Session 8: Roundtable Discussion

Policies to Promote Renewable Energy and Enhance Energy Security in Central Asia

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Outline

Energy Security & Renewable Energy

Policies to Promote RE and Enhance ES in CA

Energy Security & Renewable Energy

Energy Security

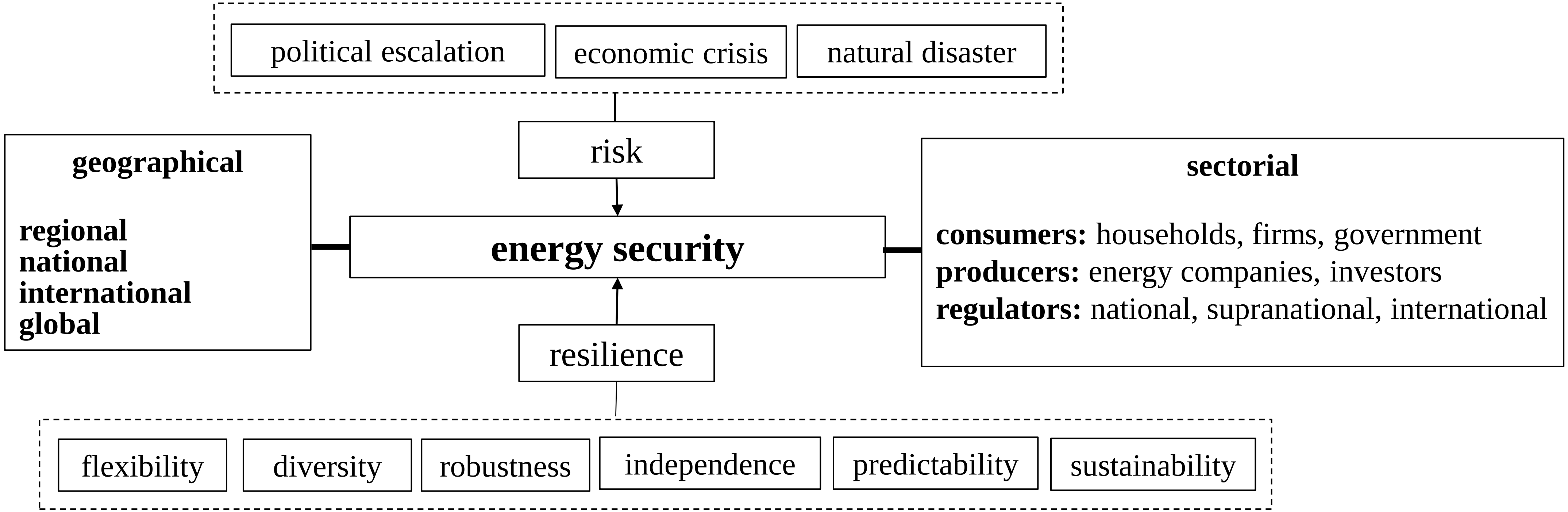
- Traditional understanding of ES builds upon IR theory, focuses on geopolitical considerations and advocates supply-side perspective (consequences of oil crises of the 1970s; major importers - IEA members) (Yergin 2006, 2011; Winzer 2012; Månsson et al. 2014; Ang et al. 2015).

- Advances on ES studies suggest application of institutionalism (Goldthau & Witte 2010; Kuzemko 2014; International 2015; The Handbook 2017) and incorporate demand-side dimension (Yenikeyeff 2006; Dickel 2009; Dynamics 2012; Yafimava 2015, Buchan & Keay 2015; Stern & Yafimava 2017).

- Contemporary contributions to ES suggest considering security of *energy systems,* defining energy security as "low vulnerability of vital energy systems and sustained provision of modern energy services" (Cherp & Jewell 2014). Vulnerability of VES is determined by an interaction between the risks and resilience capabilities of the VES.

- Comprehensive approach to ES involves two dimensions: VES as objects, i.e. exposed to various insecurities/ risks; and VES as subjects, i.e. VES themselves produce/ generate various insecurities/ risks.

Conceptual Framework for Energy Security



Source: author, influenced by Cherp and Jewell 2014: 418, 419; Biggs et al. 2015; Al-Saidi & Elagib 2017; Endoa et al. 2017

RE Security

Renewable energy sources:

* *non-combustible renewables:* hydropower; tide, wave, ocean energy; geothermal energy; wind energy; solar thermal energy and solar photo-voltaic;

* *combustible renewables* (biofuels & renewable municipal waste).

- Early studies on RE security addressed security aspects of a particular type of RE (solar, hydro, etc.) and concerned primarily domestic domain of such. Security of supply of RE is traditionally linked to intermittency (solar source), variability (biomass source), manoeuvrability or flexibility (electricity power), technological limitations, among other factors. Security of demand is determined by RE projects' CAPEX, generation and transmission costs, RE price and other factors; eventually, security of demand considerably depends on national income level;

- Most recent research examines **RE systems** (Wee et al. 2012; Johansson 2013b; Saavedra et al. 2018) and includes **international** dimension (e.g., international trade in green electricity) (Frances et al. 2013).

- Contemporary RE studies incorporate **systemic** view and exhibit **nexus-thinking** (e.g., energy – water – food – climate change; solar – land; biomass – food; etc.) (Babow & Meisen 2012; Kuzemko 2013; Biggs et al. 2015; Al-Saidi & Elagib 2017; Endoa et al. 2017; The Handbook 2017; The International 2018; Handbook 2018).

Impact of RE Development

- **Economic development and growth**, specifically, many studies confirm bidirectional causality (Bhattacharya et al. 2012; Inglesi-Lotz 2016; Kocak and Sarkgunesi 2017; Rafindadi & Ozturk 2017; Fotourehchi 2017)

- **Job creation:** Hondo & Morizumi 2017 found great variation across the technologies & countries. The biggest job opportunities are with biomass (almost 5 person-years per GWh), animal & food waste (around 4). Solar PV creates approx. 3 person-years per GWh (construction + O&M); wind and small-scale hydro: approx. 2 person-years per GWh; IRENA (2017) provides similar assessments.

- **Technological advancement** (Karataev et al. 2016)

Policies to Promote RE and Enhance ES in CA

Importance of Intraregional Cooperation in CA

- Ideas of international cooperation are not new in the context of CA. The Soviet-style arrangements, whereby upstream republics exported hydroelectricity in summer in exchange of import of coal, gas and thermal electricity from downstream Uzbekistan and Kazakhstan in winter, seized to exist over one obvious and other assorted reasons.
- Eventual disintegration of CAPS in 2009 caused an acute energy crisis in Tajikistan. From 2012, Tajikistan has not been receiving gas from Uzbekistan. Energy situation in Tajikistan demonstrated the failure of resource sharing mechanism in CA and proved that disintegration of intraregional energy cooperation undermines national energy security.
- Having the lowest GDP pc among CA economies, Tajikistan is assessed to lose annually $90 to 225 mn from idle discharge of water in summer (Laldjebaev et al. 2018). Disconnection from cross-boundary grid costs Tajikistan lost export opportunities of 5 GWh in summer.
- Hydropower exports is one of the feasible options for Tajikistan. Current exports of 1.3 bn kWh and 0.1 bn kWh to Afghanistan and Kyrgyzstan, respectively, are in total equivalent to 8% of Tajikistan’s electricity generation. Provided the government-favoured $3-5 bn Rogun HPP is constructed, Tajikistan will be able to generate about 33.5 bn kWh and export about 10 bn kWh annually.

Approaches to RE Enhancement in CA

Solution to energy problems in CA does not lie in one dimension. There is a room for a mix of approaches, each has its merits and demerits. To exemplify:

- There is a long-term approach favoured by the **EU** and **WB, which centres on the promotion of efficiency, marketisation of energy**, etc. This seems to be least desirable choice for CAs, because pursuance of market efficiency demands deep institutional reforms stretching far beyond the energy sector. Another reason is the financial resources required for implementing RE policies. Andreas et al. (2017) hold that RE policies are most actively pursued by wealthier nations; there is evidence that RE transition in some cases may undermine economic growth.
- Other obviously needed approach deals with **power inequality and energy poverty in rural areas**. Such way of ensuring the accessibility and affordability of energy through small-scale HPP, solar, wind and the like power, is suggested by the **UNDP**. WB's SE4ALL assesses the access of rural population to electricity at 99.7% for Kyrgyz R. and 99.3% for Tajikistan, while other CA economies have this parameter at 100% (as of 2014). This seems to be too optimistic. Potential for solving problems of electricity supply to rural areas is linked to hybrid projects and small distributed capacities.
- Finally, every **nation** has its **own priorities and vision as of how to design their energy policies**. While sustainability has been adopted as one of the important principle for their energy policies, the CAs seem to be willing to monetise their existing fossil and non-fossil resources by diversifying the geography and structure of their energy exports. This is not entirely irrational for the case of hydrocarbons in light of “stranded resources” debate. Yet, putting too high expectations on hydroelectricity export in the long run may be risky, as climate change affects the speed of melting of glaciers, which threatens the availability of water for HPP and increases the probability of large-scale natural disasters (avalanches, landslides, floods and other hazards), which endanger the infrastructure.

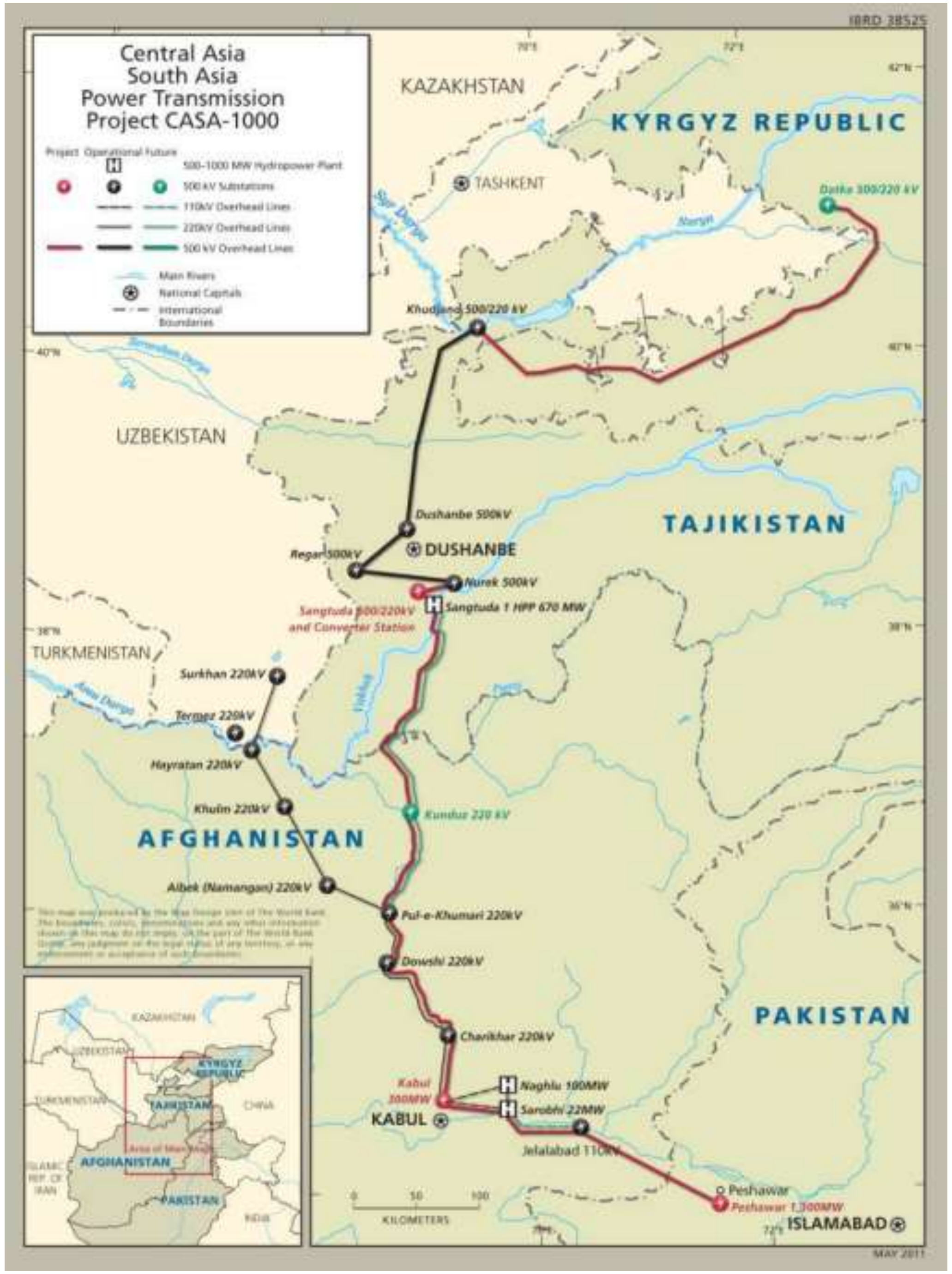
Policies to Enhance Electricity Cooperation in CA
Measures at the National Level

- coherent reforms towards de-monopolisation and de-regulation of the national electricity markets;
- introduction of feasible RE projects. Earlier, RE has been costly and therefore necessitated the state's interference. According to Sovacool (2008), hydroelectric power was ranked forth out of 13 technological ways to generate electricity by the parameter of levelized cost of electricity (LCOE) after internalising externalities, with offshore and onshore wind ranked the first and the second and solar photovoltaic ranked the most expensive ($0.39 kWh). Yet, technological advances have been so fast and profound that already helped reduce the cost of RE dramatically. **IRENA 2018 Report assesses that by 2020 all types of clean energy will be price competitive with fossil fuels. Between 2010 to 2016, solar PV saw especially astonishing 69% cost reduction, while the LCOE from onshore wind became 18% less.** Now, RE are price-competitive and shall be allowed to compete with other energy sources;
- optimisation of RE planning. Mentioned above, hybrid approach helps share the O&M costs and found to be especially advantageous in the instance of workforce for cleaning, security and system monitoring). Total savings on capital expenditure for a co-located project are estimated at 3-13% and for operating expense 3-16% (UNEP 2016);
- introduction of a policy toolkit for RE development throughout the region (FIT, green certificates, etc.) would help harmonise RE practices, streamline monitoring of implementation, etc.;

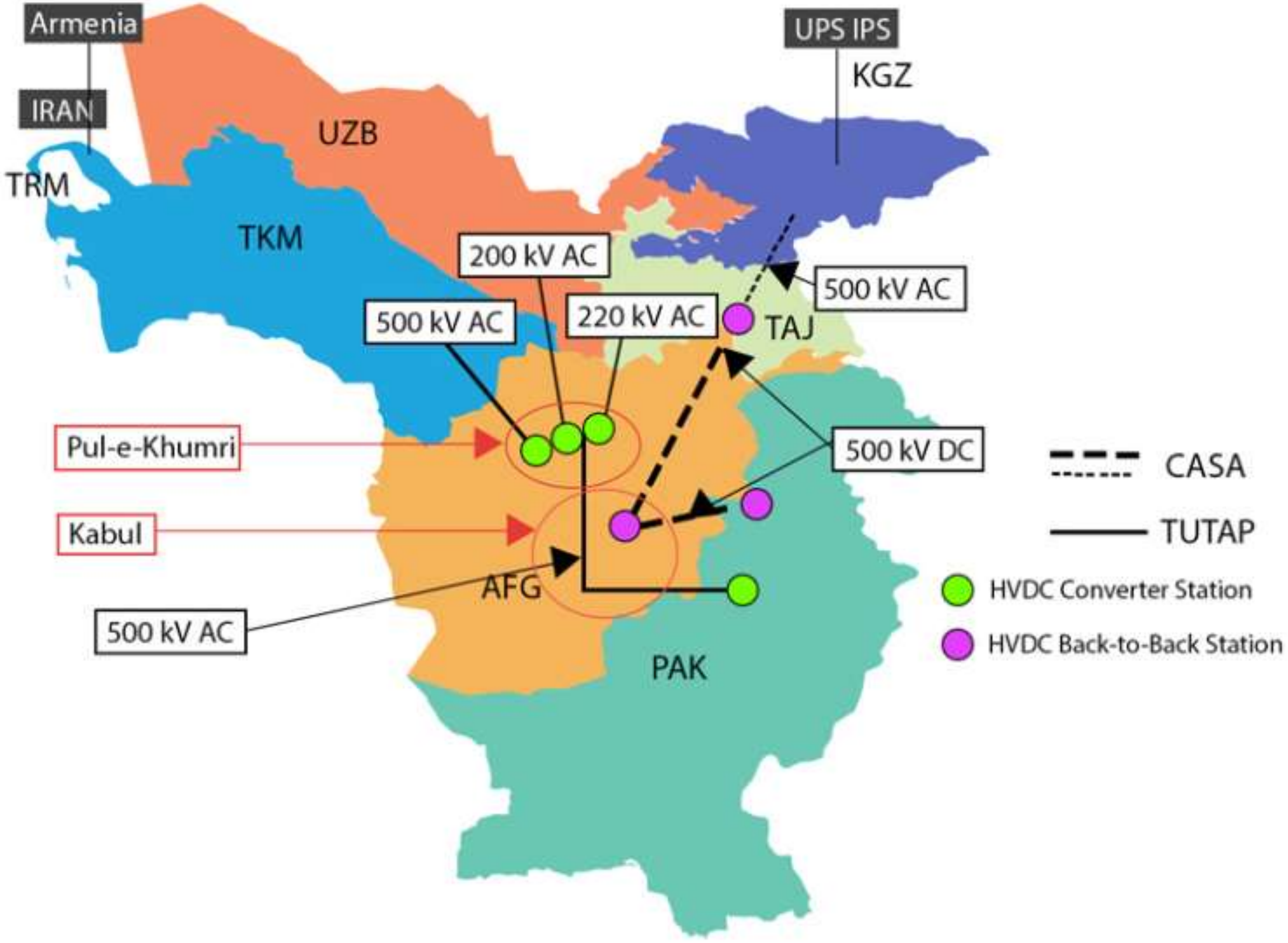
Regional Initiatives

- Intraregional cooperation is required for solving most critical water – energy issue;
- While it seems that CAs have institutional coherence, launching cross-border trade will require harmonisation of regulations and standards. The prospect of the Common Electricity Market of the EAEU needs to be taken into consideration;
- Coordination in electricity planning is among the important steps. The establishment of cross-border market requires an inventory of RE sources and deploying renewables in the areas with the highest potential. Green et al. (2016) suggest that this may help improve the matter of intermittency and reduce fuel, operating and transmission costs by 15%. Also, cross-border trade, which helps coordinate the capacity, is found to reduce costs by 5%;
- Kazakhstan, as a front-runner in the sector of RE, may become a leader for regional cooperation: Astana Communiqué on Accelerating the Uptake of Renewables in Central Asia (June 2017);
- As Kyrgyz R. and Tajikistan are already on a track of becoming power exporters (CASA-1000) and Turkmenistan, Uzbekistan and Tajikistan are parties of (TUTAP); the opportunities for non-regional economies' participation shall be examined closely;
- Development of infrastructure for intraregional trading shall include examination of the possibilities of trading on the existent centralised trading platforms, such as KOREM;

CASA – 1000



TUTAP



Source: https://sari-energy.org/program-activities/cross-border-electricity-trade/country-energy-data/

Enhancement of power trading within and beyond CA

- Development of a concept of databank, data collection and processing, comprehensive analysis of national electricity markets in a uniform format;
- Analysis of successful practices of international wholesale electricity markets, such as functioning the Nord Pool and North American Electricity Grid and projected SAARC Market for Electricity, for their applicability in CA;
- Examination of possibilities under the Common Electricity Market's (of the Eurasian Economic Union) inaugurating in 2019. Since 2015 (EAEU launch), cross-border electricity trade grew by 24 % to 7.61 bn kWh per annum. Overcapacity exceeds 282.8 GW; modernisation creates potential for synergies. There are three centralised trading platforms: Kazakhstani JSC KOREM (Kazakhstan electric power and electric capacity market operator) and two Russian - JSC "Moscow Energy Exchange" and JSC "ATS" (Administrator of Trade System of Electric Power Wholesale Market);
- Full deployment of potential of CAPS; resumption of inclusion of Tajikistan, Turkmenistan and Uzbekistan and connection of North Kazakhstan, and Afghanistan;
- Examination of options to make CASA-1000 operating round year (one of the options: Russia's LNG export to Pakistan; Russia is invited to invest in gas-fired PP in Jamshoro; provided a 600 MW PP is upgraded, CASA-1000 can transmit thermal electricity to CA during October-April);

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