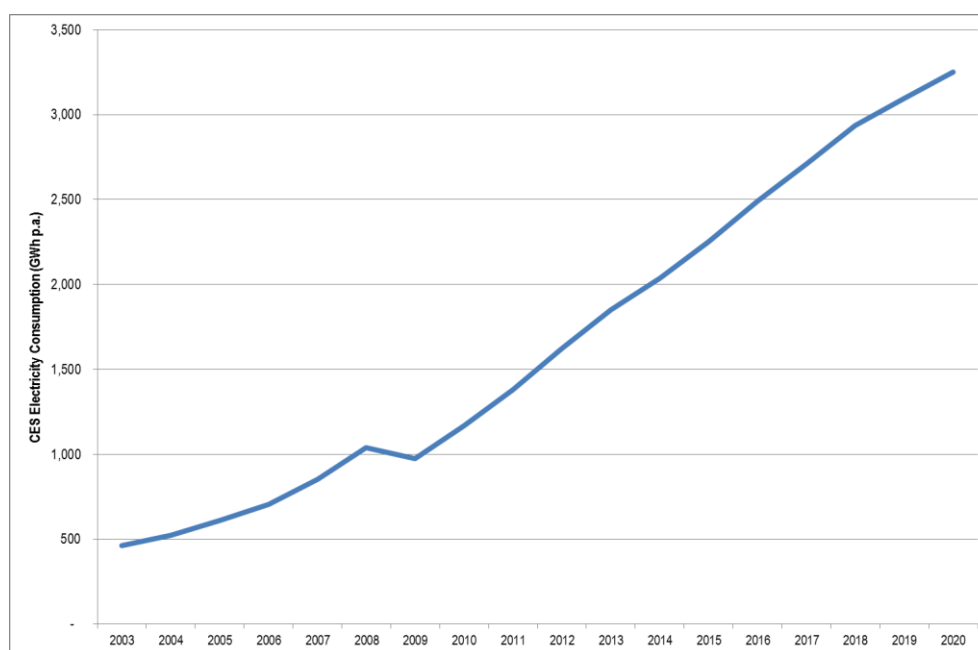
Table IV-23: CES C & LI Load Forecast

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| GWh | 1,852 | 2,038 | 2,253 | 2,493 | 2,707 | 2,935 | 3,094 | 3,252 |
| MW | 344 | 423 | 468 | 518 | 562 | 609 | 642 | 675 |
| LF | 0.62 | 0.55 | 0.55 | 0.55 | 0.55 | 0.55 | 0.55 | 0.55 |
| kWh per Customer | 61,751 | 62,659 | 63,919 | 64,891 | 64,641 | 65,669 | 64,883 | 65,892 |
| Growth | 5.4% | 1.5% | 2.0% | 1.5% | -0.4% | 1.6% | -1.2% | 1.6% |

Sources: Consultants' estimate

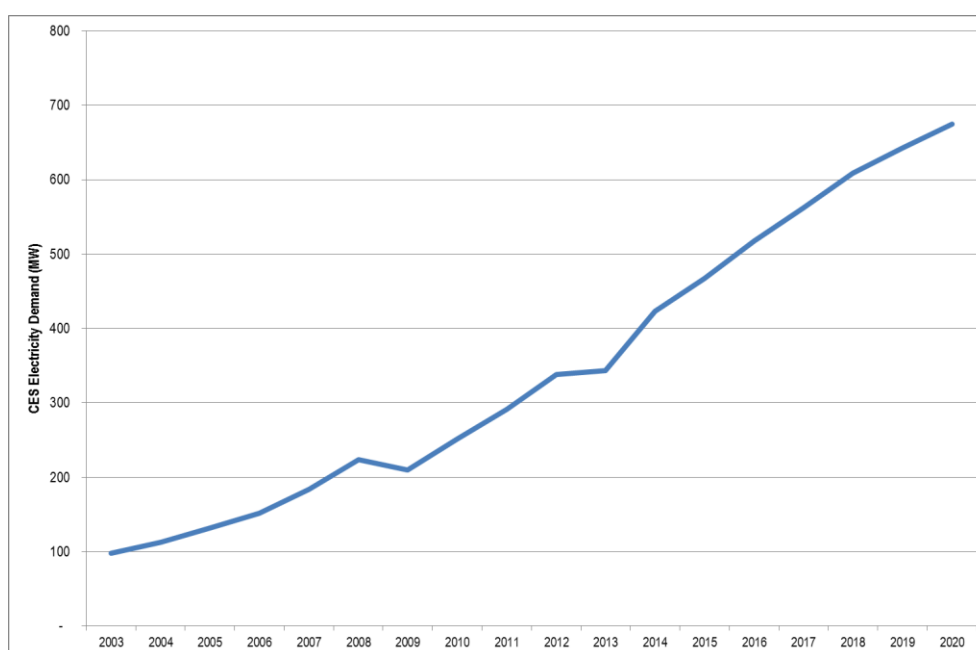
76. The historical consumption and forecast for the commercial and light industrial customer class is shown in Figure IV-24 and Figure IV-25.

Figure IV-24: CES C & LI Consumption (GWh p.a.)



Sources: Consultants' estimate

Figure IV-25: CES C & LI Demand (MW)



Sources: Consultants' estimate

77. The C & LI load forecasts by Aimag are provided as Appendix B to this report.

78. In addition new commercial and light industry consumption has been forecast for the CES by market survey.

Table IV-26: CES Light Industry Forecast Assumptions (MW)

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|----------------------------|------|------|------|------|------|------|------|------|
| e.gen empowering people | | | | | | | | |
| MONENERGY | | | | | | | | |

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---------------------|------|------|------|------|------|------|------|------|
| Sewing Factory | 6.5 | 8.1 | 10.7 | 11.2 | 11.8 | 12.1 | 12.6 | 13.1 |
| Wool & Cashmere | 3.0 | 4.5 | 6.0 | 7.5 | 9.0 | 10.5 | 12.0 | 13.5 |
| Bio & Nano | | 1.0 | 1.5 | 1.8 | 2.1 | 2.5 | 3.1 | 3.5 |
| Other Light Ind'try | 1.5 | 3.0 | 4.5 | 6.0 | 7.5 | 9.0 | 10.5 | 12.0 |
| Meat Processing | 4.5 | 6.0 | 7.5 | 9.0 | 10.5 | 12.0 | 13.5 | 15.0 |
| Milk Processing | 2.4 | 2.9 | 3.4 | 3.8 | 4.2 | 4.9 | 5.6 | 6.1 |
| Other Agriculture | 1.5 | 3.0 | 4.5 | 6.0 | 7.5 | 9.0 | 10.5 | 12.0 |
| Total | 19.4 | 28.5 | 38.1 | 45.3 | 52.6 | 60.0 | 67.8 | 75.2 |

Sources: Consultant's estimate

6. Heavy Industry Electricity Forecast

79. A forecast for electricity consumption by the heavy industry customer class is based on a simple growth rate extrapolation based on historical consumption.

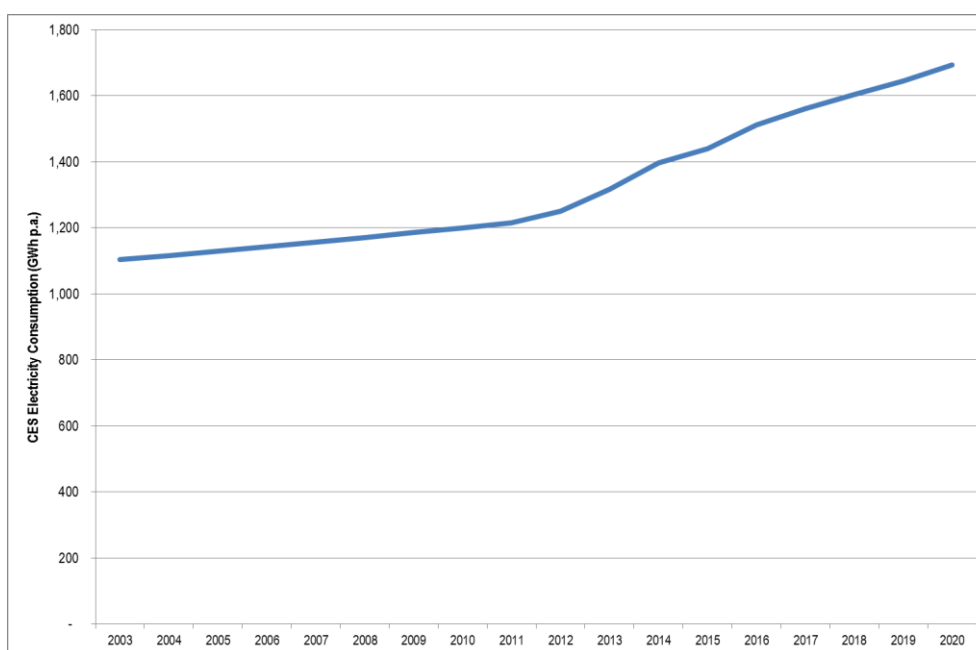
Table IV-27: CES Heavy Industry Load Forecast

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|----------------|-------|-------|-------|--------|--------|--------|--------|--------|
| Darkhan Steel | | | | | | | | |
| GWh | 429.2 | 441.5 | 453.8 | 466.0 | 484.4 | 496.7 | 509.0 | 527.4 |
| MW | 70.0 | 72.0 | 74.0 | 76.0 | 79.0 | 81.0 | 83.0 | 86.0 |
| Load Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Erdenet Copper | | | | | | | | |
| GWh | 888.5 | 955.0 | 985.2 | 1045.7 | 1075.9 | 1106.1 | 1136.3 | 1166.6 |
| MW | 147.0 | 158.0 | 163.0 | 173.0 | 178.0 | 183.0 | 188.0 | 193.0 |
| Load Factor | 0.69 | 0.69 | 0.69 | 0.69 | 0.69 | 0.69 | 0.69 | 0.69 |
| Total GWh | | | | 61.3 | 92.0 | 122.6 | 153.3 | 153.3 |
| Total MW | | | | 10.0 | 15.0 | 20.0 | 25.0 | 25.0 |

Sources: Consultant's estimate

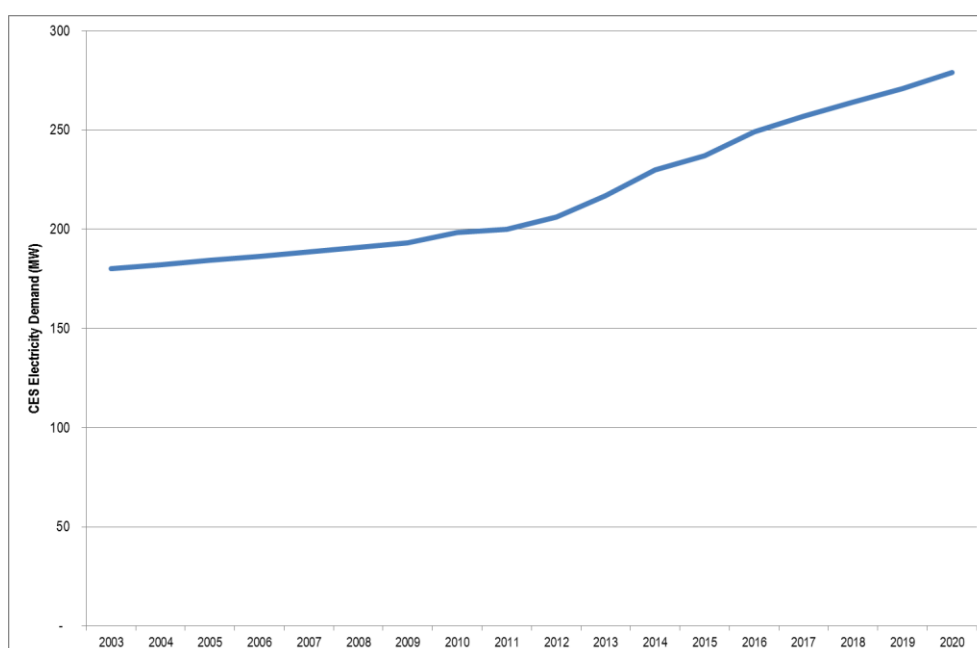
80. The historical consumption and forecast for heavy industry is shown graphically in Figure IV-28 and Figure IV-29.

Figure IV-28: CES Heavy Industry Consumption (GWh p.a.)



Sources: Consultants' estimate

Figure IV-29: CES Heavy Industry Demand (MW)



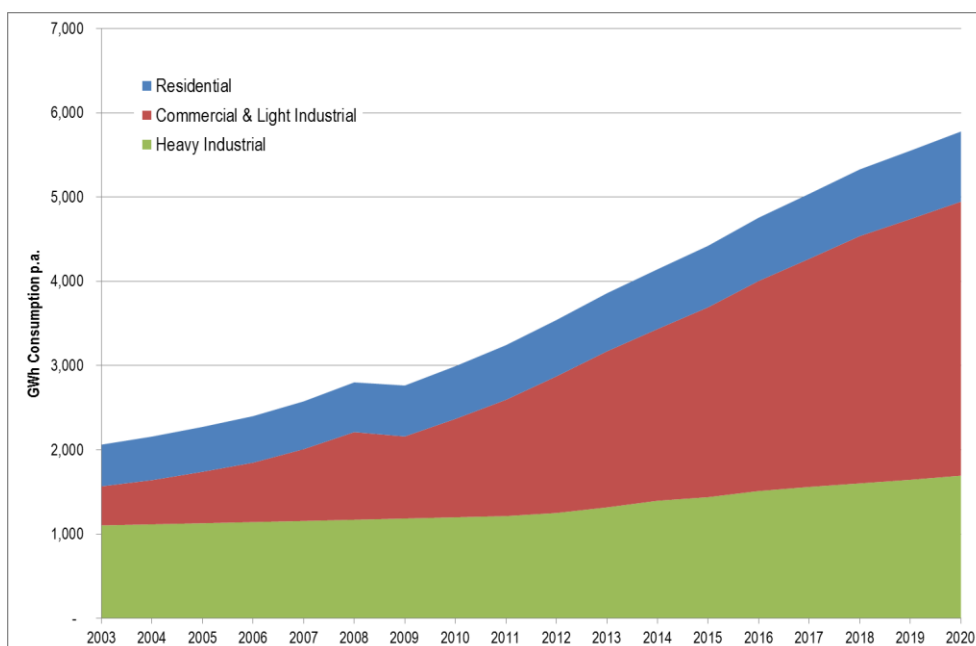
Sources: Consultants' estimate

81. The large industrial sector is discussed further in Section IX. Bear and bull market scenarios are discussed for the CES, including the implications for industrial load growth. These scenarios are incorporated in the forecast that follows where indicated.

R. CES Electricity Forecasts

82. The total GWh and MW 'low' growth forecasts by customer class for CES are charted as follows:-

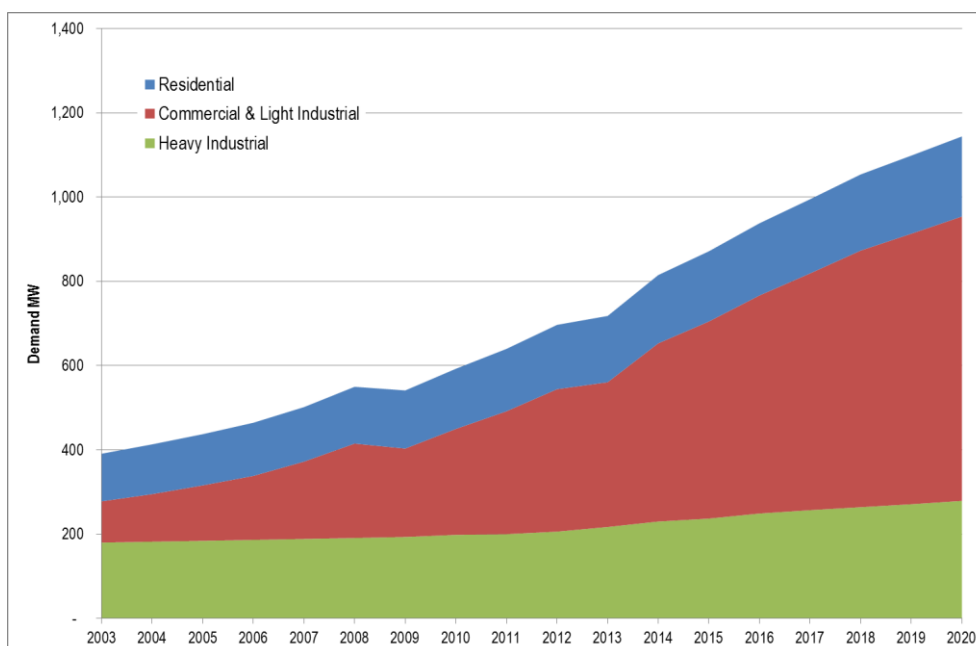
Figure IV-30: CES 'Low' GWh (cumulative)



Sources: Licensees, EA & Consultants' estimate

83. Figure IV-31 shows that by 2020 the heavy industry sector is predicted to be overtaken by the commercial and light industry sector as the major user of electricity in CES. Heavy industry usage is expected to rise by a modest amount, whereas the residential class growth rate will remain constant.

Figure IV-31: CES 'Low' MW (cumulative)



Sources: Licensees, EA & Consultants' estimate

84. Table IV-32 provides the forecast of CES electricity consumption and demand disaggregated by residential, commercial and light industry, and heavy industry customer classes.

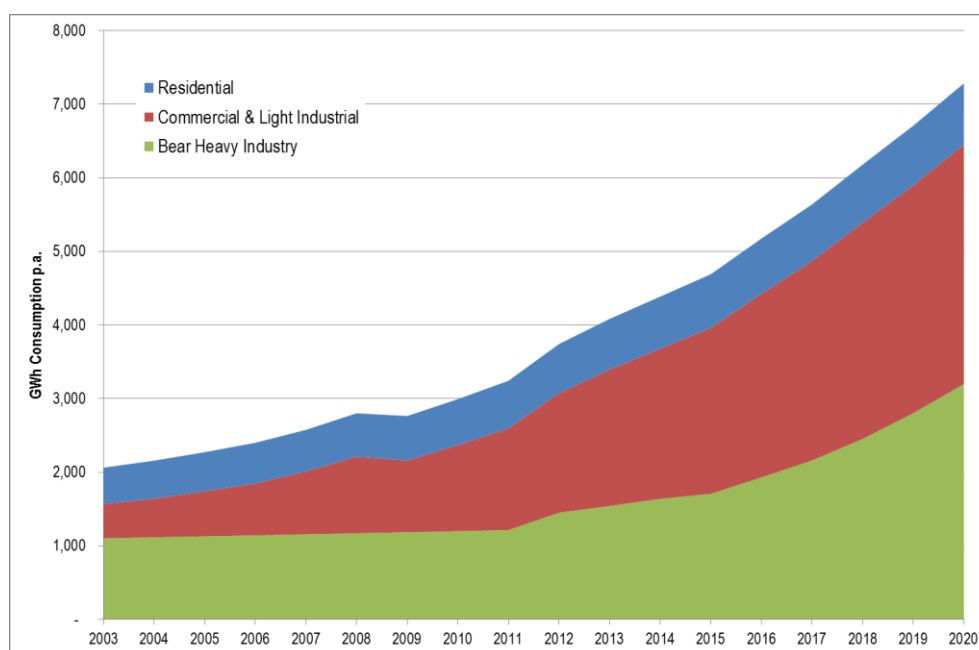
Table IV-32: CES Electricity ‘Low’ Forecast

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2025 | 2030 |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| GWh Resid'l | 669 | 689 | 710 | 730 | 751 | 771 | 792 | 812 | 832 | 954 | 1,094 |
| GWh C & LI | 1,622 | 1,852 | 2,038 | 2,253 | 2,493 | 2,707 | 2,935 | 3,094 | 3,252 | 5,031 | 7,784 |
| GWh Ind Large | 1,251 | 1,318 | 1,397 | 1,439 | 1,573 | 1,652 | 1,725 | 1,799 | 1,847 | 2,204 | 2,638 |
| GWh Total | 3,542 | 3,860 | 4,144 | 4,422 | 4,817 | 5,131 | 5,452 | 5,704 | 5,932 | 8,189 | 11,516 |
| MW Resi'l | 153 | 157 | 162 | 167 | 171 | 176 | 181 | 185 | 190 | 218 | 250 |
| MW C & LI | 338 | 344 | 423 | 468 | 518 | 562 | 609 | 642 | 675 | 1047 | 1625 |
| MW Ind Large | 206 | 217 | 230 | 237 | 259 | 272 | 284 | 296 | 304 | 363 | 434 |
| MW Total | 697 | 718 | 815 | 871 | 948 | 1010 | 1074 | 1124 | 1169 | 1,628 | 2,309 |

Sources: Consultants' estimate

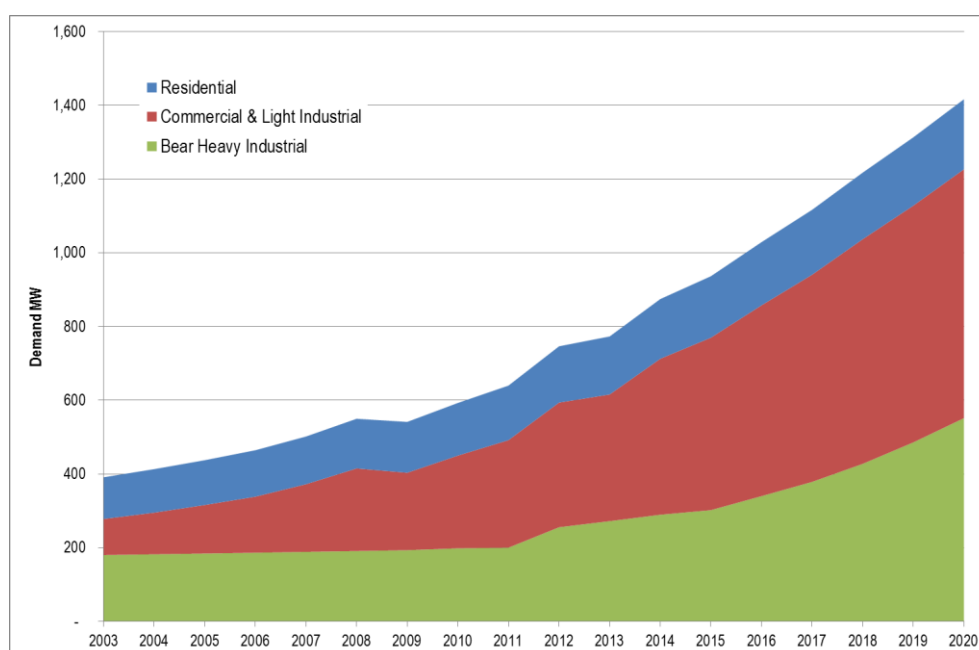
85. Table IV-32 provides the forecast of CES electricity consumption and demand disaggregated by residential, commercial and light industry, and heavy industry customer classes.

Figure IV-33: CES 'Bear' GWh (cumulative)



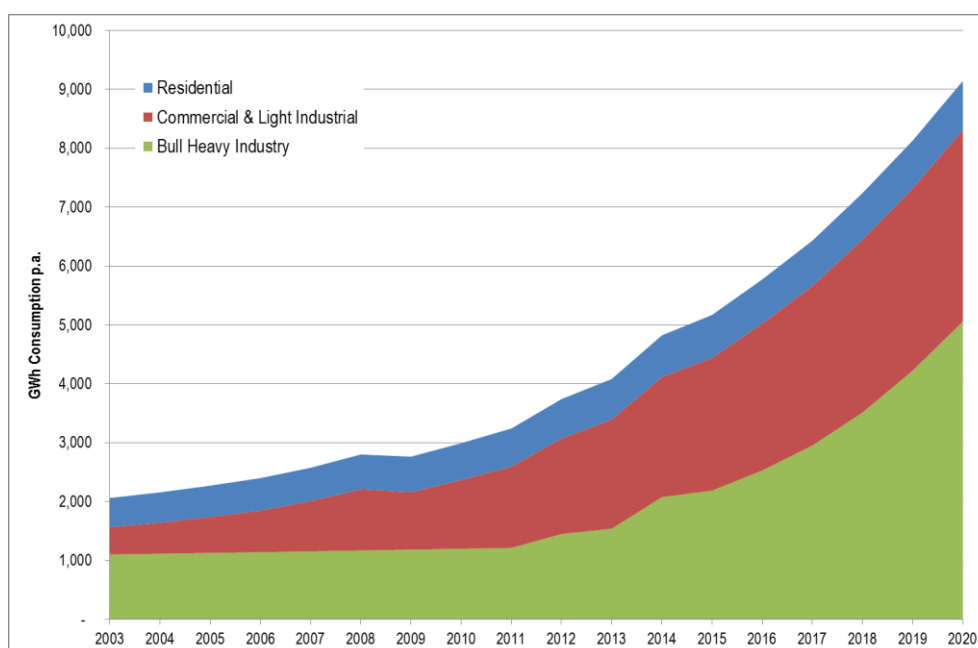
Sources: Licensees, EA & Consultants' estimate

Figure IV-34: CES 'Bear' MW (cumulative)



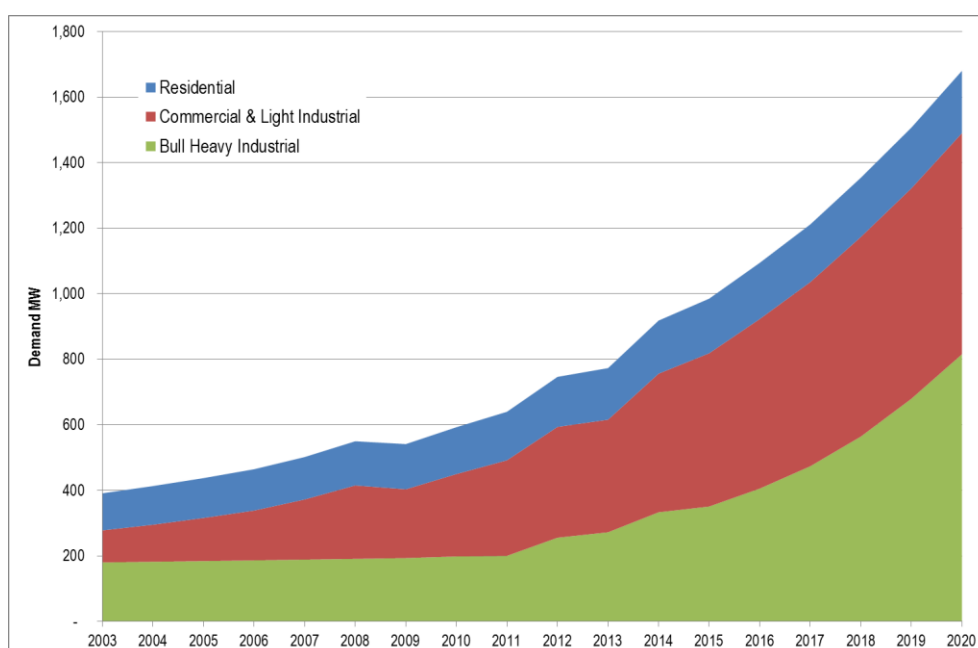
Sources: Licensees, EA & Consultants' estimate

Figure IV-35: CES 'Bull' GWh (cumulative)



Sources: Licensees, EA & Consultants' estimate

Figure IV-36: CES 'Bull' MW (cumulative)



Sources: Licensees, EA & Consultants' estimate

S. CES Power Production

86. A forecast of the power production of CES is provided for low, medium (bear) and high (bull) growth scenarios. Station and T&D loss assumptions are based on historical trends and an expectation of improvement.

Table IV-37: CES Power Production – Low Growth

| MONGOLIA | | ELECTRICITY PRODUCTION FORECAST – LOW GROWTH | | | | | | | | | | | |
|--------------------|-----|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|
| CES REGION | | | | | | | | | | | | | |
| | | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2025 | 2030 |
| Peak Production | MW | 849 | 927 | 1,010 | 1,085 | 1,158 | 1,261 | 1,343 | 1,427 | 1,493 | 1,553 | 2,094 | 2,902 |
| Total gross output | GWh | 4,834 | 5,280 | 5,754 | 6,178 | 6,593 | 7,181 | 7,649 | 8,127 | 8,504 | 8,842 | 11,921 | 16,523 |
| Load factor | | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 |
| Station loss | % | 15.6% | 15.6% | 15.6% | 15.6% | 15.6% | 15.6% | 15.6% | 15.6% | 15.6% | 15.6% | 14.0% | 13.0% |
| Station loss | GWh | 755 | 825 | 899 | 965 | 1,030 | 1,122 | 1,195 | 1,269 | 1,328 | 1,381 | 1,669 | 2,148 |
| Net | GWh | 4,079 | 4,455 | 4,855 | 5,213 | 5,563 | 6,059 | 6,454 | 6,858 | 7,176 | 7,461 | 10,252 | 14,375 |
| T&D loss | % | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% |
| T&D loss | GWh | 836 | 913 | 995 | 1,069 | 1,141 | 1,242 | 1,323 | 1,406 | 1,471 | 1,530 | 2,062 | 2,858 |
| | | | | | | | | | | | | | |
| Purchases | GWh | 3,243 | 3,542 | 3,860 | 4,144 | 4,422 | 4,817 | 5,131 | 5,452 | 5,704 | 5,932 | 8,189 | 11,516 |
| Erdenet Copper | GWh | 810 | 834 | 889 | 955 | 985 | 1,046 | 1,076 | 1,106 | 1,136 | 1,167 | 1,440 | 1,777 |
| Darkhan Steel | GWh | 405 | 417 | 429 | 442 | 454 | 466 | 484 | 497 | 509 | 527 | 611 | 707 |
| Heavy Industry | GWh | 1,215 | 1,251 | 1,318 | 1,397 | 1,439 | 1,573 | 1,652 | 1,725 | 1,799 | 1,847 | 2,204 | 2,638 |
| Other Sales | GWh | 2,028 | 2,291 | 2,542 | 2,747 | 2,983 | 3,244 | 3,478 | 3,726 | 3,906 | 4,084 | 5,986 | 8,878 |
| Demand | MW | 640 | 697 | 718 | 815 | 871 | 948 | 1,010 | 1,074 | 1,124 | 1,169 | 1,628 | 2,309 |

Sources: Consultants' estimate

Table IV-38: CES Power Production – Medium Growth (Bear Industrial Markets)

| MONGOLIA | | ELECTRICITY PRODUCTION FORECAST – MEDIUM GROWTH | | | | | | | | | | | |
|--------------------|-----|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|
| CES REGION | | | | | | | | | | | | | |
| | | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2025 | 2030 |
| Peak Production | MW | 849 | 927 | 1,010 | 1,085 | 1,159 | 1,258 | 1,355 | 1,465 | 1,567 | 1,683 | 2,663 | 4,178 |
| Total gross output | GWh | 4,834 | 5,280 | 5,754 | 6,178 | 6,600 | 7,166 | 7,713 | 8,342 | 8,922 | 9,584 | 15,162 | 23,792 |
| Load factor | | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 |
| Station loss | % | 15.6% | 15.6% | 15.6% | 15.6% | 15.6% | 15.6% | 15.6% | 15.6% | 15.6% | 15.6% | 14.0% | 13.0% |
| Station loss | GWh | 755 | 825 | 899 | 965 | 1,031 | 1,119 | 1,205 | 1,303 | 1,394 | 1,497 | 2,123 | 3,093 |
| Net | GWh | 4,079 | 4,455 | 4,855 | 5,213 | 5,569 | 6,046 | 6,508 | 7,039 | 7,528 | 8,087 | 13,039 | 20,699 |
| T&D loss | % | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% |
| T&D loss | GWh | 836 | 913 | 995 | 1,069 | 1,142 | 1,240 | 1,334 | 1,443 | 1,543 | 1,658 | 2,623 | 4,116 |
| | | | | | | | | | | | | | |
| Purchases | GWh | 3,243 | 3,542 | 3,860 | 4,144 | 4,427 | 4,807 | 5,174 | 5,596 | 5,985 | 6,429 | 10,416 | 16,583 |
| Erdenet Copper | GWh | 810 | 834 | 889 | 955 | 985 | 1,046 | 1,076 | 1,106 | 1,136 | 1,167 | 1,440 | 1,777 |
| Darkhan Steel | GWh | 405 | 417 | 429 | 442 | 454 | 466 | 484 | 497 | 509 | 527 | 611 | 707 |
| Heavy Industry | GWh | 0 | 0 | 0 | 0 | 5 | 51 | 135 | 267 | 434 | 651 | 2,380 | 5,220 |
| Other Sales | GWh | 2,028 | 2,291 | 2,542 | 2,747 | 2,983 | 3,244 | 3,478 | 3,726 | 3,906 | 4,084 | 5,986 | 8,878 |
| Demand | MW | 640 | 697 | 718 | 815 | 872 | 956 | 1,032 | 1,117 | 1,194 | 1,275 | 2,016 | 3,161 |

Sources: Consultants' estimate

Table IV-39: CES Power Production – High Growth (Bull Industrial Markets)

| MONGOLIA | | ELECTRICITY PRODUCTION FORECAST – HIGH GROWTH | | | | | | | | | | | |
|--------------------|-----|---|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|
| CES REGION | | | | | | | | | | | | | |
| | | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2025 | 2030 |
| Peak Production | MW | 849 | 927 | 1,010 | 1,085 | 1,161 | 1,274 | 1,397 | 1,548 | 1,708 | 1,895 | 3,421 | 5,064 |
| Total gross output | GWh | 4,834 | 5,280 | 5,754 | 6,178 | 6,611 | 7,252 | 7,957 | 8,815 | 9,727 | 10,788 | 19,480 | 28,833 |
| Load factor | | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 |
| Station loss | % | 15.6% | 15.6% | 15.6% | 15.6% | 15.6% | 15.6% | 15.6% | 15.6% | 15.6% | 15.6% | 14.0% | 13.0% |
| Station loss | GWh | 755 | 825 | 899 | 965 | 1,033 | 1,133 | 1,243 | 1,377 | 1,519 | 1,685 | 2,727 | 3,748 |
| Net | GWh | 4,079 | 4,455 | 4,855 | 5,213 | 5,578 | 6,119 | 6,714 | 7,438 | 8,208 | 9,103 | 16,752 | 25,085 |
| T&D loss | % | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% | 17.3% |
| T&D loss | GWh | 836 | 913 | 995 | 1,069 | 1,144 | 1,255 | 1,376 | 1,525 | 1,683 | 1,866 | 3,370 | 4,988 |
| | | | | | | | | | | | | | |
| Purchases | GWh | 3,243 | 3,542 | 3,860 | 4,144 | 4,435 | 4,864 | 5,337 | 5,913 | 6,525 | 7,236 | 13,383 | 20,097 |
| Erdenet Copper | GWh | 810 | 834 | 889 | 955 | 985 | 1,046 | 1,076 | 1,106 | 1,136 | 1,167 | 1,440 | 1,777 |
| Darkhan Steel | GWh | 405 | 417 | 429 | 442 | 454 | 466 | 484 | 497 | 509 | 527 | 611 | 707 |
| Heavy Industry | GWh | 0 | 0 | 0 | 0 | 12 | 109 | 299 | 584 | 974 | 1,458 | 5,346 | 8,734 |
| Other Sales | GWh | 2,028 | 2,291 | 2,542 | 2,747 | 2,983 | 3,244 | 3,478 | 3,726 | 3,906 | 4,084 | 5,986 | 8,878 |
| Demand | MW | 640 | 697 | 718 | 815 | 873 | 966 | 1,059 | 1,169 | 1,282 | 1,407 | 2,500 | 3,734 |

Sources: Consultants' estimate

V. SOUTH GOBI ELECTRICITY FORECASTS

T. Dalanzadgad Electricity Consumption

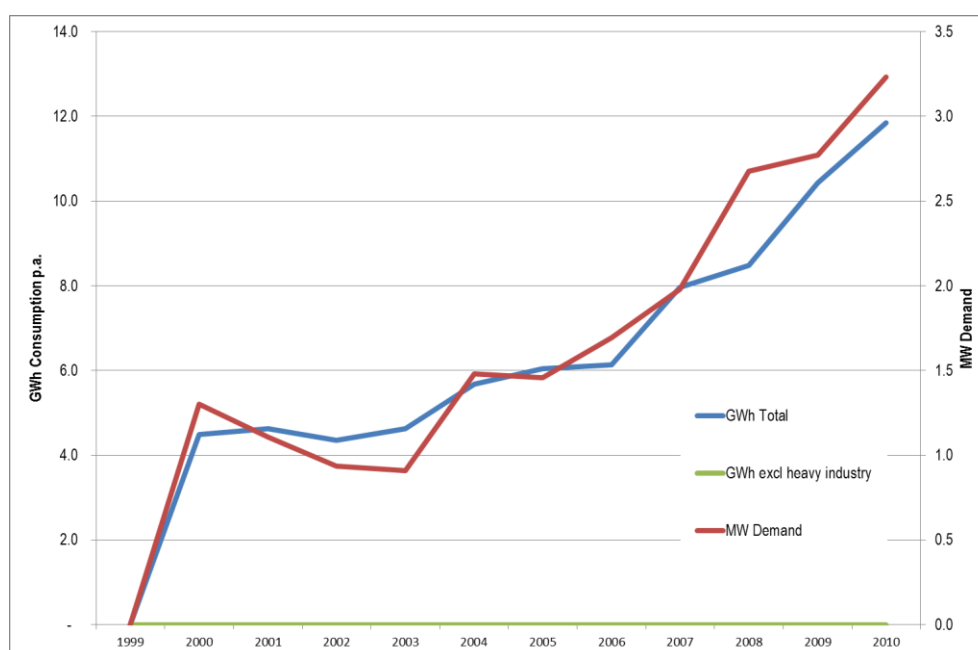
87. The methodology for preparing electricity forecasts is the same as that described in Section 0 for the CES.

88. The power demand of Dalanzadgad is currently very small compared to the CES electricity system. However, the power demand in the South Gobi region is anticipated to grow significantly, due in particular to the Oyu Tolgoi and Tavan Tolgoi mines, and due to the expected development of an industrial park at Sainshand.

7. Dalanzadgad Historical Electricity Demand

89. Historical electricity consumption and demand figures were provided by the Ministry of Energy. These figures form the basis for modelling the demand and reconciling against historical trends so as to make accurate projections.

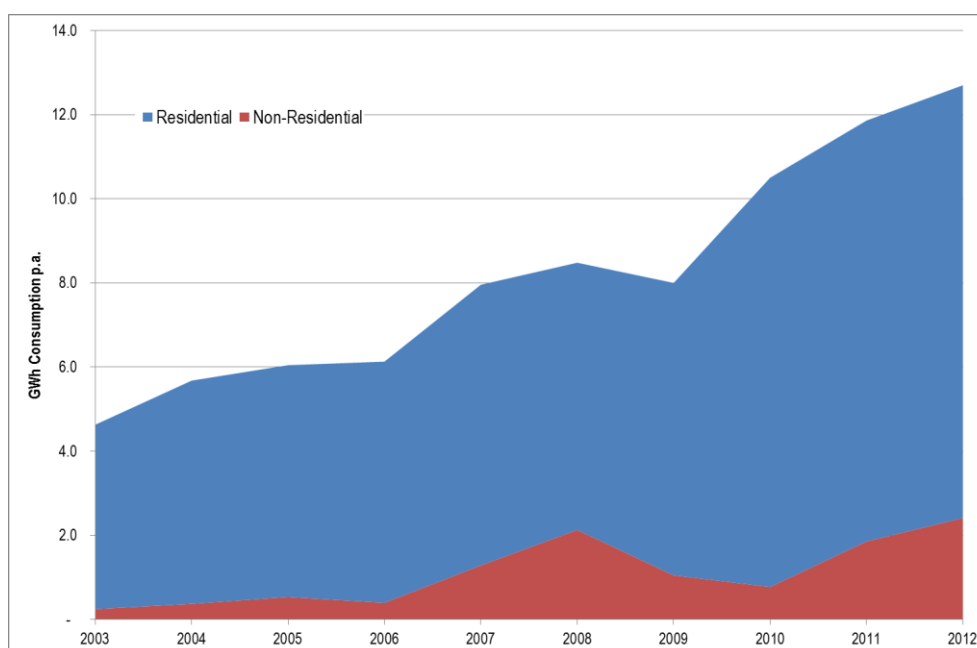
Figure V-1: Dalanzadgad Power Statistics



Sources: Licensees, EA & Consultants' estimate

90. Figure V-2 shows the historical consumption / demand in total split by residential and C&LI load. The split is based on 'bottom-up' estimates of consumption made by using typical Mongolian metrics for residential consumption (per household) and C&LI consumption (per commercial / light industry premises).

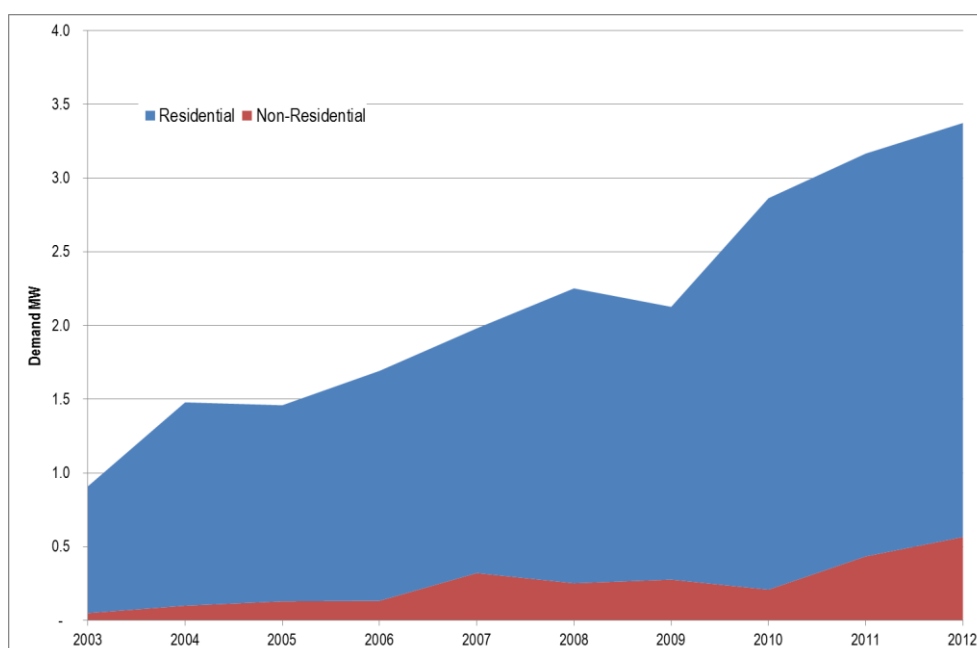
Figure V-2: Historical Dalanzadgad Consumption GWh p.a. (cumulative)



Sources: Licensees, EA & Consultants' estimate

91. Figure V-3 shows that C&LI sector use has been growing strongly for five years.

Figure V-3: Historical Dalanzadgad Demand MW (cumulative)



Sources: Licensees, EA & Consultants' estimate

92. Figure V-3 shows that C&LI demand has been increasing in line with the growth in consumption.

93. Table V-4 shows the high-level estimates for Dalanzadgad electricity consumption and demand disaggregated by residential and commercial and light industry.

Table V-4: Dalanzadgad Power Station Statistics

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------------------------|------|------|------|------|------|------|-------|-------|-------|
| GWh Residential | 5.31 | 5.51 | 5.74 | 6.67 | 6.35 | 6.95 | 9.73 | 10.01 | 10.29 |
| GWh Non-Residential | 0.37 | 0.53 | 0.39 | 1.28 | 2.13 | 1.05 | 0.77 | 1.85 | 2.41 |
| GWh Total | 5.68 | 6.04 | 6.13 | 7.96 | 8.48 | 8.00 | 10.50 | 11.86 | 12.70 |
| MW Residential | 1.4 | 1.3 | 1.6 | 1.7 | 2.0 | 1.9 | 2.7 | 2.7 | 2.8 |
| MW Non-Residential | 0.1 | 0.1 | 0.1 | 0.3 | 0.3 | 0.3 | 0.2 | 0.4 | 0.6 |
| MW Total | 1.5 | 1.5 | 1.7 | 2.0 | 2.3 | 2.1 | 2.9 | 3.2 | 3.4 |

Sources: Consultants' estimate

94. Note that the disaggregation provided in Table V-4 was derived using a 'end-use' model and, as the GWh electricity consumption was chosen as the basis for calibration, the total energy sales figures reported by the Ministry of Energy match with the figures determined by the model. The MW demand figures cannot be made to match perfectly as a result of the variation in the load factors of individual Aimags, and between their urban and rural constituents, and the effects of averaging. The calibration of the model was effected to match the demands in the later years of the historical period 2003 to 2012.

95. Table V-5 provides the historical Dalanzadgad electricity statistics reported by the Ministry of Energy.

Table V-5: Dalanzadgad TPP Statistics

| MONGOLIA | | ELECTRICITY STATISTICS | | | | | | | | | | | |
|--------------------|-----|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| DALANZADGAD TPP | | | | | | | | | | | | | |
| | | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| Peak Production | MW | 0.9 | 1.0 | 0.8 | 1.0 | 0.9 | 1.0 | 0.9 | 1.5 | 1.3 | 1.5 | 6.1 | 6.4 |
| Total gross output | GWh | 4.5 | 5.1 | 4.4 | 4.3 | 4.1 | 4.2 | 4.3 | 5.8 | 5.5 | 6.3 | 22.9 | 24.0 |
| Load factor | | 0.55 | 0.57 | 0.59 | 0.51 | 0.53 | 0.49 | 0.52 | 0.44 | 0.49 | 0.48 | 0.43 | 0.43 |
| Station loss | % | 33.2% | 34.5% | 31.1% | 32.1% | 31.3% | 32.7% | 27.5% | 27.0% | 27.0% | 24.3% | 24.0% | 23.0% |
| Station loss | GWh | 1.5 | 1.8 | 1.4 | 1.4 | 1.3 | 1.4 | 1.2 | 1.6 | 1.5 | 1.5 | 5.5 | 5.5 |
| Net | GWh | 3.0 | 3.3 | 3.0 | 2.9 | 2.8 | 2.8 | 3.1 | 4.3 | 4.0 | 4.7 | 17.4 | 18.5 |
| T&D loss | % | 42.1% | 47.1% | 48.3% | 33.8% | 32.8% | 27.0% | 26.3% | 27.2% | 22.6% | 24.1% | 24.1% | 24.1% |
| T&D loss | GWh | 1.9 | 2.4 | 2.1 | 1.5 | 1.3 | 1.1 | 1.1 | 1.6 | 1.2 | 1.5 | 5.5 | 5.8 |
| | | | | | | | | | | | | | |
| Total Sales | GWh | 1.1 | 0.9 | 0.9 | 1.5 | 1.5 | 1.7 | 2.0 | 2.7 | 2.8 | 3.2 | 3.2 | 3.9 |
| | GWh | - | - | - | - | - | - | - | - | - | - | - | - |
| | GWh | - | - | - | - | - | - | - | - | - | - | - | - |
| Heavy Industry | GWh | - | - | - | - | - | - | - | - | - | - | - | - |
| Other Sales | GWh | - | - | - | - | - | - | - | - | - | - | - | - |
| Total Demand | MW | 0.5 | 0.5 | 0.6 | 0.4 | 0.5 | 0.4 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |

U. South Gobi Electricity Growth

8. Residential Sector

96. The drivers of growth in the residential sector are taken to be the population, the number of persons per household and the change in kWh consumption per customer.

97. The population growth and shifts are based on the population statistics provided by the Mongolian Bureau of Statistics.

98. The number of persons per household varies from urban to rural centre and by regional area. The following assumptions have been adopted based on household square meter data (collected for heat planning) and urban and rural population statistics.

Table V-6: Mongolia Persons per Household

| Population Centre | Region | Urban | Rural |
|-------------------|-------------|-------|-------|
| Omnogovi | Dalanzadgad | 4.0 | 5.0 |

Sources: Consultants' estimate

99. Residential customer account statistics were estimated. The average growth in residential customer accounts from 2003 to 2011 is estimated to have been 9.5%.

Table V-7: Dalanzadgad Residential Customer Accounts

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Accounts | 4,105 | 4,235 | 4,447 | 5,049 | 4,721 | 5,085 | 7,146 | 7,352 | 7,558 |
| Growth | 15.2% | 3.2% | 5.0% | 13.5% | -6.5% | 7.7% | 40.5% | 2.9% | 2.8% |

Sources: Consultants' estimate

100. Table V-8 shows that the average growth rate of the kWh per customer measure over the last eight years has been 1%. The load factor for the residential customer class is below 0.5 as the system is very small.

Table V-8: Dalanzadgad Residential kWh per Customer (p.a.)

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| GWh | 5.31 | 5.51 | 5.74 | 6.67 | 6.35 | 6.95 | 9.73 | 10.01 | 10.29 |
| MW | 1.4 | 1.3 | 1.6 | 1.7 | 2.0 | 1.9 | 2.7 | 2.7 | 2.8 |
| LF | 0.44 | 0.47 | 0.42 | 0.46 | 0.36 | 0.43 | 0.42 | 0.42 | 0.42 |
| kWh per Customer | 1,293 | 1,301 | 1,290 | 1,322 | 1,346 | 1,367 | 1,361 | 1,361 | 1,361 |
| Growth | 5.1% | 0.6% | -0.9% | 2.5% | 1.8% | 1.6% | -0.4% | 0.0% | 0.0% |

Sources: Consultants' estimate

9. Commercial & Light Industry Sector (C & LI)

101. In Table II-1 it was shown that one of the drivers of commercial and light industrial energy consumption is floor space of public buildings. Floor space statistics have been gathered for floor space in Omnogovi Aimag.

Table V-9: Commercial / Light Industrial Floor Space ('000's m², year 2011)

| Floor Space | |
|----------------------|----|
| 000's m ² | |
| Omnogovi | 55 |

Sources: Local Government Authorities

102. Whilst the historical floor space statistics are considered valid, the forecasts for floor space are less certain given the population shifts that are expected and the potential impact on small to medium-sized business activity. As a consequence it is considered that the growth trends in customer accounts and kWh per customer are more suitable for forecasting purposes.

103. The average growth rate of C&LI industrial customer accounts is estimated to be 7%.

Table V-10: Dalanzadgad Historical C & LI Customer Account Growth

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|-------------------|------|------|------|------|-------|-------|------|------|------|
| Customer Accounts | 369 | 395 | 414 | 438 | 502 | 491 | 532 | 577 | 625 |
| Growth | 9.2% | 7.1% | 4.7% | 6.0% | 14.4% | -2.2% | 8.4% | 8.4% | 8.4% |

Sources: Consultants' estimate

104. Table V-11 shows that the average growth rate of the kWh per customer measure for the Dalanzadgad C&LI customer class during the last eight years has been of the order of 40%. The load factor for the Dalanzadgad C&LI customer class is taken to be 0.5.

Table V-11: Dalanzadgad Historical C & LI kWh per Customer

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------------------|-------|-------|--------|--------|-------|--------|--------|--------|-------|
| GWh | 0.37 | 0.53 | 0.39 | 1.28 | 2.13 | 1.05 | 0.77 | 1.85 | 2.41 |
| MW | 0.2 | 0.2 | 0.1 | 0.3 | 0.5 | 0.2 | 0.2 | 0.4 | 0.6 |
| LF | 0.22 | 0.29 | 0.56 | 0.47 | 0.50 | 0.50 | 0.49 | 0.49 | 0.49 |
| kWh per Customer | 1,003 | 1,348 | 953 | 2,929 | 4,241 | 2,135 | 1,453 | 3,213 | 3,859 |
| Growth | 38.0% | 34.3% | -29.3% | 207.3% | 44.8% | -49.7% | -31.9% | 121.1% | 20.1% |

Sources: Consultants' estimate

10. Large Industrial Sector

105. For the large industrial sector no significant large industrial customers were identified as supplied by a distribution company or the CRETG. The Oyu Tolgoi mine has been purchasing power from China and could be considered as an existing industrial load.

V. South Gobi Consumption Forecasts by Class

11. South Gobi Residential Class Forecasts

106. Residential class electricity consumption and demand figures has been modelled at the level of the Aimags and major towns, differentiated according to urban and rural populations.

107. In each case the persons per household and percentage electrification was used to estimate the number of urban and rural electricity customers. The person per household

measure was assumed according to the figures in Table IV-6.

108. The following assumptions were made with regard to annual electricity consumption by dwelling type.

Table V-12: Annual kWh Consumption per Customer

| | Small | Large |
|------------------------------------|-------|-------|
| kWh Consumption per Apartment | 1,200 | 2,300 |
| kWh Consumption per Detached House | 1,300 | 2,400 |
| kWh Consumption per Ger | 450 | 500 |

Sources: Consultant's estimate, World Bank

109. These assumptions were input to a forecasting model. The model is provided as Appendix A to this report, and includes specific details for Omnogobi.

110. The model takes into account the growth in residential customer accounts according to population movements and the average rate of growth in customer accounts between 2003 and 2012. The residential customer account forecast assumption is shown in Table V-13.

Table V-13: South Gobi Residential Customer Account Forecast

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|
| Accounts | 7,764 | 7,970 | 8,176 | 8,382 | 8,588 | 8,794 | 9,000 | 9,206 |
| Growth | 2.7% | 2.7% | 2.6% | 2.5% | 2.5% | 2.4% | 2.3% | 2.3% |

Sources: Consultants' estimate

111. The population movements suggest that residential sector kWh per customer growth will increase by around 2.5% on average as the population growth rate is expected to taper downwards during the next decade.

112. The resulting forecast for the residential customer class is shown in Table V-14. The load factor is assumed to remain constant at 0.42.

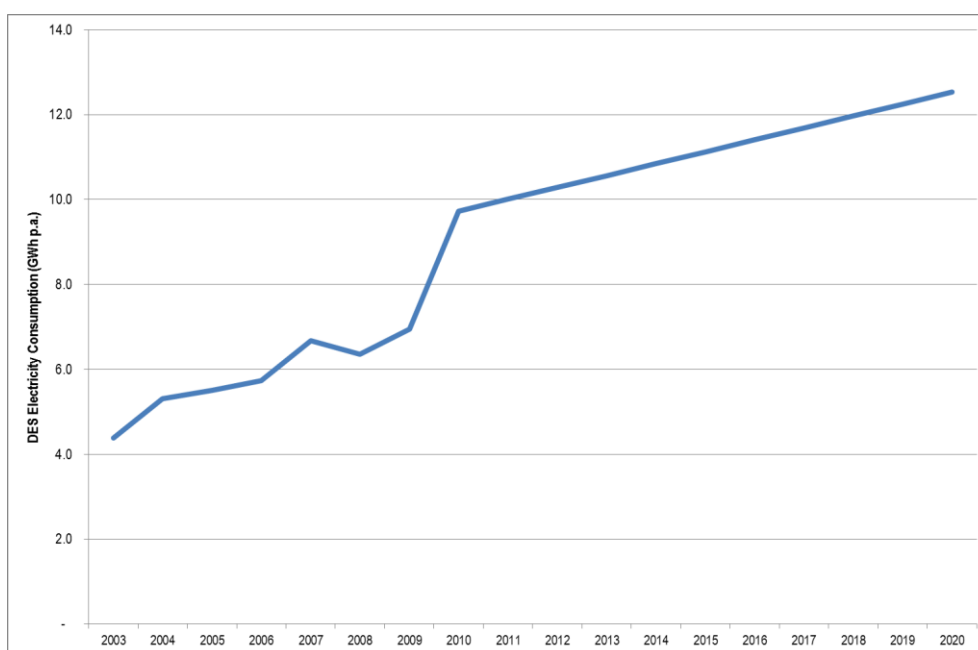
Table V-14: South Gobi Residential Load Forecast

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| GWh | 10.57 | 10.85 | 11.13 | 11.41 | 11.69 | 11.97 | 12.25 | 12.53 |
| MW | 2.9 | 3.0 | 3.0 | 3.1 | 3.2 | 3.3 | 3.3 | 3.4 |
| LF | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 |
| kWh per Customer | 1,729 | 1,739 | 1,750 | 1,759 | 1,774 | 1,785 | 1,799 | 1,809 |

Sources: Consultants' estimate

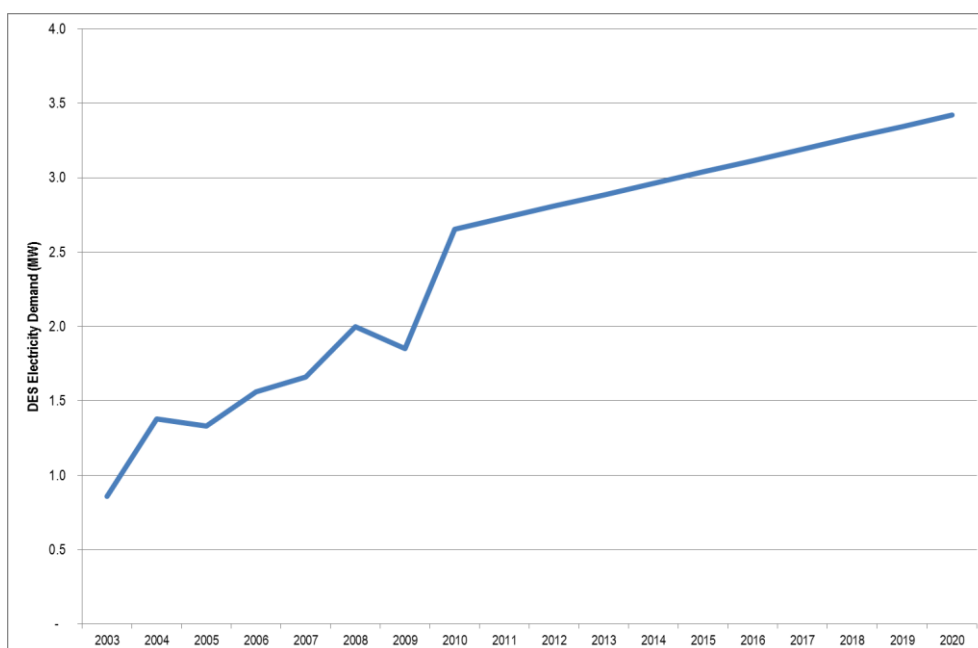
113. The historical consumption and forecast for the residential customer class is charted as Figure V-15 and Figure V-16.

Figure V-15: South Gobi Residential Consumption (GWh)



Sources: Consultants' estimate

Figure V-16: South Gobi Residential Demand (MW)



Sources: Consultants' estimate

12. C&LI Forecast

114. An end-use forecast for electricity consumption for the commercial and light industrial customer class is based on the assumption that kWh per customer growth will continue at an average of 7.5% per annum.

Table V-17: South Gobi C&LI Customer Account Forecast

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|----------|------|------|------|------|------|-------|-------|-------|
| Accounts | 678 | 734 | 796 | 868 | 946 | 1,009 | 1,077 | 1,115 |
| Growth | 8.4% | 8.4% | 8.4% | 9.0% | 9.0% | 6.7% | 6.7% | 3.5% |

Sources: Consultants' estimate

115. The resulting kWh per customer measure for the C&LI customer class is shown in Table V-18. The load factor is assumed to remain constant at 0.5 due to the small size of the system.

Table V-18: South Gobi C&LI Load Forecast

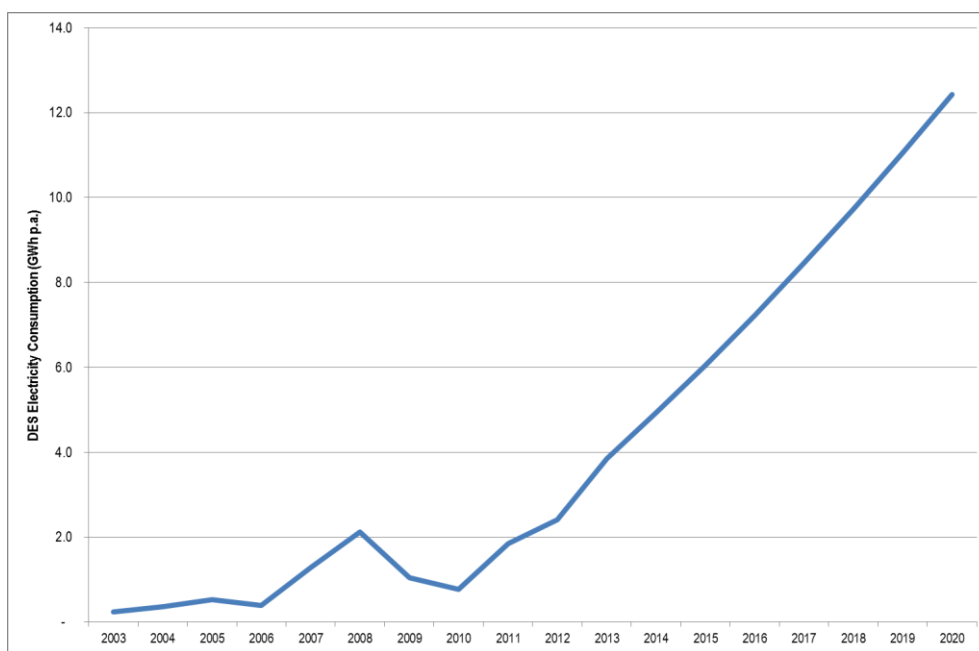
| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|------------------|-------|-------|-------|-------|-------|-------|--------|--------|
| GWh | 3.8 | 4.9 | 6.0 | 7.2 | 8.4 | 9.7 | 11.0 | 12.4 |
| MW | 0.9 | 1.1 | 1.4 | 1.6 | 1.9 | 2.2 | 2.5 | 2.8 |
| LF | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| kWh per Customer | 5,682 | 6,704 | 7,596 | 8,322 | 8,930 | 9,632 | 10,258 | 11,145 |
| Growth | 47.2% | 18.0% | 13.3% | 9.6% | 7.3% | 7.9% | 6.5% | 8.6% |

Sources: Consultants' estimate

116. The historical consumption and forecast for the C&LI customer class is charted in Figure V-19 and Figure V-20.

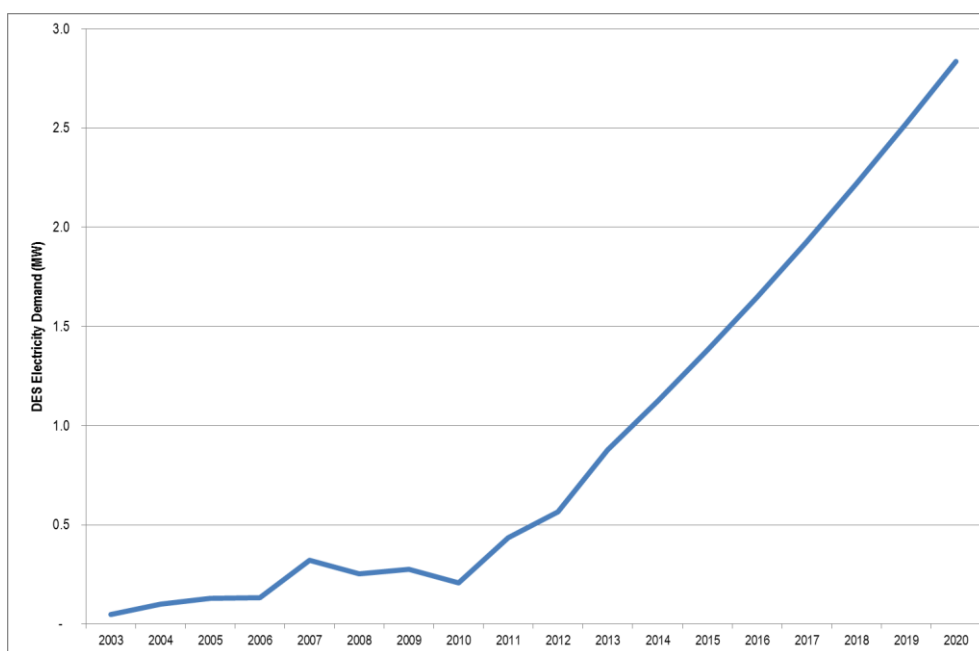
117. The C&LI end-use forecasting model is provided as Appendix B to this report specifically for Omnogobi.

Figure V-19: South Gobi C&LI Consumption (GWh p.a.)



Sources: Consultants' estimate

Figure V-20: South Gobi C&LI Demand (MW)



Sources: Consultants' estimate

13. South Gobi Heavy Industry Forecasts

118. For the large industrial sector the driver of electricity consumption and demand is taken to be the specific needs of large mines.

Table V-21: Significant Mine Development

| Mine | MW |
|----------------------------------|-----------|
| Oyu Tolgoi Gold and Copper mines | 450 / 600 |
| Tavan Tolgoi coal mine | 300 |
| Ukhaakhudag PP | 62 |
| Gurvan Tes PP | 100 |
| Total | 1,150 |

Sources: Consultants research

119. Large coal mines require a high security of supply and international practice is to build a captive mine mouth power plant. Oyu Tolgoi and Tavan Tolgoi plan to build power plants to service own-needs. The connection of the South Gobi to the CES will not release capacity for local Dalanzadgad are mines in the short term given that there is a small reserve margin in the CES. However in the medium to long term there may be a case to extend the CRETG grid to supply smaller mining loads.

Table V-22: OT & TT Mine Development

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2025 | 2030 |
|--------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Tavan Tolgoi | | | | | | | | | | | |
| GWh | 184 | 184 | 184 | 184 | 1,104 | 1,104 | 1,104 | 1,104 | 1,104 | 2,208 | 2,208 |
| MW | 30 | 30 | 30 | 30 | 180 | 180 | 180 | 180 | 180 | 360 | 360 |
| Load Factor | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 |
| Oyu Tolgoi | | | | | | | | | | | |
| GWh | 858 | 1,717 | 1,717 | 1,717 | 2,759 | 2,759 | 3,679 | 3,679 | 4,599 | 4,599 | 4,599 |
| MW | 140 | 280 | 280 | 280 | 450 | 450 | 600 | 600 | 750 | 750 | 750 |
| Load Factor | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 |
| Total GWh | 1,042 | 1,901 | 1,901 | 1,901 | 3,863 | 3,863 | 4,783 | 4,783 | 5,703 | 6,807 | 6,807 |
| Total MW | 170 | 310 | 310 | 310 | 630 | 630 | 780 | 780 | 930 | 1,110 | 1,110 |

Sources: Consultants' estimate

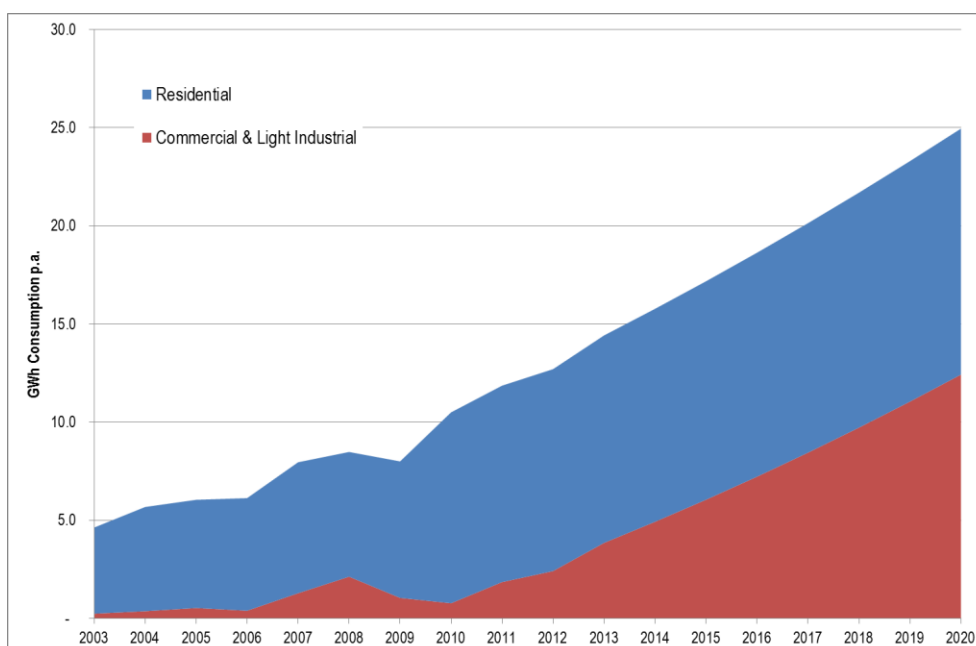
120. The large industrial sector is discussed further in Section IX. Bear and bull market scenarios are discussed for the South Gobi, including the implications for industrial load growth. These scenarios are incorporated in the forecast that follows where indicated.

W. South Gobi Electricity Forecast

121. The total GWh and MW 'low' growth forecasts by customer class for South Gobi are charted

according to the underlying growth expected due to population movement into the region.

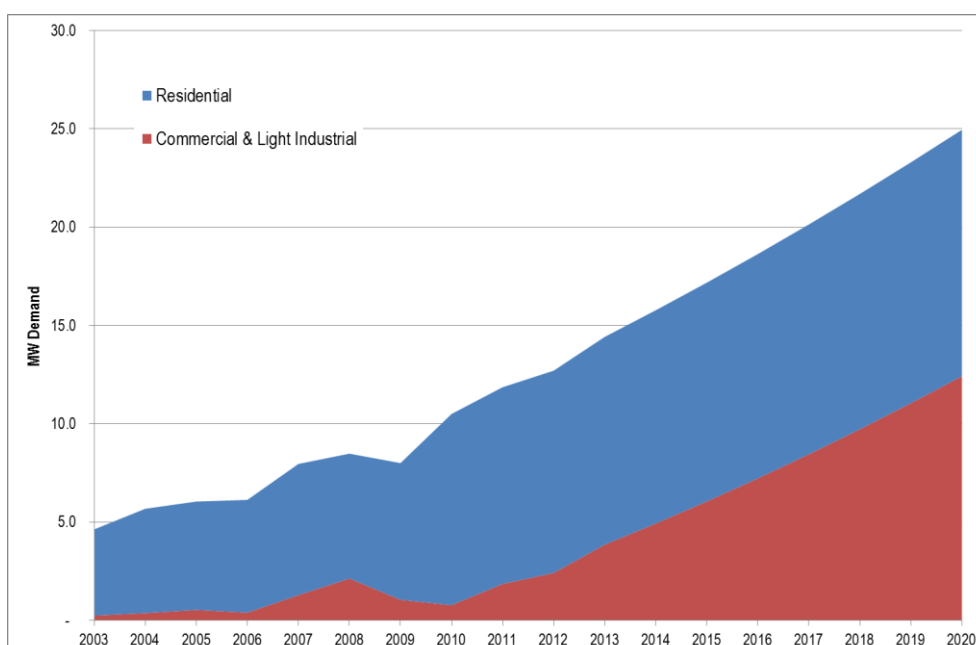
Figure V-23: South Gobi 'Low' GWh (cumulative)



Sources: Licensees, EA & Consultants' estimate

122. Figure V-23 and Figure V-24 show that by 2020 the non-residential growth could be expected to grow strongly due to the influx of population from other Aimags. The rise in population is due to the development of the mining sector.

Figure V-24: South Gobi 'Low' MW (cumulative)



Sources: Licensees, EA & Consultants' estimate

123. However this very modest growth will be overtaken by the large power demands of the

industrial sector, particularly when Oyu Tolgoi and Tavan Tolgoi are developed.

124. Table V-25 provides the forecast of South Gobi electricity consumption and demand disaggregated by residential, commercial and light industry, expected without heavy industry development.

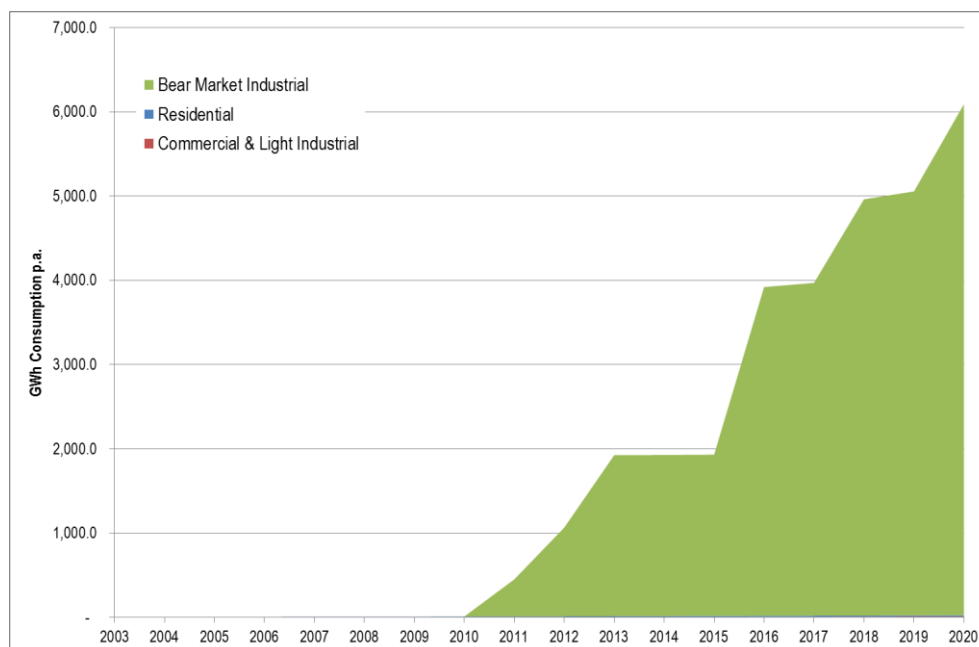
Table V-25: South Gobi Electricity 'Low' Forecast

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2025 | 2030 |
|-----------------|------|------|------|------|------|------|------|------|------|-------|
| GWh | 10.6 | 10.8 | 11.1 | 11.4 | 11.7 | 12.0 | 12.3 | 12.5 | 14.2 | 16.0 |
| Residential | | | | | | | | | | |
| GWh | 3.8 | 4.9 | 6.0 | 7.2 | 8.4 | 9.7 | 11.0 | 12.4 | 35.7 | 102.4 |
| Non-Residential | | | | | | | | | | |
| GWh Total | 14.4 | 15.8 | 17.2 | 18.6 | 20.1 | 21.7 | 23.3 | 25.0 | 49.8 | 118.4 |
| MW Residential | 2.9 | 3.0 | 3.0 | 3.1 | 3.2 | 3.3 | 3.3 | 3.4 | 3.9 | 4.4 |
| MW | 0.9 | 1.1 | 1.4 | 1.6 | 1.9 | 2.2 | 2.5 | 2.8 | 8.0 | 22.4 |
| Non-Residential | | | | | | | | | | |
| MW Total | 3.8 | 4.1 | 4.4 | 4.8 | 5.1 | 5.5 | 5.9 | 6.3 | 11.8 | 26.8 |

Sources: Consultants' estimate

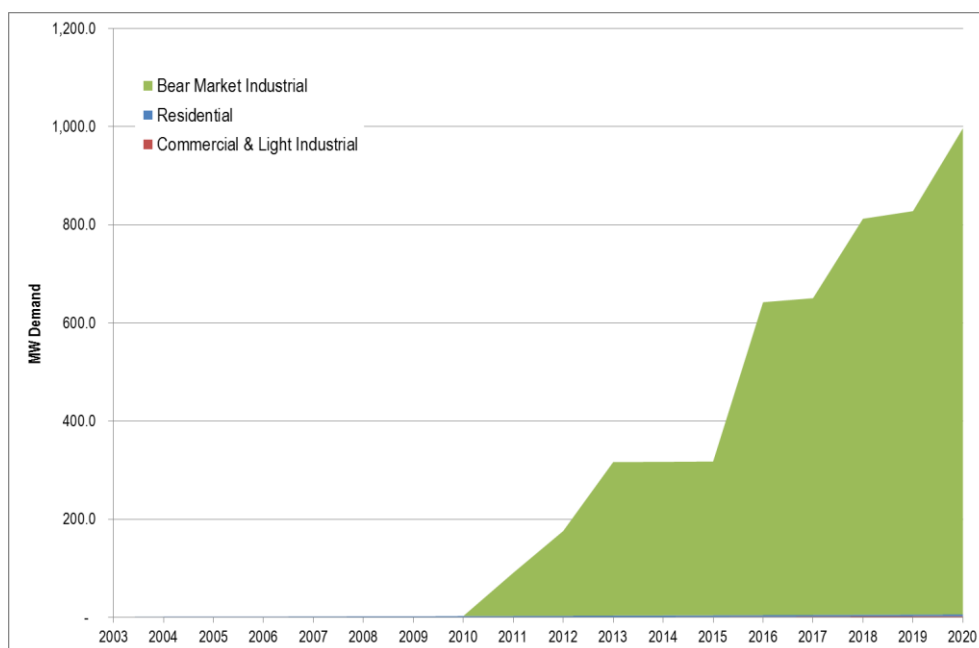
125. The following figures provide the forecasts for bear and bull market scenarios affecting mineral extraction and processing. The figures provide the forecast of South Gobi electricity consumption and demand disaggregated by residential, commercial and light industry, and heavy industry customer classes.

Figure V-26: South Gobi 'Bear' GWh (cumulative)



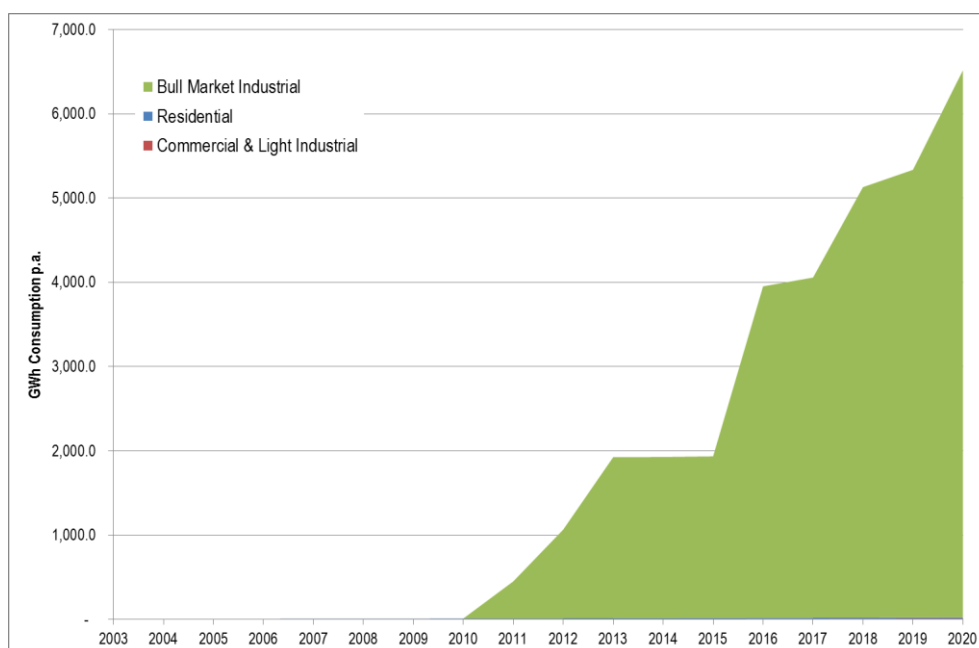
Sources: Licensees, EA & Consultants' estimate

Figure V-27: South Gobi 'Bear' MW (cumulative)



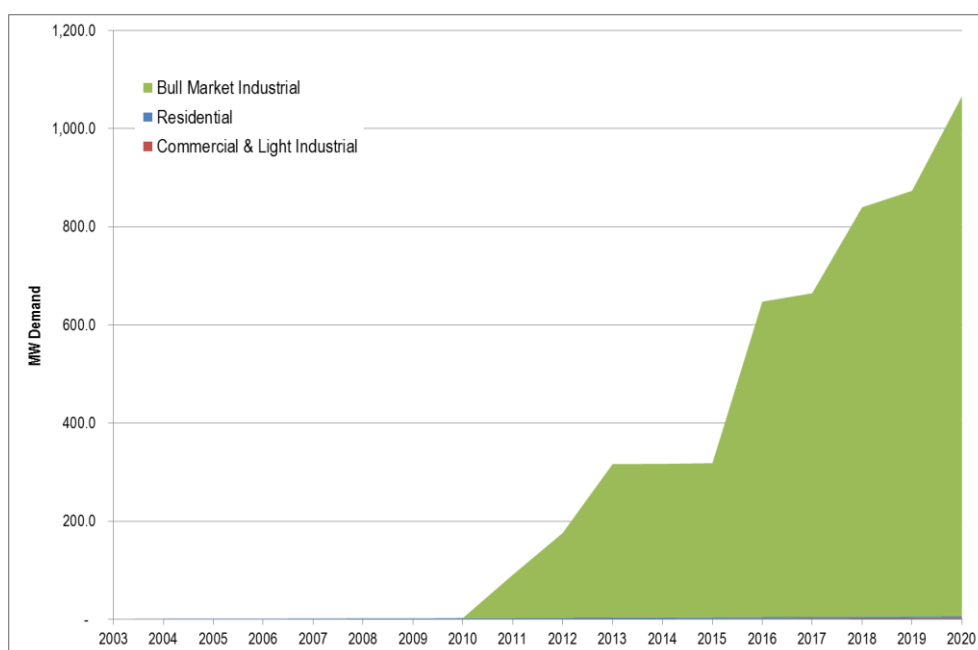
Sources: Licensees, EA & Consultants' estimate

Figure V-28: South Gobi 'Bull' GWh (cumulative)



Sources: Licensees, EA & Consultants' estimate

Figure V-29: South Gobi 'Bull' MW (cumulative)



Sources: Licensees, EA & Consultants' estimate

X. South Gobi Power Production

126. A forecast of the power production of the South Gobi is provided for low, medium (bear) and high (bull) growth scenarios. Station and T&D loss assumptions are based on historical trends and an expectation of improvement.

Table V-30: SOUTH GOBI POWER PRODUCTION - LOW

| MONGOLIA | | ELECTRICITY FORECAST - LOW | | | | | | | | | | | |
|--------------------|-----|----------------------------|------|------|------|------|------|------|------|------|------|------|-------|
| SOUTH GOBI REGION | | | | | | | | | | | | | |
| | | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2025 | 2030 |
| Peak Production | MW | 6.1 | 6.4 | 7.0 | 7.4 | 7.9 | 8.4 | 8.8 | 9.3 | 9.8 | 9.6 | 16.9 | 35.7 |
| Total gross output | GWh | 23 | 24 | 27 | 29 | 31 | 33 | 35 | 37 | 39 | 38 | 71 | 158 |
| Load factor | | 0.43 | 0.43 | 0.44 | 0.44 | 0.44 | 0.45 | 0.45 | 0.45 | 0.45 | 0.46 | 0.48 | 0.50 |
| Station loss | % | 24% | 23% | 22% | 21% | 20% | 19% | 18% | 17% | 16% | 15% | 15% | 15% |
| Station loss | GWh | 5.5 | 5.5 | 5.9 | 6.0 | 6.1 | 6.2 | 6.3 | 6.3 | 6.2 | 5.8 | 10.7 | 23.7 |
| Net | GWh | 17.4 | 18.5 | 20.9 | 22.7 | 24.6 | 26.5 | 28.5 | 30.6 | 32.7 | 32.6 | 60.5 | 134.2 |
| T&D loss | % | 24% | 24% | 24% | 24% | 24% | 24% | 24% | 24% | 24% | 20% | 15% | 10% |
| T&D loss | GWh | 5.5 | 5.8 | 6.4 | 6.9 | 7.4 | 7.9 | 8.4 | 8.9 | 9.4 | 7.7 | 10.7 | 15.8 |
| | | | | | | | | | | | | | |
| Purchases | GWh | 11.9 | 12.7 | 14.4 | 15.8 | 17.2 | 18.6 | 20.1 | 21.7 | 23.3 | 25.0 | 49.8 | 118.4 |
| | GWh | | | | | | | | | | | | |
| | GWh | | | | | | | | | | | | |
| C&LI | GWh | 1.9 | 2.4 | 3.8 | 4.9 | 6.0 | 7.2 | 8.4 | 9.7 | 11.0 | 12.4 | 35.7 | 102.4 |
| Residential | GWh | 10.0 | 10.3 | 10.6 | 10.8 | 11.1 | 11.4 | 11.7 | 12.0 | 12.3 | 12.5 | 14.2 | 16.0 |
| Demand | MW | 3.2 | 3.4 | 3.8 | 4.1 | 4.4 | 4.8 | 5.1 | 5.5 | 5.9 | 6.3 | 11.8 | 26.8 |

Sources: Consultant's Estimate

Table V-31: SOUTH GOBI POWER PRODUCTION – Medium Growth (Bear Industrial Markets)

| MONGOLIA | | ELECTRICITY FORECAST – MEDIUM GROWTH | | | | | | | | | | | |
|--------------------|-----|--------------------------------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| SOUTH GOBI REGION | | | | | | | | | | | | | |
| | | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2025 | 2030 |
| Peak Production | MW | 130.3 | 309.6 | 353 | 353 | 354 | 718 | 727 | 909 | 926 | 1,116 | 1,494 | 1,778 |
| Total gross output | GWh | 787.7 | 1884.2 | 2,152 | 2,154 | 2,158 | 4,392 | 4,448 | 5,562 | 5,667 | 6,829 | 9,138 | 10,853 |
| Load factor | | 0.69 | 0.69 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Station loss | % | 20% | 20% | 6% | 6% | 6% | 6% | 6% | 6% | 6% | 6% | 6% | 6% |
| Station loss | GWh | 157.5 | 376.8 | 129 | 129 | 129 | 264 | 267 | 334 | 340 | 410 | 548 | 651 |
| Net | GWh | 630.1 | 1507.3 | 2,023 | 2,024 | 2,028 | 4,129 | 4,181 | 5,228 | 5,327 | 6,419 | 8,590 | 10,202 |
| T&D loss | % | 24% | 24% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| T&D loss | GWh | 189.0 | 452.2 | 107.6 | 107.7 | 107.9 | 219.6 | 222.4 | 278.1 | 283.3 | 341.5 | 456.9 | 542.7 |
| | | | | | | | | | | | | | |
| Purchases | GWh | 441 | 1,055 | 1,915 | 1,917 | 1,920 | 3,909 | 3,958 | 4,950 | 5,044 | 6,078 | 8,133 | 9,659 |
| | GWh | | | | | | | | | | | | |
| | GWh | 429 | 1,042 | 1,901 | 1,901 | 1,903 | 3,890 | 3,938 | 4,928 | 5,020 | 6,053 | 8,083 | 9,541 |
| C&LI | GWh | 1.9 | 2.4 | 3.8 | 4.9 | 6.0 | 7.2 | 8.4 | 9.7 | 11.0 | 12.4 | 35.7 | 102.4 |
| Residential | GWh | 10.0 | 10.3 | 10.6 | 10.8 | 11.1 | 11.4 | 11.7 | 12.0 | 12.3 | 12.5 | 14.2 | 16.0 |
| Demand | MW | 88 | 173 | 314 | 314 | 315 | 639 | 647 | 809 | 825 | 993 | 1,330 | 1,583 |

Sources: Consultant's Estimate

Table V-32: SOUTH GOBI POWER PRODUCTION – High Growth (Bull Industrial Markets)

| MONGOLIA | | ELECTRICITY FORECAST - HIGH | | | | | | | | | | | |
|--------------------|-----|-----------------------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|
| SOUTH GOBI REGION | | | | | | | | | | | | | |
| | | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2025 | 2030 |
| Peak Production | MW | 157.4 | 309.6 | 353 | 353 | 354 | 724 | 743 | 940 | 978 | 1,194 | 1,782 | 2,127 |
| Total gross output | GWh | 787.7 | 1884.2 | 2,152 | 2,154 | 2,162 | 4,428 | 4,546 | 5,751 | 5,981 | 7,308 | 10,894 | 12,980 |
| Load factor | | 0.57 | 0.69 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Station loss | % | 20% | 20% | 6% | 6% | 6% | 6% | 6% | 6% | 6% | 6% | 6% | 6% |
| Station loss | GWh | 157.5 | 376.8 | 129 | 129 | 130 | 266 | 273 | 345 | 359 | 439 | 654 | 779 |
| Net | GWh | 630.1 | 1507.3 | 2,023 | 2,024 | 2,032 | 4,163 | 4,273 | 5,406 | 5,622 | 6,870 | 10,240 | 12,201 |
| T&D loss | % | 24% | 24% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| T&D loss | GWh | 189.0 | 452.2 | 107.6 | 107.7 | 108.1 | 221.4 | 227.3 | 287.5 | 299.1 | 365.4 | 544.7 | 649.0 |
| | | | | | | | | | | | | | |
| Purchases | GWh | 441 | 1,055 | 1,915 | 1,917 | 1,924 | 3,941 | 4,046 | 5,118 | 5,323 | 6,505 | 9,695 | 11,552 |
| | GWh | | | | | | | | | | | | |
| | GWh | 429 | 1,042 | 1,901 | 1,901 | 1,907 | 3,923 | 4,025 | 5,097 | 5,300 | 6,480 | 9,646 | 11,434 |
| C&LI | GWh | 1.9 | 2.4 | 3.8 | 4.9 | 6.0 | 7.2 | 8.4 | 9.7 | 11.0 | 12.4 | 35.7 | 102.4 |
| Residential | GWh | 10.0 | 10.3 | 10.6 | 10.8 | 11.1 | 11.4 | 11.7 | 12.0 | 12.3 | 12.5 | 14.2 | 16.0 |
| Demand | MW | 88 | 173 | 314 | 314 | 315 | 644 | 662 | 837 | 870 | 1,063 | 1,585 | 1,891 |

Sources: Consultant's Estimate

VI. AUES ELECTRICITY FORECASTS

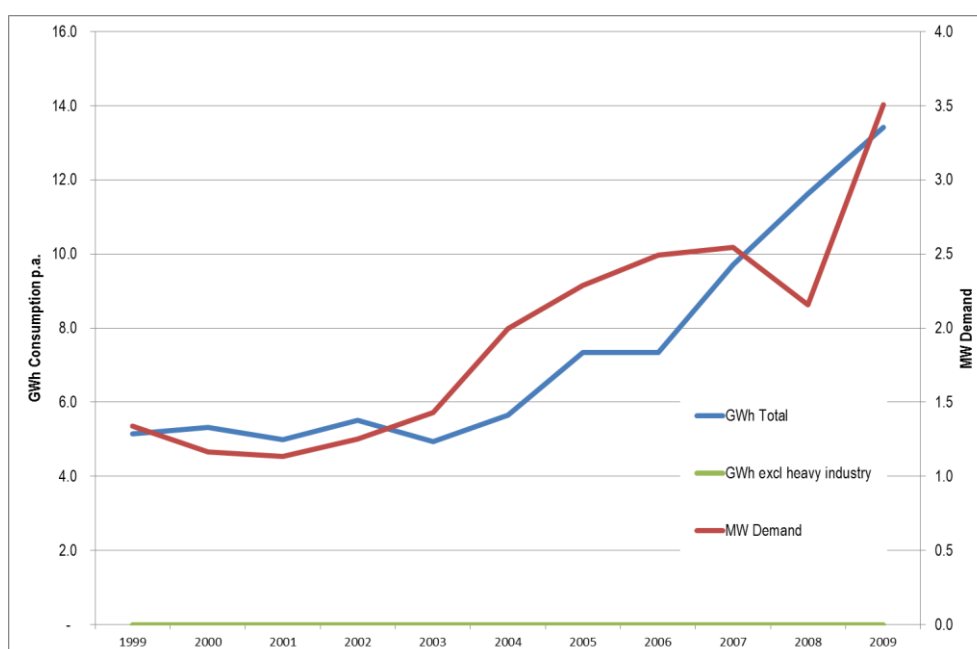
Y. AuES Electricity Consumption

127. The methodology for preparing electricity forecasts is the same as that described in Section 0 for the CES.

14. AUES Historical Electricity Demand

128. Historical electricity consumption and demand figures were provided by the Ministry of Energy. These figures form the basis for modelling the demand and reconciling against historical trends so as to make accurate projections.

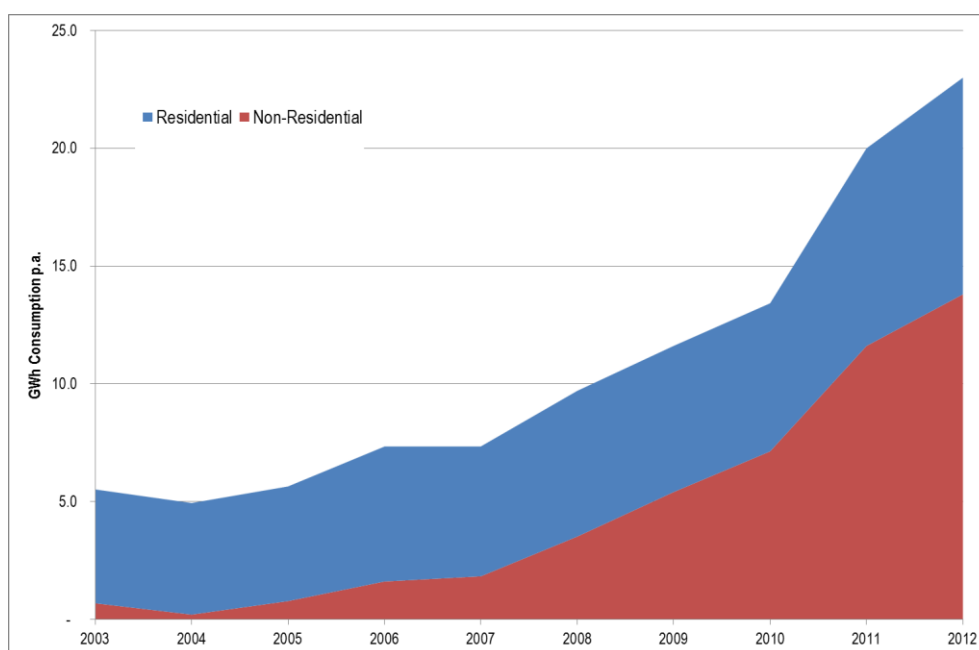
Figure VI-1: Historical AUES Power Statistics



Sources: Licensees, EA & Consultants' estimate

129. Figure VI-2 shows the historical consumption / demand in total split by residential and C&LI load. The split is based on 'bottom-up' estimates of consumption made by using typical Mongolian metrics for residential consumption (per household) and C&LI consumption (per commercial / light industry premises).

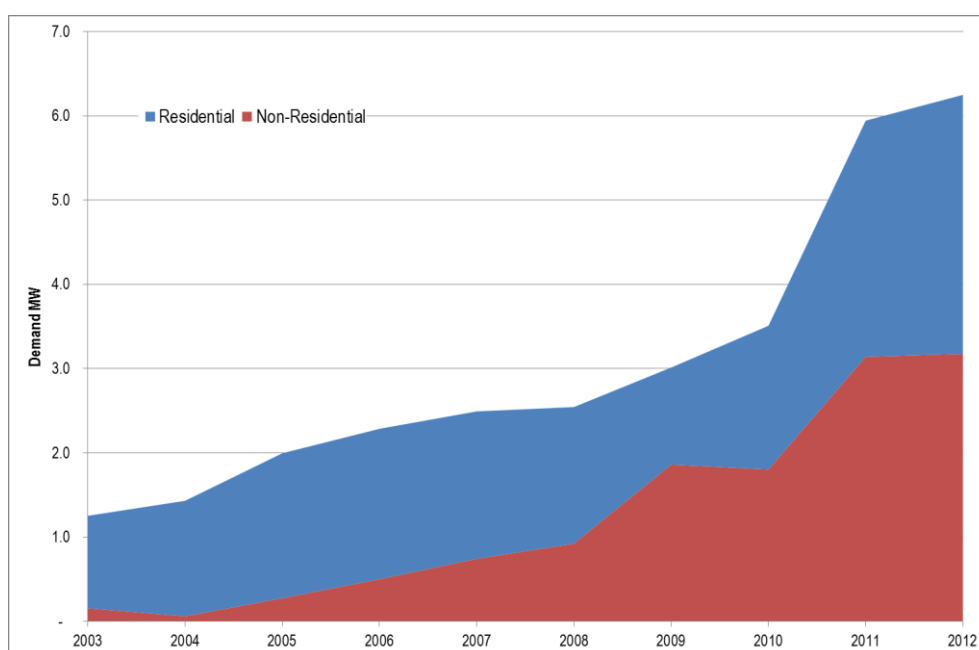
Figure VI-2: Historical AUES Consumption GWh (cumulative)



Sources: Licensees, EA & Consultants' estimate

130. Figure VI-3 shows that the non-residential sector has been growing strongly in recent years.

Figure VI-3: Historical AUES Demand MW (cumulative)



Sources: Licensees, EA & Consultants' estimate

131. Figure V-3 shows that non-residential demand has been increasing in line with the growth in consumption.

132. Table VI-4 shows the high-level estimates for AUES electricity consumption and demand disaggregated by residential and commercial and light industry.

Table VI-4: Historical AUES Electricity Statistics

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|-----------------|------|------|------|------|------|------|------|------|------|
| GWh Residential | 4.7 | 4.9 | 5.7 | 5.5 | 6.2 | 6.2 | 6.3 | 8.4 | 9.2 |
| GWh Non-Resid'l | 0.2 | 0.8 | 1.6 | 1.8 | 3.5 | 5.4 | 7.1 | 11.6 | 13.8 |
| GWh Total | 4.9 | 5.6 | 7.3 | 7.3 | 9.7 | 11.6 | 13.4 | 20.0 | 23.0 |
| MW Residential | 1.4 | 1.7 | 1.8 | 1.7 | 1.6 | 1.2 | 1.7 | 2.8 | 3.1 |
| MW Non-Resid'l | 0.1 | 0.3 | 0.5 | 0.7 | 0.9 | 1.9 | 1.8 | 3.1 | 3.2 |
| MW Total | 1.4 | 2.0 | 2.3 | 2.5 | 2.5 | 3.0 | 3.5 | 5.9 | 6.2 |

Sources: Consultants' estimate

133. Note that the disaggregation provided in Table VI-4 was derived using an 'end-use' model and, as the GWh electricity consumption was chosen as the basis for calibration, the total energy sales figures reported by the Ministry of Energy match with the figures determined by the model. The MW demand figures cannot be made to match perfectly as a result of the variation in the load factors of individual Aimags, and between their urban and rural constituents, and the effects of averaging. The calibration of the model was effected to match the demands in the later years of the historical period 2003 to 2012.

134. Table VI-5 provides the historical AUES electricity statistics reported by the Ministry of Energy.

Table VI-5: AUES Electricity Production Statistics

| MONGOLIA | | ELECTRICITY PRODUCTION STATISTICS | | | | | | | | | | | |
|--------------------|-----|-----------------------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| AUES REGION | | | | | | | | | | | | | |
| | | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| Peak Production | MW | - | - | 2.2 | 2.3 | 2.5 | 2.5 | 2.8 | 2.8 | 2.2 | 4.6 | 8.3 | 9.7 |
| Total gross output | GWh | - | - | 10.2 | 9.2 | 8.1 | 8.5 | 8.8 | 11.1 | 11.6 | 18.9 | 27.9 | 35.5 |
| Load factor | | - | - | 0.54 | 0.47 | 0.37 | 0.39 | 0.36 | 0.45 | 0.61 | 0.47 | 0.38 | 0.42 |
| Station loss | % | - | - | 3.4% | 3.2% | 4.9% | 2.9% | 2.7% | 1.7% | 3.5% | 3.8% | 3.3% | 3.3% |
| Station loss | GWh | - | - | 0.3 | 0.3 | 0.4 | 0.2 | 0.2 | 0.2 | 0.4 | 0.7 | 0.9 | 1.2 |
| Net | GWh | - | - | 9.9 | 8.9 | 7.7 | 8.3 | 8.6 | 10.9 | 11.2 | 18.2 | 27.0 | 34.3 |
| T&D loss | % | - | - | 42.7% | 43.2% | 25.6% | 10.7% | 14.3% | 10.7% | 25.0% | 25.1% | 25.1% | 25.1% |
| T&D loss | GWh | - | - | 4.4 | 4.0 | 2.1 | 0.9 | 1.3 | 1.2 | 2.9 | 4.7 | 7.0 | 8.9 |
| | | | | | | | | | | | | | |
| Total Sales | GWh | - | - | 5.5 | 4.9 | 5.6 | 7.3 | 7.3 | 9.7 | 8.3 | 13.4 | 20.0 | 25.4 |
| | GWh | - | - | - | - | - | - | - | - | - | - | - | - |
| | GWh | - | - | - | - | - | - | - | - | - | - | - | - |
| Heavy Industry | GWh | - | - | - | - | - | - | - | - | - | - | - | - |
| Other Sales | GWh | - | - | 5.5 | 4.9 | 5.6 | 7.3 | 7.3 | 9.7 | 8.3 | 13.4 | 20.0 | 25.4 |
| Total Demand | MW | - | - | 1.3 | 1.4 | 2.0 | 2.3 | 2.5 | 2.5 | 2.2 | 3.5 | 6.1 | 7.0 |

Sources: Ministry of Energy of Mongolia

Z. AuES Electricity Growth

15. Residential Sector

135. The drivers of growth in the residential sector are taken to be the population, the number of persons per household and the change in kWh consumption per customer.

136. The population growth and shifts are based on the population statistics provided by the Mongolian Bureau of Statistics.

137. The number of persons per household varies from urban to rural centre and by regional area. The following assumptions have been adopted based on household square meter data (collected for heat planning) and urban and rural population statistics.

Table VI-6: Mongolia Persons per Household

| Population Centre | Region | Urban | Rural |
|-------------------|--------|-------|-------|
| Govi-Altai | AUES | 3.0 | 4.0 |
| Zavkhan | AUES | 5.0 | 6.0 |

Sources: Consultants' estimate

138. Residential customer account statistics were estimated. The average growth in residential customer accounts from 2003 to 2012 is estimated to have been 7%.

Table VI-7: AUES Residential Customer Accounts

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|----------|-------|-------|-------|-------|-------|-------|-------|--------|--------|
| Accounts | 6,795 | 7,037 | 8,277 | 7,996 | 8,982 | 9,031 | 9,088 | 11,693 | 12,447 |
| Growth | -1.7% | 3.6% | 17.6% | -3.4% | 12.3% | 0.5% | 0.6% | 28.7% | 6.4% |

Sources: Consultants' estimate

139. Table VI-8 shows that the average growth rate of the kWh per customer measure over the last eight years has been 0.6%. The load factor for the residential customer class is below 0.4 as the system is very small.

Table VI-8: AUES Residential kWh per Customer (p.a.)

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------------------|-------|-------|------|-------|-------|-------|------|------|------|
| GWh | 4.74 | 4.87 | 5.73 | 5.51 | 6.19 | 6.21 | 6.29 | 8.39 | 9.20 |
| MW | 1.37 | 1.72 | 1.78 | 1.75 | 1.62 | 1.15 | 1.71 | 2.80 | 3.07 |
| LF | 0.39 | 0.32 | 0.37 | 0.36 | 0.44 | 0.61 | 0.42 | 0.34 | 0.34 |
| kWh per Customer | 697 | 692 | 692 | 689 | 689 | 687 | 692 | 718 | 739 |
| Growth | -0.3% | -0.7% | 0.1% | -0.4% | -0.1% | -0.2% | 0.7% | 3.7% | 3.0% |

Sources: Consultants' estimate

16. Commercial & Light Industry Sector (C & LI)

140. In Table II-1 it was shown that one of the drivers of commercial and light industrial energy consumption is floor space of public buildings. Floor space statistics have been gathered for floor space in Govi-Altai and Zavkhan Aimags.

Table VI-9: Commercial / Light Industrial Floor Space ('000's m², year 2011)

| Floor Space | |
|----------------------|-----|
| 000's m ² | |
| Govi-Altai | 134 |
| Zavkhan | 117 |

Sources: Local Government Authorities

141. Whilst the historical floor space statistics are considered valid, the forecasts for floor space are less certain given the population shifts that are expected and the potential impact on small to medium-sized business activity. As a consequence it is considered that the growth trends in customer accounts and kWh per customer are more suitable for forecasting purposes.

142. Over the last eight years the average growth rate of C&LI industrial customer accounts is estimated to be 13%.

Table VI-10: AUES Historical C & LI Customer Account Growth

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|----------|------|------|-------|------|------|------|------|-------|-------|
| Accounts | 230 | 248 | 307 | 337 | 369 | 398 | 421 | 573 | 649 |
| Growth | 3.9% | 8.0% | 23.8% | 9.6% | 9.6% | 7.9% | 5.7% | 36.2% | 13.1% |

Sources: Consultants' estimate

143. Table VI-11 shows that the average growth rate of the kWh per customer measure for the AUES C&LI customer class during the last eight years has been of the order of 46%. The load factor for the AUES C&LI customer class is taken to be 0.5.

Table VI-11: AUES Historical C & LI kWh per Customer

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------------------|--------|--------|-------|-------|-------|--------|--------|--------|--------|
| GWh | 0.21 | 0.78 | 1.61 | 1.83 | 3.52 | 5.41 | 7.13 | 11.61 | 13.80 |
| MW | 0.06 | 0.27 | 0.50 | 0.74 | 0.92 | 1.86 | 1.80 | 3.14 | 3.18 |
| LF | 0.39 | 0.32 | 0.37 | 0.28 | 0.44 | 0.33 | 0.45 | 0.42 | 0.50 |
| kWh per Customer | 895 | 3,136 | 5,244 | 5,441 | 9,533 | 13,582 | 16,943 | 20,249 | 21,282 |
| Growth | -71.2% | 250.5% | 67.2% | 3.8% | 75.2% | 42.5% | 24.7% | 19.5% | 5.1% |

Sources: Consultants' estimate

17. Large Industrial Sector

144. For the large industrial sector no significant large industrial customers were identified to be supplied by a distribution company or the CRETG.

AA. AuES Consumption Forecasts by Class

18. AUES Residential Class Forecasts

145. Residential class electricity consumption and demand figures has been modelled at the level of the Aimags and major towns, differentiated according to urban and rural populations.

146. In each case the persons per household and percentage electrification was used to estimate the number of urban and rural electricity customers. The person per household

measure was assumed according to the figures in Table IV-6.

147. The following assumptions were made with regard to annual electricity consumption by dwelling type.

Table VI-12: Annual kWh Consumption per Customer

| | Small | Large |
|------------------------------------|-------|-------|
| kWh Consumption per Apartment | 1,200 | 2,300 |
| kWh Consumption per Detached House | 1,300 | 2,400 |
| kWh Consumption per Ger | 450 | 500 |

Sources: Consultant's estimate, World Bank

148. These assumptions were input to an end-use forecasting model. The model is provided as Appendix A to this report, and includes specific details for Govi-Altai and Zavkhan Aimags.

149. The model takes into account the growth in residential customer accounts according to population movements and the average rate of growth in customer accounts between 2003 and 2011. The residential customer account forecast assumption is shown in Table VI-13.

Table VI-13: AUES Residential Customer Account Forecast

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|----------|--------|--------|--------|--------|--------|--------|--------|--------|
| Accounts | 13,175 | 14,245 | 14,501 | 14,715 | 14,548 | 14,308 | 14,068 | 13,827 |
| Growth | 5.8% | 8.1% | 1.8% | 1.5% | -1.1% | -1.7% | -1.7% | -1.7% |

Sources: Consultants' estimate

150. The population movements suggest that residential sector kWh per customer growth will have average only 1.4% due to the population movements away from Govi-Altai and Zavkhan Aimags.

151. The resulting forecast for the residential customer class is shown in Table VI-14. The load factor is assumed to remain constant at 0.34.

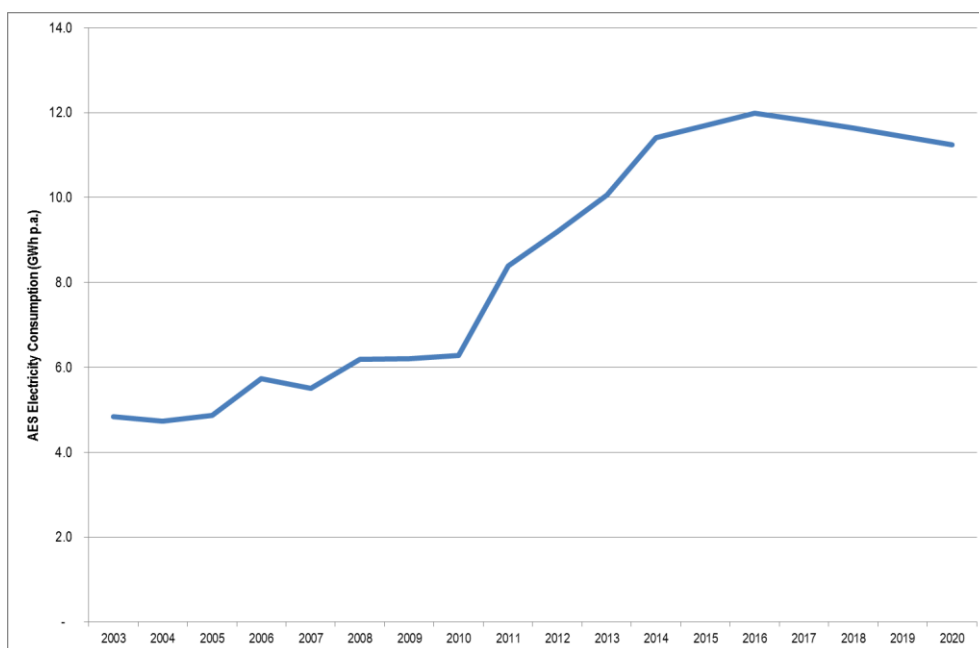
Table VI-14: AUES Residential Load Forecast

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|------------------|------|------|------|------|------|------|------|------|
| GWh | 10.1 | 11.4 | 11.7 | 12.0 | 11.8 | 11.6 | 11.4 | 11.2 |
| MW | 3.4 | 3.8 | 3.9 | 4.0 | 3.9 | 3.9 | 3.8 | 3.8 |
| LF | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 |
| kWh per Customer | 764 | 801 | 806 | 814 | 813 | 813 | 813 | 813 |

Sources: Consultants' estimate

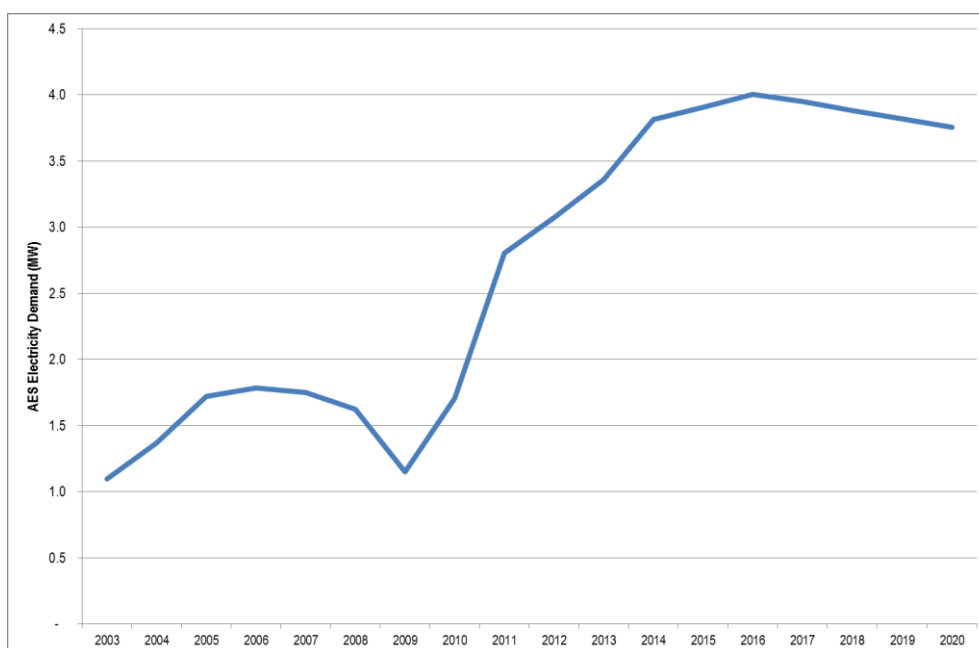
152. The historical consumption and forecast for the residential customer class is charted as Figure VI-15 and Figure VI-16.

Figure VI-15: AUES Residential Consumption (GWh p.a.)



Sources: Consultants' estimate

Figure VI-16: AUES Residential Demand (MW)



Sources: Consultants' estimate

19. C&LI Forecast

153. An end-use forecast for electricity consumption for the commercial and light industrial customer class is based on the assumption that kWh per customer growth will continue at an average of 7.8% per annum.

Table VI-17: AUES C&LI Customer Account Forecast

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|----------|-------|-------|------|------|-------|-------|-------|-------|
| Accounts | 729 | 838 | 906 | 976 | 1,024 | 1,069 | 1,115 | 1,163 |
| Growth | 12.5% | 14.9% | 8.1% | 7.8% | 5.0% | 4.4% | 4.3% | 4.4% |

Sources: Consultants' estimate

154. The resulting kWh per customer measure for the C&LI customer class is shown in Table VI-18. The load factor is assumed to remain constant at 0.5 due to the small size of the system.

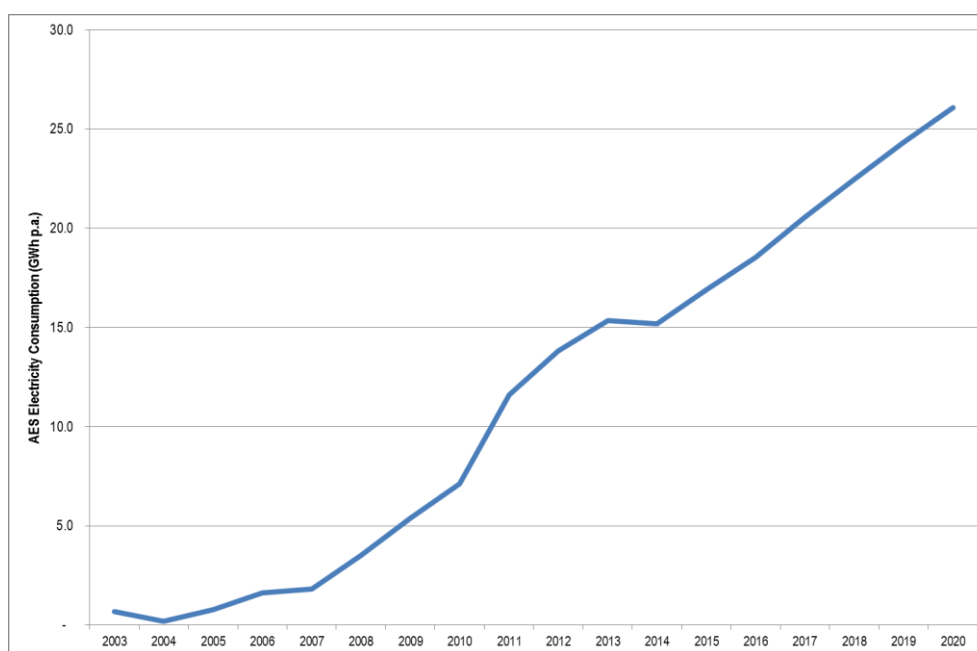
Table VI-18: AUES C&LI Load Forecast

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| GWh | 15.3 | 15.2 | 16.9 | 18.5 | 20.5 | 22.5 | 24.3 | 26.1 |
| MW | 3.5 | 3.5 | 3.9 | 4.2 | 4.7 | 5.1 | 5.6 | 6.0 |
| LF | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| kWh per Customer | 21,025 | 18,113 | 18,680 | 19,009 | 20,057 | 21,030 | 21,821 | 22,421 |
| Growth | -1.2% | -13.8% | 3.1% | 1.8% | 5.5% | 4.9% | 3.8% | 2.8% |

Sources: Consultants' estimate

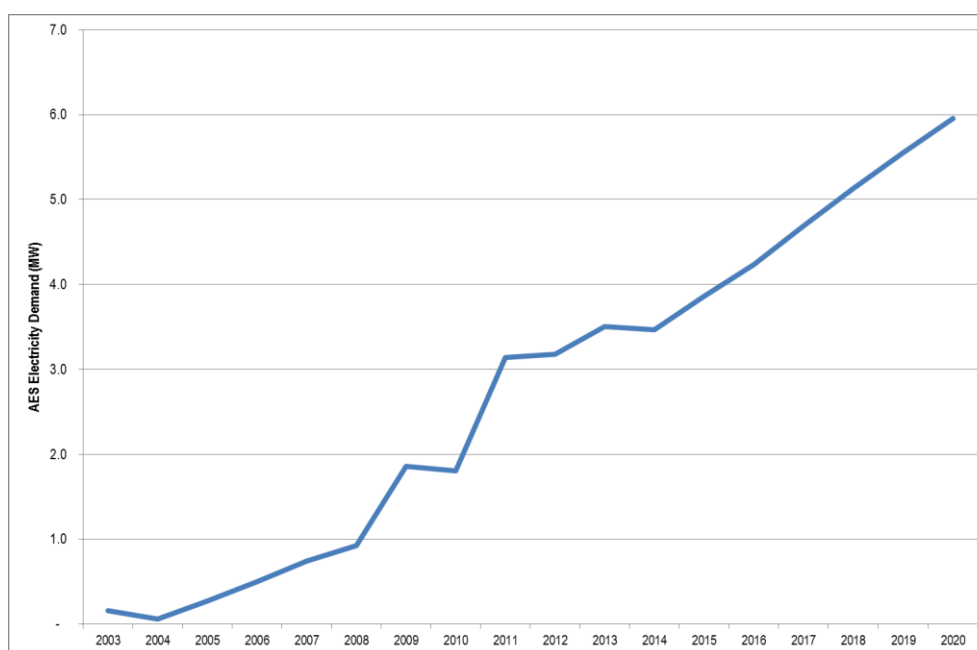
155. The end-use historical consumption and forecast for the C&LI customer class is charted in Figure VI-19 and Figure VI-20.

Figure VI-19: AUES C&LI Consumption (GWh p.a.)



Sources: Consultants' estimate

Figure VI-20: AUES C&LI Demand (MW)



Sources: Consultants' estimate

156. The non-residential end-use forecasting model is provided as Appendix B to this report specifically for Govi-Altai and Zavkhan Aimags.

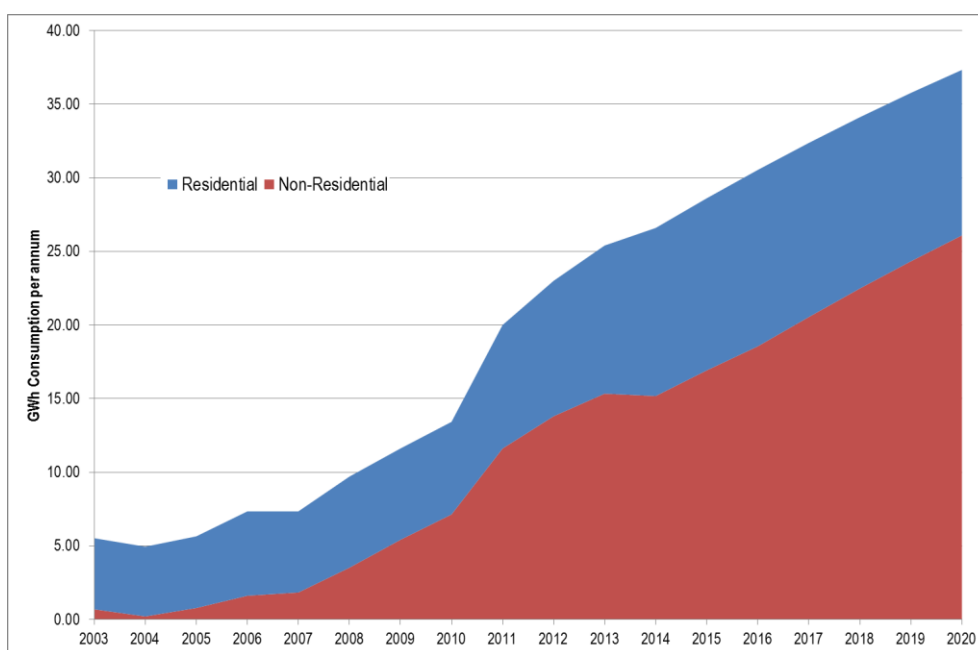
20. Heavy Industry Forecast

157. The Bayan Irag mine / iron ore dressing facilities are expected to develop, beginning at 3MW in 2013 growing to 6MW by 2015.

BB. AuES Electricity Consumption Forecasts

158. The total 'medium' growth forecasts by customer class are shown in the charts that follow.

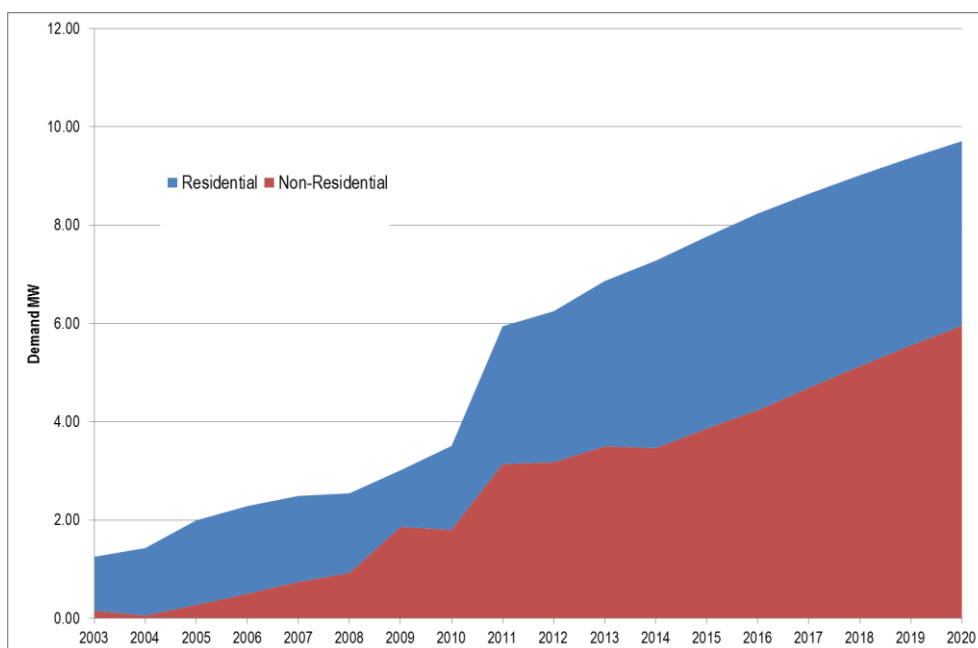
Figure VI-21: Forecast AUES Consumption GWh (cumulative)



Sources: Licensees, EA & Consultants' estimate

159. Figure VI-21 shows expected strong growth in the non-residential sector.

Figure VI-22: Forecast AUES Demand MW (cumulative)



Sources: Licensees, EA & Consultants' estimate

160. Table VI-23 provides the forecast for AUES electricity consumption and demand, disaggregated by residential, and C&LI customer classes.

Table VI-23: Forecast AUES Electricity Consumption (Medium)

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2025 | 2030 |
|----------------|------|------|------|------|------|------|------|------|------|------|
| GWh Resid'l | 10.1 | 11.4 | 11.7 | 12.0 | 11.8 | 11.6 | 11.4 | 11.2 | 12.8 | 14.6 |
| GWh Non-Resd'l | 15.3 | 15.2 | 16.9 | 18.5 | 20.5 | 22.5 | 24.3 | 26.1 | 39.0 | 58.2 |
| GWh Total | 25.4 | 26.6 | 28.6 | 30.5 | 32.4 | 34.1 | 35.8 | 37.3 | 51.8 | 72.8 |
| MW Residential | 3.4 | 3.8 | 3.9 | 4.0 | 3.9 | 3.9 | 3.8 | 3.8 | 4.3 | 4.9 |
| MW Non-Resid'l | 3.5 | 3.5 | 3.9 | 4.2 | 4.7 | 5.1 | 5.6 | 6.0 | 8.8 | 13.1 |
| MW Total | 6.9 | 7.3 | 7.8 | 8.2 | 8.6 | 9.0 | 9.4 | 9.7 | 13.1 | 18.0 |

Sources: Consultants' estimate

CC. AuES Power Production

161. A forecast of the power production of AUES under the medium growth scenario is provided as Table VI-24. Low, medium and high growth scenarios have also been prepared, as detailed in the Executive Summary; the low growth rate is assumed at -10% of the medium rate. The high growth rate includes the Bayan Irag ore mine. The high growth rate is set at more than double the medium growth rate.

Table VI-24: AUES POWER PRODUCTION – Medium Growth

| MONGOLIA | | ELECTRICITY FORECAST – MEDIUM GROWTH | | | | | | | | | | | |
|--------------------|-----|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| AUES REGION | | | | | | | | | | | | | |
| | | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2025 | 2030 |
| Peak Production | MW | 8.3 | 8.7 | 9.6 | 10.2 | 10.9 | 11.5 | 12.1 | 12.6 | 13.1 | 11.9 | 15.1 | 20.8 |
| Total gross output | GWh | 27.9 | 32.1 | 35.5 | 37.2 | 40.0 | 42.7 | 45.2 | 47.7 | 50.0 | 45.7 | 59.7 | 84.0 |
| Load factor | | 0.38 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.43 | 0.43 | 0.44 | 0.44 | 0.45 | 0.46 |
| Station loss | % | 3.30% | 3.30% | 3.30% | 3.30% | 3.30% | 3.30% | 3.30% | 3.30% | 3.30% | 3.30% | 3.30% | 3.30% |
| Station loss | GWh | 0.92 | 1.06 | 1.17 | 1.23 | 1.32 | 1.41 | 1.49 | 1.57 | 1.65 | 1.51 | 1.97 | 2.77 |
| Net | GWh | 27.0 | 31.1 | 34.3 | 35.9 | 38.6 | 41.3 | 43.7 | 46.1 | 48.3 | 44.2 | 57.8 | 81.2 |
| T&D loss | % | 25% | 25% | 25% | 25% | 25% | 25% | 25% | 25% | 25% | 15% | 10% | 10% |
| T&D loss | GWh | 7.0 | 8.1 | 8.9 | 9.3 | 10.0 | 10.7 | 11.4 | 12.0 | 12.6 | 6.9 | 6.0 | 8.4 |
| | | | | | | | | | | | | | |
| Purchases | GWh | 20.00 | 23.0 | 25.4 | 26.6 | 28.6 | 30.5 | 32.4 | 34.1 | 35.8 | 37.3 | 51.8 | 72.8 |
| | GWh | | | | | | | | | | | | |
| | GWh | | | | | | | | | | | | |
| Heavy Industry | GWh | 11.6 | 13.8 | 15.3 | 15.2 | 16.9 | 18.5 | 20.5 | 22.5 | 24.3 | 26.1 | 39.0 | 58.2 |
| Other Sales | GWh | 8.4 | 9.2 | 10.1 | 11.4 | 11.7 | 12.0 | 11.8 | 11.6 | 11.4 | 11.2 | 12.8 | 14.6 |
| Demand | MW | 5.9 | 6.2 | 6.9 | 7.3 | 7.8 | 8.2 | 8.6 | 9.0 | 9.4 | 9.7 | 13.1 | 18.0 |

VII. ERES ELECTRICITY FORECASTS

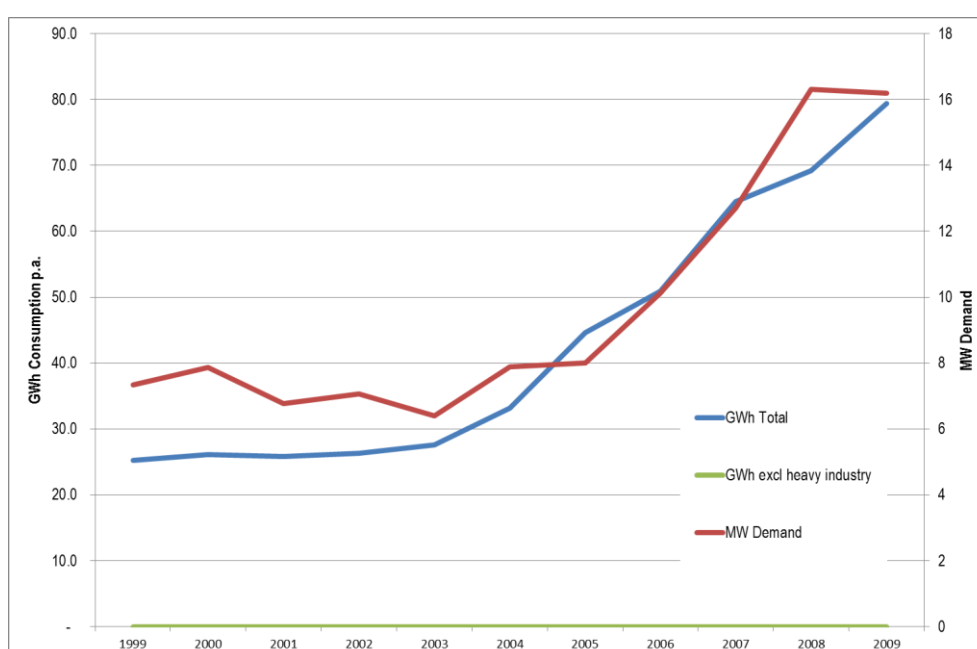
DD. ERES Electricity Consumption

162. The methodology for preparing electricity forecasts is the same as that described in Section 0 for the CES.

21. ERES Historical Electricity Demand

163. Historical electricity consumption and demand figures were provided by the Ministry of Energy. These figures form the basis for modelling the demand and reconciling against historical trends so as to make accurate projections.

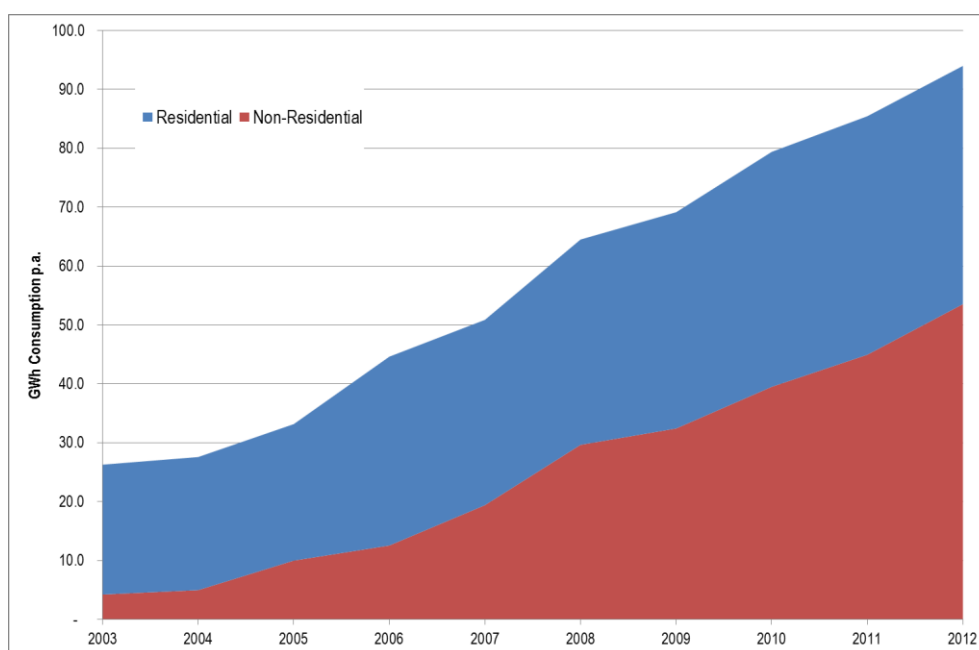
Figure VII-1: Historical ERES Power Statistics



Sources: Licensees, EA & Consultants' estimate

164. Figure VII-2 shows the historical consumption / demand in total split by residential and C&LI load. The split is based on 'bottom-up' estimates of consumption made by using typical Mongolian metrics for residential consumption (per household) and C&LI consumption (per commercial / light industry premises).

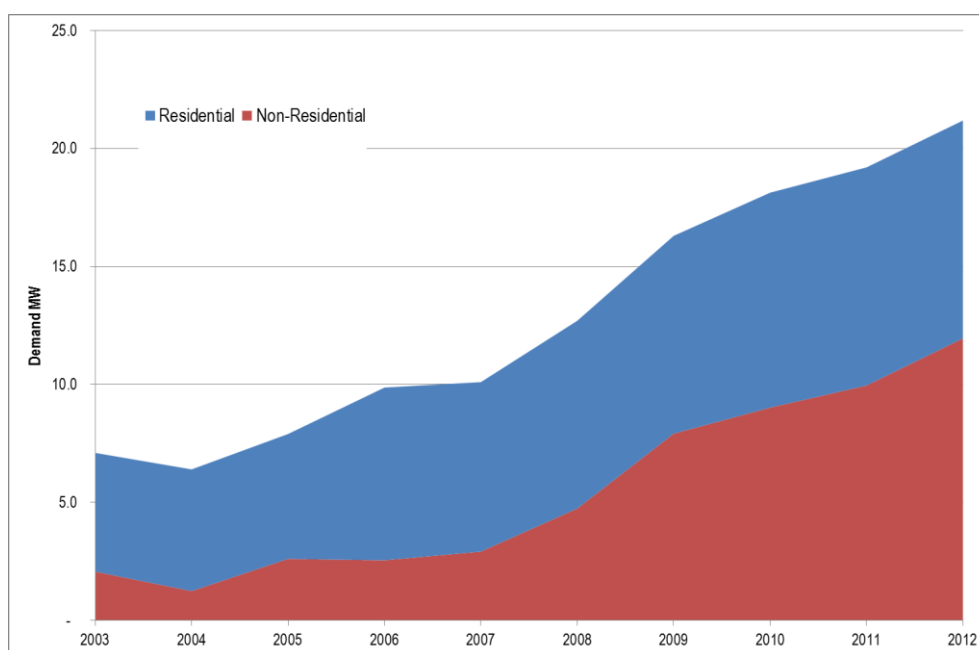
Figure VII-2: Historical ERES Consumption GWh (cumulative)



Sources: Licensees, EA & Consultants' estimate

165. Figure VII-2 shows that C&I sector consumption has been growing strongly for five years.

Figure VII-3: Historical ERES Demand MW (cumulative)



Sources: Licensees, EA & Consultants' estimate

166. Figure V-3 shows that C&I demand has been increasing in line with the growth in consumption.

167. Table VII-4 shows the high-level estimates for ERES electricity consumption and demand disaggregated by residential and commercial and light industry.

Table VII-4: ERES Electricity Consumption Statistics

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| GWh Residential | 22.6 | 23.2 | 32.1 | 31.5 | 34.9 | 36.7 | 39.9 | 40.5 | 40.5 |
| GWh Non-Resid'l | 5.0 | 10.0 | 12.6 | 19.4 | 29.7 | 32.4 | 39.5 | 45.0 | 53.5 |
| GWh Total | 27.58 | 33.17 | 44.63 | 50.88 | 64.52 | 69.15 | 79.41 | 85.45 | 94.00 |
| MW Residential | 5.2 | 5.3 | 7.3 | 7.2 | 8.0 | 8.4 | 9.1 | 9.2 | 9.2 |
| MW Non-Resid'l | 1.2 | 2.6 | 2.5 | 2.9 | 4.7 | 7.9 | 9.0 | 10.0 | 12.0 |
| MW Total | 6.4 | 7.9 | 9.9 | 10.1 | 12.7 | 16.3 | 18.1 | 19.2 | 21.2 |

Sources: Consultants' estimate

168. Note that the disaggregation provided in Table VII-4 was derived using a 'bottom-up' model and, as the GWh electricity consumption was chosen as the basis for calibration, the total energy sales figures reported by the Ministry of Energy match with the figures determined by the model. The MW demand figures cannot be made to match perfectly as a result of the variation in the load factors of individual Aimags, and between their urban and rural constituents, and the effects of averaging. The calibration of the model was effected to match the demands in the later years of the historical period 2003 to 2010.

169. Table VII-5 provides the historical ERES electricity statistics reported by the Ministry of Energy.

Table VII-5: ERES Electricity Production Statistics

| MONGOLIA | | ELECTRICITY STATISTICS | | | | | | | | | | | |
|--------------------|-----|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| ERES REGION | | | | | | | | | | | | | |
| | | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| Peak Production | MW | 14.7 | 12.7 | 12.4 | 11.3 | 12.7 | 12.2 | 14.3 | 17.7 | 22.3 | 22.2 | 26.9 | 29.3 |
| Total gross output | GWh | 59.5 | 55.2 | 52.8 | 52.5 | 57.8 | 66.6 | 73.1 | 90.7 | 99.9 | 110.9 | 119.8 | 130.0 |
| Load factor | | 0.46 | 0.50 | 0.49 | 0.53 | 0.52 | 0.62 | 0.58 | 0.58 | 0.51 | 0.57 | 0.5 | 0.5 |
| Station loss | % | 29.8% | 29.6% | 28.7% | 28.0% | 26.0% | 24.1% | 22.8% | 20.9% | 20.7% | 19.7% | 0.2 | 0.2 |
| Station loss | GWh | 17.7 | 16.3 | 15.1 | 14.7 | 15.0 | 16.1 | 16.7 | 19.0 | 20.7 | 21.9 | 24.0 | 24.7 |
| Net | GWh | 41.8 | 38.9 | 37.6 | 37.8 | 42.8 | 50.6 | 56.4 | 71.8 | 79.2 | 89.1 | 95.9 | 105.3 |
| T&D loss | % | 26.3% | 23.7% | 21.5% | 19.5% | 16.6% | 8.9% | 7.6% | 8.0% | 10.1% | 8.7% | 0.1 | 0.1 |
| T&D loss | GWh | 15.6 | 13.1 | 11.3 | 10.2 | 9.6 | 5.9 | 5.6 | 7.3 | 10.1 | 9.7 | 10.4 | 11.3 |
| | | | | | | | | | | | | | |
| Total Sales | GWh | 26.1 | 25.8 | 26.3 | 27.6 | 33.2 | 44.6 | 50.9 | 64.5 | 69.2 | 79.4 | 85.5 | 94.0 |
| | GWh | - | - | - | - | - | - | - | - | - | - | - | - |
| | GWh | - | - | - | - | - | - | - | - | - | - | - | - |
| Heavy Industry | GWh | - | - | - | - | - | - | - | - | - | - | - | - |
| Other Sales | GWh | 26.1 | 25.8 | 26.3 | 27.6 | 33.2 | 44.6 | 50.9 | 64.5 | 69.2 | 79.4 | 85.5 | 94.0 |
| Total Demand | MW | 7.9 | 6.8 | 7.1 | 6.4 | 7.9 | 8.0 | 10.1 | 12.7 | 16.3 | 16.2 | 19.2 | 21.2 |

EE. ERES Electricity Growth

22. Residential Sector

170. The drivers of growth in the residential sector are taken to be the population, the number of persons per household and the change in kWh consumption per customer.

171. The population growth and shifts are based on the population statistics provided by the Mongolian Bureau of Statistics.

172. The number of persons per household varies from urban to rural centre and by regional area. The following assumptions have been adopted based on household square meter data (collected for heat planning) and urban and rural population statistics.

Table VII-6: Mongolia Persons per Household

| Population Centre | Region | Urban | Rural |
|-------------------|--------|-------|-------|
| Dornod | ERES | 4.0 | 5.0 |
| Hentii | ERES | 4.0 | 5.0 |
| Sukhbaatar | ERES | 4.0 | 5.0 |

Sources: Consultants' estimate

173. Residential customer account statistics were estimated. The average growth in residential customer accounts from 2003 to 2011 is estimated to have been 4.2%.

Table VII-7: ERES Residential Customer Accounts

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Accounts | 23,080 | 23,693 | 24,882 | 24,898 | 26,226 | 27,980 | 30,113 | 32,042 | 32,763 |
| Growth | 2.0% | 2.7% | 5.0% | 0.1% | 5.3% | 6.7% | 7.6% | 6.4% | 2.3% |

Sources: Consultants' estimate

174. Table VII-8 shows that the average growth rate of the kWh per customer measure over the last eight years has been 3%. The load factor for the residential customer class is below 0.5 as the system is very small.

Table VII-8: ERES Residential kWh per Customer (p.a.)

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| GWh | 22.60 | 23.18 | 32.07 | 31.47 | 34.86 | 36.73 | 39.90 | 40.50 | 40.46 |
| MW | 5.16 | 5.29 | 7.32 | 7.18 | 7.96 | 8.39 | 9.11 | 9.25 | 9.24 |
| LF | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| kWh per Customer | 979 | 979 | 1,289 | 1,264 | 1,329 | 1,313 | 1,325 | 1,264 | 1,235 |
| Growth | 0.5% | -0.1% | 31.7% | -1.9% | 5.2% | -1.3% | 1.0% | -4.6% | -2.3% |

Sources: Consultants' estimate

23. Commercial & Light Industry Sector (C & LI)

175. In Table II-1 it was shown that one of the drivers of commercial and light industrial energy consumption is floor space of public buildings. Floor space statistics have been

gathered for floor space in Dornod, Hentii and Sukhbataar Aimags.

Table VII-9: Commercial / Light Industrial Floor Space ('000's m², year 2011)

| Floor Space | |
|----------------------|-----|
| 000's m ² | |
| Dornod | 109 |
| Hentii | 89 |
| Sukhbataar | 96 |

Sources: Local Government Authorities

176. Whilst the historical floor space statistics are considered valid, the forecasts for floor space are less certain given the population shifts that are expected and the potential impact on small to medium-sized business activity. As a consequence it is considered that the growth trends in customer accounts and kWh per customer are more suitable for forecasting purposes.

177. The average growth rate of C&LI industrial customer accounts is estimated to be 9%.

Table VII-10: ERES Historical C & LI Customer Account Growth

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Accounts | 1,183 | 1,276 | 1,368 | 1,418 | 1,642 | 1,698 | 1,970 | 2,211 | 2,391 |
| Growth | 7.7% | 7.9% | 7.2% | 3.7% | 15.8% | 3.4% | 16.1% | 12.2% | 8.2% |

Sources: Consultants' estimate

178. Table VII-11 shows that the average growth rate of the kWh per customer measure for the ERES C&LI customer class during the last eight years has been of the order of 24%. The load factor for the ERES C&LI customer class is taken to be 0.5.

Table VII-11: ERES Historical C & LI kWh per Customer

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------------------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| GWh | 4.98 | 9.99 | 12.56 | 19.41 | 29.65 | 32.42 | 39.50 | 44.95 | 53.54 |
| MW | 1.24 | 2.61 | 2.55 | 2.92 | 4.74 | 7.91 | 9.02 | 9.95 | 11.95 |
| LF | 0.46 | 0.44 | 0.56 | 0.76 | 0.71 | 0.47 | 0.50 | 0.52 | 0.51 |
| kWh per Customer | 4,210 | 7,828 | 9,183 | 13,685 | 18,053 | 19,100 | 20,047 | 20,333 | 22,393 |
| Growth | 9.2% | 85.9% | 17.3% | 49.0% | 31.9% | 5.8% | 5.0% | 1.4% | 10.1% |

Sources: Consultants' estimate

24. Large Industrial Sector

179. For the large industrial sector no significant large industrial customers were identified to be supplied by a distribution company or the CRETG.

FF. ERES Consumption Forecasts by Class

25. ERES Residential Class Forecasts

180. Residential class electricity consumption and demand figures has been modelled at the level of the Aimags and major towns, differentiated according to urban and rural populations.

181. In each case the persons per household and percentage electrification was used to estimate the number of urban and rural electricity customers. The person per household measure was assumed according to the figures in Table IV-6.

182. The following assumptions were made with regard to annual electricity consumption by dwelling type.

Table VII-12: Annual kWh Consumption per Customer

| | Small | Large |
|------------------------------------|-------|-------|
| kWh Consumption per Apartment | 1,200 | 2,300 |
| kWh Consumption per Detached House | 1,300 | 2,400 |
| kWh Consumption per Ger | 450 | 500 |

Sources: Consultant's estimate, World Bank

183. These assumptions were input to a forecasting model. The model is provided as Appendix A to this report, and includes specific details for Dornod, Hentii and Sukhbataar Aimags.

184. The model takes into account the growth in residential customer accounts according to population movements and the average rate of growth in customer accounts between 2003 and 2011. The residential customer account forecast assumption is shown in Table VII-13.

Table VII-13: ERES Residential Customer Account Forecast

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|----------|--------|--------|--------|--------|--------|--------|--------|--------|
| Accounts | 34,830 | 28,479 | 28,070 | 27,662 | 27,253 | 26,845 | 26,436 | 26,028 |
| Growth | 6.3% | -18.2% | -1.4% | -1.5% | -1.5% | -1.5% | -1.5% | -1.5% |

Sources: Consultants' estimate

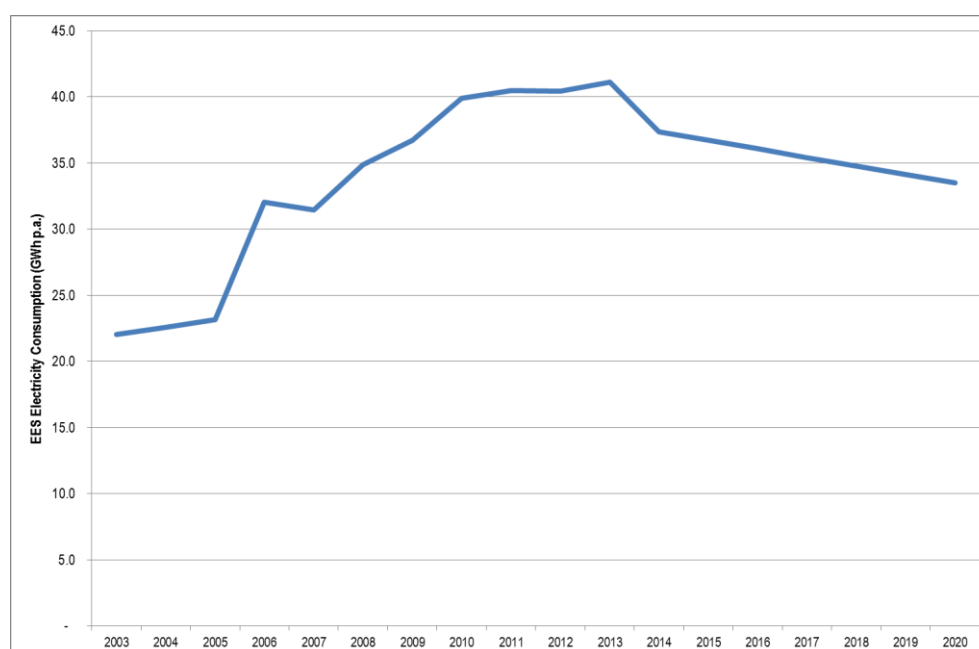
185. The population movements suggest that residential sector kWh per customer growth will have a negative average of -1.1% due to the population movements away from Dornod, Hentii and Sukhbataar Aimags. The resulting forecast for the residential customer class is shown in Table VII-14. The load factor is assumed at 0.67.

Table VII-14: ERES Residential Load Forecast

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2013 |
|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| GWh | 41.1 | 37.3 | 36.7 | 36.1 | 35.4 | 34.8 | 34.2 | 33.5 | 41.1 |
| MW | 9.4 | 8.5 | 8.4 | 8.2 | 8.1 | 7.9 | 7.8 | 7.7 | 9.4 |
| LF | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| kWh per Customer | 1,181 | 1,311 | 1,308 | 1,304 | 1,300 | 1,296 | 1,292 | 1,288 | 1,181 |

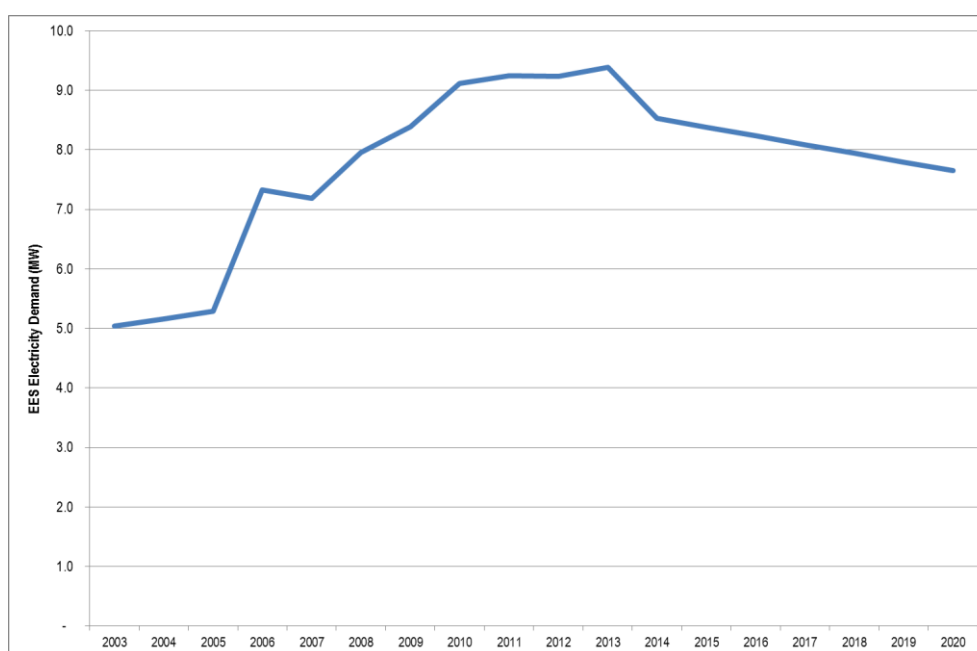
Sources: Consultants' estimate

Figure VII-15: ERES Residential Consumption (GWh p.a.)



Sources: Consultants' estimate

Figure VII-16: ERES Residential Demand (MW)



Sources: Consultants' estimate

26. C&LI Forecast

186. An end-use forecast for electricity consumption for the commercial and light industrial customer class is based on the assumption that kWh per customer growth will continue at an average of 2.4% per annum.

Table VII-17: ERES C&LI Customer Account Forecast

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2013 |
|----------|-------|--------|-------|-------|-------|-------|-------|-------|-------|
| Accounts | 2,691 | 2,331 | 2,435 | 2,558 | 2,688 | 2,766 | 2,847 | 2,843 | 2,691 |
| Growth | 12.5% | -13.4% | 4.5% | 5.1% | 5.1% | 2.9% | 2.9% | -0.1% | 12.5% |

Sources: Consultants' estimate

187. The resulting kWh per customer measure for the C&LI customer class is shown in Table VII-18. The load factor is assumed to remain constant at 0.5 due to the small size of the system.

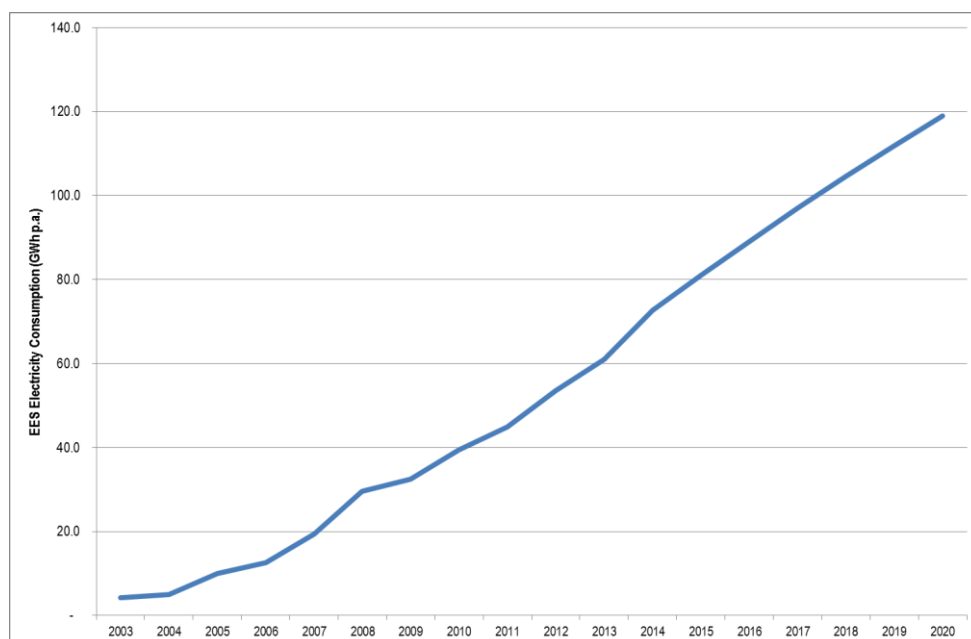
Table VII-18: ERES C&LI Load Forecast

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2013 |
|------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| GWh | 61.0 | 72.7 | 81.0 | 89.1 | 97.0 | 104.6 | 111.9 | 119.0 | 61.0 |
| MW | 13.6 | 16.2 | 18.1 | 19.9 | 21.6 | 23.3 | 25.0 | 26.6 | 13.6 |
| LF | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 |
| kWh per Customer | 22,669 | 31,199 | 33,290 | 34,845 | 36,072 | 37,799 | 39,305 | 41,858 | 22,669 |
| Growth | 1.2% | 37.6% | 6.7% | 4.7% | 3.5% | 4.8% | 4.0% | 6.5% | 1.2% |

Sources: Consultants' estimate

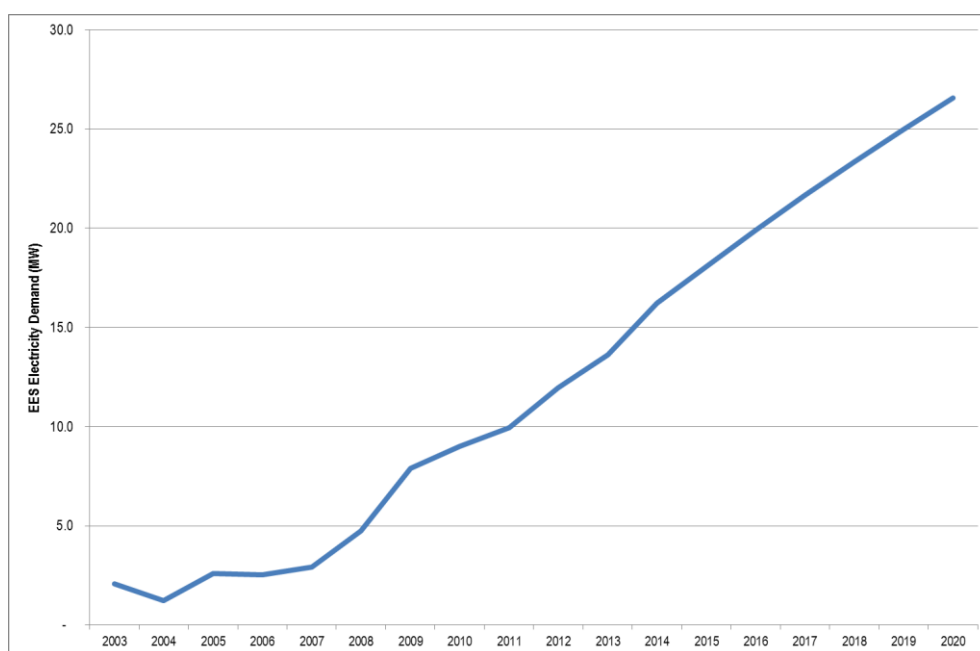
188. The forecast for the C&LI customer class follows

Figure VII-19: ERES C&LI Consumption (GWh p.a.)



Sources: Consultants' estimate

Figure VII-20: ERES C&LI Demand (MW)



Sources: Consultants' estimate

189. The C&LI end-use forecasting model is provided as Appendix B to this report specifically for Dornod, Hentii and Sukhbataar Aimags.

190. In addition industry consumption / demand have been assessed for the ERES by market survey.

191. Market surveys identified the following heavy industry developments. It is understood that these developments are in the planning phase.

Table VII-21: ERES Heavy Industry Forecast Assumptions (MW)

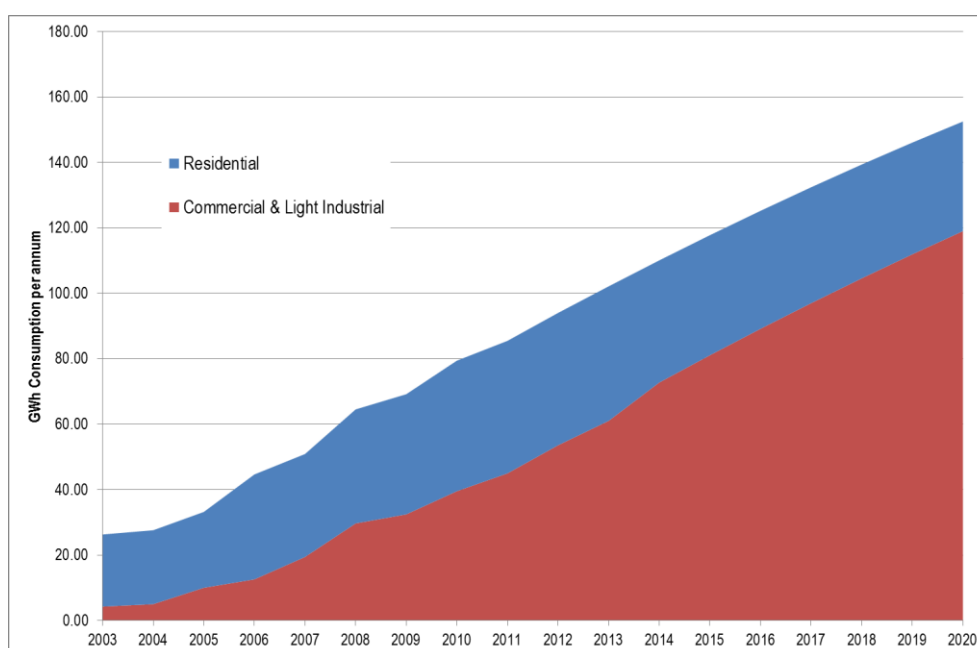
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2025 | 2030 |
|----------------------------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| MAK Company mine | - | 5 | 10 | 10 | 15 | 15 | 20 | 20 | 20 | 20 | 20 |
| Coal chemical factory, MAK | - | - | 20 | 40 | 60 | 60 | 60 | 80 | 80 | 80 | 80 |
| Other | 2.0 | 4.6 | 5.7 | 9.5 | 10 | 10.7 | 12.5 | 12.9 | 14.6 | 17.8 | 17.8 |
| MW | 2.0 | 9.6 | 35.7 | 59.5 | 85 | 85.7 | 92.5 | 112.9 | 114.6 | 117.8 | 117.8 |
| GWh | 12.3 | 58.9 | 218.9 | 364.9 | 521.2 | 525.5 | 567.2 | 692.3 | 702.7 | 722.4 | 722.4 |
| Load Factor | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 |

Sources: Consultant's survey

GG. ERES Electricity Forecast

192. The total 'medium' growth forecasts by customer class are shown in the charts that follow.

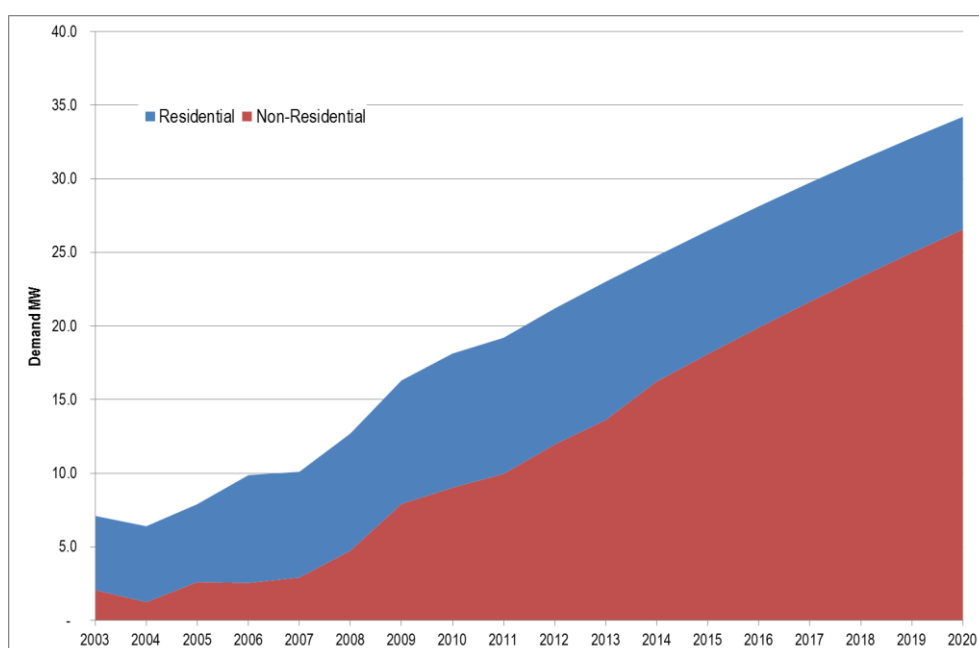
Figure VII-22: Forecast ERES Consumption GWh (cumulative)



Sources: Consultants' estimate

193. Figure VII-23 shows the significant growth expected in the commercial sector.

Figure VII-23: Forecast ERES Demand MW (cumulative)



Sources: Consultants' estimate

194. Table VII-24 provides a forecast of ERES electricity consumption and demand disaggregated by residential and commercial and light industry classes.

Table VII-24: Forecast ERES Electricity Consumption (Medium)

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2025 | 2030 |
|----------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| GWh Resid'l | 40.5 | 41.1 | 37.3 | 36.7 | 36.1 | 35.4 | 34.8 | 34.2 | 33.5 | 29.9 | 26.6 |
| GWh Non-Res | 53.5 | 61.0 | 72.7 | 81.0 | 89.1 | 97.0 | 104.6 | 111.9 | 119.0 | 196.6 | 325.0 |
| GWh Total | 94.0 | 102.1 | 110.1 | 117.8 | 125.2 | 132.4 | 139.4 | 146.1 | 152.5 | 226.5 | 351.6 |
| MW Residential | 9.2 | 9.4 | 8.5 | 8.4 | 8.2 | 8.1 | 7.9 | 7.8 | 7.7 | 6.8 | 6.1 |
| MW Non-Res | 12.0 | 13.6 | 16.2 | 18.1 | 19.9 | 21.6 | 23.3 | 25.0 | 26.6 | 43.9 | 72.5 |
| MW Total | 21.2 | 23.0 | 24.8 | 26.5 | 28.1 | 29.7 | 31.3 | 32.8 | 34.2 | 50.7 | 78.6 |

Sources: Consultants' estimate

195. A high forecast scenario assumes that the heavy industrial growth shown in Table VII-21 is realized.

Table VII-25: Forecast ERES Electricity Consumption (High)

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2025 | 2030 |
|---------------------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| GWh Resid'l | 40.5 | 41.1 | 37.3 | 36.7 | 36.1 | 35.4 | 34.8 | 34.2 | 33.5 | 29.9 | 26.6 |
| GWh Non-Residential | 53.5 | 61.0 | 72.7 | 81.0 | 89.1 | 97.0 | 104.6 | 111.9 | 119.0 | 196.6 | 325.0 |
| GWh Heavy Industry | 12.3 | 58.9 | 218.9 | 364.9 | 521.2 | 525.5 | 567.2 | 692.3 | 702.7 | 722.3 | 722.3 |

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2025 | 2030 |
|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| GWh Total | 106.3 | 161.0 | 329.0 | 482.6 | 646.4 | 657.9 | 706.6 | 838.4 | 855.2 | 948.9 | 1,073.9 |
| MW Residential | 9.2 | 9.4 | 8.5 | 8.4 | 8.2 | 8.1 | 7.9 | 7.8 | 7.7 | 6.8 | 6.1 |
| MW Non-Residential | 12.0 | 13.6 | 16.2 | 18.1 | 19.9 | 21.6 | 23.3 | 25.0 | 26.6 | 43.9 | 72.5 |
| MW Heavy Industry | 2.0 | 9.6 | 35.7 | 59.5 | 85.0 | 85.7 | 92.5 | 112.9 | 114.6 | 117.8 | 117.8 |
| MW Total | 23.2 | 32.6 | 60.5 | 86.0 | 113.1 | 115.4 | 123.8 | 145.7 | 148.8 | 168.5 | 196.4 |

Sources: Consultants' estimate

HH. ERES Power Production

196. A medium growth forecast of the power production of ERES is provided as Table VII-26.

Table VII-26: ERES POWER PRODUCTION FORECAST – Medium Growth

| MONGOLIA | | ELECTRICITY FORECASTS - MEDIUM | | | | | | | | | | | |
|--------------------|-----|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| ERES REGION | | | | | | | | | | | | | |
| | | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2025 | 2030 |
| Peak Production | MW | 26.9 | 29.3 | 31.4 | 33.3 | 35.2 | 36.9 | 39.0 | 41.0 | 43.0 | 48.9 | 67.6 | 104.8 |
| Total gross output | GWh | 119.8 | 130.0 | 139.3 | 148.1 | 156.4 | 164.1 | 173.5 | 182.6 | 191.4 | 217.9 | 302.0 | 468.8 |
| Load factor | | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 |
| Station loss | % | 20.0% | 19.0% | 18.0% | 17.0% | 16.0% | 15.0% | 15.0% | 15.0% | 15.0% | 15.0% | 15.0% | 15.0% |
| Station loss | GWh | 23.97 | 24.70 | 25.08 | 25.18 | 25.02 | 24.61 | 26.03 | 27.40 | 28.71 | 32.68 | 45.30 | 70.31 |
| Net | GWh | 95.9 | 105.3 | 114.2 | 123.0 | 131.4 | 139.5 | 147.5 | 155.2 | 162.7 | 185.2 | 256.7 | 398.4 |
| T&D loss | % | 9% | 9% | 9% | 9% | 9% | 9% | 9% | 9% | 9% | 15% | 10% | 10% |
| T&D loss | GWh | 10.4 | 11.3 | 12.1 | 12.9 | 13.6 | 14.3 | 15.1 | 15.9 | 16.7 | 32.7 | 30.2 | 46.9 |
| | | | | | | | | | | | | | |
| Purchases | GWh | 85.5 | 94.0 | 102.1 | 110.1 | 117.8 | 125.2 | 132.4 | 139.4 | 146.1 | 152.5 | 226.5 | 351.6 |
| | GWh | - | - | - | - | - | - | - | - | - | - | - | - |
| | GWh | - | - | - | - | - | - | - | - | - | - | - | - |
| Heavy Industry | GWh | - | 53.5 | 61.0 | 72.7 | 81.0 | 89.1 | 97.0 | 104.6 | 111.9 | 119.0 | 196.6 | 325.0 |
| Other Sales | GWh | 85.5 | 40.5 | 41.1 | 37.3 | 36.7 | 36.1 | 35.4 | 34.8 | 34.2 | 33.5 | 29.9 | 26.6 |
| Demand | MW | 19.2 | 21.2 | 23.0 | 24.8 | 26.5 | 28.1 | 29.7 | 31.3 | 32.8 | 34.2 | 50.7 | 78.6 |

VIII. WRES ELECTRICITY FORECASTS

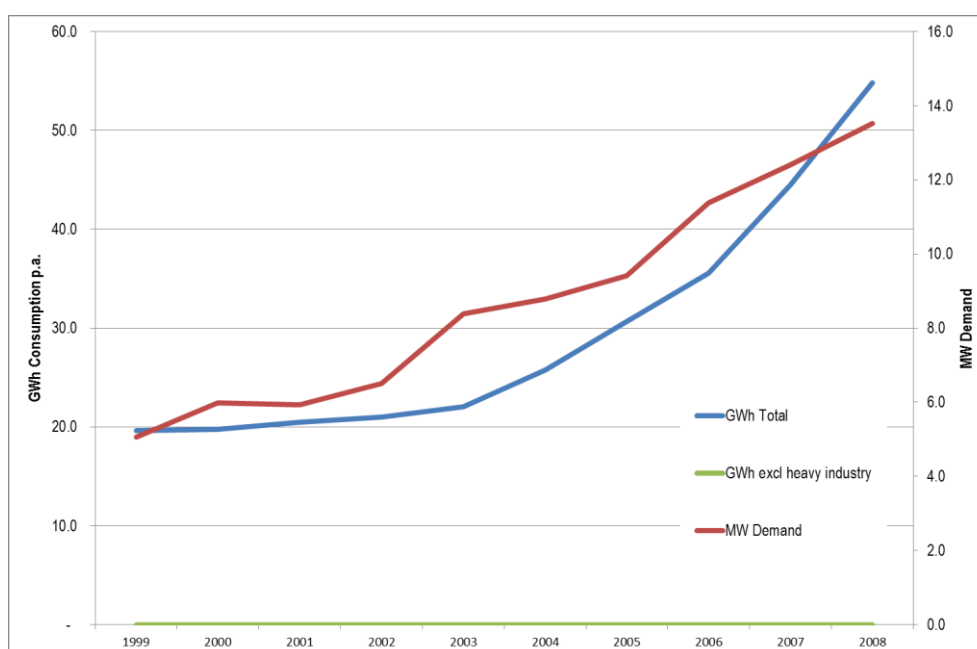
II. WRES Electricity Consumption

197. The methodology for preparing electricity forecasts is the same as that described in Section 0 for the CES.

27. WRES Historical Electricity Demand

198. Historical electricity consumption and demand figures were provided by the Ministry of Energy. These figures form the basis for modelling the demand and reconciling against historical trends so as to make accurate projections.

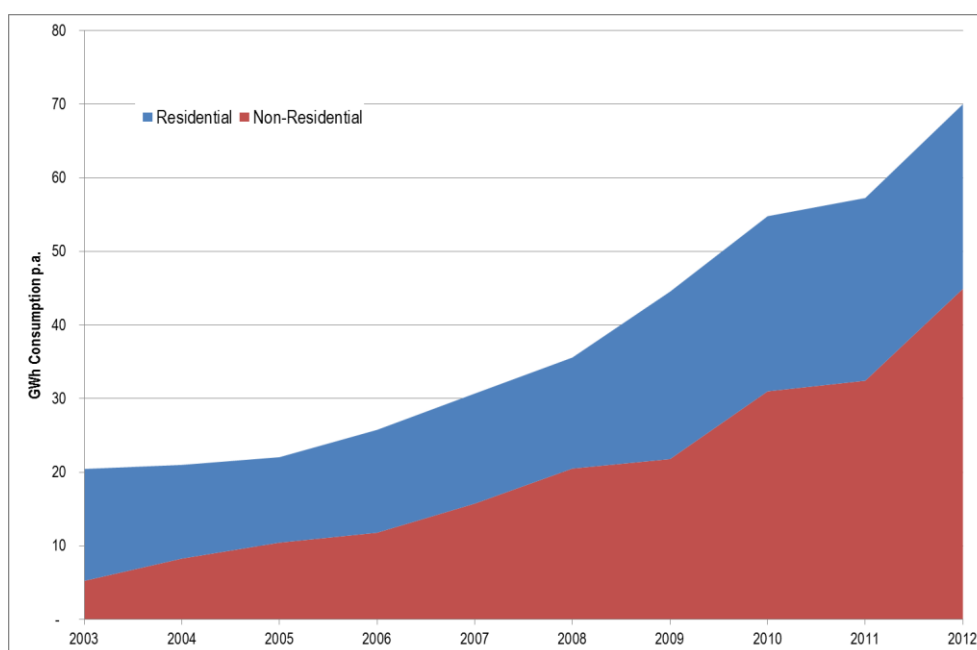
Figure VIII-1: WRES Electricity Statistics



Sources: Licensees, EA & Consultants' estimate

199. Figure VIII-2 shows the historical consumption / demand in total split by residential and C&LI load. The split is based on 'bottom-up' estimates of consumption made by using typical Mongolian metrics for residential consumption (per household) and C&LI consumption (per commercial / light industry premises).

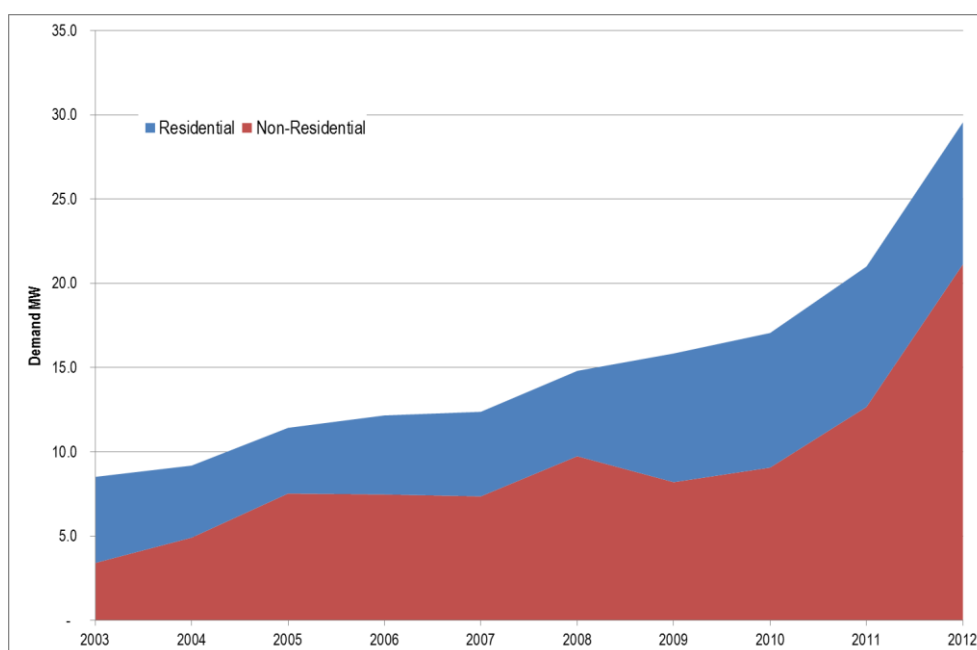
Figure VIII-2: Historical WRES Consumption GWh (cumulative)



Sources: Licensees, EA & Consultants' estimate

200. Figure VIII-2 shows that C&I sector consumption has been growing strongly for five years.

Figure VIII-3: Historical WRES Demand MW (cumulative)



Sources: Licensees, EA & Consultants' estimate

201. Figure V-3 shows that C&I demand has been increasing in line with the growth in consumption.

202. Table VIII-4 shows the high-level estimates for WRES electricity consumption and demand disaggregated by residential and commercial and light industry.

Table VIII-4: WRES Electricity Statistics

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|-----------------|------|------|------|------|------|------|------|------|------|
| GWh Residential | 12.7 | 11.6 | 14.0 | 14.9 | 15.1 | 22.7 | 23.8 | 24.8 | 25.1 |
| GWh Non-Resid'l | 8.3 | 10.4 | 11.8 | 15.7 | 20.5 | 21.8 | 31.0 | 32.4 | 44.9 |
| GWh Total | 21.0 | 22.0 | 25.8 | 30.7 | 35.6 | 44.5 | 54.8 | 57.3 | 70.0 |
| MW Residential | 4.3 | 3.9 | 4.7 | 5.0 | 5.1 | 7.6 | 8.0 | 8.3 | 8.4 |
| MW Non-Resid'l | 4.9 | 7.5 | 7.5 | 7.4 | 9.7 | 8.2 | 9.1 | 12.7 | 21.1 |
| MW Total | 9.2 | 11.4 | 12.2 | 12.4 | 14.8 | 15.8 | 17.1 | 21.0 | 29.6 |

Sources: Consultants' estimate

203. Note that the disaggregation provided in Table VIII-4 was derived using an 'end-use' model and, as the GWh electricity consumption was chosen as the basis for calibration, the total energy sales figures reported by the Ministry of Energy match with the figures determined by the model. The MW demand figures cannot be made to match perfectly as a result of the variation in the load factors of individual Aimags, and between their urban and rural constituents, and the effects of averaging. The calibration of the model was effected to match the demands in the later years of the historical period 2003 to 2012.

204. Table VIII-5 provides the historical WRES electricity statistics reported by the Ministry of Energy.

Table VIII-5: WRES Power Production Statistics

| MONGOLIA | | ELECTRICITY STATISTICS | | | | | | | | | | | |
|--------------------|-----|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| WRES REGION | | | | | | | | | | | | | |
| | | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| Peak Production | MW | 8.5 | 9.5 | 9.5 | 10.2 | 12.5 | 13.2 | 13.8 | 16.5 | 17.6 | 18.0 | 30.0 | 26.7 |
| Total gross output | GWh | 37.7 | 38.2 | 39.2 | 40.4 | 43.7 | 49.0 | 53.7 | 62.5 | 71.8 | 78.4 | 81.9 | 100.1 |
| Load factor | | 0.51 | 0.46 | 0.47 | 0.45 | 0.40 | 0.42 | 0.44 | 0.43 | 0.47 | 0.50 | 0.3 | 0.4 |
| Station loss | % | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Station loss | GWh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Net | GWh | 37.7 | 38.2 | 39.2 | 40.4 | 43.7 | 49.0 | 53.7 | 62.5 | 71.8 | 78.4 | 81.9 | 100.1 |
| T&D loss | % | 47.9% | 48.3% | 47.8% | 48.0% | 49.5% | 47.4% | 42.9% | 43.0% | 38.0% | 30.1% | 30.1% | 30.1% |
| T&D loss | GWh | 18.1 | 18.5 | 18.8 | 19.4 | 21.6 | 23.2 | 23.1 | 26.9 | 27.3 | 23.6 | 24.6 | 30.1 |
| | | | | | | | | | | | | | |
| Total Sales | GWh | 19.6 | 19.7 | 20.4 | 21.0 | 22.0 | 25.8 | 30.7 | 35.6 | 44.5 | 54.8 | 57.3 | 70.0 |
| | GWh | - | - | - | - | - | - | - | - | - | - | - | - |
| | GWh | - | - | - | - | - | - | - | - | - | - | - | - |
| Heavy Industry | GWh | - | - | - | - | - | - | - | - | - | - | - | - |
| Other Sales | GWh | 19.6 | 19.7 | 20.4 | 21.0 | 22.0 | 25.8 | 30.7 | 35.6 | 44.5 | 54.8 | 57.3 | 70.0 |
| Total Demand | MW | 5.1 | 6.0 | 0.3 | 0.3 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 | 21.0 | 18.7 |

JJ. WRES Electricity Growth

28. Residential Sector

205. The drivers of growth in the residential sector are taken to be the population, the number of persons per household and the change in kWh consumption per customer.

206. The population growth and shifts are based on the population statistics provided by the Mongolian Bureau of Statistics.

207. The number of persons per household varies from urban to rural centre and by regional area. The following assumptions have been adopted based on household square meter data (collected for heat planning) and urban and rural population statistics.

Table VIII-6: Mongolia Persons per Household

| Aimag | Region | Urban | Rural |
|-------------|--------|-------|-------|
| Khovd | WRES | 5.0 | 6.0 |
| Ulgii-Bayan | WRES | 5.0 | 6.0 |
| Uvs | WRES | 3.0 | 4.0 |

Sources: Consultants' estimate

208. Residential customer account statistics were estimated. The average growth in residential customer accounts from 2004 to 2012 is estimated to have been 5%.

Table VIII-7: WRES Residential Customer Accounts

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Accounts | 17,748 | 16,089 | 19,429 | 21,069 | 21,077 | 28,178 | 28,420 | 29,663 | 30,262 |
| Growth | -16.1% | -9.4% | 20.8% | 8.4% | 0.0% | 33.7% | 0.9% | 4.4% | 2.0% |

Sources: Consultants' estimate

209. Table VIII-8 shows that the average growth rate of the kWh per customer measure over the last eight years has been low at 1.7%. The load factor for the residential customer class is below 0.34 as the system is very small.

Table VIII-8: WRES Residential kWh per Customer (p.a.)

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| GWh | 12.73 | 11.61 | 13.97 | 14.95 | 15.08 | 22.74 | 23.79 | 24.83 | 25.08 |
| MW | 4.28 | 3.90 | 4.69 | 5.02 | 5.06 | 7.64 | 7.99 | 8.34 | 8.42 |
| LF | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 |
| kWh per Customer | 717 | 722 | 719 | 709 | 716 | 807 | 837 | 837 | 829 |
| Growth | -0.3% | 0.6% | -0.3% | -1.3% | 0.9% | 12.8% | 3.7% | 0.0% | -1.0% |

Sources: Consultants' estimate

29. Commercial & Light Industry Sector (C & LI)

210. In Table II-1 it was shown that one of the drivers of commercial and light industrial energy consumption is floor space of public buildings. Floor space statistics have been gathered for floor

space in Khovd, Ulgii-Bayan and Uvs Aimags.

Table VIII-9: Commercial / Light Industrial Floor Space ('000's m², year 2012)

| Floor Space | |
|-------------|-----|
| 000's m2 | |
| Khovd | 115 |
| Ulgii Bayan | 102 |
| Uvs | 157 |

Sources: Local Government Authorities

211. Whilst the historical floor space statistics are considered valid, the forecasts for floor space are less certain given the population shifts that are expected and the potential impact on small to medium-sized business activity. As a consequence it is considered that the growth trends in customer accounts and kWh per customer are more suitable for forecasting purposes.

212. The average growth rate of C&LI industrial customer accounts is estimated to be 9%.

Table VIII-10: WRES Historical C & LI Customer Account Growth

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|----------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| Accounts | 872 | 831 | 1,024 | 1,152 | 1,269 | 1,644 | 1,724 | 1,927 | 2,051 |
| Growth | -11.2% | -4.7% | 23.3% | 12.5% | 10.1% | 29.6% | 4.8% | 11.8% | 6.4% |

Sources: Consultants' estimate

213. Table VIII-11 shows that the average growth rate of the kWh per customer measure for the WRES C&LI customer class during the last eight years has been of the order of 20%; however the trend in recent years has been significantly negative. The load factor for the WRES C&LI customer class is taken to be 0.24.

Table VIII-11: WRES Historical C & LI kWh per Customer

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| GWh | 8.26 | 10.43 | 11.78 | 15.74 | 20.50 | 21.79 | 30.99 | 32.43 | 44.92 |
| MW | 4.91 | 7.53 | 7.47 | 7.36 | 9.74 | 8.20 | 9.07 | 12.66 | 21.13 |
| LF | 0.19 | 0.16 | 0.18 | 0.24 | 0.24 | 0.30 | 0.39 | 0.29 | 0.24 |
| kWh per Customer | 9,482 | 12,561 | 11,501 | 13,655 | 16,152 | 13,248 | 17,974 | 16,828 | 21,903 |
| Growth | 77.8% | 32.5% | -8.4% | 18.7% | 18.3% | -18.0% | 35.7% | -6.4% | 30.2% |

Sources: Consultants' estimate

KK. WRES Consumption Forecasts by Class

30. WRES Residential Class Forecasts

214. Residential class electricity consumption and demand figures has been modelled at the level of the Aimags and major towns, differentiated according to urban and rural populations.

215. In each case the persons per household and percentage electrification was used to estimate the number of urban and rural electricity customers. The person per household measure was assumed according to the figures in Table IV-6.

216. The following assumptions were made with regard to annual electricity consumption by dwelling type.

Table VIII-12: Annual kWh Consumption per Customer

| | Small | Large |
|------------------------------------|-------|-------|
| kWh Consumption per Apartment | 1,200 | 2,300 |
| kWh Consumption per Detached House | 1,300 | 2,400 |
| kWh Consumption per Ger | 450 | 500 |

Sources: Consultant's estimate, World Bank

217. These assumptions were input to a forecasting model. The model is provided as Appendix A to this report, and includes specific details for Khovd, Ulgii-Bayan and Uvs Aimags.

218. The model takes into account the growth in residential customer accounts according to population movements and the average rate of growth in customer accounts between 2003 and 2012. The residential customer account forecast assumption is shown in Table VIII-13.

Table VIII-13: WRES Residential Customer Account Forecast

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|----------|--------|--------|--------|--------|--------|--------|--------|--------|
| Accounts | 31,323 | 32,763 | 34,195 | 35,619 | 37,034 | 36,935 | 36,837 | 36,738 |
| Growth | 3.5% | 4.6% | 4.4% | 4.2% | 4.0% | -0.3% | -0.3% | -0.3% |

Sources: Consultants' estimate

219. The population movements suggest that residential sector kWh per customer growth will have a negative average of 2.5% due to the population movements away from Khovd, Ulgii-Bayan and Uvs Aimags.

220. The resulting forecast for the residential customer class is shown in Table VIII-14. The load factor is assumed to remain constant at 0.34.

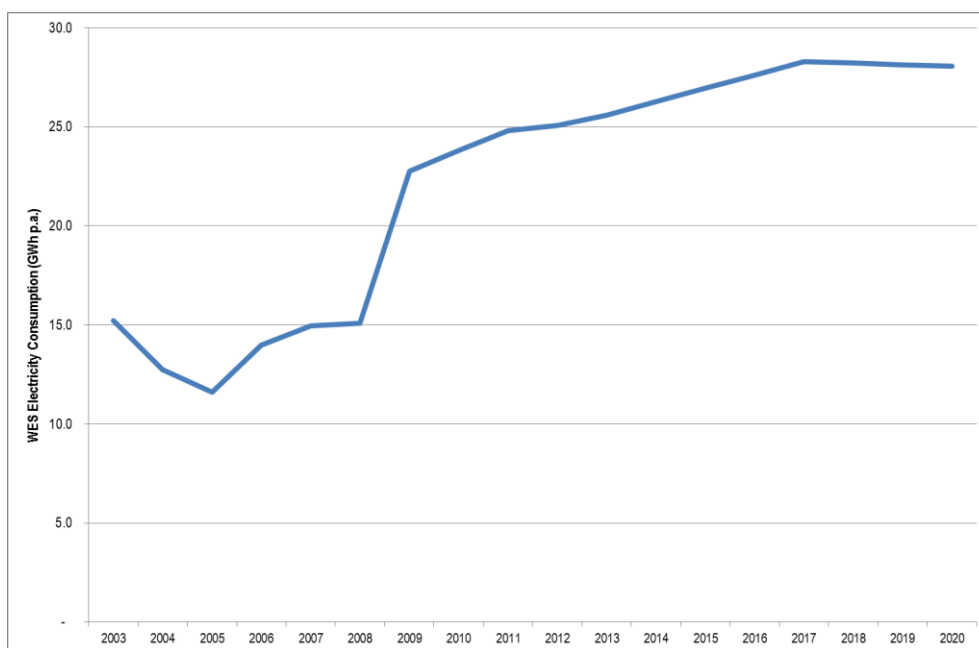
Table VIII-14: WRES Residential Load Forecast

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|------------------|------|------|------|------|------|------|------|------|
| GWh | 25.6 | 26.3 | 26.9 | 27.6 | 28.3 | 28.2 | 28.1 | 28.1 |
| MW | 8.6 | 8.8 | 9.0 | 9.3 | 9.5 | 9.5 | 9.4 | 9.4 |
| LF | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 |
| kWh per Customer | 817 | 802 | 788 | 775 | 764 | 764 | 764 | 764 |

Sources: Consultants' estimate

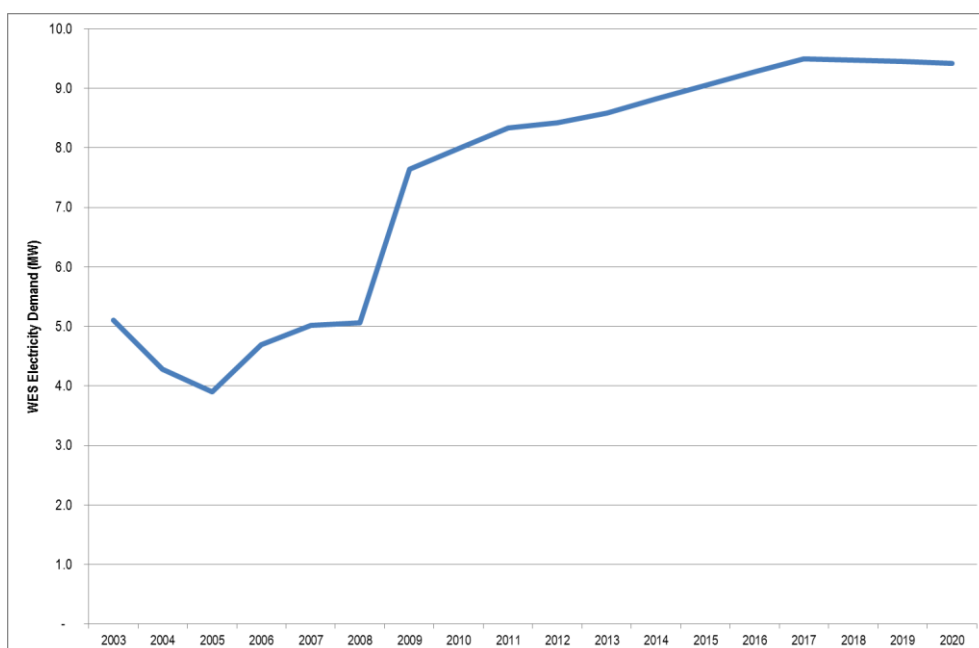
221. The historical consumption and forecast for the residential customer class is charted as Figure VIII-15 and Figure VIII-16.

Figure VIII-15: WRES Residential Consumption (GWh p.a.)



Sources: Consultants' estimate

Figure VIII-16: WRES Residential Demand (MW)



Sources: Consultants' estimate

31. C&LI Forecast

222. And end-use forecast for electricity consumption for the commercial and light industrial customer class is based on the assumption that kWh per customer growth will continue at an average of 7% per annum.

Table VIII-17: WRES C&LI Customer Account Forecast

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2013 |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Accounts | 2,214 | 2,416 | 2,631 | 2,858 | 3,097 | 3,221 | 3,348 | 3,483 | 2,214 |
| Growth | 8.0% | 9.1% | 8.9% | 8.7% | 8.4% | 4.0% | 4.0% | 4.0% | 8.0% |

Sources: Consultants' estimate

223. The resulting kWh per customer measure for the C&LI customer class is shown in Table VIII-18. The load factor is assumed to remain constant at 0.5.

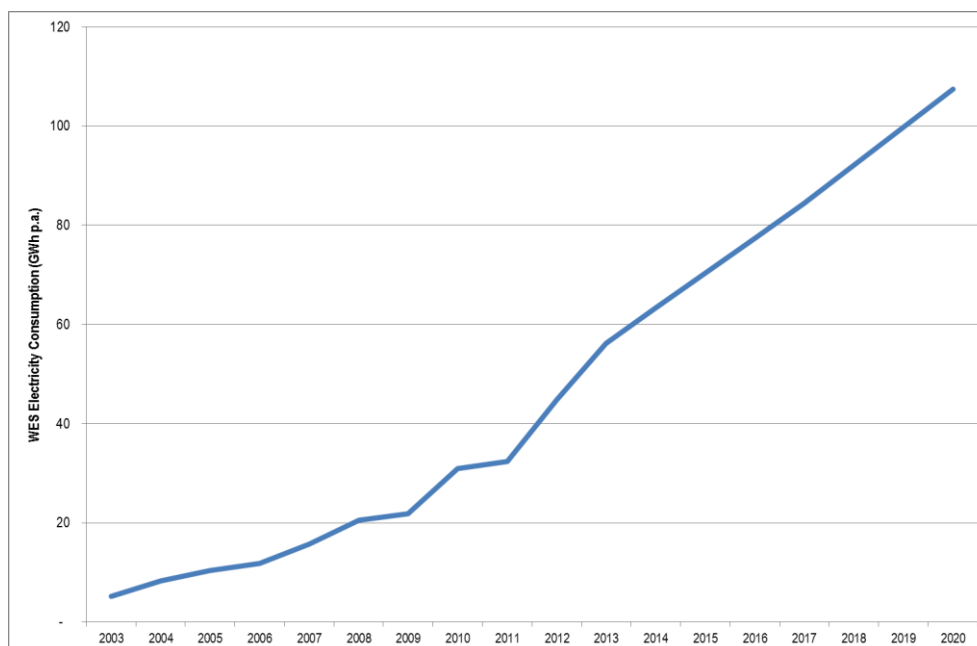
Table VIII-18: WRES C&LI Load Forecast

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2013 |
|------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| GWh | 56.2 | 63.3 | 70.3 | 77.4 | 84.4 | 92.1 | 99.8 | 107.4 | 56.2 |
| MW | 12.8 | 14.4 | 16.1 | 17.7 | 19.3 | 21.0 | 22.8 | 24.5 | 12.8 |
| LF | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| kWh per Customer | 25,376 | 26,187 | 26,740 | 27,070 | 27,241 | 28,593 | 29,797 | 30,838 | 25,376 |
| Growth | 15.9% | 3.2% | 2.1% | 1.2% | 0.6% | 5.0% | 4.2% | 3.5% | 15.9% |

Sources: Consultants' estimate

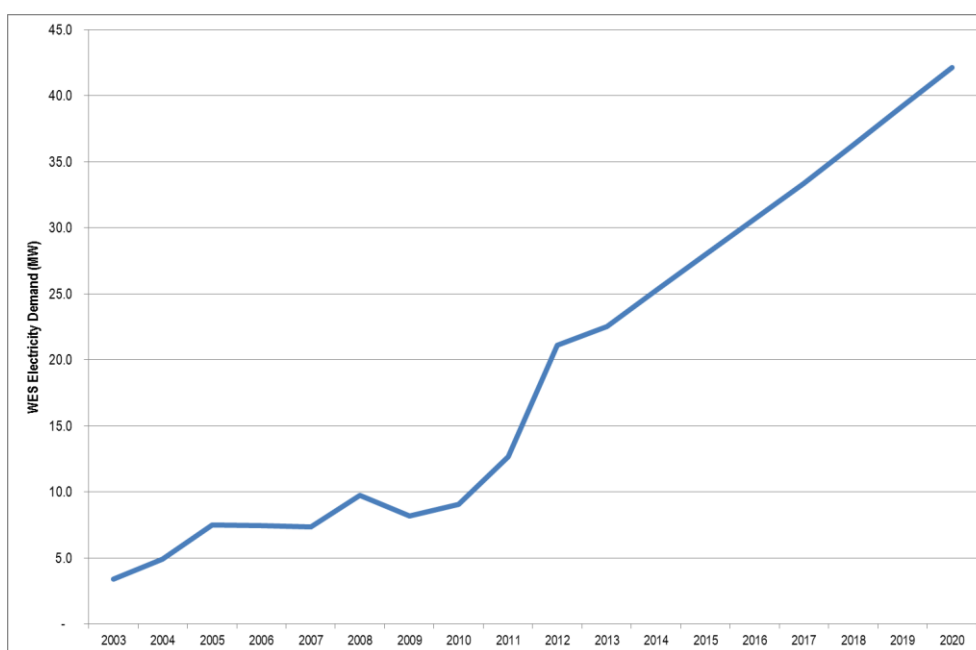
224. The forecasts for the C&LI customer class are charted in Figure VIII-19 and Figure VIII-20.

Figure VIII-19: WRES C&LI Consumption (GWh p.a.)



Sources: Consultants' estimate

Figure VIII-20: WRES C&LI Demand (MW)



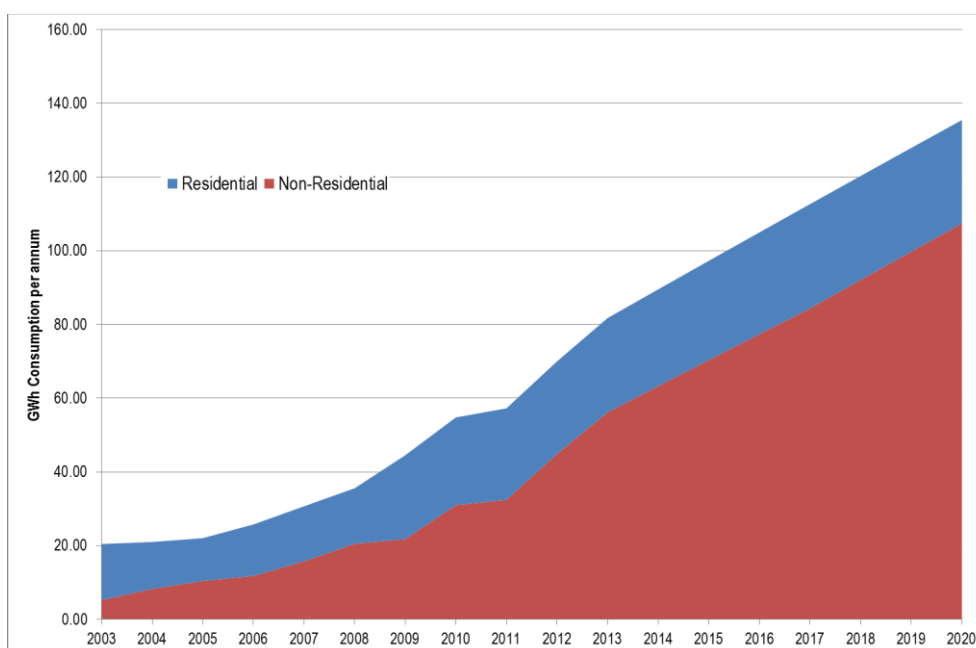
Sources: Consultants' estimate

225. The C&LI end-use forecasting model is provided as Appendix B to this report specifically for Khovd, Ulgii-Bayan and Uvs Aimags.

LL. WRES Electricity Forecast

226. The total 'medium' growth forecasts by customer class are shown in the charts that follow.

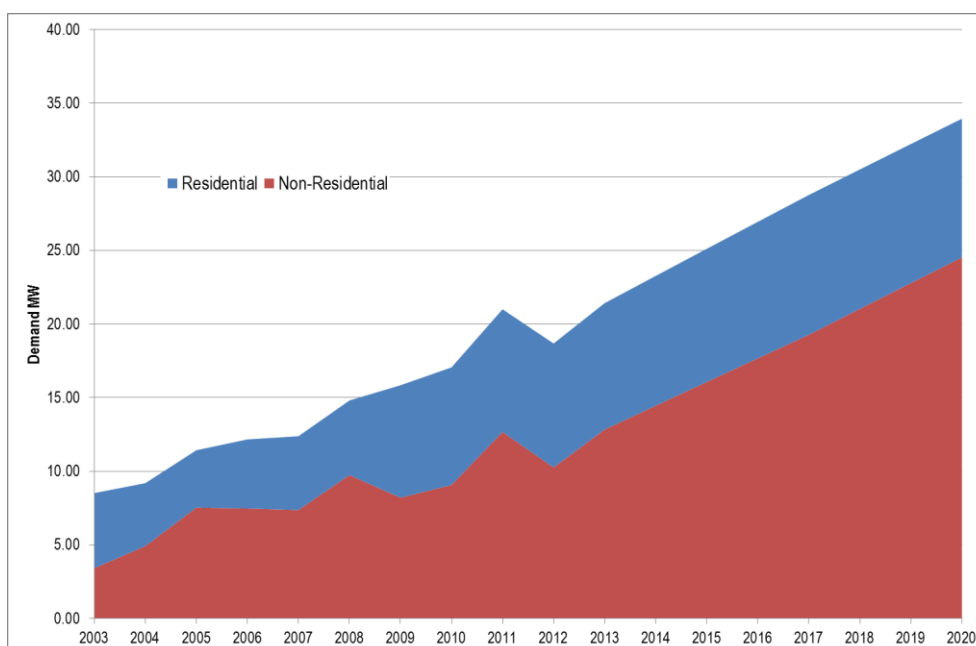
Figure VIII-21: Forecast WRES Consumption GWh p.a. (cumulative)



Sources: Licensees, EA & Consultants' estimate

227. Figure VIII-22 shows the expected organic growth to 2020.

Figure VIII-22: Forecast WRES Demand MW (cumulative)



Sources: Licensees, EA & Consultants' estimate

228. Table VIII-23 provides the forecast of WRES electricity consumption and demand disaggregated by residential, commercial and light industry, and heavy industry customer classes.

Table VIII-23: Forecast WRES Electricity Consumption

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2025 | 2030 |
|----------------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|
| GWh Resid'l | 25.1 | 25.6 | 26.3 | 26.9 | 27.6 | 28.3 | 28.2 | 28.1 | 28.1 | 30.1 | 32.3 |
| GWh Non-Res | 44.9 | 56.2 | 63.3 | 70.3 | 77.4 | 84.4 | 92.1 | 99.8 | 107.4 | 186.2 | 322.8 |
| GWh Total | 70.0 | 81.8 | 89.5 | 97.3 | 105.0 | 112.7 | 120.3 | 127.9 | 135.5 | 216.3 | 355.1 |
| MW Residential | 8.4 | 8.6 | 8.8 | 9.0 | 9.3 | 9.5 | 9.5 | 9.4 | 9.4 | 10.1 | 10.9 |
| MW Non-Res | 10.3 | 12.8 | 14.4 | 16.1 | 17.7 | 19.3 | 21.0 | 22.8 | 24.5 | 42.5 | 73.7 |
| MW Total | 18.7 | 21.4 | 23.3 | 25.1 | 26.9 | 28.8 | 30.5 | 32.2 | 33.9 | 52.6 | 84.6 |

Sources: Consultants' estimate

MM. WRES Power Production

229. A forecast of the power production of WRES is provided as Table VIII-24.

Table VIII-24: WRES POWER PRODUCTION FORECAST – Medium Growth

| MONGOLIA | | ELECTRICITY FORECAST - MEDIUM | | | | | | | | | | | |
|--------------------|-----|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| WRES | | | | | | | | | | | | | |
| | | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2025 | 2030 |
| Peak Production | MW | 30.0 | 26.7 | 30.6 | 36.4 | 39.3 | 42.2 | 45.0 | 47.7 | 50.4 | 43.0 | 62.6 | 100.7 |
| Total gross output | GWh | 81.9 | 100.1 | 117.0 | 140.1 | 152.2 | 164.3 | 176.3 | 188.3 | 200.2 | 171.5 | 257.5 | 422.8 |
| Load factor | | 0.31 | 0.43 | 0.44 | 0.44 | 0.44 | 0.44 | 0.45 | 0.45 | 0.45 | 0.46 | 0.47 | 0.48 |
| Station loss | % | 0% | 0% | 0% | 6% | 6% | 6% | 6% | 6% | 6% | 6% | 6% | 6% |
| Station loss | GWh | 0.0 | 0.0 | 0.0 | 8.4 | 9.1 | 9.9 | 10.6 | 11.3 | 12.0 | 10.3 | 15.5 | 25.4 |
| Net | GWh | 81.9 | 100.1 | 117.0 | 131.7 | 143.1 | 154.4 | 165.7 | 177.0 | 188.1 | 161.2 | 242.1 | 397.4 |
| T&D loss | % | 30% | 30% | 30% | 30% | 30% | 30% | 30% | 30% | 30% | 15% | 10% | 10% |
| T&D loss | GWh | 24.6 | 30.1 | 35.2 | 42.2 | 45.8 | 49.4 | 53.1 | 56.7 | 60.2 | 25.7 | 25.8 | 42.3 |
| | | | | | | | | | | | | | |
| Purchases | GWh | 57.3 | 70.0 | 81.8 | 89.5 | 97.3 | 105.0 | 112.7 | 120.3 | 127.9 | 135.5 | 216.3 | 355.1 |
| | GWh | - | - | - | - | - | - | - | - | - | - | - | - |
| | GWh | - | - | - | - | - | - | - | - | - | - | - | - |
| Heavy Industry | GWh | 32.4 | 44.9 | 56.2 | 63.3 | 70.3 | 77.4 | 84.4 | 92.1 | 99.8 | 107.4 | 186.2 | 322.8 |
| Other Sales | GWh | 24.8 | 25.1 | 25.6 | 26.3 | 26.9 | 27.6 | 28.3 | 28.2 | 28.1 | 28.1 | 30.1 | 32.3 |
| Demand | MW | 21 | 19 | 21 | 23 | 25 | 27 | 29 | 30 | 32 | 34 | 53 | 85 |

IX. INDUSTRIALIZATION

NN. Forecasting Industrial Demand

230. In Mongolia, supply planning for industrial developments of more than 3MVA involves assessing the relative merits of providing supply from the transmission grid, or building a local power plant. Issues such as the remoteness of the load from the transmission grid, and supply security needs, are factors that must be taken into account. Accordingly such 'spot' loads are identified separately.

231. In the case of large mines, of a similar scale to Oyu Tolgoi and Tavan Tolgoi, the owners of international mining developments invariably build a mine-mouth power plant. The fundamental reason for preferring a mine-mouth power plant is that it provides the desired level of supply security. This approach is preferred by the developers of both Oyu Tolgoi and Tavan Tolgoi. In the case of large mines, where the cost of a mine-mouth power plant is small compared to the cost of the mine, it is reasonable to assume that the power supply will be a captive power plant.

232. The following large mineral deposits are of sufficient size to require a mine-mouth power plant for security of supply:-

Table IX-1: Large Mineral Deposits and Power Needs

| Area | Mine | Producing | Timing |
|------------|----------------|----------------------------|---|
| South Gobi | Oyu Tolgoi | Copper / Gold | Captive PP under construction |
| South Gobi | Tavan Tolgoi | Coking Coal / Thermal Coal | Captive PP under construction (1,200MW) |
| CES | Shivee Ovoo | Thermal Coal | Not active (3.5GW) |
| South Gobi | Nariin Sukhait | Coking Coal / Thermal Coal | Licensed PP – Ukhaakhudag (62MW) |

Sources: Consultants' research

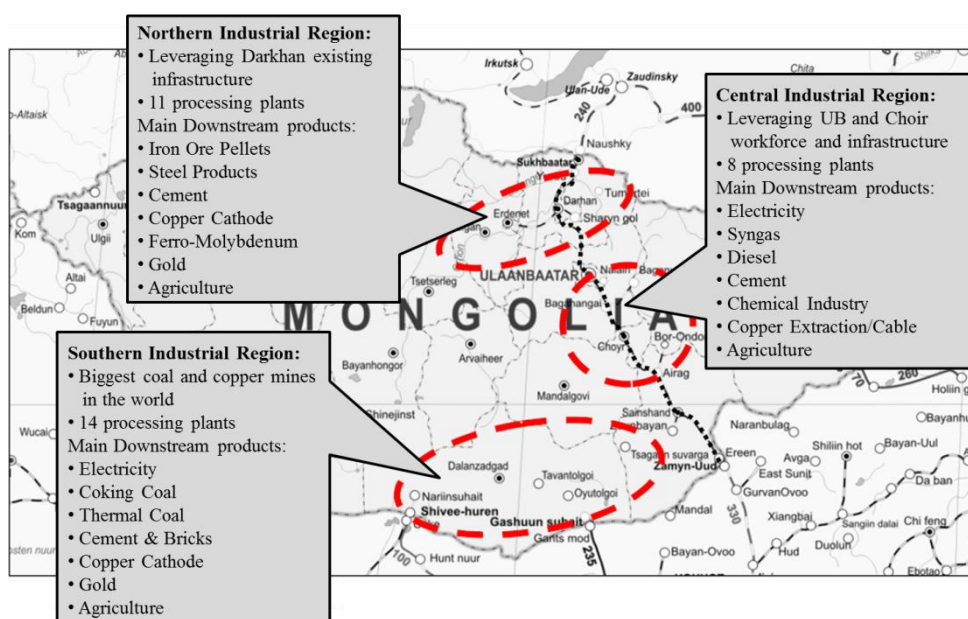
233. The GoM's industrialization strategy is based on a sustained market demand for power to support minerals extraction and processing in three industrial zones. The creation of industrial zones means that it may be more economical to supply power reliably and cost effectively from an integrated power supply system rather than by individual power plants built to service each zone. However, sufficient adequacy and security must be designed into an integrated power system to provide assurance to the owners of industrial facilities. If not, the developers will choose to build captive power plants. Nevertheless the demand of mines and mineral processing facilities have been included in the forecasts that follow, rather than assuming that major industrial facilities will take care of their own power requirements. In practice it is likely to be a blended approach.

OO. Minerals Extraction & Processing

234. The industrialization strategy for Mongolia was described in detail in the Macro-Economic Analyses report.

235. According to an independent study, Worley Parsons⁶ suggested that development of mineral processing plants could take place in three industrial zones.

Figure IX-2: Industrial Zones Envisaged for Mongolia



236. Table IX-3, Table IX-4 and Table IX-5 present the power demands estimated in the Worley Parsons report.

237. The power demand and likelihood of development for Northern, Central and Southern industrial zones are assumed as follows:-

Table IX-3: Development Potential for Northern Region

| Facility | MW |
|-------------------------------------|------------|
| Erdenet Copper Smelter | 75 |
| Erdenet Copper Concentrator Upgrade | 40 |
| Erdenet Fe/Mo Roaster/Smelter | 10 |
| Cu Refinery | 15 |
| FE Concentrator | 100 |
| Iron Ore Pellet Plant | 200 |
| Steel | 100 |
| Darkhan Direct Reduction Iron Plant | 80 |
| Darkhan Steel Rolling Mill | 120 |
| Darkhan Cement Plant | 60 |
| Booroo Gold Refinery | 15 |
| Agriculture | 10 |
| Railway | 20 |
| Townships | 20 |
| TOTAL | 865 |

⁶ Worley Parsons - 20100531 Mongolia Industrialization & Downstream Processing Study

Table IX-4: Development Potential for Central Region

| Facility | MW |
|-------------------------------|------------|
| Coal to Gas Plant | 60 |
| Coal-to-Liquids Plant | 180 |
| Cement Plant | 60 |
| Copper Extrusion Plant | 140 |
| Copper Cables Plant | 140 |
| Zn Roaster / Hydrometal Plant | 120 |
| Agriculture | 10 |
| Railway | 20 |
| Townships | 40 |
| TOTAL | 770 |

Table IX-5: Development Potential for Southern Region

| Facility | MW |
|----------------------------------|------------|
| Copper Smelter / Refinery (OT) | 120 |
| Copper Smelter / Refinery (IS) | 90 |
| Concentrator (OT) | 240 |
| Concentrator (IS) | 160 |
| Tsavaan Surga mine (Cu/Mo) | 60 |
| Brick Plant (TT) | 10 |
| Brick Plant (NS) | 10 |
| Expanded Clay Pellets Plant (TT) | 10 |
| Expanded Clay Pellets Plant (NS) | 10 |
| Cement Plant | 60 |
| Agriculture | 10 |
| Railway | 20 |
| Townships | 60 |
| TOTAL | 860 |

Source: Worley Parsons

238. The information in the above tables has been used to calculate two risk-adjusted forecasts – a medium or ‘bear’ industrial forecast and a high or ‘bull’ industrial forecast.

239. In the case of the Southern zone it should be noted that the forecasts do not include the power requirements of Tavan Tolgoi, Oyu Tolgoi, nor the power requirements of the Baganuur, Nariin Sukhait and Shivee Ovoo coal mines.

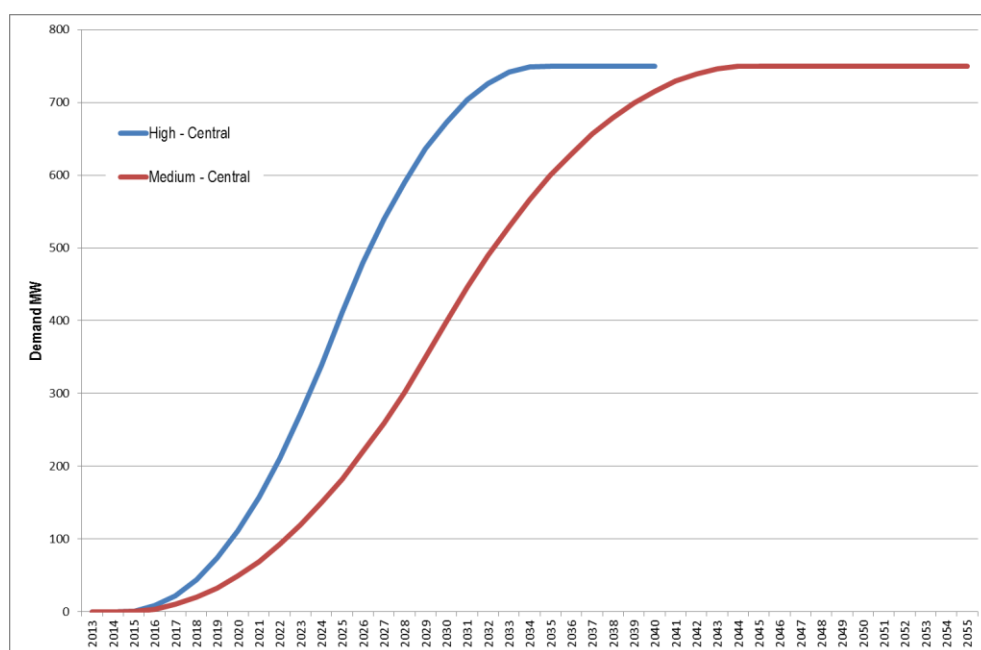
240. The risk-adjusted forecasts are based on different rates of industrial growth in each of the industrial developments zones. The rates are highly uncertain because the growth is largely a function of market demand. For the purpose of planning ‘bear’ and ‘bull’ market scenarios are considered in relation to the demand for minerals. In the case of the ‘bear’ forecast it is assumed that development will take place over a 30 year period from 2015 to 2045. This scenario is

closely aligned to the 'minerals-only' extraction strategy supported by UNIDO. In the case of the 'bull' forecast the period is assumed to be 2015 to 2035. This scenario is closely aligned with the minerals extraction and minerals processing strategy elaborated in the Worley Parsons study. The starting point of 2015 recognizes that the industrial facilities to be established in the industrial zones will require a construction lead time and therefore an electricity demand lead time.

241. Uncertainty has been introduced by assuming a triangular distribution with a peak growth rate occurring towards the centre of the development period. In the case of the 'bear' forecast the centre point is assumed to be 2035, while in the case of the 'bull' forecast it is 2025. A Monte Carlo simulation is used to predict the load growth development of each industrial zone by applying the triangular distribution on a random basis against each of the loads in the tables above.

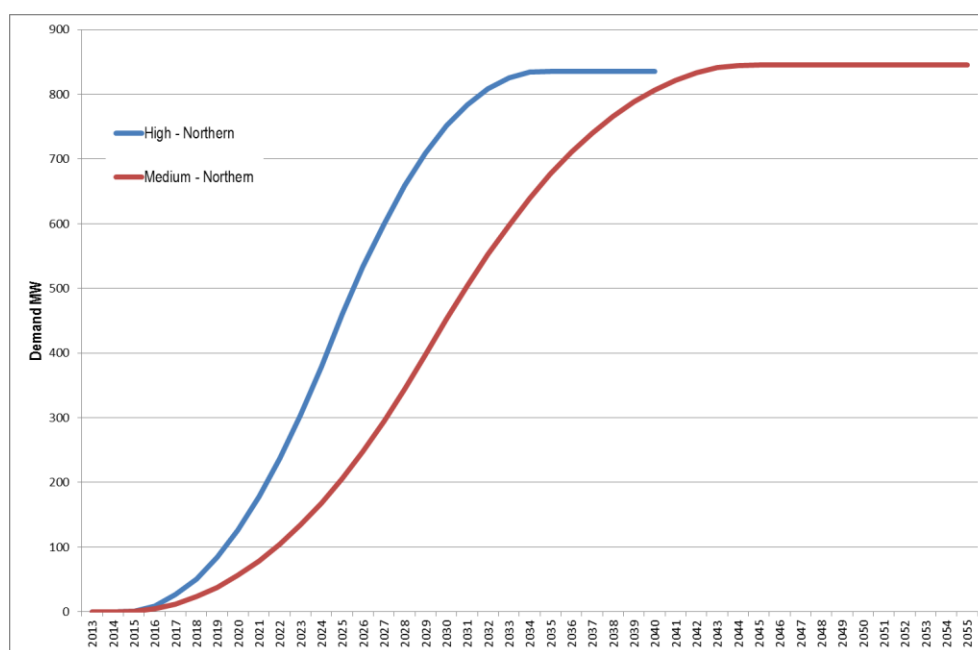
242. The result of this forecasting method is shown in Figure IX-6, Figure IX-7 and Figure IX-8.

Figure IX-6: Risk-Adjusted Central Zone MW Projections



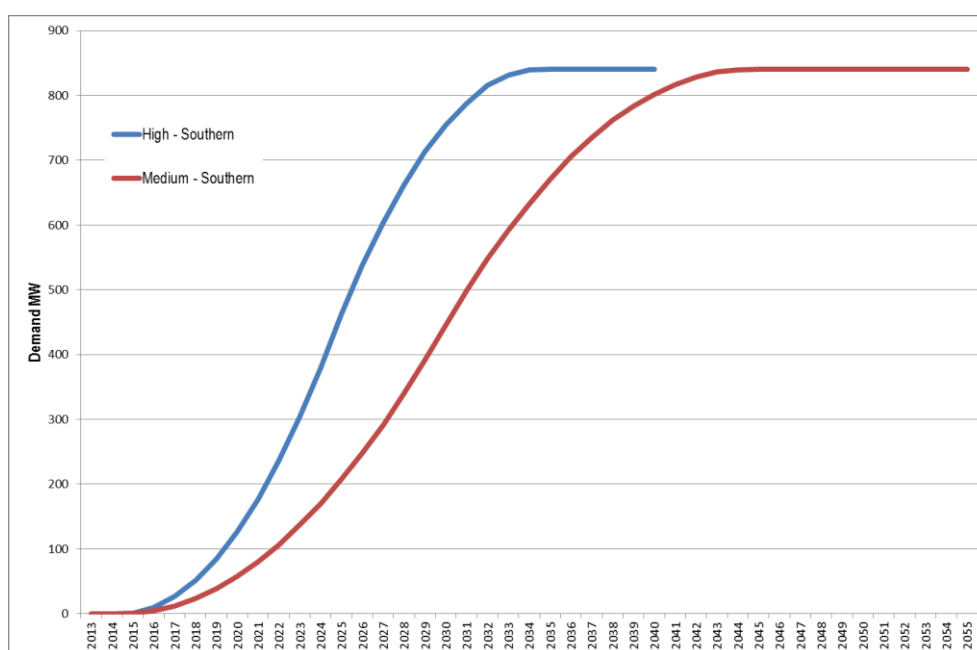
Sources: Consultant's analyses

Figure IX-7: Risk-Adjusted Northern Zone MW Projections



Sources: Consultant's analyses

Figure IX-8: Risk-Adjusted Southern Zone MW Projections



Sources: Consultant's analyses

243. A detailed summary of each load forecast by zone is provided in Table IX-9 and Table IX-10.

Table IX-9: Load Forecast for 'Bear' Industrial Zone Forecast

| Zone | | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|----------|----|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Northern | MW | 0 | 0 | 1 | 5 | 12 | 23 | 38 | 57 | 79 | 105 | 135 | 168 | 206 |
| Central | MW | 0 | 0 | 0 | 4 | 10 | 20 | 33 | 49 | 69 | 93 | 120 | 150 | 183 |

| Zone | | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|----------|-----|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| Southern | MW | 0 | 0 | 0 | 4 | 12 | 24 | 39 | 57 | 80 | 107 | 137 | 171 | 208 |
| Total | MW | 0 | 0 | 1 | 13 | 34 | 67 | 109 | 163 | 228 | 304 | 391 | 489 | 596 |
| Northern | GWh | 0 | 0 | 3 | 29 | 73 | 143 | 233 | 349 | 484 | 643 | 825 | 1,031 | 1,260 |
| Central | GWh | 0 | 0 | 2 | 22 | 62 | 124 | 201 | 302 | 420 | 569 | 734 | 920 | 1,120 |
| Southern | GWh | 0 | 0 | 2 | 27 | 75 | 145 | 237 | 350 | 492 | 653 | 841 | 1,046 | 1,276 |
| Total | GWh | 0 | 0 | 7 | 78 | 210 | 412 | 671 | 1,001 | 1,396 | 1,864 | 2,399 | 2,997 | 3,656 |

Sources: Consultant's analyses

Table IX-10: Load Forecast for 'Bull' Industrial Zone Forecast

| Zone | | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|----------|-----|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|
| Northern | MW | - | - | 1 | 9 | 26 | 51 | 85 | 126 | 178 | 237 | 304 | 379 | 460 |
| Central | MW | - | - | 1 | 9 | 22 | 44 | 74 | 111 | 158 | 211 | 272 | 339 | 412 |
| Southern | MW | - | - | 1 | 10 | 26 | 51 | 84 | 127 | 177 | 236 | 304 | 380 | 463 |
| Total | MW | - | - | 3 | 27 | 75 | 146 | 243 | 364 | 513 | 684 | 880 | 1,097 | 1,335 |
| Northern | GWh | 0 | 0 | 6 | 56 | 162 | 313 | 520 | 776 | 1,090 | 1,451 | 1,864 | 2,323 | 2,822 |
| Central | GWh | 0 | 0 | 6 | 53 | 137 | 271 | 454 | 683 | 966 | 1,291 | 1,665 | 2,076 | 2,525 |
| Southern | GWh | 0 | 0 | 6 | 60 | 162 | 314 | 517 | 777 | 1,088 | 1,449 | 1,864 | 2,329 | 2,839 |
| Total | GWh | 0 | 0 | 19 | 168 | 461 | 897 | 1,491 | 2,235 | 3,144 | 4,192 | 5,394 | 6,728 | 8,185 |

Sources: Consultant's analyses

244. The projections of demand and consumption in Table IX-9 and Table IX-10 are used for supply expansion planning purposes. Since industrial facilities require stable, reliable power, the 'bear' and 'bull' forecasts are considered in terms of the marginal investment costs required to supply these demands using coal-fired power. Whereas the base scenario for expansion is based on a supply mix determined by cost and policy perspectives. The Central and Northern zones are aggregated because they are located in the CES, whereas the Southern zone is initially considered on stand-alone basis, assuming that facilities will be developed in Sainshand. However, all three industrial zones fall under consideration of an integrated transmission plan.

X. APPENDIX

AIMAG RESIDENTIAL ELECTRICITY FORECASTS

Table X-1: ARHANGAI AIMAG

| Disco | | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | | |
|----------|----------|------------------------|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Region | CES | | | | | | | | | | | | | | | | | | | | |
| Aimag | Arhangai | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 96,100 | 94,900 | 93,800 | 93,300 | 92,800 | 92,500 | 92,500 | 83,827 | 83,207 | 82,588 | 81,968 | 81,348 | 80,729 | 80,109 | 79,489 | 78,869 | 78,250 | 77,630 |
| | % | b. | Total Pop Grow th | | -1.2% | -1.2% | -0.5% | -0.5% | -0.3% | 0.0% | -9.4% | -0.7% | -0.7% | -0.8% | -0.8% | -0.8% | -0.8% | -0.8% | -0.8% | -0.8% | -0.8% |
| | | | | | | | | | | | | | | | | | | | | | |
| Urban | No. | c. | Urban Pop | 18,067 | 18,221 | 18,291 | 18,473 | 18,838 | 18,685 | 18,408 | 16,765 | 16,641 | 16,518 | 16,394 | 16,270 | 16,146 | 16,022 | 15,898 | 15,774 | 15,650 | 15,526 |
| | No. | d. = e. + c. | Persons per Urban Household | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 3,613 | 3,644 | 3,658 | 3,695 | 3,768 | 3,737 | 3,682 | 3,353 | 3,328 | 3,304 | 3,279 | 3,254 | 3,229 | 3,204 | 3,180 | 3,155 | 3,130 | 3,105 |
| | % | g. | Electric Urban Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | h. = f. x g. | Electric Urban Customers | 3,252 | 3,280 | 3,292 | 3,325 | 3,391 | 3,363 | 3,313 | 3,018 | 2,995 | 2,973 | 2,951 | 2,929 | 2,906 | 2,884 | 2,862 | 2,839 | 2,817 | 2,795 |
| | % | i. | Apartments | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | j. | Detached Houses | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | % | k. | Gers | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | kWh p.a. | l. | Consumption per Apartment | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 |
| | kWh p.a. | m. | Consumption per Detached House | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 |
| | kWh p.a. | n. | Consumption per Ger | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| GWh p.a. | o. | Total Consumption p.a. | 6.2 | 6.3 | 6.3 | 6.4 | 6.5 | 6.4 | 6.3 | 5.8 | 5.7 | 5.7 | 5.7 | 5.6 | 5.6 | 5.5 | 5.5 | 5.4 | 5.4 | 5.4 | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Rural | No. | p. | Rural Population | 78,033 | 76,679 | 75,509 | 74,827 | 73,962 | 73,815 | 74,093 | 67,062 | 66,566 | 66,070 | 65,574 | 65,079 | 64,583 | 64,087 | 63,591 | 63,096 | 62,600 | 62,104 |
| | No. | q. | Persons per Rural Household | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | 13,006 | 12,780 | 12,585 | 12,471 | 12,327 | 12,303 | 12,349 | 11,177 | 11,094 | 11,012 | 10,929 | 10,846 | 10,764 | 10,681 | 10,599 | 10,516 | 10,433 | 10,351 |
| | % | t. | Electric Rural Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | u. | Electric Rural Customers | 11,705 | 11,502 | 11,326 | 11,224 | 11,094 | 11,072 | 11,114 | 10,059 | 9,985 | 9,911 | 9,836 | 9,762 | 9,687 | 9,613 | 9,539 | 9,464 | 9,390 | 9,316 |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w. | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | kWh p.a. | y. | Consumption per Apartment | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 |
| | kWh p.a. | z. | Consumption per Detached House | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 |
| | kWh p.a. | aa. | Consumption per Ger | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| GWh p.a. | ab. | Total Consumption p.a. | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | |
| | | | | | | | | | | | | | | | | | | | | | |
| Arhangai | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 7.63 | 7.66 | 7.66 | 7.71 | 7.82 | 7.77 | 7.68 | 6.99 | 6.93 | 6.88 | 6.83 | 6.78 | 6.73 | 6.68 | 6.62 | 6.57 | 6.52 | 6.47 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 22% | 20% | 20% | 18% | 17% | 17% | 18% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% |
| | GWh p.a. | ae. | Total Purchases p.a. | 9.30 | 9.22 | 9.18 | 9.13 | 9.19 | 9.07 | 9.04 | 8.19 | 8.13 | 8.07 | 8.01 | 7.95 | 7.89 | 7.83 | 7.77 | 7.71 | 7.65 | 7.59 |
| | - | af. | Load Factor | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| | MW | ag. | Total Demand p.a. (incl losses) | 2.12 | 2.10 | 2.10 | 2.09 | 2.10 | 2.07 | 2.06 | 1.87 | 1.86 | 1.84 | 1.83 | 1.82 | 1.80 | 1.79 | 1.77 | 1.76 | 1.75 | 1.73 |
| | MW | ah. | Total Demand p.a. (excl losses) | 1.74 | 1.75 | 1.75 | 1.76 | 1.79 | 1.77 | 1.75 | 1.60 | 1.58 | 1.57 | 1.56 | 1.55 | 1.54 | 1.52 | 1.51 | 1.50 | 1.49 | 1.48 |

Table X-2: BAYANHONGOR AIMAG

| Disco | | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | | |
|-------------|-------------|----------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Region | CES | | | | | | | | | | | | | | | | | | | | |
| Aimag | Bayanhongor | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 80,000 | 83,800 | 83,600 | 83,800 | 84,200 | 85,200 | 85,400 | 75,394 | 75,021 | 74,648 | 74,275 | 73,902 | 73,530 | 73,157 | 72,784 | 72,411 | 72,038 | 71,665 |
| | % | b. | Total Pop Grow th | | 4.8% | -0.2% | 0.2% | 0.5% | 1.2% | 0.2% | -11.7% | -0.5% | -0.5% | -0.5% | -0.5% | -0.5% | -0.5% | -0.5% | -0.5% | -0.5% | -0.5% |
| Urban | No. | c. | Urban Pop | 22,720 | 25,140 | 24,160 | 24,721 | 26,270 | 28,457 | 28,011 | 24,880 | 24,757 | 24,634 | 24,511 | 24,388 | 24,265 | 24,142 | 24,019 | 23,896 | 23,773 | 23,649 |
| | No. | d. = e. + c. | Persons per Urban Household | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 5,680 | 6,285 | 6,040 | 6,180 | 6,568 | 7,114 | 7,003 | 6,220 | 6,189 | 6,158 | 6,128 | 6,097 | 6,066 | 6,035 | 6,005 | 5,974 | 5,943 | 5,912 |
| | % | g. | Electric Urban Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | h. = f. x g. | Electric Urban Customers | 5,112 | 5,657 | 5,436 | 5,562 | 5,911 | 6,403 | 6,303 | 5,598 | 5,570 | 5,543 | 5,515 | 5,487 | 5,460 | 5,432 | 5,404 | 5,377 | 5,349 | 5,321 |
| | % | i. | Apartments | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | j. | Detached Houses | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | % | k. | Gers | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | kWh p.a. | l. | Consumption per Apartment | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 |
| | kWh p.a. | m. | Consumption per Detached House | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 |
| | kWh p.a. | n. | Consumption per Ger | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | GWh p.a. | o. | Total Consumption p.a. | 9.8 | 10.8 | 10.4 | 10.7 | 11.3 | 12.3 | 12.1 | 10.7 | 10.7 | 10.6 | 10.6 | 10.5 | 10.5 | 10.4 | 10.3 | 10.3 | 10.2 | 10.2 |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Rural | No. | p. | Rural Population | 57,280 | 58,660 | 59,440 | 59,079 | 57,930 | 56,743 | 57,389 | 50,514 | 50,264 | 50,014 | 49,764 | 49,515 | 49,265 | 49,015 | 48,765 | 48,515 | 48,265 | 48,016 |
| | No. | q. | Persons per Rural Household | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | 11,456 | 11,732 | 11,888 | 11,816 | 11,586 | 11,349 | 11,478 | 10,103 | 10,053 | 10,003 | 9,953 | 9,903 | 9,853 | 9,803 | 9,753 | 9,703 | 9,653 | 9,603 |
| | % | t. | Electric Rural Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | u. | Electric Rural Customers | 10,310 | 10,559 | 10,699 | 10,634 | 10,427 | 10,214 | 10,330 | 9,093 | 9,048 | 9,003 | 8,958 | 8,913 | 8,868 | 8,823 | 8,778 | 8,733 | 8,688 | 8,643 |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w. | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | kWh p.a. | y. | Consumption per Apartment | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 |
| | kWh p.a. | z. | Consumption per Detached House | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 |
| | kWh p.a. | aa. | Consumption per Ger | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 |
| | GWh p.a. | ab. | Total Consumption p.a. | 6.1 | 6.3 | 6.4 | 6.3 | 6.2 | 6.1 | 6.1 | 5.4 | 5.4 | 5.4 | 5.3 | 5.3 | 5.3 | 5.2 | 5.2 | 5.2 | 5.2 | 5.1 |
| Bayanhongor | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 15.92 | 17.11 | 16.78 | 16.98 | 17.52 | 18.34 | 18.22 | 16.13 | 16.05 | 15.97 | 15.89 | 15.81 | 15.73 | 15.65 | 15.57 | 15.49 | 15.41 | 15.33 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 22% | 46% | 35% | 25% | 17% | 16% | 15% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% |
| | GWh p.a. | ae. | Total Purchases p.a. | 19.41 | 25.04 | 22.57 | 21.17 | 20.41 | 21.29 | 20.95 | 18.69 | 18.60 | 18.51 | 18.42 | 18.33 | 18.23 | 18.14 | 18.05 | 17.96 | 17.86 | 17.77 |
| | - | af. | Load Factor | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| | MW | ag. | Total Demand p.a. (incl losses) | 4.43 | 5.72 | 5.15 | 4.83 | 4.66 | 4.86 | 4.78 | 4.27 | 4.25 | 4.23 | 4.20 | 4.18 | 4.16 | 4.14 | 4.12 | 4.10 | 4.08 | 4.06 |
| | MW | ah. | Total Demand p.a. (excl losses) | 3.64 | 3.91 | 3.83 | 3.88 | 4.00 | 4.19 | 4.16 | 3.68 | 3.66 | 3.65 | 3.63 | 3.61 | 3.59 | 3.57 | 3.56 | 3.54 | 3.52 | 3.50 |

Table X-3: BULGAN AIMAG

| Disco | Erd - Bulgan | | | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | |
|----------|--------------|------------------------|--|----------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Region | CES | | | | | | | | | | | | | | | | | | | | |
| Aimag | Bulgan | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 62,800 | 60,800 | 59,900 | 60,300 | 60,500 | 61,400 | 62,300 | 53,240 | 52,752 | 52,264 | 51,775 | 51,287 | 50,799 | 50,311 | 49,823 | 49,334 | 48,846 | 48,358 |
| | % | b. | Total Pop Grow th | | -3.2% | -1.5% | 0.7% | 0.3% | 1.5% | 1.5% | -14.5% | -0.9% | -0.9% | -0.9% | -0.9% | -1.0% | -1.0% | -1.0% | -1.0% | -1.0% | -1.0% |
| | | | | | | | | | | | | | | | | | | | | | |
| Urban | No. | c. | Urban Pop | 16,579 | 15,382 | 15,334 | 15,316 | 15,730 | 15,350 | 15,887 | 13,842 | 13,715 | 13,589 | 13,462 | 13,335 | 13,208 | 13,081 | 12,954 | 12,827 | 12,700 | 12,573 |
| | No. | d. = e. + c. | Persons per Urban Household | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 4,145 | 3,846 | 3,834 | 3,829 | 3,933 | 3,838 | 3,972 | 3,461 | 3,429 | 3,397 | 3,365 | 3,334 | 3,302 | 3,270 | 3,238 | 3,207 | 3,175 | 3,143 |
| | % | g. | Electric Urban Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | h. = f. x g. | Electric Urban Customers | 3,730 | 3,461 | 3,450 | 3,446 | 3,539 | 3,454 | 3,574 | 3,115 | 3,086 | 3,057 | 3,029 | 3,000 | 2,972 | 2,943 | 2,915 | 2,886 | 2,858 | 2,829 |
| | % | i. | Apartments | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | j. | Detached Houses | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | % | k. | Gers | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | kWh p.a. | l. | Consumption per Apartment | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 |
| | kWh p.a. | m. | Consumption per Detached House | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 |
| | kWh p.a. | n. | Consumption per Ger | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| GWh p.a. | o. | Total Consumption p.a. | 7.1 | 6.6 | 6.6 | 6.6 | 6.8 | 6.6 | 6.8 | 6.0 | 5.9 | 5.9 | 5.8 | 5.7 | 5.7 | 5.6 | 5.6 | 5.5 | 5.5 | 5.4 | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Rural | No. | p. | Rural Population | 46,221 | 45,418 | 44,566 | 44,984 | 44,770 | 46,050 | 46,414 | 39,398 | 39,036 | 38,675 | 38,314 | 37,953 | 37,591 | 37,230 | 36,869 | 36,507 | 36,146 | 35,785 |
| | No. | q. | Persons per Rural Household | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | 9,244 | 9,084 | 8,913 | 8,997 | 8,954 | 9,210 | 9,283 | 7,880 | 7,807 | 7,735 | 7,663 | 7,591 | 7,518 | 7,446 | 7,374 | 7,301 | 7,229 | 7,157 |
| | % | t. | Electric Rural Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | u. | Electric Rural Customers | 8,320 | 8,175 | 8,022 | 8,097 | 8,059 | 8,289 | 8,354 | 7,092 | 7,027 | 6,962 | 6,896 | 6,831 | 6,766 | 6,701 | 6,636 | 6,571 | 6,506 | 6,441 |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w. | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | kWh p.a. | y. | Consumption per Apartment | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 |
| | kWh p.a. | z. | Consumption per Detached House | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 |
| | kWh p.a. | aa. | Consumption per Ger | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 |
| GWh p.a. | ab. | Total Consumption p.a. | 5.0 | 4.9 | 4.8 | 4.8 | 4.8 | 4.9 | 5.0 | 4.2 | 4.2 | 4.1 | 4.1 | 4.1 | 4.0 | 4.0 | 3.9 | 3.9 | 3.9 | 3.8 | |
| | | | | | | | | | | | | | | | | | | | | | |
| Bulgan | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 12.09 | 11.49 | 11.38 | 11.42 | 11.57 | 11.55 | 11.82 | 10.18 | 10.09 | 10.00 | 9.90 | 9.81 | 9.72 | 9.62 | 9.53 | 9.44 | 9.34 | 9.25 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 22% | 20% | 20% | 18% | 17% | 17% | 18% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% |
| | GWh p.a. | ae. | Total Purchases p.a. | 14.74 | 13.83 | 13.63 | 13.52 | 13.59 | 13.49 | 13.91 | 11.95 | 11.84 | 11.73 | 11.62 | 11.51 | 11.40 | 11.29 | 11.18 | 11.07 | 10.96 | 10.85 |
| | - | af. | Load Factor | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| | MW | ag. | Total Demand p.a. (incl losses) | 3.37 | 3.16 | 3.11 | 3.09 | 3.10 | 3.08 | 3.18 | 2.73 | 2.70 | 2.68 | 2.65 | 2.63 | 2.60 | 2.58 | 2.55 | 2.53 | 2.50 | 2.48 |
| | MW | ah. | Total Demand p.a. (excl losses) | 2.76 | 2.62 | 2.60 | 2.61 | 2.64 | 2.64 | 2.70 | 2.33 | 2.30 | 2.28 | 2.26 | 2.24 | 2.22 | 2.20 | 2.18 | 2.15 | 2.13 | 2.11 |

Table X-4: DARKHAN – UUL AIMAG

| Disco | Darkhan - Seleng | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | | |
|-------------|------------------|------------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Region | CES | | | | | | | | | | | | | | | | | | | | |
| Aimag | Darkhan-Uul | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 86,500 | 87,000 | 87,700 | 87,500 | 87,600 | 88,200 | 90,000 | 90,075 | 90,973 | 91,872 | 92,770 | 93,668 | 94,567 | 95,465 | 96,363 | 97,261 | 98,160 | 99,058 |
| | % | b. | Total Pop Grow th | | 0.6% | 0.8% | -0.2% | 0.1% | 0.7% | 2.0% | 0.1% | 1.0% | 1.0% | 1.0% | 1.0% | 1.0% | 0.9% | 0.9% | 0.9% | 0.9% | 0.9% |
| | | | | | | | | | | | | | | | | | | | | | |
| Urban | No. | c. | Urban Pop | 70,584 | 71,253 | 72,265 | 71,838 | 72,358 | 72,412 | 72,990 | 73,720 | 74,455 | 75,190 | 75,926 | 76,661 | 77,396 | 78,131 | 78,866 | 79,602 | 80,337 | 81,072 |
| | No. | d. = e. + c. | Persons per Urban Household | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 17,646 | 17,813 | 18,066 | 17,959 | 18,089 | 18,103 | 18,248 | 18,430 | 18,614 | 18,798 | 18,981 | 19,165 | 19,349 | 19,533 | 19,717 | 19,900 | 20,084 | 20,268 |
| | % | g. | Electric Urban Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | h. = f. x g. | Electric Urban Customers | 15,881 | 16,032 | 16,260 | 16,163 | 16,280 | 16,293 | 16,423 | 16,587 | 16,752 | 16,918 | 17,083 | 17,249 | 17,414 | 17,580 | 17,745 | 17,910 | 18,076 | 18,241 |
| | % | i. | Apartments | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | j. | Detached Houses | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | % | k. | Gers | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | kWh p.a. | l. | Consumption per Apartment | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 |
| | kWh p.a. | m. | Consumption per Detached House | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 |
| | kWh p.a. | n. | Consumption per Ger | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| GWh p.a. | o. | Total Consumption p.a. | 30.4 | 30.7 | 31.1 | 31.0 | 31.2 | 31.2 | 31.4 | 31.8 | 32.1 | 32.4 | 32.7 | 33.0 | 33.3 | 33.7 | 34.0 | 34.3 | 34.6 | 34.9 | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Rural | No. | p. | Rural Population | 15,916 | 15,747 | 15,435 | 15,663 | 15,242 | 15,788 | 17,010 | 16,355 | 16,518 | 16,681 | 16,844 | 17,007 | 17,171 | 17,334 | 17,497 | 17,660 | 17,823 | 17,986 |
| | No. | q. | Persons per Rural Household | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | 3,183 | 3,149 | 3,087 | 3,133 | 3,048 | 3,158 | 3,402 | 3,271 | 3,304 | 3,336 | 3,369 | 3,401 | 3,434 | 3,467 | 3,499 | 3,532 | 3,565 | 3,597 |
| | % | t. | Electric Rural Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | u. | Electric Rural Customers | 2,865 | 2,834 | 2,778 | 2,819 | 2,744 | 2,842 | 3,062 | 2,944 | 2,973 | 3,003 | 3,032 | 3,061 | 3,091 | 3,120 | 3,149 | 3,179 | 3,208 | 3,237 |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w . | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | kWh p.a. | y. | Consumption per Apartment | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 |
| | kWh p.a. | z. | Consumption per Detached House | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 |
| | kWh p.a. | aa. | Consumption per Ger | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 |
| GWh p.a. | ab. | Total Consumption p.a. | 1.7 | 1.7 | 1.7 | 1.7 | 1.6 | 1.7 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | |
| | | | | | | | | | | | | | | | | | | | | | |
| Darkhan-Uul | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 32.12 | 32.39 | 32.79 | 32.63 | 32.81 | 32.89 | 33.27 | 33.52 | 33.85 | 34.18 | 34.52 | 34.85 | 35.19 | 35.52 | 35.86 | 36.19 | 36.52 | 36.86 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 22% | 20% | 20% | 18% | 17% | 17% | 18% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% |
| | GWh p.a. | ae. | Total Purchases p.a. | 39.15 | 38.96 | 39.28 | 38.63 | 38.52 | 38.42 | 39.16 | 39.31 | 39.71 | 40.10 | 40.49 | 40.88 | 41.27 | 41.67 | 42.06 | 42.45 | 42.84 | 43.23 |
| | - | af. | Load Factor | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| | MW | ag. | Total Demand p.a. (incl losses) | 8.94 | 8.90 | 8.97 | 8.82 | 8.79 | 8.77 | 8.94 | 8.98 | 9.07 | 9.15 | 9.24 | 9.33 | 9.42 | 9.51 | 9.60 | 9.69 | 9.78 | 9.87 |
| | MW | ah. | Total Demand p.a. (excl losses) | 7.33 | 7.39 | 7.49 | 7.45 | 7.49 | 7.51 | 7.60 | 7.65 | 7.73 | 7.80 | 7.88 | 7.96 | 8.03 | 8.11 | 8.19 | 8.26 | 8.34 | 8.42 |

Table X-5: DORNOD AIMAG

| Disco | | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | | |
|----------|----------|------------------------|--|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Region | EES | | | | | | | | | | | | | | | | | | | | |
| Aimag | Dornod | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 73,000 | 73,100 | 73,400 | 73,600 | 72,900 | 73,600 | 73,600 | 88,841 | 86,681 | 84,522 | 82,362 | 80,203 | 78,043 | 75,883 | 73,724 | 71,564 | 69,405 | 67,245 |
| | % | b. | Total Pop Grow th | | 0.1% | 0.4% | 0.3% | -1.0% | 1.0% | 0.0% | 20.7% | -2.4% | -2.5% | -2.6% | -2.6% | -2.7% | -2.8% | -2.8% | -2.9% | -3.0% | -3.1% |
| | | | | | | | | | | | | | | | | | | | | | |
| Urban | No. | c. | Urban Pop | 36,500 | 38,743 | 39,342 | 39,523 | 39,147 | 37,683 | 39,229 | 47,581 | 46,424 | 45,267 | 44,111 | 42,954 | 41,798 | 40,641 | 39,484 | 38,328 | 37,171 | 36,015 |
| | No. | d. = e. + c. | Persons per Urban Household | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 9,125 | 9,686 | 9,836 | 9,881 | 9,787 | 9,421 | 9,807 | 11,895 | 11,606 | 11,317 | 11,028 | 10,739 | 10,449 | 10,160 | 9,871 | 9,582 | 9,293 | 9,004 |
| | % | g. | Electric Urban Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | h. = f. x g. | Electric Urban Customers | 8,213 | 8,717 | 8,852 | 8,893 | 8,808 | 8,479 | 8,826 | 10,706 | 10,445 | 10,185 | 9,925 | 9,665 | 9,404 | 9,144 | 8,884 | 8,624 | 8,364 | 8,103 |
| | % | i. | Apartments | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | j. | Detached Houses | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | % | k. | Gers | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | kWh p.a. | l. | Consumption per Apartment | 1,200.0 | 1,200.0 | 1,200.0 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 |
| | kWh p.a. | m. | Consumption per Detached House | 1,300.0 | 1,300.0 | 1,300.0 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 |
| | kWh p.a. | n. | Consumption per Ger | 450.0 | 450.0 | 450.0 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| GWh p.a. | o. | Total Consumption p.a. | 9.2 | 9.8 | 10.0 | 17.9 | 17.7 | 17.1 | 17.8 | 21.6 | 21.0 | 20.5 | 20.0 | 19.5 | 18.9 | 18.4 | 17.9 | 17.4 | 16.9 | 16.3 | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Rural | No. | p. | Rural Population | 36,500 | 34,357 | 34,058 | 34,077 | 33,753 | 35,917 | 34,371 | 41,260 | 40,257 | 39,254 | 38,251 | 37,248 | 36,245 | 35,242 | 34,239 | 33,236 | 32,233 | 31,230 |
| | No. | q. | Persons per Rural Household | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | 7,300 | 6,871 | 6,812 | 6,815 | 6,751 | 7,183 | 6,874 | 8,252 | 8,051 | 7,851 | 7,650 | 7,450 | 7,249 | 7,048 | 6,848 | 6,647 | 6,447 | 6,246 |
| | % | t. | Electric Rural Customers | 22% | 22% | 23% | 27% | 30% | 35% | 40% | 45% | 55% | 60% | 71% | 45% | 45% | 45% | 45% | 45% | 45% | 45% |
| | No. | u. | Electric Rural Customers | 1,606 | 1,512 | 1,567 | 1,840 | 2,025 | 2,514 | 2,750 | 3,713 | 4,428 | 4,711 | 5,432 | 3,352 | 3,262 | 3,172 | 3,082 | 2,991 | 2,901 | 2,811 |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w. | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | kWh p.a. | y. | Consumption per Apartment | 1,200.0 | 1,200.0 | 1,200.0 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 |
| | kWh p.a. | z. | Consumption per Detached House | 1,300.0 | 1,300.0 | 1,300.0 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 |
| | kWh p.a. | aa. | Consumption per Ger | 450.0 | 450.0 | 450.0 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| | GWh p.a. | ab. | Total Consumption p.a. | 0.8 | 0.7 | 0.8 | 1.1 | 1.2 | 1.5 | 1.6 | 2.2 | 2.6 | 2.8 | 3.2 | 2.0 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.7 |
| | | | | | | | | | | | | | | | | | | | | | |
| Dornod | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 10.03 | 10.55 | 10.73 | 19.01 | 18.95 | 18.58 | 19.42 | 23.78 | 23.68 | 23.33 | 23.23 | 21.47 | 20.89 | 20.31 | 19.73 | 19.16 | 18.58 | 18.00 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 22% | 19% | 17% | 9% | 7% | 8% | 10% | 9% | 9% | 9% | 9% | 9% | 9% | 9% | 9% | 9% | 9% | 9% |
| | GWh p.a. | ae. | Total Purchases p.a. | 12.19 | 12.60 | 12.51 | 20.71 | 20.24 | 20.07 | 21.38 | 25.85 | 25.74 | 25.36 | 25.25 | 23.34 | 22.71 | 22.08 | 21.45 | 20.82 | 20.19 | 19.57 |
| | - | af. | Load Factor | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| | MW | ag. | Total Demand p.a. (incl losses) | 2.78 | 2.88 | 2.86 | 4.73 | 4.62 | 4.58 | 4.88 | 5.90 | 5.88 | 5.79 | 5.77 | 5.33 | 5.18 | 5.04 | 4.90 | 4.75 | 4.61 | 4.47 |
| | MW | ah. | Total Demand p.a. (excl losses) | 2.29 | 2.41 | 2.45 | 4.34 | 4.33 | 4.24 | 4.43 | 5.43 | 5.41 | 5.33 | 5.30 | 4.90 | 4.77 | 4.64 | 4.51 | 4.37 | 4.24 | 4.11 |

Table X-6: DORNOGOVI AIMAG

| Disco | UBEDN | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | | |
|-----------|-----------|------------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Region | CES | | | | | | | | | | | | | | | | | | | | |
| Aimag | Dornogovi | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 52,100 | 52,000 | 53,300 | 54,500 | 55,600 | 57,200 | 58,300 | 57,243 | 58,176 | 59,108 | 60,041 | 60,974 | 61,907 | 62,839 | 63,772 | 64,705 | 65,637 | 66,570 |
| | % | b. | Total Pop Grow th | | -0.2% | 2.5% | 2.3% | 2.0% | 2.9% | 1.9% | -1.8% | 1.6% | 1.6% | 1.6% | 1.6% | 1.5% | 1.5% | 1.5% | 1.5% | 1.4% | 1.4% |
| | | | | | | | | | | | | | | | | | | | | | |
| Urban | No. | c. | Urban Pop | 27,613 | 27,872 | 29,049 | 31,174 | 31,247 | 32,718 | 34,922 | 34,444 | 35,005 | 35,566 | 36,128 | 36,689 | 37,250 | 37,811 | 38,372 | 38,934 | 39,495 | 40,056 |
| | No. | d. = e. + c. | Persons per Urban Household | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 7,889 | 7,963 | 8,300 | 8,907 | 8,928 | 9,348 | 9,978 | 9,841 | 10,001 | 10,162 | 10,322 | 10,483 | 10,643 | 10,803 | 10,964 | 11,124 | 11,284 | 11,445 |
| | % | g. | Electric Urban Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | h. = f. x g. | Electric Urban Customers | 7,100 | 7,167 | 7,470 | 8,016 | 8,035 | 8,413 | 8,980 | 8,857 | 9,001 | 9,146 | 9,290 | 9,434 | 9,579 | 9,723 | 9,867 | 10,012 | 10,156 | 10,300 |
| | % | i. | Apartments | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | j. | Detached Houses | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | % | k. | Gers | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | kWh p.a. | l. | Consumption per Apartment | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 |
| | kWh p.a. | m. | Consumption per Detached House | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 |
| | kWh p.a. | n. | Consumption per Ger | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| GWh p.a. | o. | Total Consumption p.a. | 13.6 | 13.7 | 14.3 | 15.4 | 15.4 | 16.1 | 17.2 | 17.0 | 17.2 | 17.5 | 17.8 | 18.1 | 18.3 | 18.6 | 18.9 | 19.2 | 19.4 | 19.7 | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Rural | No. | p. | Rural Population | 24,487 | 24,128 | 24,252 | 23,326 | 24,353 | 24,482 | 23,378 | 22,799 | 23,171 | 23,542 | 23,914 | 24,285 | 24,656 | 25,028 | 25,399 | 25,771 | 26,142 | 26,514 |
| | No. | q. | Persons per Rural Household | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | 5,442 | 5,362 | 5,389 | 5,184 | 5,412 | 5,440 | 5,195 | 5,066 | 5,149 | 5,232 | 5,314 | 5,397 | 5,479 | 5,562 | 5,644 | 5,727 | 5,809 | 5,892 |
| | % | t. | Electric Rural Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | u. | Electric Rural Customers | 4,897 | 4,826 | 4,850 | 4,665 | 4,871 | 4,896 | 4,676 | 4,560 | 4,634 | 4,708 | 4,783 | 4,857 | 4,931 | 5,006 | 5,080 | 5,154 | 5,228 | 5,303 |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w. | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | kWh p.a. | y. | Consumption per Apartment | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 |
| | kWh p.a. | z. | Consumption per Detached House | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 |
| | kWh p.a. | aa. | Consumption per Ger | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 |
| GWh p.a. | ab. | Total Consumption p.a. | 2.9 | 2.9 | 2.9 | 2.8 | 2.9 | 2.9 | 2.8 | 2.7 | 2.8 | 2.8 | 2.8 | 2.9 | 2.9 | 3.0 | 3.0 | 3.1 | 3.1 | 3.2 | |
| | | | | | | | | | | | | | | | | | | | | | |
| Dornogovi | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 16.51 | 16.60 | 17.19 | 18.13 | 18.28 | 19.02 | 19.98 | 19.67 | 19.99 | 20.32 | 20.64 | 20.96 | 21.28 | 21.60 | 21.92 | 22.24 | 22.56 | 22.88 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 22% | 20% | 20% | 18% | 17% | 17% | 18% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% |
| | GWh p.a. | ae. | Total Purchases p.a. | 20.13 | 19.97 | 20.59 | 21.46 | 21.47 | 22.22 | 23.51 | 23.08 | 23.45 | 23.83 | 24.21 | 24.58 | 24.96 | 25.33 | 25.71 | 26.09 | 26.46 | 26.84 |
| | - | af. | Load Factor | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| | MW | ag. | Total Demand p.a. (incl losses) | 4.60 | 4.56 | 4.70 | 4.90 | 4.90 | 5.07 | 5.37 | 5.27 | 5.35 | 5.44 | 5.53 | 5.61 | 5.70 | 5.78 | 5.87 | 5.96 | 6.04 | 6.13 |
| | MW | ah. | Total Demand p.a. (excl losses) | 3.77 | 3.79 | 3.92 | 4.14 | 4.17 | 4.34 | 4.56 | 4.49 | 4.57 | 4.64 | 4.71 | 4.78 | 4.86 | 4.93 | 5.00 | 5.08 | 5.15 | 5.22 |

Table X-7: DUNDGOVI AIMAG

| Disco | | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | | |
|----------|----------|----------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Region | CES | | | | | | | | | | | | | | | | | | | | |
| Aimag | Dundgovi | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 50,500 | 49,900 | 49,600 | 49,200 | 48,800 | 48,200 | 47,700 | 38,651 | 38,182 | 37,713 | 37,243 | 36,774 | 36,305 | 35,836 | 35,367 | 34,897 | 34,428 | 33,959 |
| | % | b. | Total Pop Grow th | | -1.2% | -0.6% | -0.8% | -0.8% | -1.2% | -1.0% | -19.0% | -1.2% | -1.2% | -1.2% | -1.3% | -1.3% | -1.3% | -1.3% | -1.3% | -1.3% | -1.4% |
| | | | | | | | | | | | | | | | | | | | | | |
| Urban | No. | c. | Urban Pop | 13,888 | 10,130 | 13,987 | 13,776 | 10,248 | 10,315 | 10,208 | 7,979 | 7,882 | 7,785 | 7,688 | 7,591 | 7,494 | 7,398 | 7,301 | 7,204 | 7,107 | 7,010 |
| | No. | d. = e. + c. | Persons per Urban Household | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 2,778 | 2,026 | 2,797 | 2,755 | 2,050 | 2,063 | 2,042 | 1,596 | 1,576 | 1,557 | 1,538 | 1,518 | 1,499 | 1,480 | 1,460 | 1,441 | 1,421 | 1,402 |
| | % | g. | Electric Urban Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | h. = f. x g. | Electric Urban Customers | 2,500 | 1,823 | 2,518 | 2,480 | 1,845 | 1,857 | 1,837 | 1,436 | 1,419 | 1,401 | 1,384 | 1,366 | 1,349 | 1,332 | 1,314 | 1,297 | 1,279 | 1,262 |
| | % | i. | Apartments | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | j. | Detached Houses | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | % | k. | Gers | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | kWh p.a. | l. | Consumption per Apartment | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 |
| | kWh p.a. | m. | Consumption per Detached House | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 |
| | kWh p.a. | n. | Consumption per Ger | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | GWh p.a. | o. | Total Consumption p.a. | 4.8 | 3.5 | 4.8 | 4.7 | 3.5 | 3.6 | 3.5 | 2.8 | 2.7 | 2.7 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 |
| | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | |
| Rural | No. | p. | Rural Population | 36,613 | 39,770 | 35,613 | 35,424 | 38,552 | 37,885 | 37,492 | 30,672 | 30,300 | 29,928 | 29,555 | 29,183 | 28,811 | 28,438 | 28,066 | 27,694 | 27,321 | 26,949 |
| | No. | q. | Persons per Rural Household | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | 6,102 | 6,628 | 5,935 | 5,904 | 6,425 | 6,314 | 6,249 | 5,112 | 5,050 | 4,988 | 4,926 | 4,864 | 4,802 | 4,740 | 4,678 | 4,616 | 4,554 | 4,491 |
| | % | t. | Electric Rural Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | u. | Electric Rural Customers | 5,492 | 5,966 | 5,342 | 5,314 | 5,783 | 5,683 | 5,624 | 4,601 | 4,545 | 4,489 | 4,433 | 4,377 | 4,322 | 4,266 | 4,210 | 4,154 | 4,098 | 4,042 |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w. | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | kWh p.a. | y. | Consumption per Apartment | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 |
| | kWh p.a. | z. | Consumption per Detached House | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 |
| | kWh p.a. | aa. | Consumption per Ger | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 |
| | GWh p.a. | ab. | Total Consumption p.a. | 3.3 | 3.5 | 3.2 | 3.2 | 3.4 | 3.4 | 3.3 | 2.7 | 2.7 | 2.7 | 2.7 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 |
| | | | | | | | | | | | | | | | | | | | | | |
| Dundgovi | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 8.05 | 7.04 | 8.00 | 7.91 | 6.97 | 6.94 | 6.86 | 5.49 | 5.42 | 5.35 | 5.29 | 5.22 | 5.15 | 5.09 | 5.02 | 4.95 | 4.89 | 4.82 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 22% | 20% | 20% | 18% | 17% | 17% | 18% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% |
| | GWh p.a. | ae. | Total Purchases p.a. | 9.82 | 8.47 | 9.58 | 9.37 | 8.19 | 8.10 | 8.08 | 6.44 | 6.36 | 6.28 | 6.20 | 6.12 | 6.05 | 5.97 | 5.89 | 5.81 | 5.73 | 5.66 |
| | - | af. | Load Factor | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| | MW | ag. | Total Demand p.a. (incl losses) | 2.24 | 1.93 | 2.19 | 2.14 | 1.87 | 1.85 | 1.84 | 1.47 | 1.45 | 1.43 | 1.42 | 1.40 | 1.38 | 1.36 | 1.34 | 1.33 | 1.31 | 1.29 |
| | MW | ah. | Total Demand p.a. (excl losses) | 1.84 | 1.61 | 1.83 | 1.81 | 1.59 | 1.58 | 1.57 | 1.25 | 1.24 | 1.22 | 1.21 | 1.19 | 1.18 | 1.16 | 1.15 | 1.13 | 1.12 | 1.10 |

Table X-8: GOVI - ALTAI AIMAG

| Disco | | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | | |
|------------|------------|------------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Region | AES | | | | | | | | | | | | | | | | | | | | |
| Aimag | Govi-Altai | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 61,400 | 60,900 | 60,400 | 60,300 | 60,200 | 59,800 | 59,400 | 53,144 | 52,547 | 51,949 | 51,352 | 50,755 | 50,158 | 49,560 | 48,963 | 48,366 | 47,768 | 47,171 |
| | % | b. | Total Pop Grow th | | -0.8% | -0.8% | -0.2% | -0.2% | -0.7% | -0.7% | -10.5% | -1.1% | -1.1% | -1.1% | -1.2% | -1.2% | -1.2% | -1.2% | -1.2% | -1.2% | -1.3% |
| | | | | | | | | | | | | | | | | | | | | | |
| Urban | No. | c. | Urban Pop | 19,587 | 19,610 | 19,328 | 19,236 | 18,481 | 17,761 | 17,701 | 15,943 | 15,764 | 15,585 | 15,406 | 15,226 | 15,047 | 14,868 | 14,689 | 14,510 | 14,330 | 14,151 |
| | No. | d. = e. + c. | Persons per Urban Household | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 6,529 | 6,537 | 6,443 | 6,412 | 6,160 | 5,920 | 5,900 | 5,314 | 5,255 | 5,195 | 5,135 | 5,075 | 5,016 | 4,956 | 4,896 | 4,837 | 4,777 | 4,717 |
| | % | g. | Electric Urban Customers | 22% | 22% | 23% | 27% | 27% | 30% | 30% | 35% | 40% | 45% | 50% | 60% | 65% | 71% | 71% | 71% | 71% | 71% |
| | No. | h. = f. x g. | Electric Urban Customers | 1,436 | 1,438 | 1,482 | 1,731 | 1,663 | 1,776 | 1,770 | 1,860 | 2,102 | 2,338 | 2,568 | 3,045 | 3,260 | 3,519 | 3,476 | 3,434 | 3,392 | 3,349 |
| | % | i. | Apartments | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | j. | Detached Houses | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | % | k. | Gers | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | kWh p.a. | l. | Consumption per Apartment | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 |
| | kWh p.a. | m. | Consumption per Detached House | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,400.0 | 1,450.0 | 1,520.0 | 1,600.0 | 1,600.0 | 1,600.0 | 1,600.0 | 1,600.0 | 1,600.0 | 1,600.0 |
| | kWh p.a. | n. | Consumption per Ger | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 |
| GWh p.a. | o. | Total Consumption p.a. | 1.6 | 1.6 | 1.7 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | 2.5 | 2.9 | 3.3 | 4.1 | 4.4 | 4.8 | 4.7 | 4.7 | 4.6 | 4.6 | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Rural | No. | p. | Rural Population | 41,813 | 41,290 | 41,072 | 41,064 | 41,719 | 42,039 | 41,699 | 37,201 | 36,783 | 36,365 | 35,946 | 35,528 | 35,110 | 34,692 | 34,274 | 33,856 | 33,438 | 33,020 |
| | No. | q. | Persons per Rural Household | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | 10,453 | 10,323 | 10,268 | 10,266 | 10,430 | 10,510 | 10,425 | 9,300 | 9,196 | 9,091 | 8,987 | 8,882 | 8,778 | 8,673 | 8,569 | 8,464 | 8,359 | 8,255 |
| | % | t. | Electric Rural Customers | 22% | 22% | 23% | 27% | 27% | 29% | 30% | 35% | 55% | 60% | 65% | 71% | 71% | 71% | 71% | 71% | 71% | 71% |
| | No. | u. | Electric Rural Customers | 2,300 | 2,271 | 2,362 | 2,772 | 2,816 | 3,048 | 3,127 | 3,255 | 5,058 | 5,455 | 5,841 | 6,306 | 6,232 | 6,158 | 6,084 | 6,009 | 5,935 | 5,861 |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w. | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | kWh p.a. | y. | Consumption per Apartment | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 |
| | kWh p.a. | z. | Consumption per Detached House | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,400.0 | 1,500.0 | 1,600.0 | 1,600.0 | 1,600.0 | 1,600.0 | 1,600.0 | 1,600.0 |
| | kWh p.a. | aa. | Consumption per Ger | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 |
| GWh p.a. | ab. | Total Consumption p.a. | 1.1 | 1.1 | 1.2 | 1.4 | 1.4 | 1.5 | 1.5 | 1.6 | 2.5 | 2.7 | 2.9 | 3.2 | 3.2 | 3.1 | 3.1 | 3.0 | 3.0 | 3.0 | |
| | | | | | | | | | | | | | | | | | | | | | |
| Govi-Altai | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 2.75 | 2.74 | 2.83 | 3.31 | 3.26 | 3.50 | 3.53 | 3.70 | 5.03 | 5.63 | 6.27 | 7.34 | 7.60 | 7.91 | 7.82 | 7.72 | 7.62 | 7.53 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 43% | 43% | 26% | 11% | 15% | 11% | 10% | 12% | 11% | 11% | 11% | 11% | 11% | 11% | 11% | 11% | 11% | 11% |
| | GWh p.a. | ae. | Total Purchases p.a. | 3.92 | 3.92 | 3.56 | 3.67 | 3.75 | 3.87 | 3.90 | 4.14 | 5.59 | 6.25 | 6.96 | 8.15 | 8.43 | 8.78 | 8.67 | 8.57 | 8.46 | 8.36 |
| | - | af. | Load Factor | 0.50 | 0.39 | 0.32 | 0.37 | 0.34 | 0.44 | 0.61 | 0.44 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 |
| | MW | ag. | Total Demand p.a. (incl losses) | 0.89 | 1.13 | 1.26 | 1.14 | 1.27 | 1.01 | 0.72 | 1.08 | 1.86 | 2.08 | 2.32 | 2.71 | 2.81 | 2.92 | 2.89 | 2.85 | 2.82 | 2.78 |
| | MW | ah. | Total Demand p.a. (excl losses) | 0.62 | 0.79 | 1.00 | 1.03 | 1.11 | 0.92 | 0.66 | 0.97 | 1.68 | 1.87 | 2.09 | 2.44 | 2.53 | 2.63 | 2.60 | 2.57 | 2.54 | 2.51 |

Table X-9: GOVISUMBER AIMAG

| Disco | | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | | |
|------------|------------|------------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Region | CES | | | | | | | | | | | | | | | | | | | | |
| Aimag | Govisumber | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 12,200 | 12,300 | 12,200 | 12,300 | 12,600 | 12,900 | 13,300 | 12,957 | 13,092 | 13,226 | 13,361 | 13,495 | 13,630 | 13,765 | 13,899 | 14,034 | 14,168 | 14,303 |
| | % | b. | Total Pop Grow th | | 0.8% | -0.8% | 0.8% | 2.4% | 2.4% | 3.1% | -2.6% | 1.0% | 1.0% | 1.0% | 1.0% | 1.0% | 1.0% | 1.0% | 1.0% | 1.0% | 1.0% |
| | | | | | | | | | | | | | | | | | | | | | |
| Urban | No. | c. | Urban Pop | 7,174 | 7,331 | 7,271 | 7,540 | 7,623 | 7,856 | 8,206 | 8,044 | 8,128 | 8,212 | 8,295 | 8,379 | 8,462 | 8,546 | 8,629 | 8,713 | 8,797 | 8,880 |
| | No. | d. = e. + c. | Persons per Urban Household | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 1,435 | 1,466 | 1,454 | 1,508 | 1,525 | 1,571 | 1,641 | 1,609 | 1,626 | 1,642 | 1,659 | 1,676 | 1,692 | 1,709 | 1,726 | 1,743 | 1,759 | 1,776 |
| | % | g. | Electric Urban Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | h. = f. x g. | Electric Urban Customers | 1,291 | 1,320 | 1,309 | 1,357 | 1,372 | 1,414 | 1,477 | 1,448 | 1,463 | 1,478 | 1,493 | 1,508 | 1,523 | 1,538 | 1,553 | 1,568 | 1,583 | 1,598 |
| | % | i. | Apartments | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | j. | Detached Houses | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | % | k. | Gers | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | kWh p.a. | l. | Consumption per Apartment | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 |
| | kWh p.a. | m. | Consumption per Detached House | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 |
| | kWh p.a. | n. | Consumption per Ger | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| GWh p.a. | o. | Total Consumption p.a. | 2.6 | 2.7 | 2.6 | 2.7 | 2.8 | 2.8 | 3.0 | 2.9 | 2.9 | 3.0 | 3.0 | 3.0 | 3.1 | 3.1 | 3.1 | 3.2 | 3.2 | 3.2 | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Rural | No. | p. | Rural Population | 5,026 | 4,969 | 4,929 | 4,760 | 4,977 | 5,044 | 5,094 | 4,913 | 4,964 | 5,015 | 5,066 | 5,117 | 5,168 | 5,219 | 5,270 | 5,321 | 5,372 | 5,423 |
| | No. | q. | Persons per Rural Household | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | 838 | 828 | 821 | 793 | 830 | 841 | 849 | 819 | 827 | 836 | 844 | 853 | 861 | 870 | 878 | 887 | 895 | 904 |
| | % | t. | Electric Rural Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | u. | Electric Rural Customers | 754 | 745 | 739 | 714 | 747 | 757 | 764 | 737 | 745 | 752 | 760 | 768 | 775 | 783 | 790 | 798 | 806 | 813 |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w. | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | kWh p.a. | y. | Consumption per Apartment | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 |
| | kWh p.a. | z. | Consumption per Detached House | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 |
| | kWh p.a. | aa. | Consumption per Ger | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 |
| GWh p.a. | ab. | Total Consumption p.a. | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | |
| | | | | | | | | | | | | | | | | | | | | | |
| Govisumber | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 3.05 | 3.10 | 3.08 | 3.16 | 3.21 | 3.30 | 3.43 | 3.36 | 3.39 | 3.43 | 3.46 | 3.50 | 3.53 | 3.57 | 3.60 | 3.64 | 3.67 | 3.70 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 22% | 20% | 17% | 9% | 8% | 8% | 10% | 9% | 9% | 9% | 9% | 9% | 9% | 9% | 9% | 9% | 9% | 9% |
| | GWh p.a. | ae. | Total Purchases p.a. | 3.71 | 3.71 | 3.59 | 3.44 | 3.45 | 3.56 | 3.78 | 3.65 | 3.69 | 3.72 | 3.76 | 3.80 | 3.84 | 3.88 | 3.91 | 3.95 | 3.99 | 4.03 |
| | - | af. | Load Factor | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| | MW | ag. | Total Demand p.a. (incl losses) | 0.85 | 0.85 | 0.82 | 0.79 | 0.79 | 0.81 | 0.86 | 0.83 | 0.84 | 0.85 | 0.86 | 0.87 | 0.88 | 0.88 | 0.89 | 0.90 | 0.91 | 0.92 |
| | MW | ah. | Total Demand p.a. (excl losses) | 0.70 | 0.71 | 0.70 | 0.72 | 0.73 | 0.75 | 0.78 | 0.77 | 0.77 | 0.78 | 0.79 | 0.80 | 0.81 | 0.81 | 0.82 | 0.83 | 0.84 | 0.85 |

Table X-10: HENTII AIMAG

| Disco | | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | | |
|--------|----------|----------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Region | EES | | | | | | | | | | | | | | | | | | | | |
| Aimag | Hentii | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 70,100 | 70,200 | 70,800 | 71,000 | 71,300 | 71,000 | 71,500 | 65,027 | 64,809 | 64,590 | 64,372 | 64,153 | 63,935 | 63,716 | 63,498 | 63,279 | 63,061 | 62,842 |
| | % | b. | Total Pop Growth | | 0.1% | 0.9% | 0.3% | 0.4% | -0.4% | 0.7% | -9.1% | -0.3% | -0.3% | -0.3% | -0.3% | -0.3% | -0.3% | -0.3% | -0.3% | -0.3% | -0.3% |
| Urban | No. | c. | Urban Pop | 28,531 | 28,571 | 30,090 | 30,530 | 26,880 | 28,187 | 29,315 | 25,955 | 25,868 | 25,781 | 25,693 | 25,606 | 25,519 | 25,432 | 25,345 | 25,257 | 25,170 | 25,083 |
| | No. | d. = e. + c. | Persons per Urban Household | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 7,133 | 7,143 | 7,523 | 7,633 | 6,720 | 7,047 | 7,329 | 6,489 | 6,467 | 6,445 | 6,423 | 6,402 | 6,380 | 6,358 | 6,336 | 6,314 | 6,293 | 6,271 |
| | % | g. | Electric Urban Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | h. = f. x g. | Electric Urban Customers | 6,419 | 6,429 | 6,770 | 6,869 | 6,048 | 6,342 | 6,596 | 5,840 | 5,820 | 5,801 | 5,781 | 5,761 | 5,742 | 5,722 | 5,703 | 5,683 | 5,663 | 5,644 |
| | % | i. | Apartments | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | j. | Detached Houses | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | % | k. | Gers | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | kWh p.a. | l. | Consumption per Apartment | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 |
| | kWh p.a. | m. | Consumption per Detached House | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 |
| | kWh p.a. | n. | Consumption per Ger | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 |
| | GWh p.a. | o. | Total Consumption p.a. | 7.2 | 7.2 | 7.6 | 7.7 | 6.8 | 7.1 | 7.4 | 6.6 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.4 | 6.4 | 6.4 | 6.4 | 6.3 |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Rural | No. | p. | Rural Population | 41,569 | 41,629 | 40,710 | 40,470 | 44,420 | 42,813 | 42,185 | 39,072 | 38,941 | 38,809 | 38,678 | 38,547 | 38,416 | 38,284 | 38,153 | 38,022 | 37,890 | 37,759 |
| | No. | q. | Persons per Rural Household | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | 8,314 | 8,326 | 8,142 | 8,094 | 8,884 | 8,563 | 8,437 | 7,814 | 7,788 | 7,762 | 7,736 | 7,709 | 7,683 | 7,657 | 7,631 | 7,604 | 7,578 | 7,552 |
| | % | t. | Electric Rural Customers | 22% | 22% | 23% | 27% | 30% | 35% | 40% | 45% | 55% | 60% | 71% | 45% | 45% | 45% | 45% | 45% | 45% | 45% |
| | No. | u. | Electric Rural Customers | 1,829 | 1,832 | 1,873 | 2,185 | 2,665 | 2,997 | 3,375 | 3,516 | 4,283 | 4,657 | 5,492 | 3,469 | 3,457 | 3,446 | 3,434 | 3,422 | 3,410 | 3,398 |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w. | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | kWh p.a. | y. | Consumption per Apartment | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 |
| | kWh p.a. | z. | Consumption per Detached House | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 |
| | kWh p.a. | aa. | Consumption per Ger | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 |
| | GWh p.a. | ab. | Total Consumption p.a. | 0.9 | 0.9 | 0.9 | 1.1 | 1.3 | 1.5 | 1.7 | 1.7 | 2.1 | 2.3 | 2.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 |
| Hentii | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 8.12 | 8.13 | 8.54 | 8.80 | 8.12 | 8.61 | 9.08 | 8.30 | 8.66 | 8.82 | 9.21 | 8.19 | 8.16 | 8.13 | 8.11 | 8.08 | 8.05 | 8.02 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 22% | 20% | 20% | 18% | 17% | 17% | 18% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% |
| | GWh p.a. | ae. | Total Purchases p.a. | 9.90 | 9.79 | 10.23 | 10.42 | 9.53 | 10.06 | 10.69 | 9.74 | 10.16 | 10.35 | 10.80 | 9.61 | 9.57 | 9.54 | 9.51 | 9.48 | 9.44 | 9.41 |
| | - | af. | Load Factor | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| | MW | ag. | Total Demand p.a. (incl losses) | 2.26 | 2.23 | 2.34 | 2.38 | 2.18 | 2.30 | 2.44 | 2.22 | 2.32 | 2.36 | 2.47 | 2.19 | 2.19 | 2.18 | 2.17 | 2.16 | 2.16 | 2.15 |
| | MW | ah. | Total Demand p.a. (excl losses) | 1.85 | 1.86 | 1.95 | 2.01 | 1.85 | 1.97 | 2.07 | 1.90 | 1.98 | 2.01 | 2.10 | 1.87 | 1.86 | 1.86 | 1.85 | 1.84 | 1.84 | 1.83 |

Table X-11: KHOVD AIMAG

| Disco | | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | | |
|--------|----------|----------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Region | WES | | | | | | | | | | | | | | | | | | | | |
| Aimag | Hovd | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 87,500 | 87,800 | 87,900 | 88,500 | 88,600 | 88,400 | 88,500 | 72,668 | 72,279 | 71,890 | 71,501 | 71,112 | 70,723 | 70,334 | 69,945 | 69,556 | 69,167 | 68,778 |
| | % | b. | Total Pop Grow th | | 0.3% | 0.1% | 0.7% | 0.1% | -0.2% | 0.1% | -17.9% | -0.5% | -0.5% | -0.5% | -0.5% | -0.5% | -0.6% | -0.6% | -0.6% | -0.6% | -0.6% |
| Urban | No. | c. | Urban Pop | 29,313 | 30,203 | 30,589 | 30,621 | 28,441 | 27,492 | 28,055 | 23,254 | 23,129 | 23,005 | 22,880 | 22,756 | 22,631 | 22,507 | 22,382 | 22,258 | 22,133 | 22,009 |
| | No. | d. = e. + c. | Persons per Urban Household | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 5,863 | 6,041 | 6,118 | 6,124 | 5,688 | 5,498 | 5,611 | 4,651 | 4,626 | 4,601 | 4,576 | 4,551 | 4,526 | 4,501 | 4,476 | 4,452 | 4,427 | 4,402 |
| | % | g. | Electric Urban Customers | 38% | 32% | 29% | 35% | 38% | 38% | 70% | 86% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | h. = f. x g. | Electric Urban Customers | 2,228 | 1,933 | 1,774 | 2,143 | 2,161 | 2,089 | 3,928 | 4,000 | 4,163 | 4,141 | 4,118 | 4,096 | 4,074 | 4,051 | 4,029 | 4,006 | 3,984 | 3,962 |
| | % | i. | Apartments | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | j. | Detached Houses | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | % | k. | Gers | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | kWh p.a. | l. | Consumption per Apartment | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 |
| | kWh p.a. | m. | Consumption per Detached House | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 |
| | kWh p.a. | n. | Consumption per Ger | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 |
| | GWh p.a. | o. | Total Consumption p.a. | 2.5 | 2.2 | 2.0 | 2.4 | 2.4 | 2.4 | 4.4 | 4.5 | 4.7 | 4.7 | 4.6 | 4.6 | 4.6 | 4.6 | 4.5 | 4.5 | 4.5 | 4.5 |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Rural | No. | p. | Rural Population | 58,188 | 57,597 | 57,311 | 57,879 | 60,159 | 60,908 | 60,446 | 49,414 | 49,150 | 48,885 | 48,621 | 48,356 | 48,092 | 47,827 | 47,563 | 47,298 | 47,034 | 46,769 |
| | No. | q. | Persons per Rural Household | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | 9,698 | 9,599 | 9,552 | 9,647 | 10,027 | 10,151 | 10,074 | 8,236 | 8,192 | 8,148 | 8,103 | 8,059 | 8,015 | 7,971 | 7,927 | 7,883 | 7,839 | 7,795 |
| | % | t. | Electric Rural Customers | 38% | 32% | 29% | 35% | 38% | 38% | 40% | 42% | 44% | 47% | 50% | 55% | 60% | 65% | 70% | 70% | 70% | 70% |
| | No. | u. | Electric Rural Customers | 3,685 | 3,072 | 2,770 | 3,376 | 3,810 | 3,857 | 4,030 | 3,459 | 3,604 | 3,829 | 4,052 | 4,433 | 4,809 | 5,181 | 5,549 | 5,518 | 5,487 | 5,456 |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w. | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | kWh p.a. | y. | Consumption per Apartment | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 |
| | kWh p.a. | z. | Consumption per Detached House | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 |
| | kWh p.a. | aa. | Consumption per Ger | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 |
| | GWh p.a. | ab. | Total Consumption p.a. | 1.8 | 1.5 | 1.4 | 1.7 | 1.9 | 1.9 | 2.0 | 1.7 | 1.8 | 1.9 | 2.0 | 2.2 | 2.4 | 2.6 | 2.7 | 2.7 | 2.7 | 2.7 |
| Hovd | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 4.32 | 3.69 | 3.36 | 4.07 | 4.31 | 4.25 | 6.40 | 6.20 | 6.46 | 6.54 | 6.63 | 6.79 | 6.95 | 7.11 | 7.27 | 7.22 | 7.18 | 7.14 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 40.2% | 40.3% | 42.5% | 40.6% | 36.5% | 35.3% | 29.2% | 20.7% | 20.7% | 21% | 21% | 21% | 21% | 21% | 21% | 21% | 21% | 21% |
| | GWh p.a. | ae. | Total Purchases p.a. | 6.06 | 5.18 | 4.79 | 5.73 | 5.88 | 5.75 | 8.27 | 7.49 | 7.80 | 7.90 | 8.00 | 8.20 | 8.39 | 8.58 | 8.77 | 8.72 | 8.67 | 8.63 |
| | - | af. | Load Factor | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 |
| | MW | ag. | Total Demand p.a. (incl losses) | 2.03 | 1.74 | 1.61 | 1.92 | 1.97 | 1.93 | 2.78 | 2.51 | 2.62 | 2.65 | 2.69 | 2.75 | 2.82 | 2.88 | 2.95 | 2.93 | 2.91 | 2.90 |
| | MW | ah. | Total Demand p.a. (excl losses) | 1.45 | 1.24 | 1.13 | 1.37 | 1.45 | 1.43 | 2.15 | 2.08 | 2.17 | 2.20 | 2.23 | 2.28 | 2.33 | 2.39 | 2.44 | 2.43 | 2.41 | 2.40 |

Table X-12: OMNOGOVI AIMAG

| Disco | | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | | |
|----------|----------|----------------------|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Region | | | | | | | | | | | | | | | | | | | | | |
| Aimag | | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 46,700 | 46,800 | 46,100 | 46,500 | 46,900 | 47,700 | 49,300 | 59,969 | 61,698 | 63,427 | 65,156 | 66,885 | 68,614 | 70,342 | 72,071 | 73,800 | 75,529 | 77,258 |
| | % | b. | Total Pop Grow th | | 0.2% | -1.5% | 0.9% | 0.9% | 1.7% | 3.4% | 21.6% | 2.9% | 2.8% | 2.7% | 2.7% | 2.6% | 2.5% | 2.5% | 2.4% | 2.3% | 2.3% |
| | | | | | | | | | | | | | | | | | | | | | |
| Urban | No. | c. | Urban Pop | 14,150 | 14,882 | 14,936 | 14,090 | 14,820 | 15,359 | 16,713 | 19,987 | 20,563 | 21,139 | 21,715 | 22,292 | 22,868 | 23,444 | 24,020 | 24,597 | 25,173 | 25,749 |
| | No. | d. = e. + c. | Persons per Urban Household | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 3,538 | 3,721 | 3,734 | 3,522 | 3,705 | 3,840 | 4,178 | 4,997 | 5,141 | 5,285 | 5,429 | 5,573 | 5,717 | 5,861 | 6,005 | 6,149 | 6,293 | 6,437 |
| | % | g. | Electric Urban Customers | 40% | 52% | 55% | 60% | 67% | 64% | 64% | 71% | 71% | 71% | 71% | 71% | 71% | 71% | 71% | 71% | 71% | 71% |
| | No. | h. = f. x g. | Electric Urban Customers | 1,415 | 1,935 | 2,054 | 2,113 | 2,482 | 2,458 | 2,674 | 3,548 | 3,650 | 3,752 | 3,854 | 3,957 | 4,059 | 4,161 | 4,264 | 4,366 | 4,468 | 4,570 |
| | % | i. | Apartments | 41% | 41% | 41% | 38% | 39% | 40% | 41% | 41% | 41% | 41% | 41% | 41% | 41% | 41% | 41% | 41% | 41% | 41% |
| | % | j. | Detached Houses | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | % | k. | Gers | 39% | 39% | 39% | 42% | 41% | 40% | 39% | 39% | 39% | 39% | 39% | 39% | 39% | 39% | 39% | 39% | 39% | 39% |
| | kWh p.a. | l. | Consumption per Apartment | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 |
| | kWh p.a. | m. | Consumption per Detached House | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 |
| | kWh p.a. | n. | Consumption per Ger | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| | GWh p.a. | o. | Total Consumption p.a. | 2.3 | 3.1 | 3.3 | 3.3 | 3.9 | 3.9 | 4.3 | 5.7 | 5.9 | 6.1 | 6.2 | 6.4 | 6.6 | 6.7 | 6.9 | 7.1 | 7.2 | 7.4 |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Rural | No. | p. | Rural Population | 32,550 | 31,918 | 31,164 | 32,411 | 32,080 | 32,341 | 32,587 | 39,982 | 41,135 | 42,288 | 43,440 | 44,593 | 45,746 | 46,898 | 48,051 | 49,204 | 50,356 | 51,509 |
| | No. | q. | Persons per Rural Household | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | 6,510 | 6,384 | 6,233 | 6,482 | 6,416 | 6,468 | 6,517 | 7,996 | 8,227 | 8,458 | 8,688 | 8,919 | 9,149 | 9,380 | 9,610 | 9,841 | 10,071 | 10,302 |
| | % | t. | Electric Rural Customers | 33% | 34% | 35% | 36% | 40% | 35% | 37% | 45% | 45% | 45% | 45% | 45% | 45% | 45% | 45% | 45% | 45% | 45% |
| | No. | u. | Electric Rural Customers | 2,148 | 2,170 | 2,181 | 2,334 | 2,566 | 2,264 | 2,411 | 3,598 | 3,702 | 3,806 | 3,910 | 4,013 | 4,117 | 4,221 | 4,325 | 4,428 | 4,532 | 4,636 |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w. | Detached Houses | 25% | 27% | 27% | 29% | 30% | 30% | 31% | 32% | 32% | 32% | 32% | 32% | 32% | 32% | 32% | 32% | 32% | 32% |
| | % | x. | Gers | 75% | 74% | 74% | 72% | 70% | 70% | 69% | 68% | 68% | 68% | 68% | 68% | 68% | 68% | 68% | 68% | 68% | 68% |
| | kWh p.a. | y. | Consumption per Apartment | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 |
| | kWh p.a. | z. | Consumption per Detached House | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 | 2,400 |
| | kWh p.a. | aa. | Consumption per Ger | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| | GWh p.a. | ab. | Total Consumption p.a. | 2.1 | 2.2 | 2.2 | 2.4 | 2.7 | 2.4 | 2.6 | 4.0 | 4.1 | 4.2 | 4.3 | 4.4 | 4.6 | 4.7 | 4.8 | 4.9 | 5.0 | 5.1 |
| | | | | | | | | | | | | | | | | | | | | | |
| Omnogovi | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 4.38 | 5.31 | 5.51 | 5.74 | 6.67 | 6.35 | 6.95 | 9.73 | 10.01 | 10.29 | 10.57 | 10.85 | 11.13 | 11.41 | 11.69 | 11.97 | 12.25 | 12.53 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 48% | 34% | 31% | 27% | 26% | 27% | 23% | 24% | 24% | 24% | 24% | 24% | 24% | 24% | 24% | 24% | 24% | 24% |
| | GWh p.a. | ae. | Total Purchases p.a. | 6.50 | 7.10 | 7.21 | 7.28 | 8.41 | 8.08 | 8.52 | 12.07 | 12.42 | 12.77 | 13.12 | 13.46 | 13.81 | 14.16 | 14.51 | 14.86 | 15.20 | 15.55 |
| | - | af. | Load Factor | 0.58 | 0.44 | 0.47 | 0.42 | 0.46 | 0.36 | 0.43 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 |
| | MW | ag. | Total Demand p.a. (incl losses) | 1.28 | 1.84 | 1.74 | 1.98 | 2.09 | 2.54 | 2.27 | 3.29 | 3.39 | 3.48 | 3.58 | 3.67 | 3.77 | 3.86 | 3.96 | 4.05 | 4.15 | 4.24 |

Table X-13: HUVSGUL AIMAG

| Disco | | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | | |
|---------|----------|----------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Region | | CES | | | | | | | | | | | | | | | | | | | |
| Aimag | | Huvsgul | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 119,000 | 119,400 | 121,700 | 122,100 | 122,400 | 123,000 | 124,100 | 113,636 | 113,694 | 113,752 | 113,811 | 113,869 | 113,927 | 113,985 | 114,043 | 114,102 | 114,160 | 114,218 |
| | % | b. | Total Pop Grow th | | 0.3% | 1.9% | 0.3% | 0.2% | 0.5% | 0.9% | -8.4% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% |
| | | | | | | | | | | | | | | | | | | | | | |
| Urban | No. | c. | Urban Pop | 37,366 | 37,253 | 38,214 | 38,584 | 38,678 | 38,499 | 39,216 | 35,893 | 35,911 | 35,930 | 35,948 | 35,966 | 35,985 | 36,003 | 36,021 | 36,040 | 36,058 | 36,077 |
| | No. | d. = e. + c. | Persons per Urban Household | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 9,342 | 9,313 | 9,553 | 9,646 | 9,670 | 9,625 | 9,804 | 8,973 | 8,978 | 8,982 | 8,987 | 8,992 | 8,996 | 9,001 | 9,005 | 9,010 | 9,015 | 9,019 |
| | % | g. | Electric Urban Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | h. = f. x g. | Electric Urban Customers | 8,407 | 8,382 | 8,598 | 8,681 | 8,703 | 8,662 | 8,824 | 8,076 | 8,080 | 8,084 | 8,088 | 8,092 | 8,097 | 8,101 | 8,105 | 8,109 | 8,113 | 8,117 |
| | % | i. | Apartments | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | j. | Detached Houses | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | % | k. | Gers | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | kWh p.a. | l. | Consumption per Apartment | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 |
| | kWh p.a. | m. | Consumption per Detached House | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 |
| | kWh p.a. | n. | Consumption per Ger | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | GWh p.a. | o. | Total Consumption p.a. | 16.1 | 16.1 | 16.5 | 16.6 | 16.7 | 16.6 | 16.9 | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Rural | No. | p. | Rural Population | 81,634 | 82,147 | 83,486 | 83,516 | 83,722 | 84,501 | 84,884 | 77,743 | 77,783 | 77,823 | 77,863 | 77,903 | 77,942 | 77,982 | 78,022 | 78,062 | 78,102 | 78,141 |
| | No. | q. | Persons per Rural Household | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | 16,327 | 16,429 | 16,697 | 16,703 | 16,744 | 16,900 | 16,977 | 15,549 | 15,557 | 15,565 | 15,573 | 15,581 | 15,588 | 15,596 | 15,604 | 15,612 | 15,620 | 15,628 |
| | % | t. | Electric Rural Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | u. | Electric Rural Customers | 14,694 | 14,786 | 15,028 | 15,033 | 15,070 | 15,210 | 15,279 | 13,994 | 14,001 | 14,008 | 14,015 | 14,022 | 14,030 | 14,037 | 14,044 | 14,051 | 14,058 | 14,065 |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w. | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | kWh p.a. | y. | Consumption per Apartment | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 |
| | kWh p.a. | z. | Consumption per Detached House | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 |
| | kWh p.a. | aa. | Consumption per Ger | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 |
| | GWh p.a. | ab. | Total Consumption p.a. | 8.7 | 8.8 | 8.9 | 8.9 | 9.0 | 9.1 | 9.1 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 |
| | | | | | | | | | | | | | | | | | | | | | |
| Huvsgul | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 24.84 | 24.85 | 25.41 | 25.57 | 25.63 | 25.64 | 25.99 | 23.79 | 23.80 | 23.82 | 23.83 | 23.84 | 23.85 | 23.86 | 23.88 | 23.89 | 23.90 | 23.91 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 41% | 41% | 39% | 26% | 21% | 22% | 22% | 24% | 24% | 24% | 24% | 24% | 24% | 24% | 24% | 24% | 24% | 24% |
| | GWh p.a. | ae. | Total Purchases p.a. | 35.10 | 35.11 | 35.32 | 32.29 | 31.07 | 31.25 | 31.58 | 29.41 | 29.42 | 29.44 | 29.45 | 29.47 | 29.48 | 29.50 | 29.51 | 29.53 | 29.54 | 29.56 |
| | - | af. | Load Factor | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| | MW | ag. | Total Demand p.a. (incl losses) | 8.01 | 8.02 | 8.06 | 7.37 | 7.09 | 7.14 | 7.21 | 6.71 | 6.72 | 6.72 | 6.72 | 6.73 | 6.73 | 6.73 | 6.74 | 6.74 | 6.74 | 6.75 |
| | MW | ah. | Total Demand p.a. (excl losses) | 5.67 | 5.67 | 5.80 | 5.84 | 5.85 | 5.85 | 5.93 | 5.43 | 5.43 | 5.44 | 5.44 | 5.44 | 5.45 | 5.45 | 5.45 | 5.45 | 5.46 | 5.46 |

Table X-14: ORKHON AIMAG

| Disco | UBEDN | | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------|----------|------------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Region | CES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aimag | Orkhon | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | | | | | | | | | | | | | | | | | | |
| Total | No. | a. | Population | 75,100 | 78,400 | 79,000 | 79,400 | 80,100 | 81,900 | 83,100 | 86,250 | 88,336 | 90,422 | 92,508 | 94,594 | 96,680 | 98,765 | 100,851 | 102,937 | 105,023 | 107,109 | | | | | | | | | | | | | | | | | | |
| | % | b. | Total Pop Grow th | | 4.4% | 0.8% | 0.5% | 0.9% | 2.2% | 1.5% | 3.8% | 2.4% | 2.4% | 2.3% | 2.3% | 2.2% | 2.2% | 2.1% | 2.1% | 2.0% | 2.0% | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Urban | No. | c. | Urban Pop | 69,017 | 72,755 | 73,075 | 73,524 | 74,333 | 75,921 | 77,449 | 80,397 | 82,342 | 84,286 | 86,230 | 88,175 | 90,119 | 92,063 | 94,008 | 95,952 | 97,897 | 99,841 | | | | | | | | | | | | | | | | | | |
| | No. | d. = e. + c. | Persons per Urban Household | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | | | | | | | | | | | | | | | | | |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | |
| | No. | f. = c. / d. | Urban Households | 17,254 | 18,189 | 18,269 | 18,381 | 18,583 | 18,980 | 19,362 | 20,099 | 20,585 | 21,072 | 21,558 | 22,044 | 22,530 | 23,016 | 23,502 | 23,988 | 24,474 | 24,960 | | | | | | | | | | | | | | | | | | |
| | % | g. | Electric Urban Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | | | | | | | | | | | | | | | | | | |
| | No. | h. = f. x g. | Electric Urban Customers | 15,529 | 16,370 | 16,442 | 16,543 | 16,725 | 17,082 | 17,426 | 18,089 | 18,527 | 18,964 | 19,402 | 19,839 | 20,277 | 20,714 | 21,152 | 21,589 | 22,027 | 22,464 | | | | | | | | | | | | | | | | | | |
| | % | i. | Apartments | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | | | | | | | | | | | | | | | | | | |
| | % | j. | Detached Houses | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | | | | | | | | | | | | | | | | | | |
| | % | k. | Gers | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | | | | | | | | | | | | | | | | | | |
| | kWh p.a. | l. | Consumption per Apartment | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | | | | | | | | | | | | | | | | | | |
| | kWh p.a. | m. | Consumption per Detached House | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | | | | | | | | | | | | | | | | | | |
| | kWh p.a. | n. | Consumption per Ger | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | |
| GWh p.a. | o. | Total Consumption p.a. | 29.7 | 31.3 | 31.5 | 31.7 | 32.0 | 32.7 | 33.4 | 34.6 | 35.5 | 36.3 | 37.2 | 38.0 | 38.8 | 39.7 | 40.5 | 41.3 | 42.2 | 43.0 | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | | | | | | | | | | | | | | | | | | |
| Rural | No. | p. | Rural Population | 6,083 | 5,645 | 5,925 | 5,876 | 5,767 | 5,979 | 5,651 | 5,853 | 5,994 | 6,136 | 6,277 | 6,419 | 6,560 | 6,702 | 6,843 | 6,985 | 7,127 | 7,268 | | | | | | | | | | | | | | | | | | |
| | No. | q. | Persons per Rural Household | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | | | | | | | | | | | | | | | | | |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | |
| | No. | s. | Rural Households | 1,217 | 1,129 | 1,185 | 1,175 | 1,153 | 1,196 | 1,130 | 1,171 | 1,199 | 1,227 | 1,255 | 1,284 | 1,312 | 1,340 | 1,369 | 1,397 | 1,425 | 1,454 | | | | | | | | | | | | | | | | | | |
| | % | t. | Electric Rural Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | | | | | | | | | | | | | | | | | | |
| | No. | u. | Electric Rural Customers | 1,095 | 1,016 | 1,067 | 1,058 | 1,038 | 1,076 | 1,017 | 1,053 | 1,079 | 1,104 | 1,130 | 1,155 | 1,181 | 1,206 | 1,232 | 1,257 | 1,283 | 1,308 | | | | | | | | | | | | | | | | | | |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | | | | | | | | | | | | | | | | | | |
| | % | w. | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | | | | | | | | | | | | | | | | | | |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | | | | | | | | | | | | | | | | | | |
| | kWh p.a. | y. | Consumption per Apartment | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | | | | | | | | | | | | | | | | | | |
| | kWh p.a. | z. | Consumption per Detached House | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | | | | | | | | | | | | | | | | | | |
| | kWh p.a. | aa. | Consumption per Ger | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | | | | | | | | | | | | | | | | | | |
| GWh p.a. | ab. | Total Consumption p.a. | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.8 | 0.8 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Orkhon | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 30.39 | 31.95 | 32.12 | 32.31 | 32.65 | 33.35 | 33.98 | 35.27 | 36.12 | 36.97 | 37.83 | 38.68 | 39.53 | 40.39 | 41.24 | 42.09 | 42.94 | 43.80 | | | | | | | | | | | | | | | | | | |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 22% | 20% | 20% | 18% | 17% | 17% | 18% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | | | | | | | | | | | | | | | | | | |
| | GWh p.a. | ae. | Total Purchases p.a. | 37.04 | 38.44 | 38.48 | 38.25 | 38.33 | 38.96 | 39.99 | 41.37 | 42.37 | 43.37 | 44.37 | 45.37 | 46.37 | 47.37 | 48.37 | 49.37 | 50.37 | 51.37 | | | | | | | | | | | | | | | | | | |
| | - | af. | Load Factor | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | | | | | | | | | | | | | | | | | | |
| | MW | ag. | Total Demand p.a. (incl losses) | 8.46 | 8.78 | 8.79 | 8.73 | 8.75 | 8.89 | 9.13 | 9.45 | 9.67 | 9.90 | 10.13 | 10.36 | 10.59 | 10.82 | 11.04 | 11.27 | 11.50 | 11.73 | | | | | | | | | | | | | | | | | | |
| | MW | ah. | Total Demand p.a. (excl losses) | 6.94 | 7.30 | 7.33 | 7.38 | 7.45 | 7.61 | 7.76 | 8.05 | 8.25 | 8.44 | 8.64 | 8.83 | 9.03 | 9.22 | 9.42 | 9.61 | 9.80 | 10.00 | | | | | | | | | | | | | | | | | | |

Table X-15: SELENG AIMAG

| Disco | | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | | |
|----------|----------|------------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Region | CES | | | | | | | | | | | | | | | | | | | | |
| Aimag | Seleng | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 100,800 | 100,800 | 99,800 | 100,100 | 100,500 | 101,600 | 103,500 | 95,219 | 95,271 | 95,323 | 95,376 | 95,428 | 95,480 | 95,532 | 95,584 | 95,637 | 95,689 | 95,741 |
| | % | b. | Total Pop Grow th | | 0.0% | -1.0% | 0.3% | 0.4% | 1.1% | 1.9% | -8.0% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% |
| | | | | | | | | | | | | | | | | | | | | | |
| Urban | No. | c. | Urban Pop | 32,054 | 28,426 | 30,639 | 33,233 | 27,035 | 33,528 | 33,534 | 30,443 | 30,460 | 30,476 | 30,493 | 30,510 | 30,526 | 30,543 | 30,560 | 30,576 | 30,593 | 30,610 |
| | No. | d. = e. + c. | Persons per Urban Household | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 6,411 | 5,685 | 6,128 | 6,647 | 5,407 | 6,706 | 6,707 | 6,089 | 6,092 | 6,095 | 6,099 | 6,102 | 6,105 | 6,109 | 6,112 | 6,115 | 6,119 | 6,122 |
| | % | g. | Electric Urban Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | h. = f. x g. | Electric Urban Customers | 5,770 | 5,117 | 5,515 | 5,982 | 4,866 | 6,035 | 6,036 | 5,480 | 5,483 | 5,486 | 5,489 | 5,492 | 5,495 | 5,498 | 5,501 | 5,504 | 5,507 | 5,510 |
| | % | i. | Apartments | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | j. | Detached Houses | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | % | k. | Gers | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | kWh p.a. | l. | Consumption per Apartment | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 |
| | kWh p.a. | m. | Consumption per Detached House | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 |
| | kWh p.a. | n. | Consumption per Ger | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| GWh p.a. | o. | Total Consumption p.a. | 11.0 | 9.8 | 10.6 | 11.5 | 9.3 | 11.6 | 11.6 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.6 |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Rural | No. | p. | Rural Population | 68,746 | 72,374 | 69,161 | 66,867 | 73,466 | 68,072 | 69,966 | 64,776 | 64,812 | 64,847 | 64,883 | 64,918 | 64,954 | 64,989 | 65,025 | 65,060 | 65,096 | 65,131 |
| | No. | q. | Persons per Rural Household | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | 11,458 | 12,062 | 11,527 | 11,144 | 12,244 | 11,345 | 11,661 | 10,796 | 10,802 | 10,808 | 10,814 | 10,820 | 10,826 | 10,832 | 10,837 | 10,843 | 10,849 | 10,855 |
| | % | t. | Electric Rural Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | u. | Electric Rural Customers | 10,312 | 10,856 | 10,374 | 10,030 | 11,020 | 10,211 | 10,495 | 9,716 | 9,722 | 9,727 | 9,732 | 9,738 | 9,743 | 9,748 | 9,754 | 9,759 | 9,764 | 9,770 |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w. | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | kWh p.a. | y. | Consumption per Apartment | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 |
| | kWh p.a. | z. | Consumption per Detached House | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 |
| | kWh p.a. | aa. | Consumption per Ger | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 |
| GWh p.a. | ab. | Total Consumption p.a. | 6.1 | 6.5 | 6.2 | 6.0 | 6.6 | 6.1 | 6.2 | 5.8 | 5.8 | 5.8 | 5.8 | 5.8 | 5.8 | 5.8 | 5.8 | 5.8 | 5.8 | 5.8 | |
| | | | | | | | | | | | | | | | | | | | | | |
| Seleng | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 17.18 | 16.26 | 16.73 | 17.42 | 15.88 | 17.63 | 17.80 | 16.27 | 16.28 | 16.29 | 16.30 | 16.31 | 16.32 | 16.33 | 16.34 | 16.35 | 16.36 | 16.36 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 22% | 20% | 20% | 18% | 17% | 17% | 18% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% |
| | GWh p.a. | ae. | Total Purchases p.a. | 20.95 | 19.56 | 20.05 | 20.63 | 18.64 | 20.59 | 20.95 | 19.09 | 19.10 | 19.11 | 19.12 | 19.13 | 19.14 | 19.15 | 19.16 | 19.17 | 19.18 | 19.20 |
| | - | af. | Load Factor | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| | MW | ag. | Total Demand p.a. (incl losses) | 4.78 | 4.47 | 4.58 | 4.71 | 4.26 | 4.70 | 4.78 | 4.36 | 4.36 | 4.36 | 4.37 | 4.37 | 4.37 | 4.37 | 4.38 | 4.38 | 4.38 | 4.38 |
| | MW | ah. | Total Demand p.a. (excl losses) | 3.92 | 3.71 | 3.82 | 3.98 | 3.62 | 4.03 | 4.06 | 3.72 | 3.72 | 3.72 | 3.72 | 3.72 | 3.73 | 3.73 | 3.73 | 3.73 | 3.73 | 3.74 |

Table X-16: SUKHBATAAR AIMAG

| Disco | | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | | |
|------------|------------|----------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Region | EES | | | | | | | | | | | | | | | | | | | | |
| Aimag | Sukhbaatar | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 56,000 | 56,600 | 56,000 | 55,600 | 55,100 | 54,900 | 55,000 | 50,864 | 50,651 | 50,437 | 50,224 | 50,011 | 49,798 | 49,584 | 49,371 | 49,158 | 48,944 | 48,731 |
| | % | b. | Total Pop Grow th | | 1.1% | -1.1% | -0.7% | -0.9% | -0.4% | 0.2% | -7.5% | -0.4% | -0.4% | -0.4% | -0.4% | -0.4% | -0.4% | -0.4% | -0.4% | -0.4% | -0.4% |
| Urban | No. | c. | Urban Pop | 11,592 | 11,603 | 11,480 | 12,232 | 12,398 | 13,231 | 14,025 | 13,036 | 12,981 | 12,926 | 12,872 | 12,817 | 12,762 | 12,708 | 12,653 | 12,598 | 12,544 | 12,489 |
| | No. | d. = e. + c. | Persons per Urban Household | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 2,898 | 2,901 | 2,870 | 3,058 | 3,099 | 3,308 | 3,506 | 3,259 | 3,245 | 3,232 | 3,218 | 3,204 | 3,191 | 3,177 | 3,163 | 3,150 | 3,136 | 3,122 |
| | % | g. | Electric Urban Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | h. = f. x g. | Electric Urban Customers | 2,608 | 2,611 | 2,583 | 2,752 | 2,789 | 2,977 | 3,156 | 2,933 | 2,921 | 2,908 | 2,896 | 2,884 | 2,872 | 2,859 | 2,847 | 2,835 | 2,822 | 2,810 |
| | % | i. | Apartments | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | j. | Detached Houses | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | % | k. | Gers | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | kWh p.a. | l. | Consumption per Apartment | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 |
| | kWh p.a. | m. | Consumption per Detached House | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 2,500.0 | 2,500.0 | 2,500.0 | 2,500.0 | 2,500.0 | 2,500.0 | 2,500.0 | 2,500.0 | 2,500.0 | 2,500.0 | 2,500.0 | 2,500.0 | 2,500.0 |
| | kWh p.a. | n. | Consumption per Ger | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 |
| | GWh p.a. | o. | Total Consumption p.a. | 2.9 | 2.9 | 2.9 | 3.1 | 3.1 | 6.2 | 6.6 | 6.1 | 6.1 | 6.1 | 6.1 | 6.0 | 6.0 | 6.0 | 6.0 | 5.9 | 5.9 | 5.9 |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Rural | No. | p. | Rural Population | 44,408 | 44,997 | 44,520 | 43,368 | 42,703 | 41,669 | 40,975 | 37,828 | 37,670 | 37,511 | 37,352 | 37,194 | 37,035 | 36,876 | 36,718 | 36,559 | 36,401 | 36,242 |
| | No. | q. | Persons per Rural Household | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | 8,882 | 8,999 | 8,904 | 8,674 | 8,541 | 8,334 | 8,195 | 7,566 | 7,534 | 7,502 | 7,470 | 7,439 | 7,407 | 7,375 | 7,344 | 7,312 | 7,280 | 7,248 |
| | % | t. | Electric Rural Customers | 22% | 22% | 23% | 27% | 30% | 35% | 40% | 45% | 55% | 60% | 71% | 45% | 45% | 45% | 45% | 45% | 45% | 45% |
| | No. | u. | Electric Rural Customers | 1,954 | 1,980 | 2,048 | 2,342 | 2,562 | 2,917 | 3,278 | 3,405 | 4,144 | 4,501 | 5,304 | 3,347 | 3,333 | 3,319 | 3,305 | 3,290 | 3,276 | 3,262 |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w. | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | kWh p.a. | y. | Consumption per Apartment | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 |
| | kWh p.a. | z. | Consumption per Detached House | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 |
| | kWh p.a. | aa. | Consumption per Ger | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 |
| | GWh p.a. | ab. | Total Consumption p.a. | 1.0 | 1.0 | 1.0 | 1.2 | 1.3 | 1.4 | 1.6 | 1.7 | 2.0 | 2.2 | 2.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |
| Sukhbaatar | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 3.90 | 3.91 | 3.91 | 4.25 | 4.40 | 7.67 | 8.23 | 7.82 | 8.16 | 8.31 | 8.68 | 7.69 | 7.66 | 7.62 | 7.59 | 7.56 | 7.53 | 7.49 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 22% | 18% | 16% | 8% | 8% | 8% | 11% | 13% | 13% | 13% | 13% | 13% | 13% | 13% | 13% | 13% | 13% | 13% |
| | GWh p.a. | ae. | Total Purchases p.a. | 4.73 | 4.63 | 4.53 | 4.59 | 4.75 | 8.27 | 9.09 | 8.85 | 9.24 | 9.41 | 9.83 | 8.71 | 8.67 | 8.63 | 8.59 | 8.56 | 8.52 | 8.48 |
| | - | af. | Load Factor | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| | MW | ag. | Total Demand p.a. (incl losses) | 1.08 | 1.06 | 1.03 | 1.05 | 1.08 | 1.89 | 2.08 | 2.02 | 2.11 | 2.15 | 2.24 | 1.99 | 1.98 | 1.97 | 1.96 | 1.95 | 1.95 | 1.94 |
| | MW | ah. | Total Demand p.a. (excl losses) | 0.89 | 0.89 | 0.89 | 0.97 | 1.00 | 1.75 | 1.88 | 1.79 | 1.86 | 1.90 | 1.98 | 1.76 | 1.75 | 1.74 | 1.73 | 1.73 | 1.72 | 1.71 |

Table X-17: TUV AIMAG

| Disco | | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | | |
|----------|----------|------------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Region | | | | | | | | | | | | | | | | | | | | | |
| Aimag | | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 90,500 | 88,900 | 87,400 | 86,400 | 85,900 | 86,800 | 88,500 | 83,745 | 82,932 | 82,119 | 81,305 | 80,492 | 79,679 | 78,866 | 78,053 | 77,239 | 76,426 | 75,613 |
| | % | b. | Total Pop Grow th | | -1.8% | -1.7% | -1.1% | -0.6% | 1.0% | 2.0% | -5.4% | -1.0% | -1.0% | -1.0% | -1.0% | -1.0% | -1.0% | -1.0% | -1.0% | -1.1% | -1.1% |
| | | | | | | | | | | | | | | | | | | | | | |
| Urban | No. | c. | Urban Pop | 17,286 | 16,980 | 17,305 | 16,589 | 13,572 | 17,100 | 17,612 | 15,816 | 15,662 | 15,509 | 15,355 | 15,202 | 15,048 | 14,894 | 14,741 | 14,587 | 14,434 | 14,280 |
| | No. | d. = e. + c. | Persons per Urban Household | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 4,939 | 4,851 | 4,944 | 4,740 | 3,878 | 4,886 | 5,032 | 4,519 | 4,475 | 4,431 | 4,387 | 4,343 | 4,299 | 4,256 | 4,212 | 4,168 | 4,124 | 4,080 |
| | % | g. | Electric Urban Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | h. = f. x g. | Electric Urban Customers | 4,445 | 4,366 | 4,450 | 4,266 | 3,490 | 4,397 | 4,529 | 4,067 | 4,027 | 3,988 | 3,948 | 3,909 | 3,869 | 3,830 | 3,790 | 3,751 | 3,712 | 3,672 |
| | % | i. | Apartments | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | j. | Detached Houses | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | % | k. | Gers | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | kWh p.a. | l. | Consumption per Apartment | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 |
| | kWh p.a. | m. | Consumption per Detached House | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 |
| | kWh p.a. | n. | Consumption per Ger | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| GWh p.a. | o. | Total Consumption p.a. | 9.0 | 8.8 | 9.0 | 8.6 | 7.0 | 8.9 | 9.1 | 8.2 | 8.1 | 8.0 | 8.0 | 7.9 | 7.8 | 7.7 | 7.6 | 7.6 | 7.5 | 7.4 | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Rural | No. | p. | Rural Population | 73,215 | 71,920 | 70,095 | 69,811 | 72,328 | 69,700 | 70,889 | 67,929 | 67,270 | 66,610 | 65,950 | 65,291 | 64,631 | 63,971 | 63,312 | 62,652 | 61,993 | 61,333 |
| | No. | q. | Persons per Rural Household | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | 16,270 | 15,982 | 15,577 | 15,514 | 16,073 | 15,489 | 15,753 | 15,095 | 14,949 | 14,802 | 14,656 | 14,509 | 14,362 | 14,216 | 14,069 | 13,923 | 13,776 | 13,630 |
| | % | t. | Electric Rural Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | u. | Electric Rural Customers | 14,643 | 14,384 | 14,019 | 13,962 | 14,466 | 13,940 | 14,178 | 13,586 | 13,454 | 13,322 | 13,190 | 13,058 | 12,926 | 12,794 | 12,662 | 12,530 | 12,399 | 12,267 |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w. | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | kWh p.a. | y. | Consumption per Apartment | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 |
| | kWh p.a. | z. | Consumption per Detached House | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 |
| | kWh p.a. | aa. | Consumption per Ger | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 |
| GWh p.a. | ab. | Total Consumption p.a. | 8.7 | 8.6 | 8.3 | 8.3 | 8.6 | 8.3 | 8.4 | 8.1 | 8.0 | 7.9 | 7.8 | 7.8 | 7.7 | 7.6 | 7.5 | 7.5 | 7.4 | 7.3 | |
| | | | | | | | | | | | | | | | | | | | | | |
| Tov | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 17.67 | 17.36 | 17.31 | 16.90 | 15.64 | 17.15 | 17.56 | 16.28 | 16.12 | 15.96 | 15.80 | 15.65 | 15.49 | 15.33 | 15.17 | 15.01 | 14.86 | 14.70 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 22% | 20% | 20% | 18% | 17% | 17% | 18% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% |
| | GWh p.a. | ae. | Total Purchases p.a. | 21.54 | 20.88 | 20.73 | 20.01 | 18.36 | 20.04 | 20.67 | 19.09 | 18.91 | 18.72 | 18.54 | 18.35 | 18.17 | 17.98 | 17.80 | 17.61 | 17.43 | 17.24 |
| | - | af. | Load Factor | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| | MW | ag. | Total Demand p.a. (incl losses) | 4.92 | 4.77 | 4.73 | 4.57 | 4.19 | 4.57 | 4.72 | 4.36 | 4.32 | 4.27 | 4.23 | 4.19 | 4.15 | 4.11 | 4.06 | 4.02 | 3.98 | 3.94 |
| | MW | ah. | Total Demand p.a. (excl losses) | 4.03 | 3.96 | 3.95 | 3.86 | 3.57 | 3.92 | 4.01 | 3.72 | 3.68 | 3.64 | 3.61 | 3.57 | 3.54 | 3.50 | 3.46 | 3.43 | 3.39 | 3.36 |

Table X-18: ULAANBAATAR AIMAG

| Disco | UBEDN | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | | |
|-------------|-------------|----------------------|--|---------|---------|---------|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Region | CES | | | | | | | | | | | | | | | | | | | | |
| Aimag | Ulaanbaatar | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 893,400 | 928,500 | 965,300 | 994,300 | 1,031,200 | 1,071,700 | 1,112,300 | 1,147,095 | 1,199,265 | 1,251,435 | 1,303,606 | 1,355,776 | 1,407,946 | 1,460,116 | 1,512,286 | 1,564,457 | 1,616,627 | 1,668,797 |
| | % | b. | Total Pop Grow th | | 3.9% | 4.0% | 3.0% | 3.7% | 3.9% | 3.8% | 3.1% | 4.5% | 4.4% | 4.2% | 4.0% | 3.8% | 3.7% | 3.6% | 3.4% | 3.3% | 3.2% |
| Urban | No. | c. | Urban Pop | 893,400 | 928,500 | 965,300 | 994,300 | 1,031,200 | 1,071,700 | 1,112,300 | 1,147,095 | 1,199,265 | 1,251,435 | 1,303,606 | 1,355,776 | 1,407,946 | 1,460,116 | 1,512,286 | 1,564,457 | 1,616,627 | 1,668,797 |
| | No. | d. = e. + c. | Persons per Urban Household | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 223,350 | 232,125 | 241,325 | 248,575 | 257,800 | 267,925 | 278,075 | 286,774 | 299,816 | 312,859 | 325,901 | 338,944 | 351,987 | 365,029 | 378,072 | 391,114 | 404,157 | 417,199 |
| | % | g. | Electric Urban Customers | 59% | 61% | 61% | 63% | 63% | 64% | 63% | 67% | 67% | 67% | 67% | 67% | 67% | 67% | 67% | 67% | 67% | 67% |
| | No. | h. = f. x g. | Electric Urban Customers | 132,581 | 142,208 | 147,827 | 155,819 | 163,290 | 171,207 | 176,006 | 191,048 | 200,877 | 209,615 | 218,354 | 227,092 | 235,831 | 244,569 | 253,308 | 262,046 | 270,785 | 279,523 |
| | % | i. | Apartments | 42% | 42% | 42% | 42% | 42% | 42% | 42% | 42% | 42% | 42% | 42% | 42% | 42% | 42% | 42% | 42% | 42% | 42% |
| | % | j. | Detached Houses | 28% | 28% | 28% | 28% | 28% | 28% | 28% | 28% | 28% | 28% | 28% | 28% | 28% | 28% | 28% | 28% | 28% | 28% |
| | % | k. | Gers | 25% | 25% | 25% | 25% | 25% | 25% | 25% | 25% | 25% | 25% | 25% | 25% | 25% | 25% | 25% | 25% | 25% | 25% |
| | kWh p.a. | l. | Consumption per Apartment | 2,287 | 2,287 | 2,287 | 2,287 | 2,287 | 2,287 | 2,287 | 2,287 | 2,287 | 2,287 | 2,287 | 2,287 | 2,287 | 2,287 | 2,287 | 2,287 | 2,287 | 2,287 |
| | kWh p.a. | m. | Consumption per Detached House | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 |
| | kWh p.a. | n. | Consumption per Ger | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 | 2,396 |
| | GWh p.a. | o. | Total Consumption p.a. | 294.2 | 315.5 | 328.0 | 345.7 | 362.3 | 379.9 | 390.5 | 423.9 | 445.7 | 465.1 | 484.5 | 503.9 | 523.3 | 542.6 | 562.0 | 581.4 | 600.8 | 620.2 |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Rural | No. | p. | Rural Population | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | No. | q. | Persons per Rural Household | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | % | t. | Electric Rural Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | u. | Electric Rural Customers | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w. | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | kWh p.a. | y. | Consumption per Apartment | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 |
| | kWh p.a. | z. | Consumption per Detached House | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 |
| | kWh p.a. | aa. | Consumption per Ger | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 |
| | GWh p.a. | ab. | Total Consumption p.a. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ulaanbaatar | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 294.17 | 315.53 | 327.99 | 345.73 | 362.30 | 379.87 | 390.52 | 423.89 | 445.70 | 465.09 | 484.48 | 503.87 | 523.25 | 542.64 | 562.03 | 581.42 | 600.81 | 620.20 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 22% | 20% | 20% | 18% | 17% | 17% | 18% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% |
| | GWh p.a. | ae. | Total Purchases p.a. | 358.59 | 379.58 | 392.94 | 409.34 | 425.34 | 443.69 | 459.64 | 497.22 | 522.81 | 545.55 | 568.29 | 591.03 | 613.78 | 636.52 | 659.26 | 682.01 | 704.75 | 727.49 |
| | - | af. | Load Factor | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| | MW | ag. | Total Demand p.a. (incl losses) | 81.87 | 86.66 | 89.71 | 93.46 | 97.11 | 101.30 | 104.94 | 113.52 | 119.36 | 124.55 | 129.75 | 134.94 | 140.13 | 145.32 | 150.52 | 155.71 | 160.90 | 166.09 |
| | MW | ah. | Total Demand p.a. (excl losses) | 67.16 | 72.04 | 74.88 | 78.93 | 82.72 | 86.73 | 89.16 | 96.78 | 101.76 | 106.18 | 110.61 | 115.04 | 119.46 | 123.89 | 128.32 | 132.74 | 137.17 | 141.60 |

Table X-19: ULGII-BAYAN AIMAG

| Disco | | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | | |
|-------------|-------------|------------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Region | WES | | | | | | | | | | | | | | | | | | | | |
| Aimag | Ulgii-Bayan | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 99,500 | 100,000 | 100,000 | 100,100 | 100,800 | 101,300 | 101,900 | 84,423 | 84,678 | 84,933 | 85,188 | 85,443 | 85,699 | 85,954 | 86,209 | 86,464 | 86,719 | 86,974 |
| | % | b. | Total Pop Grow th | | 0.5% | 0.0% | 0.1% | 0.7% | 0.5% | 0.6% | -17.2% | 0.3% | 0.3% | 0.3% | 0.3% | 0.3% | 0.3% | 0.3% | 0.3% | 0.3% | 0.3% |
| | | | | | | | | | | | | | | | | | | | | | |
| Urban | No. | c. | Urban Pop | 30,248 | 30,900 | 30,100 | 30,430 | 30,038 | 32,011 | 32,812 | 28,901 | 28,901 | 28,901 | 28,988 | 29,074 | 29,161 | 29,248 | 29,335 | 29,422 | 29,509 | 29,595 |
| | No. | d. = e. + c. | Persons per Urban Household | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 6,050 | 6,180 | 6,020 | 6,086 | 6,008 | 6,402 | 6,562 | 5,780 | 5,780 | 5,780 | 5,798 | 5,815 | 5,832 | 5,850 | 5,867 | 5,884 | 5,902 | 5,919 |
| | % | g. | Electric Urban Customers | 38% | 32% | 29% | 35% | 38% | 38% | 70% | 86% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | h. = f. x g. | Electric Urban Customers | 2,299 | 1,978 | 1,746 | 2,130 | 2,283 | 2,433 | 4,594 | 4,971 | 5,202 | 5,202 | 5,218 | 5,233 | 5,249 | 5,265 | 5,280 | 5,296 | 5,312 | 5,327 |
| | % | i. | Apartments | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | j. | Detached Houses | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | % | k. | Gers | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | kWh p.a. | l. | Consumption per Apartment | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 |
| | kWh p.a. | m. | Consumption per Detached House | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 |
| | kWh p.a. | n. | Consumption per Ger | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 |
| GWh p.a. | o. | Total Consumption p.a. | 2.6 | 2.2 | 2.0 | 2.4 | 2.6 | 2.7 | 5.2 | 5.6 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 6.0 | 6.0 | 6.0 | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Rural | No. | p. | Rural Population | 69,252 | 69,100 | 69,900 | 69,670 | 70,762 | 69,289 | 69,088 | 55,719 | 55,888 | 56,032 | 56,201 | 56,369 | 56,537 | 56,706 | 56,874 | 57,042 | 57,210 | 57,379 |
| | No. | q. | Persons per Rural Household | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | 11,542 | 11,517 | 11,650 | 11,612 | 11,794 | 11,548 | 11,515 | 9,287 | 9,315 | 9,339 | 9,367 | 9,395 | 9,423 | 9,451 | 9,479 | 9,507 | 9,535 | 9,563 |
| | % | t. | Electric Rural Customers | 38% | 32% | 29% | 35% | 38% | 38% | 40% | 42% | 44% | 46% | 50% | 55% | 60% | 65% | 70% | 70% | 70% | 70% |
| | No. | u. | Electric Rural Customers | 4,386 | 3,685 | 3,379 | 4,064 | 4,482 | 4,388 | 4,606 | 3,900 | 4,098 | 4,296 | 4,683 | 5,167 | 5,654 | 6,143 | 6,635 | 6,655 | 6,675 | 6,694 |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w. | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | kWh p.a. | y. | Consumption per Apartment | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 |
| | kWh p.a. | z. | Consumption per Detached House | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 |
| | kWh p.a. | aa. | Consumption per Ger | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 |
| GWh p.a. | ab. | Total Consumption p.a. | 2.2 | 1.8 | 1.7 | 2.0 | 2.2 | 2.2 | 2.3 | 1.9 | 2.0 | 2.1 | 2.3 | 2.5 | 2.8 | 3.0 | 3.3 | 3.3 | 3.3 | 3.3 | |
| | | | | | | | | | | | | | | | | | | | | | |
| Ulgii-Bayan | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 4.75 | 4.04 | 3.63 | 4.40 | 4.78 | 4.90 | 7.44 | 7.51 | 7.87 | 7.97 | 8.18 | 8.43 | 8.69 | 8.95 | 9.21 | 9.24 | 9.26 | 9.29 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 40.2% | 40.3% | 42.5% | 40.6% | 36.5% | 35.3% | 29.2% | 20.7% | 21% | 21% | 21% | 21% | 21% | 21% | 21% | 21% | 21% | 21% |
| | GWh p.a. | ae. | Total Purchases p.a. | 6.65 | 5.67 | 5.17 | 6.18 | 6.52 | 6.63 | 9.61 | 9.07 | 9.50 | 9.62 | 9.87 | 10.18 | 10.49 | 10.80 | 11.12 | 11.15 | 11.18 | 11.22 |
| | - | af. | Load Factor | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 |
| | MW | ag. | Total Demand p.a. (incl losses) | 2.23 | 1.90 | 1.74 | 2.08 | 2.19 | 2.23 | 3.23 | 3.05 | 3.19 | 3.23 | 3.31 | 3.42 | 3.52 | 3.63 | 3.73 | 3.74 | 3.75 | 3.77 |
| | MW | ah. | Total Demand p.a. (excl losses) | 1.59 | 1.36 | 1.22 | 1.48 | 1.60 | 1.64 | 2.50 | 2.52 | 2.64 | 2.68 | 2.75 | 2.83 | 2.92 | 3.00 | 3.09 | 3.10 | 3.11 | 3.12 |

Table X-20: UVURHANGAI AIMAG

| Disco | | | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | |
|------------|------------|--------------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Region | CES | | | | | | | | | | | | | | | | | | | | |
| Aimag | Uvurhangai | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 112,000 | 113,200 | 113,800 | 114,900 | 115,700 | 116,600 | 117,500 | 100,009 | 99,570 | 99,132 | 98,693 | 98,254 | 97,816 | 97,377 | 96,938 | 96,499 | 96,061 | 95,622 |
| | % | b. | Total Pop Grow th | | 1.1% | 0.5% | 1.0% | 0.7% | 0.8% | 0.8% | -14.9% | -0.4% | -0.4% | -0.4% | -0.4% | -0.4% | -0.4% | -0.5% | -0.5% | -0.5% | -0.5% |
| | | | | | | | | | | | | | | | | | | | | | |
| Urban | No. | c. | Urban Pop | 21,504 | 22,074 | 22,760 | 24,359 | 25,107 | 25,186 | 26,203 | 22,959 | 22,858 | 22,758 | 22,657 | 22,556 | 22,456 | 22,355 | 22,254 | 22,154 | 22,053 | 21,952 |
| | No. | d. = e. + c. | Persons per Urban Household | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 4,301 | 4,415 | 4,552 | 4,872 | 5,021 | 5,037 | 5,241 | 4,592 | 4,572 | 4,552 | 4,531 | 4,511 | 4,491 | 4,471 | 4,451 | 4,431 | 4,411 | 4,390 |
| | % | g. | Electric Urban Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | h. = f. x g. | Electric Urban Customers | 3,871 | 3,973 | 4,097 | 4,385 | 4,519 | 4,533 | 4,716 | 4,133 | 4,115 | 4,096 | 4,078 | 4,060 | 4,042 | 4,024 | 4,006 | 3,988 | 3,970 | 3,951 |
| | % | i. | Apartments | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | j. | Detached Houses | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | % | k. | Gers | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | kWh p.a. | l. | Consumption per Apartment | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 | 2300 |
| | kWh p.a. | m. | Consumption per Detached House | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 | 2400 |
| | kWh p.a. | n. | Consumption per Ger | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | GWh p.a. | o. | Total Consumption p.a. | 7.4 | 7.6 | 7.8 | 8.4 | 8.7 | 8.7 | 9.0 | 7.9 | 7.9 | 7.8 | 7.8 | 7.8 | 7.7 | 7.7 | 7.7 | 7.6 | 7.6 | 7.6 |
| | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | |
| Rural | No. | p. | Rural Population | 90,496 | 91,126 | 91,040 | 90,541 | 90,593 | 91,414 | 91,298 | 77,050 | 76,712 | 76,374 | 76,036 | 75,698 | 75,360 | 75,022 | 74,684 | 74,346 | 74,008 | 73,670 |
| | No. | q. | Persons per Rural Household | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | 15,083 | 15,188 | 15,173 | 15,090 | 15,099 | 15,236 | 15,216 | 12,842 | 12,785 | 12,729 | 12,673 | 12,616 | 12,560 | 12,504 | 12,447 | 12,391 | 12,335 | 12,278 |
| | % | t. | Electric Rural Customers | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | u. | Electric Rural Customers | 13,574 | 13,669 | 13,656 | 13,581 | 13,589 | 13,712 | 13,695 | 11,557 | 11,507 | 11,456 | 11,405 | 11,355 | 11,304 | 11,253 | 11,203 | 11,152 | 11,101 | 11,050 |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w. | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | kWh p.a. | y. | Consumption per Apartment | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 |
| | kWh p.a. | z. | Consumption per Detached House | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 |
| | kWh p.a. | aa. | Consumption per Ger | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 | 500.0 |
| | GWh p.a. | ab. | Total Consumption p.a. | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.2 | 8.1 | 6.9 | 6.8 | 6.8 | 6.8 | 6.8 | 6.7 | 6.7 | 6.7 | 6.6 | 6.6 | 6.6 |
| | | | | | | | | | | | | | | | | | | | | | |
| Uvurhangai | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 15.49 | 15.74 | 15.97 | 16.48 | 16.74 | 16.84 | 17.18 | 14.79 | 14.73 | 14.66 | 14.60 | 14.53 | 14.47 | 14.40 | 14.34 | 14.27 | 14.21 | 14.14 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 22% | 20% | 20% | 18% | 17% | 17% | 18% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% |
| | GWh p.a. | ae. | Total Purchases p.a. | 18.88 | 18.94 | 19.13 | 19.51 | 19.65 | 19.67 | 20.22 | 17.35 | 17.27 | 17.20 | 17.12 | 17.05 | 16.97 | 16.89 | 16.82 | 16.74 | 16.66 | 16.59 |
| | - | af. | Load Factor | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| | MW | ag. | Total Demand p.a. (incl losses) | 4.31 | 4.32 | 4.37 | 4.45 | 4.49 | 4.49 | 4.62 | 3.96 | 3.94 | 3.93 | 3.91 | 3.89 | 3.87 | 3.86 | 3.84 | 3.82 | 3.80 | 3.79 |
| | MW | ah. | Total Demand p.a. (excl losses) | 3.54 | 3.59 | 3.65 | 3.76 | 3.82 | 3.84 | 3.92 | 3.38 | 3.36 | 3.35 | 3.33 | 3.32 | 3.30 | 3.29 | 3.27 | 3.26 | 3.24 | 3.23 |

Table X-21: UVS AIMAG

| Disco | | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | | |
|--------|----------|----------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Region | WES | | | | | | | | | | | | | | | | | | | | |
| Aimag | Uvs | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 81,900 | 81,000 | 80,600 | 80,500 | 80,400 | 79,800 | 78,800 | 75,797 | 75,417 | 75,036 | 74,656 | 74,275 | 73,895 | 73,514 | 73,134 | 72,753 | 72,373 | 71,992 |
| | % | b. | Total Pop Grow th | | -1.1% | -0.5% | -0.1% | -0.1% | -0.7% | -1.3% | -3.8% | -0.5% | -0.5% | -0.5% | -0.5% | -0.5% | -0.5% | -0.5% | -0.5% | -0.5% | -0.5% |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Urban | No. | c. | Urban Pop | 24,161 | 22,518 | 23,858 | 23,023 | 21,949 | 22,982 | 23,561 | 22,739 | 22,625 | 22,511 | 22,397 | 22,283 | 22,168 | 22,054 | 21,940 | 21,826 | 21,712 | 21,598 |
| | No. | d. = e. + c. | Persons per Urban Household | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 8,054 | 7,506 | 7,953 | 7,674 | 7,316 | 7,661 | 7,854 | 7,580 | 7,542 | 7,504 | 7,466 | 7,428 | 7,389 | 7,351 | 7,313 | 7,275 | 7,237 | 7,199 |
| | % | g. | Electric Urban Customers | 38% | 32% | 29% | 35% | 38% | 38% | 70% | 86% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |
| | No. | h. = f. x g. | Electric Urban Customers | 3,060 | 2,402 | 2,306 | 2,686 | 2,780 | 2,911 | 5,498 | 6,519 | 6,787 | 6,753 | 6,719 | 6,685 | 6,651 | 6,616 | 6,582 | 6,548 | 6,514 | 6,479 |
| | % | i. | Apartments | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | j. | Detached Houses | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | % | k. | Gers | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | kWh p.a. | l. | Consumption per Apartment | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 |
| | kWh p.a. | m. | Consumption per Detached House | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 |
| | kWh p.a. | n. | Consumption per Ger | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 |
| | GWh p.a. | o. | Total Consumption p.a. | 3.4 | 2.7 | 2.6 | 3.0 | 3.1 | 3.3 | 6.2 | 7.3 | 7.6 | 7.6 | 7.6 | 7.5 | 7.5 | 7.4 | 7.4 | 7.4 | 7.3 | 7.3 |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Rural | No. | p. | Rural Population | 57,740 | 58,482 | 56,742 | 57,477 | 58,451 | 56,818 | 55,239 | 53,058 | 52,792 | 52,525 | 52,259 | 51,993 | 51,726 | 51,460 | 51,193 | 50,927 | 50,661 | 50,394 |
| | No. | q. | Persons per Rural Household | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | 14,435 | 14,621 | 14,186 | 14,369 | 14,613 | 14,204 | 13,810 | 13,264 | 13,198 | 13,131 | 13,065 | 12,998 | 12,932 | 12,865 | 12,798 | 12,732 | 12,665 | 12,599 |
| | % | t. | Electric Rural Customers | 38% | 32% | 29% | 35% | 38% | 38% | 40% | 42% | 44% | 46% | 50% | 55% | 60% | 65% | 70% | 70% | 70% | 70% |
| | No. | u. | Electric Rural Customers | 5,485 | 4,679 | 4,114 | 5,029 | 5,553 | 5,398 | 5,524 | 5,571 | 5,807 | 6,040 | 6,532 | 7,149 | 7,759 | 8,362 | 8,959 | 8,912 | 8,866 | 8,819 |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w. | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | kWh p.a. | y. | Consumption per Apartment | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 |
| | kWh p.a. | z. | Consumption per Detached House | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 |
| | kWh p.a. | aa. | Consumption per Ger | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 |
| | GWh p.a. | ab. | Total Consumption p.a. | 2.7 | 2.3 | 2.0 | 2.5 | 2.7 | 2.7 | 2.7 | 2.7 | 2.9 | 3.0 | 3.2 | 3.5 | 3.8 | 4.1 | 4.4 | 4.4 | 4.4 | 4.3 |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Uvs | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 6.14 | 5.01 | 4.62 | 5.50 | 5.86 | 5.93 | 8.91 | 10.08 | 10.50 | 10.57 | 10.78 | 11.04 | 11.30 | 11.56 | 11.82 | 11.76 | 11.69 | 11.63 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 40.2% | 40.3% | 42.5% | 40.6% | 36.5% | 35.3% | 29.2% | 20.7% | 20.7% | 21% | 21% | 21% | 21% | 21% | 21% | 21% | 21% | 21% |
| | GWh p.a. | ae. | Total Purchases p.a. | 8.61 | 7.03 | 6.59 | 7.73 | 8.00 | 8.03 | 11.51 | 12.17 | 12.67 | 12.76 | 13.01 | 13.33 | 13.65 | 13.96 | 14.27 | 14.19 | 14.12 | 14.04 |
| | - | af. | Load Factor | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 |
| | MW | ag. | Total Demand p.a. (incl losses) | 2.89 | 2.36 | 2.21 | 2.59 | 2.69 | 2.70 | 3.86 | 4.09 | 4.25 | 4.29 | 4.37 | 4.48 | 4.58 | 4.69 | 4.79 | 4.77 | 4.74 | 4.72 |
| | MW | ah. | Total Demand p.a. (excl losses) | 2.06 | 1.68 | 1.55 | 1.85 | 1.97 | 1.99 | 2.99 | 3.38 | 3.52 | 3.55 | 3.62 | 3.71 | 3.80 | 3.88 | 3.97 | 3.95 | 3.93 | 3.91 |

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Table X-22: ZAVKHAN AIMAG

| Disco | | ELECTRICITY FORECAST | | | | | | | | | | | | | | | | | | | |
|---------|----------|----------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Region | AES | | | | | | | | | | | | | | | | | | | | |
| Aimag | Zavkhan | | | | | | | | | | | | | | | | | | | | |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Total | No. | a. | Population | 82,900 | 80,700 | 80,100 | 80,600 | 81,100 | 79,800 | 79,300 | 65,238 | 63,859 | 62,481 | 61,102 | 59,723 | 58,345 | 56,966 | 55,587 | 54,208 | 52,830 | 51,451 |
| | % | b. | Total Pop Grow th | | -2.7% | -0.7% | 0.6% | 0.6% | -1.6% | -0.6% | -17.7% | -2.1% | -2.2% | -2.2% | -2.3% | -2.3% | -2.4% | -2.4% | -2.5% | -2.5% | -2.6% |
| Urban | No. | c. | Urban Pop | 18,735 | 17,270 | 16,020 | 16,362 | 16,544 | 16,838 | 16,812 | 14,352 | 14,049 | 13,746 | 13,442 | 13,139 | 12,836 | 12,532 | 12,229 | 11,926 | 11,623 | 11,319 |
| | No. | d. = e. + c. | Persons per Urban Household | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| | No. | e. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | f. = c. / d. | Urban Households | 3,747 | 3,454 | 3,204 | 3,272 | 3,309 | 3,368 | 3,362 | 2,870 | 2,810 | 2,749 | 2,688 | 2,628 | 2,567 | 2,506 | 2,446 | 2,385 | 2,325 | 2,264 |
| | % | g. | Electric Urban Customers | 22% | 22% | 23% | 27% | 25% | 30% | 30% | 35% | 55% | 60% | 65% | 71% | 71% | 71% | 71% | 71% | 71% | 71% |
| | No. | h. = f. x g. | Electric Urban Customers | 824 | 760 | 737 | 884 | 827 | 1,010 | 1,009 | 1,005 | 1,545 | 1,649 | 1,748 | 1,866 | 1,823 | 1,780 | 1,737 | 1,693 | 1,650 | 1,607 |
| | % | i. | Apartments | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | j. | Detached Houses | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | % | k. | Gers | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | kWh p.a. | l. | Consumption per Apartment | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 |
| | kWh p.a. | m. | Consumption per Detached House | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,400.0 | 1,450.0 | 1,520.0 | 1,600.0 | 1,600.0 | 1,600.0 | 1,600.0 | 1,600.0 | 1,600.0 | 1,600.0 |
| | kWh p.a. | n. | Consumption per Ger | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 |
| | GWh p.a. | o. | Total Consumption p.a. | 0.9 | 0.9 | 0.8 | 1.0 | 0.9 | 1.1 | 1.1 | 1.1 | 1.9 | 2.1 | 2.3 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.2 | 2.2 |
| | | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Rural | No. | p. | Rural Population | 64,165 | 63,430 | 64,080 | 64,238 | 64,556 | 62,962 | 62,488 | 50,886 | 49,810 | 48,735 | 47,659 | 46,584 | 45,509 | 44,433 | 43,358 | 42,283 | 41,207 | 40,132 |
| | No. | q. | Persons per Rural Household | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| | No. | r. | Delta P per H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | No. | s. | Rural Households | 10,694 | 10,572 | 10,680 | 10,706 | 10,759 | 10,494 | 10,415 | 8,481 | 8,302 | 8,122 | 7,943 | 7,764 | 7,585 | 7,406 | 7,226 | 7,047 | 6,868 | 6,689 |
| | % | t. | Electric Rural Customers | 22% | 22% | 23% | 27% | 25% | 30% | 30% | 35% | 36% | 37% | 38% | 39% | 42% | 44% | 45% | 45% | 45% | 45% |
| | No. | u. | Electric Rural Customers | 2,353 | 2,326 | 2,456 | 2,891 | 2,690 | 3,148 | 3,124 | 2,968 | 2,989 | 3,005 | 3,018 | 3,028 | 3,186 | 3,258 | 3,252 | 3,171 | 3,091 | 3,010 |
| | % | v. | Apartments | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | % | w. | Detached Houses | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | % | x. | Gers | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | kWh p.a. | y. | Consumption per Apartment | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 |
| | kWh p.a. | z. | Consumption per Detached House | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 1,400.0 | 1,500.0 | 1,520.0 | 1,600.0 | 1,600.0 | 1,600.0 | 1,600.0 | 1,600.0 | 1,600.0 | 1,600.0 |
| | kWh p.a. | aa. | Consumption per Ger | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 | 450.0 |
| | GWh p.a. | ab. | Total Consumption p.a. | 1.2 | 1.1 | 1.2 | 1.4 | 1.3 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.6 | 1.7 | 1.7 | 1.6 | 1.6 | 1.5 |
| Zavkhan | GWh p.a. | ac. | Total Sales p.a. (excl losses) | 2.09 | 2.00 | 2.04 | 2.42 | 2.26 | 2.69 | 2.67 | 2.59 | 3.36 | 3.57 | 3.79 | 4.07 | 4.10 | 4.07 | 4.01 | 3.91 | 3.81 | 3.71 |
| | % | ad. | Loss Technical + Non-Technical Loss Factor | 43% | 43% | 26% | 11% | 14% | 11% | 25% | 25% | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% |
| | GWh p.a. | ae. | Total Purchases p.a. | 2.98 | 2.86 | 2.56 | 2.68 | 2.58 | 2.97 | 3.34 | 3.24 | 4.21 | 4.48 | 4.76 | 5.12 | 5.14 | 5.12 | 5.04 | 4.91 | 4.79 | 4.66 |
| | - | af. | Load Factor | 0.50 | 0.39 | 0.32 | 0.37 | | 0.44 | 0.61 | | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 |
| | MW | ag. | Total Demand p.a. (incl losses) | 0.68 | 0.83 | 0.91 | 0.83 | 0.74 | 0.78 | 0.62 | 0.93 | 1.42 | 1.50 | 1.60 | 1.72 | 1.73 | 1.72 | 1.69 | 1.65 | 1.61 | 1.57 |
| | MW | ah. | Total Demand p.a. (excl losses) | 0.47 | 0.58 | 0.72 | 0.75 | 0.64 | 0.70 | 0.50 | 0.74 | 1.13 | 1.20 | 1.27 | 1.37 | 1.38 | 1.37 | 1.35 | 1.31 | 1.28 | 1.25 |

XI. APPENDIX

AIMAG COMMERCIAL & LIGHT INDUSTRIAL ELECTRICITY FORECASTS

Table XI-1: CENTRAL ENERGY SYSTEM

| CENTRAL ENERGY SYSTEM | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|-----------------------|-------|-----------|-------|-------|-------|-------|-------|-------|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Arhangai | | GWh | 0.9 | 1.7 | 2.1 | 2.5 | 3.2 | 4.5 | 3.8 | 4.6 | 5.5 | 6.6 | 7.8 | 9.1 | 10.5 | 12.3 | 14.3 | 16.3 | 18.5 | 20.3 |
| | | MW | 0.2 | 0.4 | 0.5 | 0.5 | 0.7 | 1.0 | 0.8 | 1.0 | 1.2 | 1.4 | 1.4 | 1.9 | 2.2 | 2.5 | 3.0 | 3.4 | 3.8 | 4.2 |
| m3 | 179.5 | C&I custs | 441 | 481 | 515 | 540 | 572 | 655 | 640 | 694 | 753 | 816 | 884 | 959 | 1,039 | 1,133 | 1,235 | 1,318 | 1,406 | 1,455 |
| Bayanhongor | | GWh | 1.4 | 2.6 | 3.2 | 3.8 | 4.9 | 6.9 | 5.8 | 7.0 | 8.4 | 10.0 | 11.9 | 13.8 | 16.0 | 18.7 | 21.8 | 24.8 | 28.1 | 30.8 |
| | | MW | 0.3 | 0.6 | 0.7 | 0.8 | 1.1 | 1.5 | 1.3 | 1.5 | 1.8 | 2.1 | 2.2 | 2.9 | 3.3 | 3.9 | 4.5 | 5.2 | 5.8 | 6.4 |
| m3 | 272.9 | C&I custs | 670 | 732 | 784 | 821 | 870 | 995 | 974 | 1,056 | 1,144 | 1,241 | 1,345 | 1,458 | 1,580 | 1,722 | 1,877 | 2,003 | 2,137 | 2,212 |
| Bulgan | | GWh | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.8 | 0.7 | 0.8 | 1.0 | 1.2 | 1.4 | 1.6 | 1.9 | 2.2 | 2.6 | 3.0 | 3.4 | 3.7 |
| | | MW | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.4 | 0.5 | 0.5 | 0.6 | 0.7 |
| m3 | 32.6 | C&I custs | 80 | 87 | 94 | 98 | 104 | 119 | 116 | 126 | 137 | 148 | 161 | 174 | 189 | 206 | 224 | 239 | 255 | 264 |
| Darkhan-Uul | | GWh | 1.4 | 2.6 | 3.2 | 3.8 | 4.9 | 6.9 | 5.8 | 7.0 | 8.4 | 10.0 | 11.9 | 13.8 | 16.0 | 18.7 | 21.8 | 24.8 | 28.1 | 30.8 |
| | | MW | 0.3 | 0.6 | 0.7 | 0.8 | 1.1 | 1.5 | 1.3 | 1.5 | 1.8 | 2.1 | 2.2 | 2.9 | 3.3 | 3.9 | 4.5 | 5.2 | 5.8 | 6.4 |
| m3 | 273.0 | C&I custs | 670 | 732 | 784 | 821 | 871 | 996 | 974 | 1,056 | 1,145 | 1,241 | 1,345 | 1,458 | 1,581 | 1,723 | 1,878 | 2,004 | 2,138 | 2,213 |
| Dornogovi | | GWh | 1.3 | 2.4 | 3.0 | 3.6 | 4.6 | 6.4 | 5.5 | 6.6 | 7.8 | 9.4 | 11.2 | 12.9 | 15.0 | 17.5 | 20.4 | 23.3 | 26.4 | 28.9 |
| | | MW | 0.3 | 0.5 | 0.7 | 0.8 | 1.0 | 1.4 | 1.2 | 1.4 | 1.7 | 2.0 | 2.1 | 2.7 | 3.1 | 3.6 | 4.2 | 4.8 | 5.5 | 6.0 |
| m3 | 256.2 | C&I custs | 629 | 687 | 736 | 771 | 817 | 935 | 914 | 991 | 1,074 | 1,165 | 1,262 | 1,368 | 1,483 | 1,617 | 1,762 | 1,881 | 2,007 | 2,077 |
| Dundgovi | | GWh | 0.7 | 1.3 | 1.6 | 1.9 | 2.5 | 3.5 | 2.9 | 3.5 | 4.2 | 5.0 | 6.0 | 6.9 | 8.1 | 9.4 | 11.0 | 12.5 | 14.2 | 15.5 |
| | | MW | 0.2 | 0.3 | 0.4 | 0.4 | 0.5 | 0.7 | 0.6 | 0.8 | 0.9 | 1.0 | 1.1 | 1.4 | 1.7 | 2.0 | 2.3 | 2.6 | 2.9 | 3.2 |
| m3 | 137.5 | C&I custs | 338 | 369 | 395 | 414 | 438 | 502 | 491 | 532 | 577 | 625 | 678 | 734 | 796 | 868 | 946 | 1,009 | 1,077 | 1,115 |
| Govisumber | | GWh | 0.4 | 0.7 | 0.9 | 1.1 | 1.4 | 2.0 | 1.7 | 2.0 | 2.4 | 2.9 | 3.4 | 4.0 | 4.6 | 5.4 | 6.2 | 7.1 | 8.1 | 8.9 |
| | | MW | 0.1 | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.4 | 0.4 | 0.5 | 0.6 | 0.6 | 0.8 | 1.0 | 1.1 | 1.3 | 1.5 | 1.7 | 1.8 |
| m3 | 78.4 | C&I custs | 193 | 210 | 225 | 236 | 250 | 286 | 280 | 303 | 329 | 356 | 386 | 419 | 454 | 495 | 539 | 575 | 614 | 636 |
| Huvsgul | | GWh | 3.9 | 7.1 | 8.9 | 10.5 | 13.4 | 18.8 | 16.0 | 19.2 | 22.9 | 27.3 | 32.5 | 37.7 | 43.7 | 51.0 | 59.5 | 67.9 | 76.8 | 84.3 |
| | | MW | 0.8 | 1.5 | 1.9 | 2.3 | 2.9 | 4.0 | 3.4 | 4.1 | 4.8 | 5.7 | 6.0 | 7.8 | 9.1 | 10.6 | 12.3 | 14.1 | 15.9 | 17.5 |
| m3 | 746.4 | C&I custs | 1,833 | 2,001 | 2,143 | 2,245 | 2,380 | 2,723 | 2,663 | 2,887 | 3,130 | 3,393 | 3,678 | 3,987 | 4,322 | 4,711 | 5,135 | 5,479 | 5,846 | 6,050 |
| Orkhon | | GWh | 1.4 | 2.6 | 3.2 | 3.8 | 4.9 | 6.9 | 5.8 | 7.0 | 8.4 | 10.0 | 11.9 | 13.8 | 16.0 | 18.7 | 21.8 | 24.8 | 28.1 | 30.8 |
| | | MW | 0.3 | 0.6 | 0.7 | 0.8 | 1.1 | 1.5 | 1.3 | 1.5 | 1.8 | 2.1 | 2.2 | 2.9 | 3.3 | 3.9 | 4.5 | 5.2 | 5.8 | 6.4 |
| m3 | 273.0 | C&I custs | 670 | 732 | 784 | 821 | 871 | 996 | 974 | 1,056 | 1,145 | 1,241 | 1,345 | 1,458 | 1,581 | 1,723 | 1,878 | 2,004 | 2,138 | 2,213 |
| Seleng | | GWh | 2.2 | 4.1 | 5.2 | 6.1 | 7.8 | 10.9 | 9.3 | 11.2 | 13.3 | 15.9 | 18.9 | 21.9 | 25.4 | 29.7 | 34.6 | 39.5 | 44.7 | 49.0 |
| | | MW | 0.5 | 0.9 | 1.1 | 1.3 | 1.7 | 2.3 | 2.0 | 2.4 | 2.8 | 3.3 | 3.5 | 4.6 | 5.3 | 6.2 | 7.2 | 8.2 | 9.3 | 10.2 |
| m3 | 434.0 | C&I custs | 1,066 | 1,164 | 1,246 | 1,305 | 1,384 | 1,583 | 1,548 | 1,679 | 1,820 | 1,973 | 2,139 | 2,318 | 2,513 | 2,739 | 2,986 | 3,186 | 3,399 | 3,518 |
| Tov | | GWh | 3.1 | 5.6 | 7.1 | 8.3 | 10.7 | 14.9 | 12.7 | 15.3 | 18.2 | 21.7 | 25.9 | 30.0 | 34.8 | 40.6 | 47.4 | 54.1 | 61.2 | 67.1 |
| | | MW | 0.6 | 1.2 | 1.5 | 1.8 | 2.3 | 3.2 | 2.7 | 3.3 | 3.8 | 4.5 | 4.8 | 6.2 | 7.2 | 8.4 | 9.8 | 11.2 | 12.7 | 13.9 |
| m3 | 594.2 | C&I custs | 1,459 | 1,593 | 1,706 | 1,787 | 1,895 | 2,167 | 2,120 | 2,299 | 2,492 | 2,701 | 2,928 | 3,174 | 3,440 | 3,750 | 4,088 | 4,362 | 4,654 | 4,817 |
| Ulaanbaatar | | GWh | 446.1 | 492.7 | 570.9 | 658.2 | 791.9 | 955.9 | 902.8 | 1,081.6 | 1,277.0 | 1,499.7 | 1,706.9 | 1,868.8 | 2,057.3 | 2,264.9 | 2,440.8 | 2,630.4 | 2,749.7 | 2,874.4 |
| | | MW | 94.2 | 106.1 | 123.0 | 141.8 | 170.6 | 205.9 | 194.5 | 233.0 | 269.9 | 312.6 | 316.5 | 387.9 | 427.0 | 470.1 | 506.6 | 546.0 | 570.7 | 596.6 |
| | | C&I custs | 6,743 | 7,362 | 7,885 | 8,259 | 8,755 | 9,791 | 9,796 | 10,622 | 11,514 | 12,481 | 13,530 | 14,666 | 15,898 | 17,329 | 18,889 | 20,154 | 21,505 | 22,257 |
| Uvurhangai | | GWh | 0.3 | 0.6 | 0.8 | 0.9 | 1.2 | 1.6 | 1.4 | 1.7 | 2.0 | 2.4 | 2.8 | 3.3 | 3.8 | 4.4 | 5.2 | 5.9 | 6.7 | 7.3 |
| | | MW | 0.1 | 0.1 | 0.2 | 0.2 | 0.3 | 0.4 | 0.3 | 0.4 | 0.4 | 0.5 | 0.5 | 0.7 | 0.8 | 0.9 | 1.1 | 1.2 | 1.4 | 1.5 |
| m3 | 64.7 | C&I custs | 159 | 173 | 186 | 195 | 206 | 236 | 231 | 250 | 271 | 294 | 319 | 346 | 375 | 408 | 445 | 475 | 507 | 524 |

Table XI-2: SOUTH GOBI ENERGY SYSTEM

| SOUTH GOBI ENERGY SYSTEM | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|--------------------------|-------|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| Omnogovi | GWh | | 0.2 | 0.4 | 0.5 | 0.4 | 1.3 | 2.1 | 1.0 | 0.8 | 1.9 | 2.4 | 3.8 | 4.9 | 6.0 | 7.2 | 8.4 | 9.7 | 11.0 | 12.4 |
| | MW | | 0.05 | 0.10 | 0.13 | 0.13 | 0.32 | 0.25 | 0.28 | 0.21 | 0.43 | 0.57 | 0.88 | 1.12 | 1.38 | 1.65 | 1.93 | 2.22 | 2.52 | 2.84 |
| m3 | 137.5 | C&I custs | 338 | 369 | 395 | 414 | 438 | 502 | 491 | 532 | 577 | 625 | 678 | 734 | 796 | 868 | 946 | 1,009 | 1,077 | 1,115 |

Table XI-3: ALTAI-ULIASTAI ENERGY SYSTEM

| ALTAI ENERGY SYSTEM | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---------------------|-------|-----------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Govi-Altai | GWh | | 1.7 | 3.2 | 4.0 | 4.7 | 6.0 | 8.4 | 7.1 | 8.6 | 10.2 | 12.2 | 14.5 | 16.9 | 19.6 | 22.8 | 26.6 | 30.4 | 34.4 | 37.7 |
| | MW | | 0.3 | 0.6 | 0.7 | 0.9 | 1.1 | 1.6 | 1.3 | 1.6 | 1.9 | 2.3 | 2.6 | 3.2 | 3.7 | 4.4 | 5.1 | 5.8 | 6.6 | 7.3 |
| m3 | 333.8 | C&I custs | 820 | 895 | 959 | 1,004 | 1,064 | 1,218 | 1,191 | 1,291 | 1,400 | 1,517 | 1,645 | 1,783 | 1,933 | 2,107 | 2,296 | 2,450 | 2,614 | 2,706 |
| Zavkhan | GWh | | 1.5 | 2.8 | 3.5 | 4.1 | 5.3 | 7.4 | 6.3 | 7.5 | 9.0 | 10.7 | 12.8 | 14.8 | 17.2 | 20.1 | 23.4 | 26.7 | 30.2 | 33.1 |
| | MW | | 0.3 | 0.6 | 0.8 | 0.9 | 1.1 | 1.6 | 1.4 | 1.6 | 1.9 | 2.2 | 2.4 | 3.1 | 3.6 | 4.2 | 4.9 | 5.5 | 6.3 | 6.9 |
| m3 | 293.4 | C&I custs | 721 | 787 | 843 | 882 | 936 | 1,070 | 1,047 | 1,135 | 1,230 | 1,334 | 1,446 | 1,567 | 1,699 | 1,852 | 2,018 | 2,154 | 2,298 | 2,378 |

Table XI-4: EASTERN REGION ENERGY SYSTEM

| EASTERN ENERGY SYSTEM | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|-----------------------|-------|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| Dornod | GWh | | 1.6 | 1.8 | 3.7 | 4.7 | 7.2 | 11.0 | 12.0 | 14.7 | 16.7 | 19.9 | 22.6 | 27.0 | 30.1 | 33.1 | 36.0 | 38.8 | 41.5 | 44.2 |
| | MW | | 0.8 | 0.5 | 1.0 | 0.9 | 1.1 | 1.8 | 2.9 | 3.3 | 3.7 | 4.4 | 5.1 | 6.0 | 6.7 | 7.4 | 8.0 | 8.7 | 9.3 | 9.9 |
| m3 | 273.0 | C&I custs | 408 | 439 | 474 | 508 | 526 | 610 | 630 | 731 | 821 | 888 | 999 | 865 | 904 | 949 | 998 | 1,027 | 1,057 | 1,055 |
| Hentii | GWh | | 1.3 | 1.5 | 3.0 | 3.8 | 5.8 | 8.9 | 9.8 | 11.9 | 13.5 | 16.1 | 18.4 | 21.9 | 24.4 | 26.8 | 29.2 | 31.5 | 33.7 | 35.8 |
| | MW | | 0.6 | 0.4 | 0.8 | 0.8 | 0.9 | 1.4 | 2.4 | 2.7 | 3.0 | 3.6 | 4.1 | 4.9 | 5.4 | 6.0 | 6.5 | 7.0 | 7.5 | 8.0 |
| m3 | 221.4 | C&I custs | 331 | 356 | 384 | 412 | 427 | 494 | 511 | 593 | 666 | 720 | 810 | 702 | 733 | 770 | 809 | 833 | 857 | 856 |
| Sukhbaatar | GWh | | 1.4 | 1.6 | 3.3 | 4.1 | 6.4 | 9.7 | 10.6 | 12.9 | 14.7 | 17.6 | 20.0 | 23.8 | 26.6 | 29.2 | 31.8 | 34.3 | 36.7 | 39.0 |
| | MW | | 0.7 | 0.4 | 0.9 | 0.8 | 1.0 | 1.6 | 2.6 | 3.0 | 3.3 | 3.9 | 4.5 | 5.3 | 5.9 | 6.5 | 7.1 | 7.7 | 8.2 | 8.7 |
| m3 | 241.1 | C&I custs | 360 | 388 | 418 | 448 | 465 | 538 | 556 | 646 | 725 | 784 | 882 | 764 | 798 | 839 | 881 | 907 | 933 | 932 |

Table XI-5: WESTERN REGION ENERGY SYSTEM

| WESTERN ENERGY SYSTEM | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|-----------------------|-------|-----------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|
| Ulgii-Bayan | | GWh | 1.4 | 2.3 | 2.9 | 3.2 | 4.3 | 5.6 | 6.0 | 8.5 | 8.9 | 12.3 | 15.4 | 17.3 | 19.2 | 21.2 | 23.1 | 25.2 | 27.3 | 29.4 |
| | | MW | 0.9 | 1.3 | 2.1 | 2.0 | 2.0 | 2.7 | 2.2 | 2.5 | 3.5 | 5.8 | 6.2 | 6.9 | 7.7 | 8.4 | 9.1 | 9.9 | 10.7 | 11.5 |
| m3 | 256.2 | C&I custs | 269 | 238 | 227 | 280 | 315 | 347 | 450 | 472 | 527 | 561 | 606 | 661 | 720 | 782 | 847 | 881 | 916 | 953 |
| Uvs | | GWh | 2.2 | 3.5 | 4.4 | 4.9 | 6.6 | 8.6 | 9.1 | 13.0 | 13.6 | 18.8 | 23.6 | 26.6 | 29.5 | 32.5 | 35.4 | 38.6 | 41.9 | 45.1 |
| | | MW | 1.4 | 2.1 | 3.2 | 3.1 | 3.1 | 4.1 | 3.4 | 3.8 | 5.3 | 8.9 | 9.5 | 10.6 | 11.7 | 12.9 | 14.0 | 15.2 | 16.5 | 17.7 |
| m3 | 393.0 | C&I custs | 412 | 366 | 349 | 430 | 484 | 533 | 690 | 724 | 809 | 861 | 929 | 1,014 | 1,104 | 1,200 | 1,300 | 1,352 | 1,405 | 1,462 |
| Hovd | | GWh | 1.6 | 2.5 | 3.2 | 3.6 | 4.8 | 6.3 | 6.7 | 9.5 | 9.9 | 13.8 | 17.2 | 19.4 | 21.6 | 23.7 | 25.9 | 28.3 | 30.6 | 33.0 |
| | | MW | 1.0 | 1.5 | 2.3 | 2.3 | 2.3 | 3.0 | 2.5 | 2.8 | 3.9 | 6.5 | 6.9 | 7.7 | 8.6 | 9.4 | 10.2 | 11.1 | 12.0 | 12.9 |
| m3 | 287.3 | C&I custs | 301 | 267 | 255 | 314 | 354 | 389 | 504 | 529 | 591 | 629 | 679 | 741 | 807 | 877 | 950 | 988 | 1,027 | 1,068 |