

Energy Sector Progress Report and Work Plan

(June 2017 - May 2018)

CAREC Senior Officials' Meeting

27-28 June 2018

Bangkok, Thailand



Highlights

- Reconnection of Uzbekistan to CAPS
 - Tajikistan and Uzbekistan agreement
 - Uzbekistan and Turkmenistan agreement
- CASAREM investments are producing results
- Regional Renewable Energy Program
 - Moving but progress is slow
- Power sector utilities reform on the agenda
 - Initiatives in Uzbekistan
 - Initiatives in Tajikistan

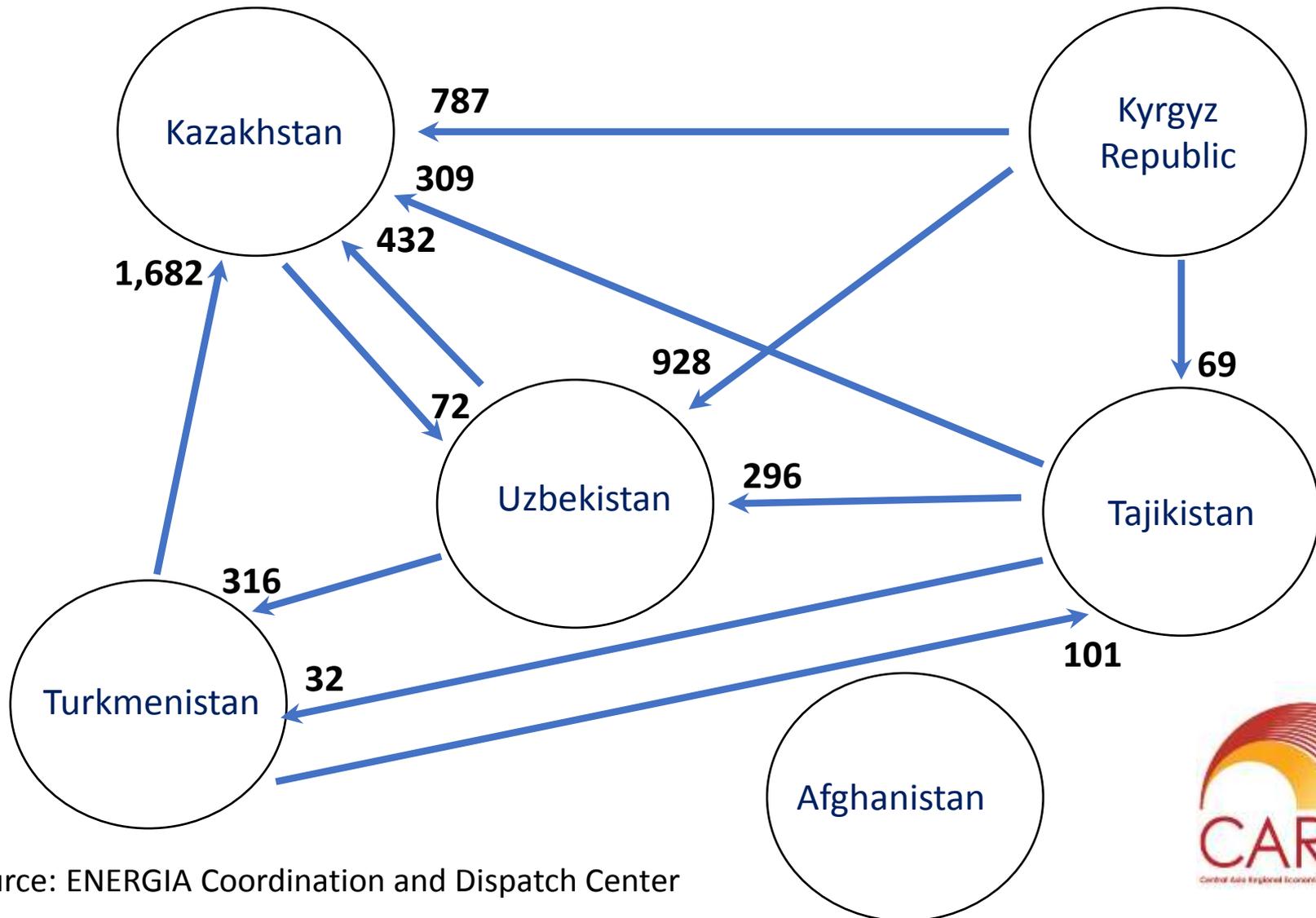
Support for Central Dispatch Center

- Regional energy trade **decreased** from 7,602 GWh in 1995 to 2,080 GWh in 2016 (**73% reduction** in energy trade)
- **ADB will support CDC** through a regional technical assistance to increase in regional power trade



Regional Power Trade (GWh)

Year: 1995

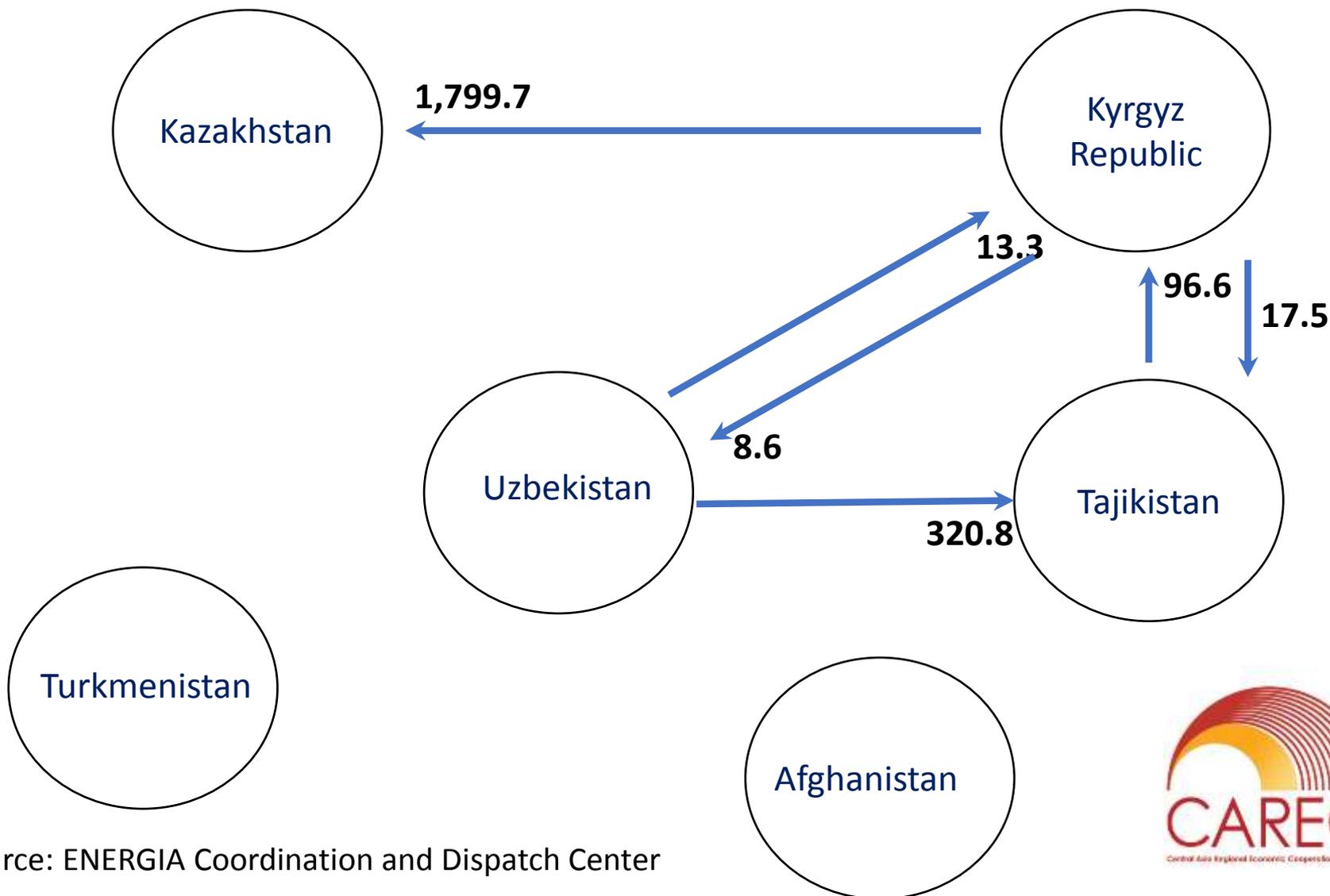


Source: ENERZIA Coordination and Dispatch Center



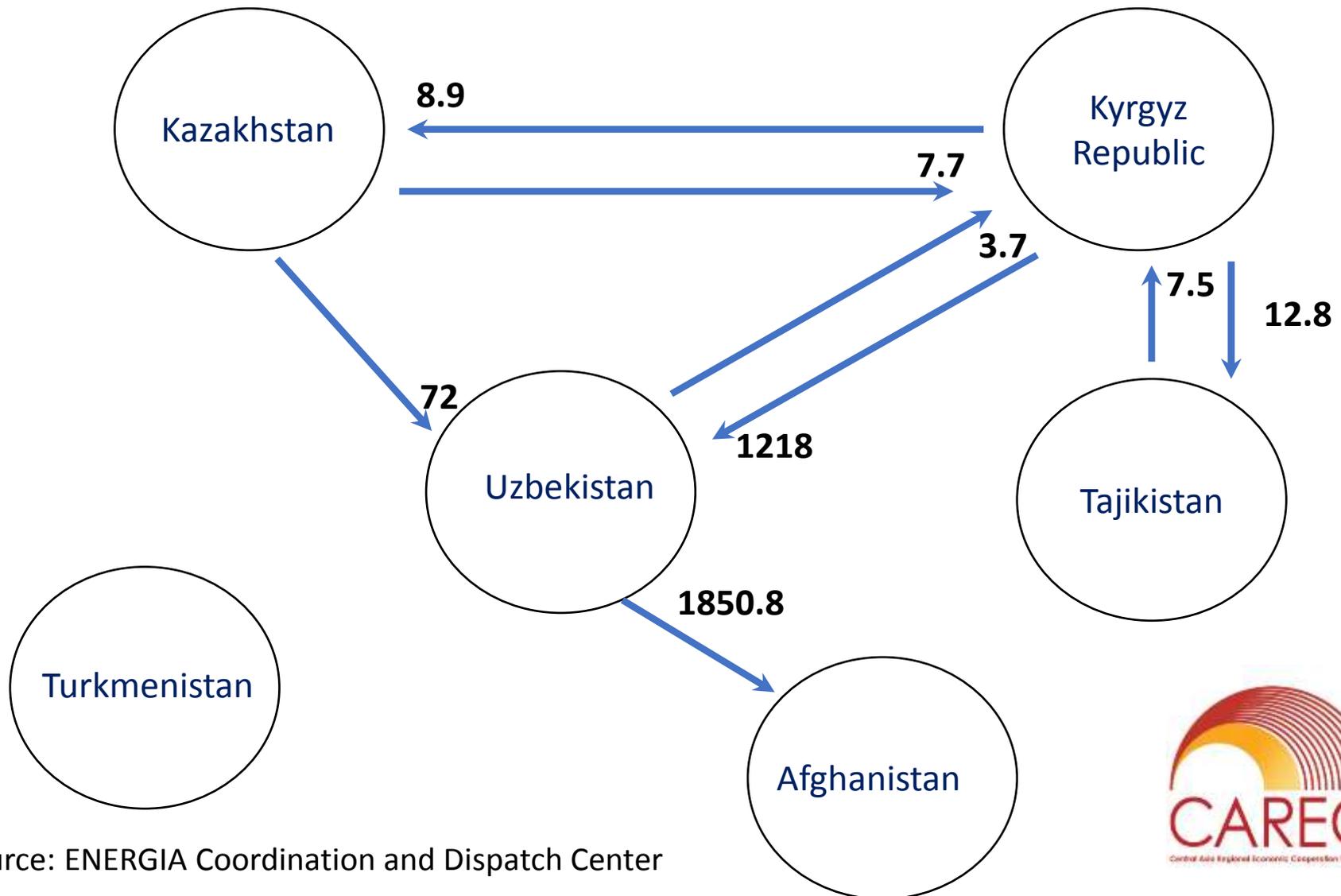
Regional Power Trade (GWh)

Year: 2010



Regional Power Trade (GWh)

Year: 2017



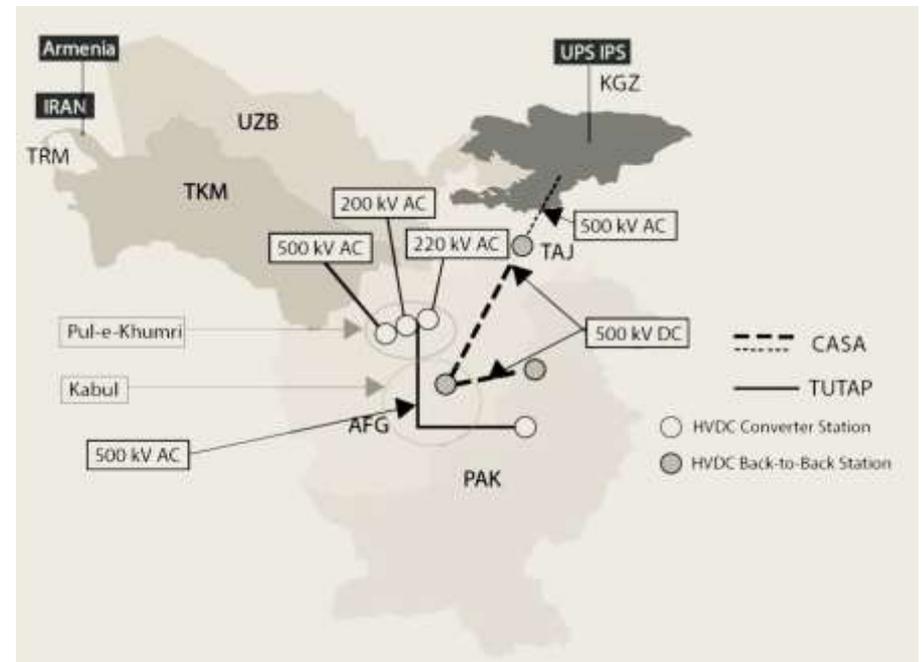
Source: ENERGIA Coordination and Dispatch Center



Update on CASAREM projects

TUTAP: 500kV HVDC line (2,000 MW) from Turkmenistan, Uzbekistan and Tajikistan to Afghanistan and Pakistan

- ADB loan for fifth phase (\$240 million) approved in December 2016 for the convertor station at Pul-e-Khumri
- Converter station to synchronize power, and enable power export to Pakistan using CASA
- Contract award expected by the end of 2018.
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- Next steps: World Bank to develop open access for CASA-1000; ADB will rehabilitate infrastructure in Tajikistan and the Kyrgyz



Update on CASAREM projects

TAP Project: 500 KV transmission line (4,000 MW capacity) from Turkmenistan to Afghanistan and Pakistan



Phase 1 TAP Implementation Map



Phase 2 TAP Implementation Map

In Q3 2018, ADB will:

- Prepare studies: systems stability, reliability, and grid interconnection.
- Project feasibility, technical design, PPAs
- Final implementation roadmap



Update on CASAREM projects

CASA-1000: 500kV HVDC transmission line (765 km, 1300 MW) from Kyrgyz Republic and Tajikistan to Pakistan



- **Project agreements** complete among participating countries
- **Procurement** for the major infrastructure packages are in the final stages
- **Contracts** for the construction of the HVDC transmission line in Afghanistan awarded and signed in December 2017

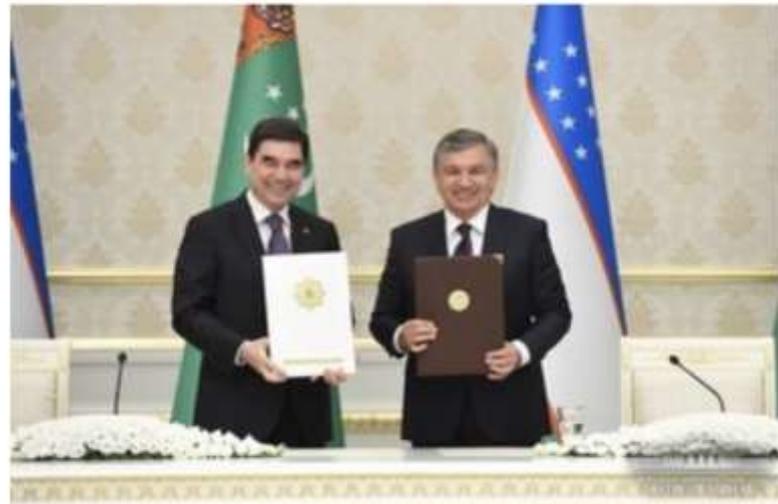
AFG-UZB 500-kV Surkhan-Pule Khumri Interconnection

- A new 500kV interconnection is urgently needed as the existing 220kV interconnection is overloaded
- Earlier 2018, both the governments have agreed on the line
- May be postponed to 2019 because of funding
- Feasibility study (technical, social and financial and economic) planned next

Turkmenistan to increase export

Recently, Turkmenistan and Uzbekistan signed an MOU for Turkmenistan to export to Kazakhstan, Kyrgyz Republic, and Tajikistan using Uzbekistan as a transit country

This will be done in an “island mode” with dedicated generations for export without reconnecting to CAPS



Slow progress on renewable energy

- **Kazakhstan**

- **290 MW** solar power

- **Pakistan**

- **950 MW**, wind power

- **Uzbekistan**

- **1 GW**, announced in March 2018

Jointly with SkyPower to finance \$1.3 billion

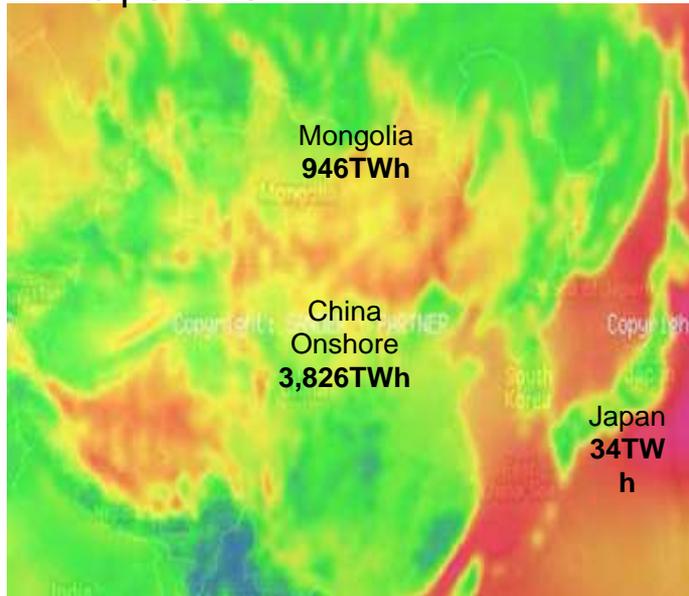


Aggressive intentions but slow progress

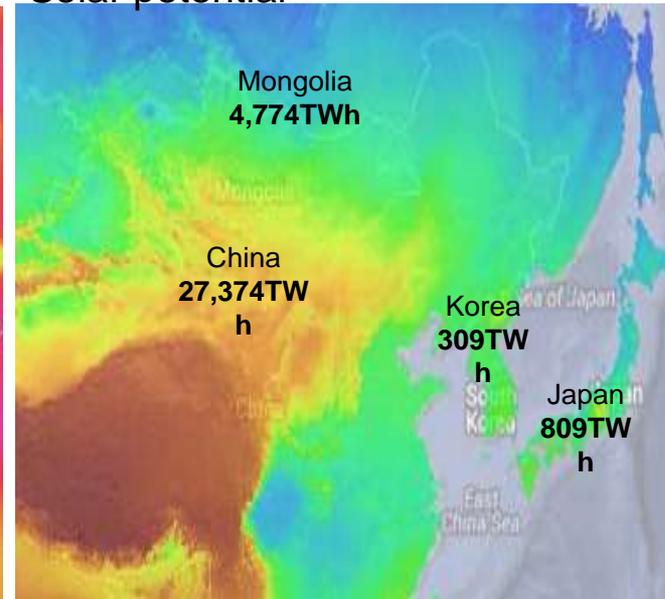
Renewable Energy (Solar + Wind) Potential –

Rich resources in China and Mongolia

Wind potential



Solar potential



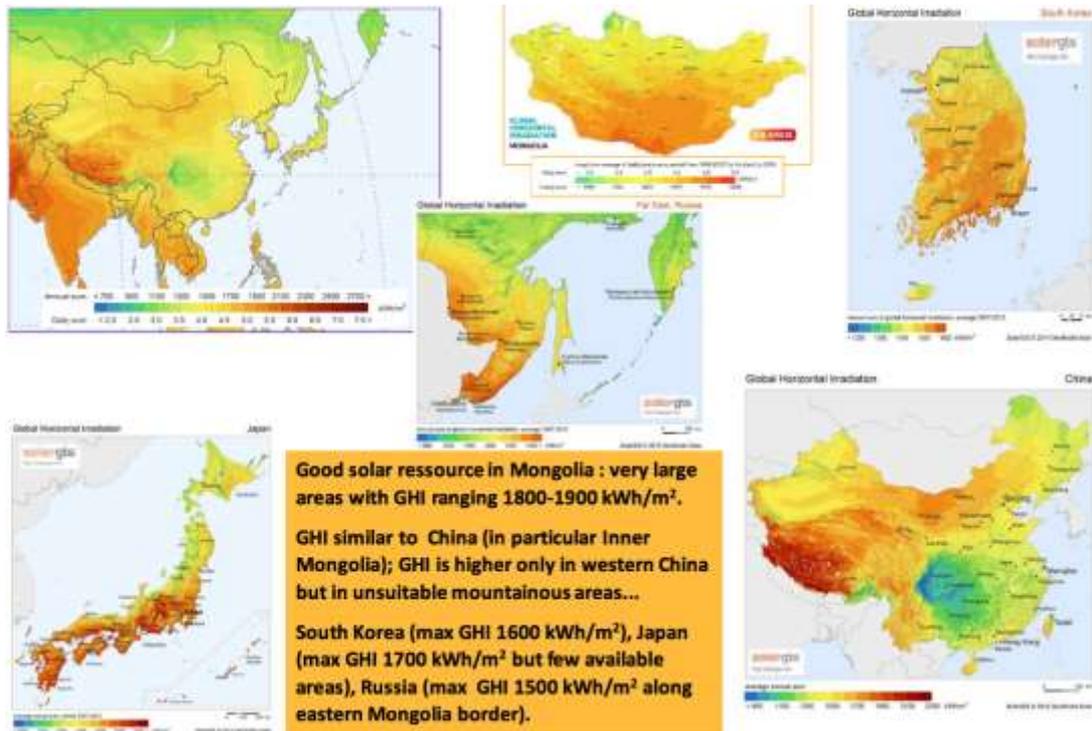
Source: <http://globalatlas.irena.org/>

Proposed Solution: Interconnection (HVDC) + Renewables + Intelligence = Smart Northeast Regional Grid

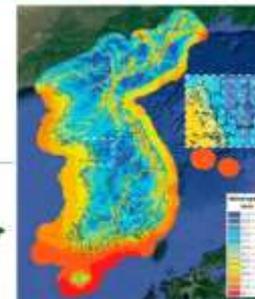
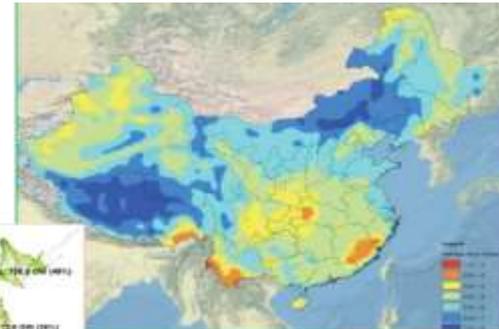
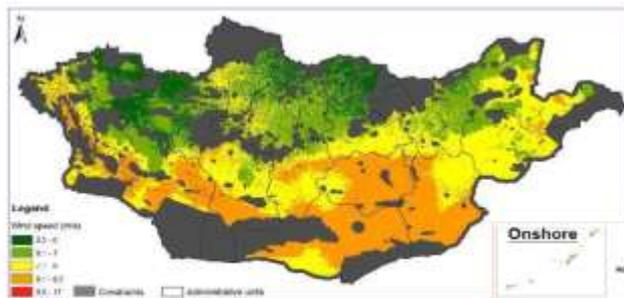


Source: Electric power grid interconnections in Northeast Asia: A quantitative analysis of opportunities and challenges.

Solar Resource in Northeast Asian Counties



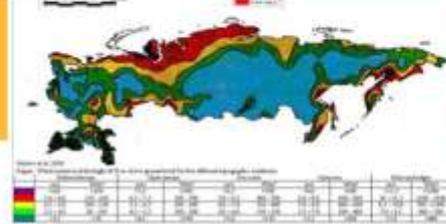
Wind Resource in Northeast Asian Counties



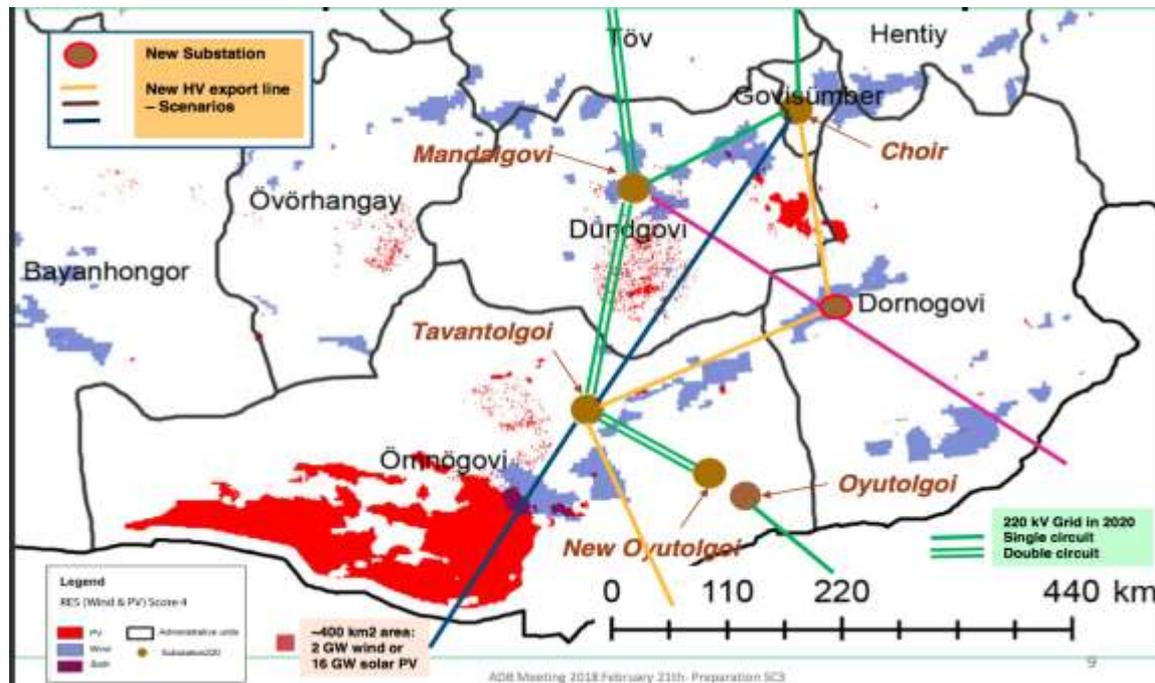
Excellent wind resource in Mongolia : very large areas with average wind speed ranging 8-9.5 m/s.

Average wind speed similar to China (in particular Inner Mongolia); best wind resource in western China but in unsuitable mountainous areas...

In South Korea (max 8m/s but in mountains and small areas), Japan (max 8.5m/s but very few available areas), Russia (max 6m/s).



Some of the key outputs: **Identified RE Export Corridor in Mongolia**



Investments in CAREC

- Investment needs more than **\$90 billion** over 7 years
- 2017 year investment was about **\$2.5 billion**
 - Huge gap remains and public sector alone can't meet those demands

Indicator	Unit		2017
Wind power installed	Capacity	MW net	156
	Generation	MWh	243,548
Solar power installed	Capacity	MW net	218
	Generation	MWh	22,561
Electric vehicle adoption	Nos.		210
LED public lighting	Km of roads		231
Energy Efficiency Savings	MWh		344,923

Indicator	Unit	2017
Transmission lines installed or upgraded transmission lines	Km	259,937
Increased energy generation capacity	MW	14,857
Rehabilitated generation capacity	MW	197
Upgraded substations	MVA	390

Sector reform

- Need to accelerate reform
- Urgent need to bring private investment to narrow the gap
- Financially weak conditions create huge burden on fiscal resources
- While some positive development on RE, energy efficiency lags behind
- Interest in sector reform but slow progress
- Many unfinished business in the region

SOE Reform Policy

- The power utilities are state-owned enterprises (SOEs)
- Many process **duplication** and **inefficiencies** remain because of organic growth
- SOE reform need to be **prioritized** – **UZB** leading the way!

Mobilizing Finance

- CAREC 2030 Strategy:

“Without private sector financing, the large investment requirements of the CAREC region cannot be met”

- **Energy Investment Forum**

- facilitate the private energy sector investment
- 3rd EIF on 11-12 September 2018 in Batumi, Georgia



2017-2018 Meetings and Capacity Development

- ESCC in Astana, Kazakhstan (17 July 2017);
- ESCC Video Conference (8 November 2017);
- Energy Investment Forum, Astana, (18-19 July 2017);
- ESCC in Ashgabat, Turkmenistan (13 March 2018);
- Training on Forecasting, Manila (1-3 June 2018);
- Asian Clean Energy Forum, Manila (4-8 June 2018)

* ESCC: Energy Sector Coordinating Committee Meeting



Pilot Projects

(ADB Technical Assistancess)

- **Off-grid solar electricity in 5 countries (TA9168)**
 - KGZ and TAJ: Kits delivered in June 2018
 - Procurement for AFG completed (Delivery September 2018)
- **Leapfrogging of Technology (TA9299)**
 - Final list of pilots being confirmed consistent with the CAREC High Technology Roadmap.
- **RE Integration to Grid(TA9365):**
 - finalizing the grid reinforcement plan (use of energy storage system and launching a pilot dispatching operation).
 - identify technical and regulatory reinforcement for distributed renewable energy in Uzbekistan

