Central Asia Regional Electricity Market
CAREM

РЕГИОНАЛЬНЫЙ РЫНОК ЭЛЕКТРОЭНЕРГИИ ЦЕНТРАЛЬНОЙ АЗИИ
ОРТАЛЫК АЗИЯДАГЫ ЭЛЕКТР ҚУАТЫНЫҢ ӨНІРЛІҚ НАРЫҒЫ
ЭЛЕКТР ЭНЕРГИЯСЫНЫҢ БОРБОРДУК АЗИЯ РЕГИОНДУК РЫНУГУ
Towards a Regional Electricity Market

CAREM WORKSHOP ON REGIONAL ELECTRICITY MARKETS CONCEPT AND PROSPECTIVE.

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Towards a Regional Electricity Market

Over the next FIVE YEARS, Central Asian economies are projected to grow at an average of 4.7%.

For Emerging Markets and developing economies...
Towards a Regional Electricity Market

Challenge #1 → Power Supply Reliability

Central Question…

“To achieve this GDP growth of 4.7%, and meet the increasing demand for electricity, would CA countries need to build new power plants?”

YES  NO
Towards a Regional Electricity Market

DISCUSSIONS:
❖ Conceptual principles of Electricity Markets.
❖ International practices.
❖ Competitive Market models.
❖ Market design.
❖ Economic benefits from regional electricity trade.
❖ Complementarity and security of supply.
❖ Others…

Day-Ahead Market
Forward Market
Intraday Market
Balancing Market
Capacity Market
System & Ancillary Services Market
Complementarity

“Right after the introduction of NordPool, the demand for power in Nordic countries steadily increased, while investment in new power generation did not grow at the same rate”.

Central Asian countries have been spending lots of economic resources pursuing self-sufficiency in power generation.

Losing out substantial benefits by not leveraging **Complementarity**.
Factor in imports in the annual energy balance.

Electrically speaking, countries do not operate as islands anymore, unless you are an actual island.

Needs to add **6,000 MW** of capacity every year.

### Complementarity

### Brazil

<table>
<thead>
<tr>
<th>Source</th>
<th>Number of plants</th>
<th>Installed capacity (MW)</th>
<th>% Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydroelectricity</td>
<td>1259</td>
<td>96,925</td>
<td>64.5%</td>
</tr>
<tr>
<td>Gas</td>
<td>156</td>
<td>12,965</td>
<td>8.6%</td>
</tr>
<tr>
<td>Oil</td>
<td>2200</td>
<td>8,877</td>
<td>5.9%</td>
</tr>
<tr>
<td>Biomass</td>
<td>504</td>
<td>14,001</td>
<td>9.3%</td>
</tr>
<tr>
<td>Nuclear</td>
<td>2</td>
<td>1,990</td>
<td>1.3%</td>
</tr>
<tr>
<td>Coal</td>
<td>13</td>
<td>3,389</td>
<td>2.3%</td>
</tr>
<tr>
<td>Wind</td>
<td>413</td>
<td>10,124</td>
<td>0.2%</td>
</tr>
<tr>
<td><strong>Total installed capacity</strong></td>
<td><strong>4,707</strong></td>
<td><strong>150,338</strong></td>
<td><strong>94.3%</strong></td>
</tr>
<tr>
<td><strong>Contracted imports</strong></td>
<td></td>
<td><strong>5,850</strong></td>
<td><strong>5.7%</strong></td>
</tr>
<tr>
<td>Available power</td>
<td></td>
<td><strong>156,271</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

*Source: Ministry of Mines and Energy, 2016*
## Complementarity

<table>
<thead>
<tr>
<th>Country</th>
<th>Resources</th>
<th>Dominant Resource</th>
<th>Fuel Import</th>
<th>Generation</th>
<th>Import Electricity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TAJIKISTAN</strong></td>
<td>Hydro, Coal, Natural Gas (*)</td>
<td>HYDRO</td>
<td>-- Coal, Natural Gas (UZ)</td>
<td>93% 7%</td>
<td>KR, UZ</td>
</tr>
<tr>
<td><strong>KYRGYZSTAN</strong></td>
<td>Hydro, Coal (*)</td>
<td>HYDRO</td>
<td>-- Coal (KZ), Natural Gas (UZ) Fuel Oil (UZ)</td>
<td>94% 6%</td>
<td>KZ, Tj</td>
</tr>
<tr>
<td><strong>KAZAKHSTAN</strong></td>
<td>Coal, Oil, Hydro, Natural Gas</td>
<td>COAL</td>
<td></td>
<td>81% - Thermal</td>
<td>RU, KR, UZ</td>
</tr>
<tr>
<td><strong>UZBEKISTAN</strong></td>
<td>Natural Gas, Oil, Hydro</td>
<td>GAS</td>
<td>-- Coal (KR)</td>
<td>86% 9% 2% 3%</td>
<td>KR, Tj</td>
</tr>
<tr>
<td><strong>TURKMENISTAN</strong></td>
<td>Natural Gas, Oil</td>
<td>GAS</td>
<td></td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

(*) Modest / Largely undeveloped
Complementarity

Tajikistan / Kyrgyzstan  
Water Abundant + Hydrocarbons Abundant

Kazakhstan / Uzbekistan / Turkmenistan

TJ+KR will supply competitive electricity, and provide Ancillary Services to all systems.

Under a regional market: KZ+UZ+TK will provide base load independent of hydrological conditions.

A Day-Ahead Market may unlock the high value of TJ+KR flexible hydro power plants.

The key takeaway:
There is absolutely NO WAY in which you can grow your economies without increasing the availability of electric power. Trying to do so individually is economic suicide in the long run.
Why CA needs to shift to a Market-Based Structure

➢ A REM is the only way to fully benefit from complementarity of resources.

➢ Complementarity combined with competitive trading of electricity offers a strong potential to defer construction of new power plants (savings of US$ millions).

➢ A competitive electricity market delivers the best possible price.

➢ REM underpinned by strong transmission links and efficient pricing will ensure sufficient power sector liquidity and competition.

➢ A well-functioning REM will send powerful signals to private investors of an improved investment climate.

➢ Brings financial discipline to the power sector.
After the six Central American countries became **electrically integrated** - and the regional market opened - the realized annual savings in the use of diesel and HFO:

8%

US$200 Million/year
The CAREM Project

Efforts are being concentrated on:

1. Strengthening priority transmission infrastructure (collaborating with DFIs);
2. Returning to a coordinated, synchronized operation of all CA transmission systems;
3. Helping to increase the volume of existing bilateral electricity trades;
4. Facilitating the creation and operation of a multilateral platform for power exchanges;
5. Ultimately, to migrating to a wider competitive regional electricity market.
Invited:
Central Asian experts, CAREM experts: AFM (Spain) and EKC (Serbia).

**DAY ONE**
- **AFM** (Spain) - How trading is done in regional markets.
- **Central Asian TSOs** - Recent developments and current priorities in national power sectors.
- **KOREM** - Experience and lessons learned since the Kazakh market started operation.

**DAY TWO**
- **EKC** (Serbia) - “Technical aspects to support regional market operation”.
- **AFM** (Spain) - International experience on regional trading.
- **CDC-Energia** - Update on the current status of regional trade in Central Asian countries.
DO NOT
ask me any questions!

Our invited speakers will answer all of them

Thank you
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