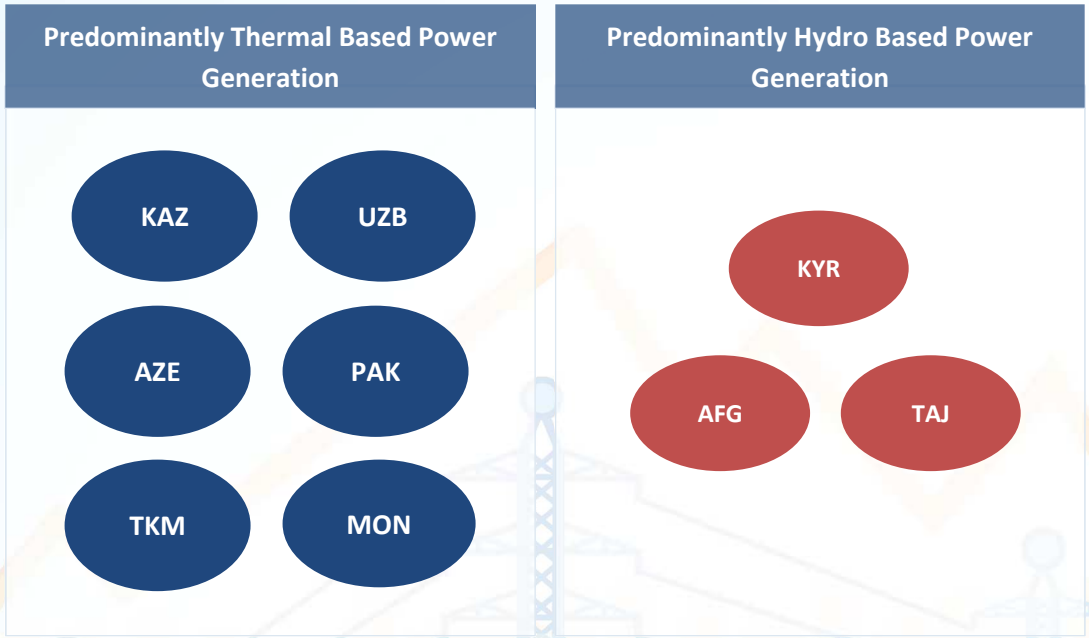
The Future of the Energy Sector in Central Asia

PwC, Infrastructure and Energy

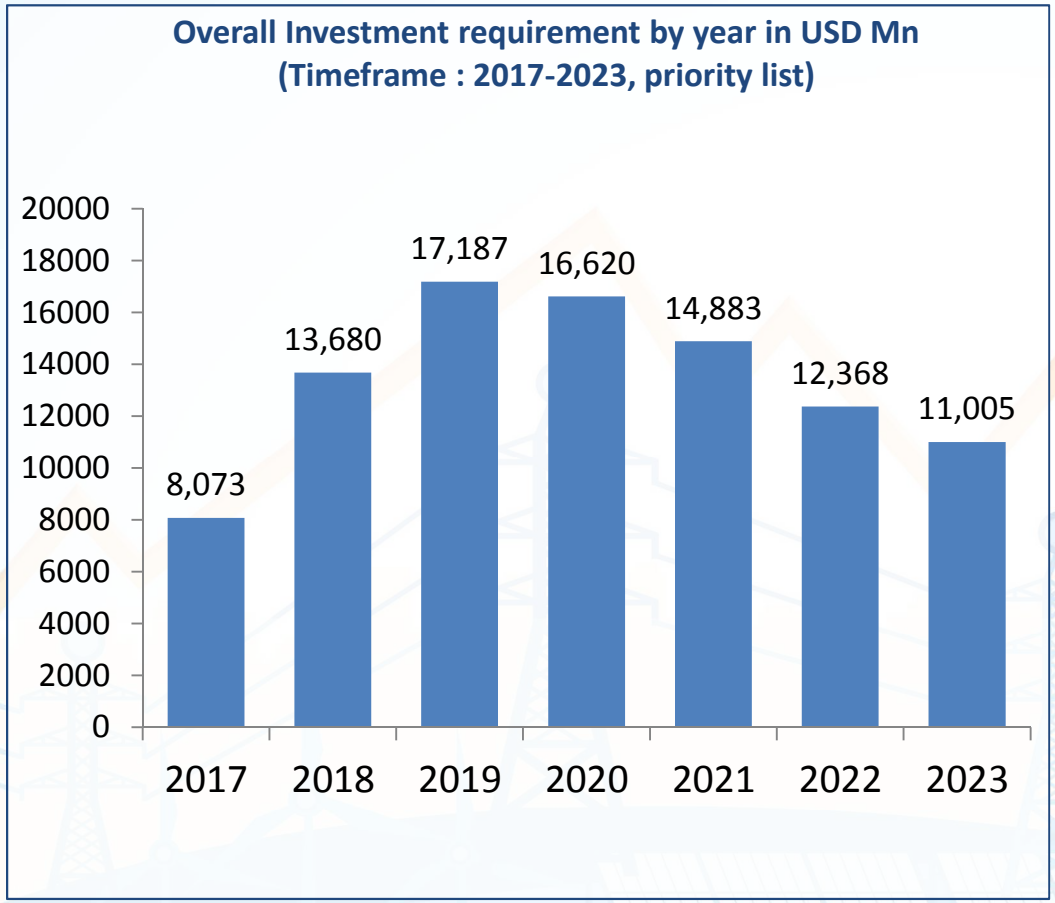
Regional overview



Power Deficit	Seasonal/Regional Imbalance	Power Surplus
AFG	KAZ	AZE
PAK	KYR	
MON	TAJ	TKM

- Diverse energy mix across the countries.
- Mainly fossil-fuel based generation: Pakistan, Azerbaijan, Mongolia, Kazakhstan, Uzbekistan and Turkmenistan.
- Primarily hydro: Tajikistan, Kyrgyz Republic and Afghanistan.
- Upstream countries release water to downstream countries during summer in exchange of power during winter.
- Kyrgyz Republic & Tajikistan: power surplus during summer but shortages during winter.
- Uzbekistan is faced with shortages due to ageing of key power plants.

Estimated investment requirement for 2017-2023



- Total estimated investment requirement for priority projects (as per individual country plans) is **USD 103,924 mn**. (excludes GOBITEC initiative in MON, Balkhash TPP in KAZ, etc.)
- Estimated investment requirement **between 2017 and 2023** is **USD 93,816 mn**.
- Financing gap for the private sector to fill in is expected to be at least **USD 38,000 mn**.

Energy investments - what we have today

1. Predominantly state run power sectors - state capitalism at best
2. Historically, sizeable private investments were "financed" through lucrative tariffs
3. Private sector participation increase is not a priority for most CAREC states*
4. Energy sector privatization plans are limited – KAZ shows some serious intention
5. PPPs and "disguised/ distorted" PPPs are gaining momentum
6. Fossil fueled generation is still dominant

   Both generation and transmission are largely local

** Strategy and Work Plan (2016–2020) for Regional Cooperation in the Energy Sector of CAREC Countries*

Path to successful investments: stakeholders' prospective

1. **Governments**: Prioritise, streamline, renegotiate, invest, leverage
2. **Project owners**: Prioritise, streamline, renegotiate
3. **Engineering and construction firms**: Improve efficiencies, renegotiate, consolidate
4. **Investors**: Rationalise, reposition
5. **Multilaterals**: Expand, support

Further insights:
Capital project and infrastructure spending outlook:Agile strategies for changing markets 2016 edition (PwC)
To own or not to own: Realising the value of public sector assets (PwC)

Industry's view of the sector's future

1. **97%** expect to see a medium to very high level of market disruption by 2020
2. **82%** believe that regional multilaterals will be more important than global for the sector*
3. **78%** anticipate greater competition.
4. **73%** anticipate major or very major business model transformation by 2030
5. **66%** say business model change is becoming urgent
6. **60%** expect their main home market will be more than '50% transformed' by 2030

***Further insights**:*
19th Annual Global CEO Survey (PwC)
14th Global Power & Utilities Survey (PwC)

Thoughts on longer-term future-readiness of CAREC energy sector (1/9)

Based on DELPHI ENERGY FUTURE 2040, a joint project of BDEW, GIZ and PwC

With interpretation and adaptation of the conclusions in the CAREC local context

Selected conclusions only from the report (e.g. stronger views)

'It is not a matter of correctly predicting the future, but of being prepared for it.'

Pericles (ca. 500 - 429 BCE), Athenian politician and military commander

***Further insights**:*

*DELPHI ENERGY FUTURE 2040, a joint project of **BDEW** German Association of Energy and Water Industries, Deutsche Gesellschaft für Internationale Zusammenarbeit (**GIZ**) GmbH and PricewaterhouseCoopers (**PwC**)*

… (2/9)

		certain	likely
1	By 2040 developing countries and emerging economies will have abandoned subsidies for fossil energy sources and nuclear power in view of the significant strain on national budgets	8%	55%
7	By 2040 the largest CO2-emitting countries will have taken decisive action to change course as a result of a series of ecological disasters; sustainable energy systems will have been promoted, economic and energy policies will primarily be aimed at fighting climate change	10%	63%
8	By 2040 the growing middle classes in emerging economies such as China and India will have forced their countries' governments to adopt sustainable energy policies. Policymakers' top priority will be to fight environmental pollution, a rising share of growing energy demand will be met from renewable energy sources	17%	61%

***Further insights**:*
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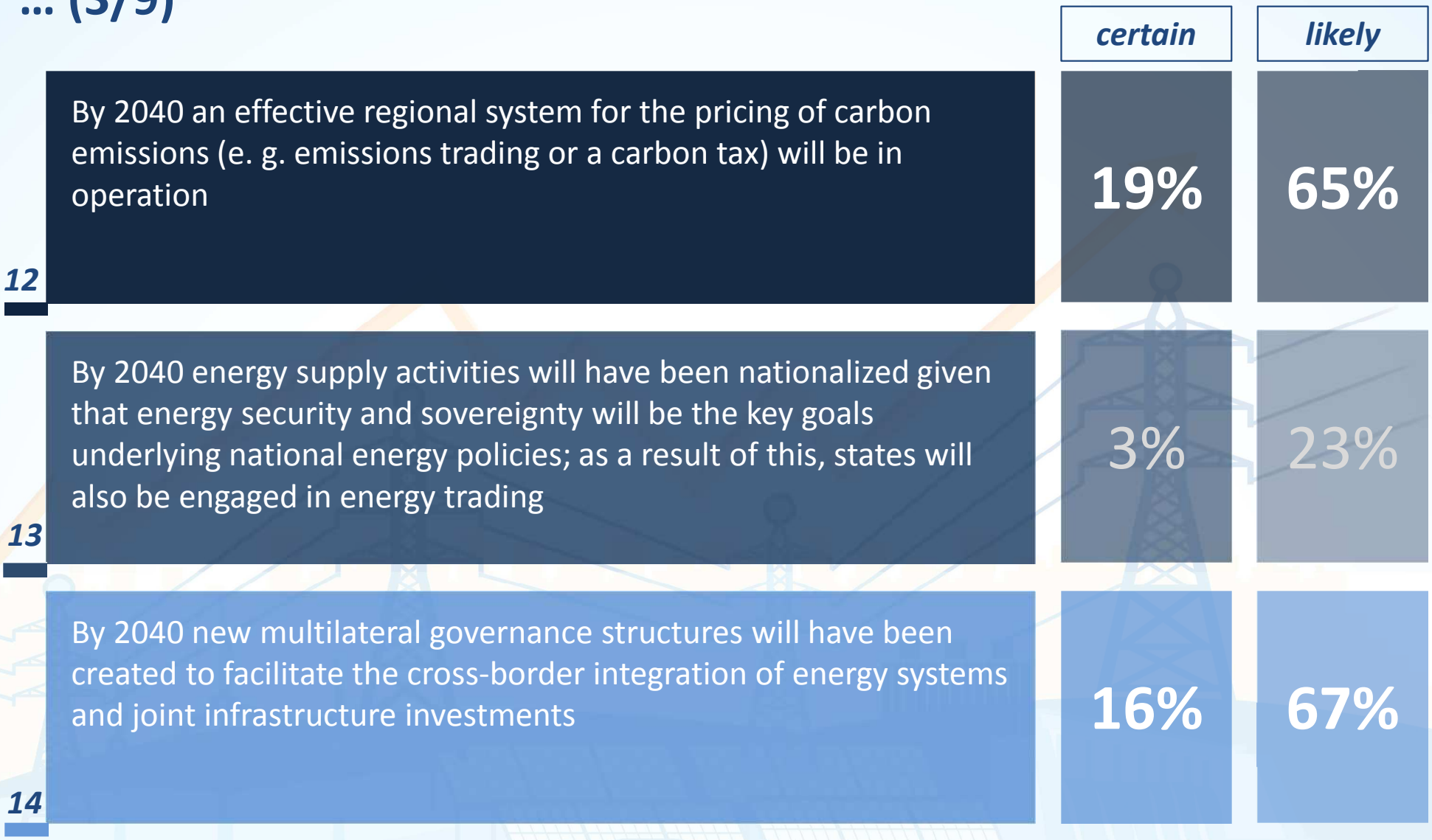
… (3/9)



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… (4/9)

		certain	likely
15	By 2040 energy generation, power grids and energy trading activities will be organised supra-regionally based on shared resources (e.g. wind power in northern Europe) without regard to state borders; national systems and monopolies will no longer exist	11%	58%
16	By 2040 Europe will have adopted a common foreign energy policy, including joint strategic infrastructure investments and collective supply deals with third countries for the supply of resources	11%	61%
17	By 2040 Europe will have adopted common, harmonised domestic energy policies and achieved an effective internal energy market; a highly efficient super grid will connect the European countries	17%	60%

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… (5/9)

		certain	likely
18	By 2040 states that have strongly promoted renewable energy sources will have improved their economic position enormously and will be dominating the list of most competitive economies	17%	57%
20	By 2040 the falling demand for fossil energy sources in industrialised and emerging countries will have led to a destabilization of producing countries	3%	57%
21	By 2040 important resources (silver, copper, rare earth elements) will be in greater demand and will have become increasingly scarce as a result of a worldwide promotion of renewable energy sources and expansion of electricity networks. Many industrialised countries and emerging economies will be competing for strategic commodity partnerships with resource-rich countries	10%	55%

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… (6/9)

		certain	likely
22	By 2040 Russia will have become much less important as a supplier of natural gas and oil for Europe compared to 2015	13%	60%
23	By 2040 the generation and supply of energy will have been decentralised and made more flexible, which will have led to the emergence of structures that are more resilient to crises and acts of terrorism	14%	56%
24	By 2040 consumers will expect businesses, products and services to be sustainable on a comprehensive scale. Non-sustainable forms of production will be considered unethical	17%	61%

***Further insights**:*
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… (7/9)

		certain	likely
27	By 2040 highly efficient “sustainable cities” will have emerged, with populations that have sharply reduced their individual mobility needs and that satisfy their energy demand by acting as prosumers in smart microgrid systems (“neighbourhood generation”)	10%	55%
29	By 2040 distributed generation with renewable energies using battery storage will have led to the emergence of new democratic self-governance structures at the local level. Municipalities and social bottom-up movements will have gained momentum	12%	60%
30	By 2040 large parts of the population will have fallen into energy poverty and lost out on the benefits of the energy transition as a result of rising prices of fossil energy sources, high costs of renewable energy generation and expensive efficiency technologies	0%	19%

***Further insights**:*
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… (8/9)

		certain	likely
32	By 2040 the carbon emissions that have been generated in manufacturing and transporting products and services – including mobility – will be a standard information indicated on product labels	20%	63%
33	By 2040 an "all electric society" will have become a reality. Electricity, especially power generated from renewable sources, will also provide mobility and heating, and will have displaced petroleum and natural gas in many industrial processes	13%	62%
34	By 2040 battery storage facilities providing frequency control services will have taken over the role of conventional power stations in maintaining system stability	11%	57%

***Further insights**:*
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… (9/9)

		certain	likely
35	By 2040 renewable energy sources operating in conjunction with storage units will be the generation technology with the lowest electricity production costs. High-performance customer generation facilities will be sold in retail stores and can be installed in a matter of minutes	23%	55%
37	By 2040 thin-film and organic photovoltaics technologies will be the "game changers" driving a decentralisation of energy generation; power-generating windows and facades will be conquering the market	13%	70%
38	By 2040 the energy supply system will be structured in a cellular way: interconnected cells and "islands" of the size of a city or medium-sized region will generate their energy from solar power, wind power, storage units and a minor share of conventional reserves	10%	65%

***Further insights**:*
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Thank you!
And have a productive forum!