

Renewable Energy Prospects in PRC

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PRC Strategic Challenges in the Oil Sector

- Second world oil consumer after USA
 - 40% imported and expected to increase
 - Low consumption per capita
 - Demand rapidly expanding
 - Building up of strategic reserves
- 2/3 imported from the Middle East
 - Increased competition between USA, Japan, PRC
 - Diversification of oil sources is critical
 - Sea routes (Latin America, Africa)
 - Continental (Russia, Central Asia)

Policy Issues in the PRC Energy Sector

- Improved energy efficiency ratio
- Diversification of commercial energy sources
 - Coal 65%
 - Oil 21%
 - Natural gas 5%
 - Nuclear 1%
 - Renewable 8%
- Major policy issues
 - Incentives for renewable energy
 - Gasoline and fuel oil consumer prices: inflation versus industrial shortage

PRC's Energy Challenges

- Energy efficiency
 - GDP expected to quadruple by 2020
 - Commercial energy expected to only double
 - Energy intensity will, therefore, need to be halved
- Investment requirements: \$2 trillion by 2030 in the electricity sector
- Renewable Energy expected to double in less than 20 years (17%)

Renewable Energy Context in PRC

- Increasing focus on pollution, oil prices, CDM values
- Strong commercial RE growth prospects, mostly hydropower
- Biomass (mostly non-commercial)
 - 18% of total primary energy supply

The Opportunities

- Large biomass and waste resources available
- More efficient use of biomass
- Large untapped hydropower
- Large wind resources, but very tariff dependent
- Solar water heating
 - 25% of RE in 2020
 - Major export opportunities

PRC's Renewable Energy Law

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- Major development, strong international support
- Includes resource surveys, frameworks for sale of renewable electricity, gas and heat into grids, penalties for grid connection delays
- Establishes principles for financial support, promotion of RE and product standardization
- Challenge of translating principles into
 - Practical supportive actions
 - Binding purchase contracts
 - Individual targets at regional/local levels

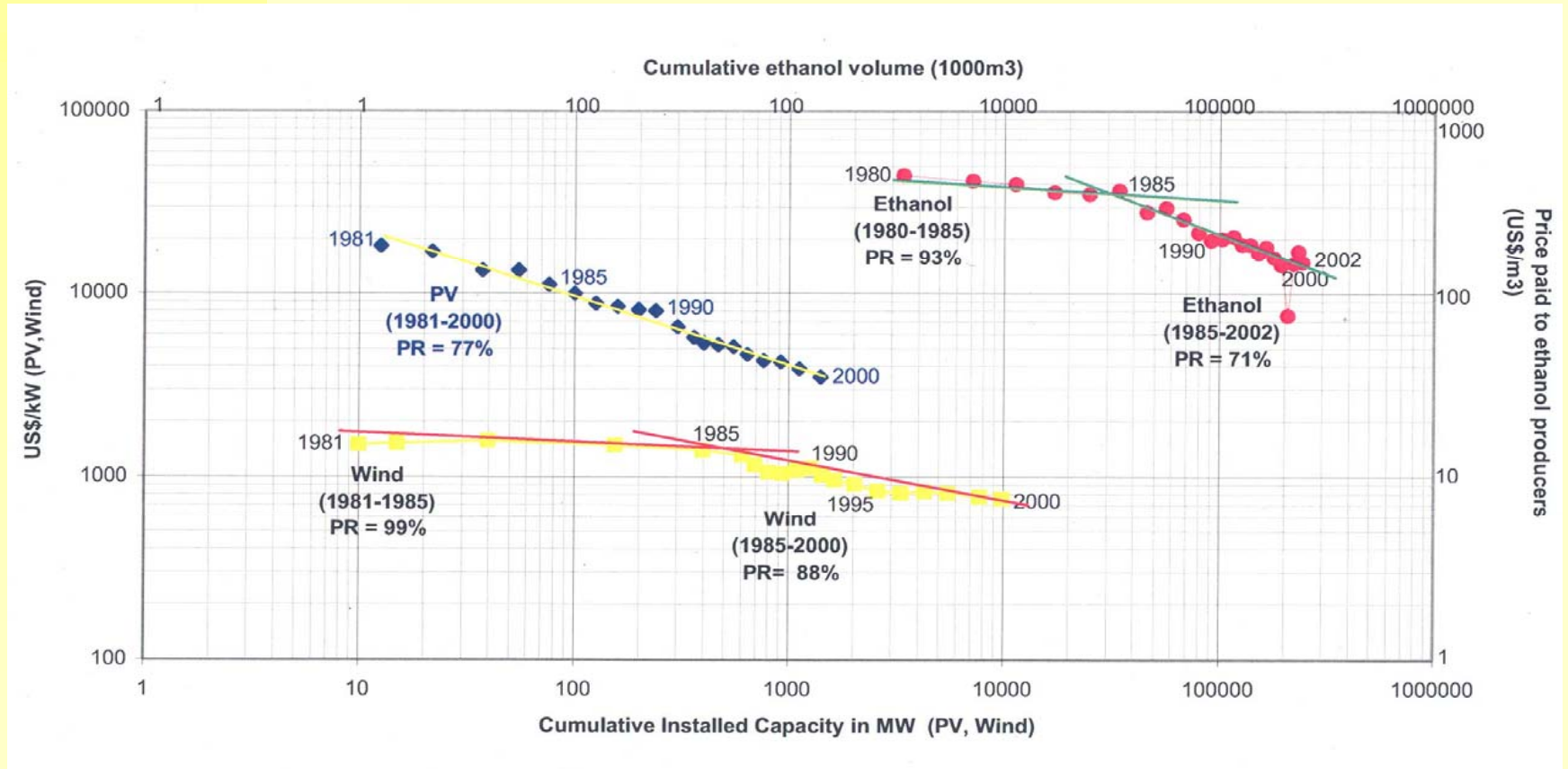
Realizing RE Projects in PRC

- Developing bankable RE projects, a major capacity challenge
- Legacy of administrative controls still prevalent
- Banking sector geared towards large SOEs
- Renewable Energy markets often not transparent
- Biomass resources rural, dispersed and decentralized

Some Barriers to RE in PRC

- Capital investment, including connections to grids, not fully reflected in RE electricity tariffs
- Plentiful low-cost coal, with implicit subsidies
- No level playing field vis-à-vis coal (pollution not considered as a cost)
- Higher up-front capital costs for Renewable Energy
- Under-developed domestic capital markets
- High level of uneconomic grid extensions (but with often unreliable supply and unrealistically low tariffs)

Positives for RE in PRC



Source: Johansson et al. January 2004
 PV = Photovoltaic

ADB-Funded Energy Projects in PRC

- 20 loan projects completed for \$2 billion
- 7 ongoing loan projects for \$670 million
- ADTAs and PPTAs for \$47 million

ADB-Funded Energy Projects in PRC

- 50% of the projects have direct impact on environment and energy use:
 - Hydropower pumped storage to meet peak loads
 - CDM aspects for Run of River 98MW Hydro project; coal bed methane/mine methane capture and use of CDM
 - Rural clean energy projects to use biomass more efficiently
 - Improved industrial technologies (steel, fertilizer, cement, chemicals); combined heat and power
 - Urban gas and district heat supply to replace coal

ADB Clean Energy Initiatives

- ADB Energy Policy 2000 includes RE priorities:
 - "...addressing global environmental impacts, by supporting use of clean energy and Kyoto Protocol mechanism for GHG abatement..."*
 - "...promoting the use of renewable energy, demand side management and energy efficiency..."*
- Over 50 Loans and TAs in the last 10 years (1994-2004) in 15 DMCs, covering RE, energy efficiency and other GHG reduction measures/technologies
- New Energy Efficiency Initiative under development

ADB Renewable Energy Project Loans in PRC

	Total Cost	ADB Funding
RE Projects (\$million)	1,450	468
Coalmine Methane Demonstration	237	117
Liaoning Environment	161	70
Gansu Clean Energy Development	87	35
Hebei Zhanghewan Pumped Storage	775	144
Shanxi Environment Improvement	190	102
Other Projects (\$million)	400	200
Shen-Da Power Transmission and Grid Rehabilitation	300	100
Yunnan Dachaoshan Power Transmission	100	100
TOTAL	1,850	668

ADB-Funded Renewable Energy TAs in PRC

ADB Funding
11.4

Technical Assistance (\$million)

Wind Power Development

Rural Electrification Development

Inner Mongolia Environment Improvement

Energy Conservation and Resource Management

Jiangsu Urban Environment Improvement

Gansu Hydropower

Hebei Zhanghewan Pumped-Storage Plant

Shen-Da Power Transmission and Grid Rehabilitation

Wind Power Development

Power Rehabilitation and Environment Improvement

ADB Climate Change Initiatives

- **ALGAS** (Asia Least Cost Greenhouse Gas Abatement Study)
 - \$10M RETA for GHG abatement option analysis and capacity building
 - Co-financed with GEF, Norway and 12 participating countries – fully implemented, set scene for REACH
- **REACH** (Renewable Energy, Energy Efficiency and Climate Change Program) 2002
 - TA and capacity building supported by 3 Trust Funds:
 - **Dutch** Cooperation Fund for Promotion of Renewable Energy and Energy Efficiency (\$6.0M)
 - **Canadian** Cooperation Fund on Climate Change (Can\$5M)
 - **Danish** Cooperation Fund for Renewable Energy and Energy Efficiency in Rural Areas (DKK30M)

ADB Financing Instruments for Renewable Energy Projects

- Project loans for RE to be expanded beyond large hydro power projects
- Grants to support RE feasibility studies, e.g. REACH
- Technical assistance to develop RE project proposals
- Equity participation in private sector investments
- Assistance through Clean Development Mechanism
- CDM capacity building at national and local levels
- Access to GEF via ADB to build RE capacity

Main ADB Web Links

- **RE & CDM Projects**

REACH: www.adb.org/reach

PREGA:

www.adb.org/Documents/Events/2001/PREGA/prega.asp

- **Consulting and Procurements**

DACON: www.adb.org/Consulting/dacon.asp

DICON: www.adb.org/Consulting/dicon.asp

EOI: www.adb.org/Consulting/faqs/con_firms-eoi.asp

Main ADB Web Links

- **ADB Operations**

ADB, Manila: www.adb.org

ADB PRCM, Beijing: www.adb.org/PRC

ADB ERO: www.adb.org/ero

- **Country Strategies and Programs**

www.adb.org/Documents/CSPs/default.asp

- **Regional Cooperation Strategies and Programs**

www.adb.org/Documents/RCSPs/default.asp?p=ctry