Pre-feasibility Study on the Opportunities to Accelerate Coal to Clean Power Transition in Kazakhstan
1. Session objectives
2. Introduction to the Pre-FS
3. Overview and insights from the Policy and regulatory report
4. Overview of the Multi-Criteria Analysis (MCA)
5. Next steps for the Pre-FS
Objectives for today

- To provide an overview of the Pre-Feasibility Study (Pre-FS) to identify potential energy transition mechanism (ETM) opportunities towards a transition to clean power generation in Kazakhstan.

- To summarise some of the initial findings and insights from the Pre-FS.

- To give an update on ongoing progress with the Pre-FS and key next steps.
Meet the consulting team

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# Our approach to the Pre-FS ETM will include 6 sequential stages

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Inception Report</td>
<td>To define and outline the objectives, approach and governance for the project, and its deliverables</td>
</tr>
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<td>2. Policy and Reg</td>
<td>To understand the feasibility of acquiring, retiring, and replacing CFPPs/CHPPs from existing policy and regulatory structures</td>
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<tr>
<td>3. MCA*</td>
<td>To conduct a high-level screening of CFPPs/CHPPs based on financial, contractual, institutional, regulatory, and market factors</td>
</tr>
<tr>
<td>4. Financial Analysis</td>
<td>To conduct a detailed financial analysis of top 5 representative CFPPs/CHPPs based off the MCA prioritisation analysis</td>
</tr>
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<td>5. Pre-feasibility TOR</td>
<td>To define the TORs for a full feasibility study with a larger scope and timeframe to pilot a potential ETM.</td>
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<td>6. Final Report</td>
<td>To provide an analysis of feasibility of ETM opportunities and models, roadmap of emission reductions, and deliver a capacity building workshop</td>
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## Objectives

- **1. Inception Report**
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  - To understand the feasibility of acquiring, retiring, and replacing CFPPs/CHPPs from existing policy and regulatory structures

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  - To conduct a detailed financial analysis of top 5 representative CFPPs/CHPPs based off the MCA prioritisation analysis

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- **6. Final Report**
  - To provide an analysis of feasibility of ETM opportunities and models, roadmap of emission reductions, and deliver a capacity building workshop

## Outputs

1. **Kick-off workshop**
2. **Inception Report**
3. **Report on Kazakhstan’s energy policy and regulatory environment**
4. **Report on MCA approach process and prioritisation outcomes**
5. **Workshop to share findings**
6. **Detailed plant-level financial analysis on top 5 plants (by value share)**
7. **Workshop to share findings**
8. **A full feasibility TOR on HCRF**
9. **Final report**
10. **Capacity building workshop with stakeholders**

## Delivery lead

- Carbon Trust
- National Coordinator
- CSV

*Multi-criteria Analysis*
Approach to the policy and regulatory analysis

The policy and regulatory analysis is expected to contribute directly to the development of the MCA including the impact that the current and future power generation conditions are likely to have on the role and lifetime of CFPPs/CHPPs. It also aims to analyse the suitable ETM models within the prevailing legal and regulatory framework of Kazakhstan’s energy sector.

Objectives:

- Develop understanding of the existing power sector landscape and climate change commitments
- Provide insights on policy, regulatory and other legal provisions available for early retirement
- Explore financing options for the ETM

Opportunities and Challenges for Implementing ETM

- Existing Climate Change Commitments
- Power Policy Landscape
- National Power Landscape
- Electricity Markets
- Stakeholder Interviews
- Regulatory Clauses

Develop underdstanding of the existing power sector landscape and climate change commitments

Provide insights on policy, regulatory and other legal provisions available for early retirement

Explore financing options for the ETM
A summary of insights on Kazakhstan’s energy landscape

There have been some positive commitments made towards investment in renewables but there is a clear lack of urgency in policy targets and regulatory changes set against the backdrop of an energy system with complex needs.

Positive commitments

There have been some positive policy changes and commitments in the last decade e.g., setting up an auction mechanism for RE projects (2018) and the Carbon Neutrality Strategy 2060 (2023).

A need for urgency

There are some ambitious targets for 2050 with 50% RES and then 80% by 2060 but there is a lack of urgency in target setting with a target of only 12.5% RE generation by 2029.

Preferential treatment for CHPs

Because Kazakhstan has a critical heating requirement, CHPPs are given preferential treatment. However, this acts as a disincentive for investing in renewable alternatives.

Lack of investment in RE

There are plans for renewable built out but there are likely to be low levels of penetration in next decade.

Heavy reliance on fossil fuels

More than 70% of Kazakhstan's power comes from fossil fuel generation sources.

Increasing power demand

Peak power consumption in Kazakhstan has been growing, while there has been a decrease in generation in 2020. This will require an increase in power generation capacity to meet demand.

Critical heating requirement

Heating demand is also increasing set against a backdrop of ageing assets and infrastructure that has led to increasing accident rates at sites.

Power imbalances

A lack of generating capacity and historic imbalances in the power market have necessitated increased imports from Russia.
Challenges for an ETM in Kazakhstan

There are some key technical, market and policy barriers that will create challenges for the successful implementation of an ETM in Kazakhstan.

A. Technical
- High dependence on coal assets for power and heat in Kazakhstan
- Old and ageing assets and infrastructure in the power and heat sectors
- High and increasing accident rates in the sector
- Transmission constraints, particularly to and from Western zones in Kazakhstan
- Switching to renewables will create more supply variability that needs to be managed

B. Market conditions
- Historically some contradictions between market rules and price regulation for the power market
- High risks for RE developers and lack of certainty around tariffs and therefore returns
- Lack of knowledge of suitable renewable alternatives, particularly for heat
- Lack of investment in new RE, due to the unpreparedness of the Kazakhstan power system for the RE integration.

C. Policy
- Historically a lack of planning and analytical work to support plans to reduce reliance on fossil fuel generation and support investment in RE
- Insufficient economic analysis on the development of the energy sector more generally
- Lack of environmental policy and policies that do exist are hard to enforce including those relating to the commissioning and decommissioning of generation assets including support for workers and communities
Recommendations for Kazakhstan

It is critical that Kazakhstan set ambitious targets and plans for the phase-out of coal generation and the build-out of renewable energy capacity that incentivises private investments, prioritises the needs of local communities, and maintains grid stability. There are lots of ways to achieve this, often in the form of risk reduction schemes or direct subsidies:

**Contracts for Difference (CfDs)**
Used in Great Britain and the Netherlands as SDE++, CfDs provide developers with a guaranteed price for the electricity they generate.

**Feed-In-Tariffs (FiTs)**
FiTs provide renewable energy producers with a fixed price per kilowatt-hour of electricity generated. This can help to reduce the risk of investing in renewable energy and make it more attractive to investors.

**Smart Export Guarantee (SEG)**
The SEG allows homeowners and businesses with rooftop solar panels to sell the excess electricity they generate back to the grid.

**Renewable Heat Incentives (RHI)**
The RHI provides financial incentives to businesses, public sector organisations, and non-profit organisations to install renewable heating technologies.

**Round-the-clock auctions**
Round-the-clock renewable energy auctions aim to procure renewable energy that can be supplied 24 hours a day, 7 days a week.

**Tax Credits**
Tax credits are used to provide renewable energy generators for each kilowatt-hour of electricity produced. In the US this scheme is called Production Tax Credits (PTC).
Coal phase-out case studies

There are multiple examples of coal transition mechanisms internationally, which includes a broad range of interventions from innovative financial structures to social and economic policies.

**Germany – Closure-premium through Reverse Auctions**

- In 2022, the German government approved a draft law ("Act to Reduce and End Coal-Fired Power Generation") to phase out coal by 2038, through compensation schemes. Coal plant owners are offered the option of bidding in a reverse auction to receive compensation to realise (partial) capital recovery for early closure.
- The first five auctions (covered 40% of the country's hard coal and small lignite resources) cost around 700 million Euros in compensations, proving to be a cheaper alternative to individual negotiations with energy companies.

**US – Ratepayer-backed Securitisation**

- Ratepayer-backed securitisations involve refinancing regulated utility coal-fired assets using bonds backed by surcharges on ratepayers’ energy bills to decommission existing assets.
- **Example:** New Mexico’s 2019 Energy Transition Act authorised the use of securitisation for coal phase-out. In 2020, New Mexico’s largest utility, Public Service of New Mexico (PNM) was approved for a USD361 million ratepayer-backed securitisation bond to support the retirement and replacement of the 924 MW San Juan coal plant with a portfolio of clean energy. This saved PNM’s customers nearly USD 80 million in 2023.

**Chile – Future Cash Flows from Carbon Credits**

- Carbon credits can be awarded to asset owners for the reduction in emissions attributed to managed coal phase-out. Asset owners sell credits to offset revenue losses and accelerate phase-out dates.
- **Example:** In December 2020, Engie Energía (Engie’s Chilean subsidiary) signed a 12-year, USD125 million loan package with IDB Invest to build and operate its 151 MW Calama wind farm and retire two units (125 MW each) of its 32-year-old Tocopilla coal plant. Lenders paid Engie a floor price for carbon abated through early retirement, by decreasing the financing cost in the USD15 million Clean Technology Fund (CTF) loan tranche. A total of 5.16 million tCO₂ are expected to be displaced during the loan tenure, with up to 2.19 million tCO₂ eligible at maturity for credit under the CTF loan, for USD6.54 million, implying a carbon floor price of USD 3/tonne.

Source: RMI (2023)
Approach to the prioritisation of CFPPs/CHPPs

An MCA will enable a high-level screening of Kazakhstan’s fleet of coal and high-carbon power plants to identify and rank CFPPs/CHPPs for early retirement in the context of an ETM.

The MCA will aim to:

- Develop a framework of metrics to score and rank CFPPs and CHPPs to highlight the best candidates for transition.
- Provide high-level insights on CFPPs/CHPPs that can be considered for early retirement in Kazakhstan.
- Offer a foundation for engagement and communication with governments and international stakeholders on the energy transition and using a retirement mechanism.
- Test plants that are considered good candidates for early retirement by an ETM.
The MCA prioritises plants based on 4 key pillars below and ensure that (i) will have the least impact on the security of supply, (ii) are the most financially viable for acquisition by an ETM, (iii) are most environmentally damaging, (iv) have the smallest impact on the local economy and livelihoods.

1. Energy Security
2. Financial viability
3. Environmental impact
4. Just Transition

- **High priority**
  - Low
  - High
  - High
  - Low

- **Medium priority**
  - High
  - Low
  - Low
  - High

- **Low priority**
  - High
  - Low
  - Low
  - High
## Approach to scoring and ranking coal plants in Kazakhstan

### 1. Macro analysis
Conduct country-level analysis to assess Kazakhstan’s readiness for coal phase-out. Assessments are used to inform the weighting of scores across the four pillars:
- energy security,
- financial viability,
- environmental impact,
- just transition

### 2. Develop plant metrics
For the plant level scoring:
- a) develop metrics for each pillar
- b) collect data (including plant size, utilisation, efficiency, age, location, financials, etc.) and develop assumptions

### 3. Generate plant scores
The scores for each metric are aggregated within each pillar to give a pillar score between 0 and 1.

Pillar scores are then multiplied by a weighting determined by the macro analysis and aggregated to give a total plant score.

### 4. Review results
Plant scores are reviewed, and different sensitivities of different metrics are tested.

Plants with the highest scores i.e., closest to 1, are considered the best candidates for early retirement under an ETM.
## Preliminary MCA Results by Total Score

### Scenario 1: Equal Weightings across each pillar (25%)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Plant Name</th>
<th>Type</th>
<th>Size (MW)</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tekeli CHP 2</td>
<td>CHPP</td>
<td>24</td>
<td>0.635</td>
</tr>
<tr>
<td>2</td>
<td>Arcelor Mittal CHP PVA</td>
<td>CHPP</td>
<td>192</td>
<td>0.543</td>
</tr>
<tr>
<td>3</td>
<td>Kentau CHP 5</td>
<td>CHPP</td>
<td>13</td>
<td>0.539</td>
</tr>
<tr>
<td>4</td>
<td>Pavlodarenergo Pavlodar CHP 2</td>
<td>CHPP</td>
<td>110</td>
<td>0.535</td>
</tr>
<tr>
<td>5</td>
<td>Karaganda GRES-1 power station / Kazakhmys Corporation Balkhash power station</td>
<td>CHPP</td>
<td>84</td>
<td>0.533</td>
</tr>
<tr>
<td>6</td>
<td>Zhezkazgan CHP</td>
<td>CHPP</td>
<td>252</td>
<td>0.464</td>
</tr>
<tr>
<td>7</td>
<td>Stepnogorsk CHP</td>
<td>CHPP</td>
<td>180</td>
<td>0.460</td>
</tr>
<tr>
<td>8</td>
<td>Sogra CHP / Sogrinsk power station</td>
<td>CHPP</td>
<td>75</td>
<td>0.459</td>
</tr>
<tr>
<td>9</td>
<td>Akmola CHP 1</td>
<td>CHPP</td>
<td>22</td>
<td>0.447</td>
</tr>
</tbody>
</table>

### Scenario 2: Energy Security (30%); Financial Viability (20%); Environment (20%); Just Transition (30%)

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<th>Score</th>
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<td>2</td>
<td>Kentau CHP 5</td>
<td>CHPP</td>
<td>13</td>
<td>0.571</td>
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<tr>
<td>3</td>
<td>Pavlodarenergo Pavlodar CHP 2</td>
<td>CHPP</td>
<td>110</td>
<td>0.569</td>
</tr>
<tr>
<td>4</td>
<td>Arcelor Mittal CHP PVA</td>
<td>CHPP</td>
<td>192</td>
<td>0.562</td>
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<tr>
<td>5</td>
<td>Karaganda GRES-1 power station</td>
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Next steps and closing remarks

Transitioning Kazakhstan’s energy system is complex and challenging but **targeting initial CFPPs/CHPPs to retire and replace early, and promoting initial build out of renewable generation**, are key first steps.

The **ETM will provide an important opportunity to finance and accelerate the phase-out of CFPPs/CHPPs and this Pre-Feasibility Study is the very first step towards realising that opportunity.**

The **consultant team are continuing their work on the MCA and financial analysis and hope to publish their reports and findings towards the end of this year.**
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The ETM Program Overview

- **Accelerate the retirement or repurposing** of coal-fired power plants using public and private finance through refinancing, acquisition, or sustainability-linked corporate loans
- **Scale up investment** in clean energy and energy storage
- **Aim to achieve just and affordable transition**, addressing impacts of coal retirement on people and communities

**Governments and Philanthropies**

Grants and highly concessional funding*

**ETM Partnership Trust Fund** *(ADB-administered)*

Concessional finance**

**Technical assistance (e.g.):**

- Grid, technical, and financial analyses
- Just Transition (e.g., skills and livelihood development)
- Policy and regulatory support
- Carbon finance (e.g., carbon credit structuring)
- Measurement, reporting, and verification

**IFIs and global climate finance**

Grant, debt, equity, or guarantee

**International and local investors and lenders**

**ETM Fund/Vehicle**

- **Carbon Reduction Facility (CRF)**
- **Clean Energy Facility (CEF)**

**Direct ADB Transactions** *(Sovereign or nonsovereign sectors with potential IFIs cofinancing)*

**Coal retirement transactions (asset level)**

**Clean energy transactions (asset level)**

**Corporate transactions (portfolio level)**

❖ Just Transaction activities to be supported in line with agreed JT plan.

* Grants and highly concessional funding (low-cost equity and debt) are critical to catalyze private capital and make ETM a success.

** Concessional finance may include concessional loans, evergreen debts, junior equities, and guarantees.
## Transaction Structuring and Financial Analysis

Transaction models to accelerate retirement/repurposing of coal-fired power plants (CFPPs)

<table>
<thead>
<tr>
<th>01</th>
<th>Acquisition Model¹ (SPV Level)</th>
<th>02</th>
<th>Synthetic Model (SPV Level)</th>
<th>03</th>
<th>Portfolio Model (Corporate Level)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETM acquires share capital in CFPP</td>
<td>ETM invests senior/junior debt and/or other mezzanine capital to the CFPP</td>
<td>ETM provides funding to the corporate sponsor with CFPPs and greenfield clean energy projects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ETM to take role as owner and operator of the coal plant</td>
<td>Equity ownership and operational responsibility kept with the current asset owner</td>
<td>Sponsor guarantees greenfield clean energy projects will be built and coal plants retired ahead of schedule</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ETM agrees an early termination date with the utility and operates the plant until that date and then closes it or repurposes</td>
<td>Investment conditional on early termination being contractually agreed with owner and utility and appropriate security being provided</td>
<td>Incentives (such as penalty interest) can be used to ensure that the transition occurs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most suitable for IPP plants with international bankable PPA</td>
<td>Most suitable for IPP plants with international bankable PPA</td>
<td>Most suitable for Utilities with a portfolio of plants</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

While multiple transaction options exist, ETM will seek commitments from:
- current project investors not to develop any new coal; and
- host country commitment to energy transition as a pre-condition for any deal.

1. Acquisition Model to be utilized only in specific applications.
Synthetic Model: ETM will re-leverage CFPPs with low-cost capital while existing owners remain involved as equity owners and operator

1. **ETM invests in debt-like instrument** into the project company and receives repayment based on sculpted cash flow (% of CFADS) over the investment horizon.

2. **Proceeds from ETM investment are paid to existing shareholders as a special dividend** as a form of equity return. Existing shareholders continue to receive equity dividends (but at a lower level than without CRF).

3. **Existing shareholders remain as 100% common shareholders until the end of the shortened PPA tenure.**

4. **Transaction to be structured for existing financing arrangement to remain** (e.g. pari-pasu with CRF) or fully exit.

5. **Shortening of PPA tenure to be contractually agreed with the Utility; major project agreements (O&M, Fuel) to remain as is but with shorter tenor.**

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**CFADS:** cash flow available for debt service, **CFPP:** coal-fired power plant, **CRF:** carbon reduction facility
**Synthetic Model: illustrative cash flow model**

- **Future cash flow (US$ million)**

  - Business as Usual (without CRF entry refinancing)
  - After CRF Investment

  **Legend**
  - Net equity cashflow
  - Net debt cashflow
  - Net CRF cashflow

  **Key Points**
  - $300m ETM 10Y loan (funded by ~25% concessional capital) is provided to the project.
  - ETM loan proceeds are used to repay existing lenders.
  - Remaining ETM loan proceeds are used to pay a special dividend to sponsors, to compensate them for the economic loss due to the shortened operation period (same IRR as BAU scenario).
  - Project cash flows are used to repay ETM loan.

**ETM’s market-based approach will significantly reduce coal plant life by re-leveraging with lower-cost capital from governments, multilateral banks, philanthropies, and private sector investors**
Portfolio Model: ETM will provide a performance-linked transition facility with financing provided at the corporate level

ETM Portfolio Transaction Structure

1. Utility to provide a corporate loan facility to Utility. KPIs could include items such as:
   - Individual coal plant shutdown (identified CFPP(s) to close)
   - Overall GW of coal plants closure by a certain date (Utility choose CFPP(s) to close)
   - CO2 reduction achievement - Utility and ADB/Financiers to agree a mechanism for calculating current emissions baseline and achieved CO2 reductions vis-à-vis this baseline

2. Utility uses cash receipt to shut CFPPs over time and use funding for renewable energy and grid upgrade projects

3. Utility to pay penalty for not meeting KPIs which may include:
   - Penalty interest – level of concessionality of the loan would be reduced if KPIs are not met by applying a penalty interest (potentially cumulative since the inception of the loan)
   - Default – inappropriate use of funds or failure to meet KPIs could provide financiers the right to withhold future drawdowns and/or immediate repayment

4. Additional concessional capital/TA could be provided to help fund Just Transition (JT) activities

CFPP: Coal-Fired Power Plant
Comprehensive Approach to Just Transition under the ETM

Just Transition (JT) activities extend beyond the scope and implementation timeframe of ETM.

JT considers the geopolitical context and enabling environment, including policy frameworks, education systems, and economic structure.

ETM considers the direct, indirect, and induced impacts along the coal value chain and national system-level effects.

JT activities include asset-level impact assessments, social dialogue, and development of JT plans, considering direct and indirect workers, employers, labor unions, and environmental remediation issues as well as communities in general.

JT entails coordination with other development partners, stakeholders, and national or regional platforms.

JT considers the availability of alternative employment, potential for economic diversification, and impacts on local and subnational budget.

It mobilizes investments in social sector projects to strengthen the enabling environment.

Together with ADB’s social and environmental safeguards, Just Transition provides support for workers, communities, and regions impacted by the intervention of the ETM and associated projects, while preserving the environment.
ETM Partnership Trust Fund: **Expanded Scope (from Nov. 2022)**

**Governments and Philanthropies**

Grants and non-grant contributions 1 with flexibility 2

**ETM Partnership Trust Fund (ADB-managed)**

Grants and Concessional finance 3, 4

1 Both grants and non-grant contributions can be received by ETMPTF, subject to the same service fee and cost recovery arrangement.

2 Additional flexibility allowed through opt-out provisions.

3 Concessional finance may include concessional loans, evergreen debts, junior equities, and guarantees.

4 Support for stand-alone projects.

**ETM Fund/Vehicle**

<table>
<thead>
<tr>
<th>IFIs and global climate finance</th>
<th>International and local investors and lenders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grant, debt, equity, or guarantee</td>
<td>(expected to happen in the longer term)</td>
</tr>
</tbody>
</table>

**Technical assistance (e.g.)**

- Grid, technical, and financial analyses
- Just transition (e.g., skills and livelihood development)
- Policy and regulatory support
- Carbon finance (e.g., carbon credit structuring)
- Measurement, reporting and verification

**Direct ADB Transactions**

(Sovereign or nonsovereign sectors with potential IFIs cofinancing)

**Carbon Reduction Facility (CRF)**

**Clean Energy Facility (CEF)**

**Expanded Scope (from Nov. 2022)**

- IFIs and global climate finance
- International and local investors and lenders
- (expected to happen in the longer term)

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1 Additional flexibility allowed through opt-out provisions.

2 Concessional finance may include concessional loans, evergreen debts, junior equities, and guarantees.

3 Support for stand-alone projects.

4 IFIs and global climate finance

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