



TA 9365 Regional Cooperation on Renewable Energy Integration to the Grid

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CAREC ESCC meeting

10 April 2019, Tashkent



29TH CAREC ESCC MEETING
10 APRIL 2019, TASHKENT, UZBEKISTAN



ADB



Overview

- Vision and Approach
- Regional Coping Mechanisms for Intermittent RES



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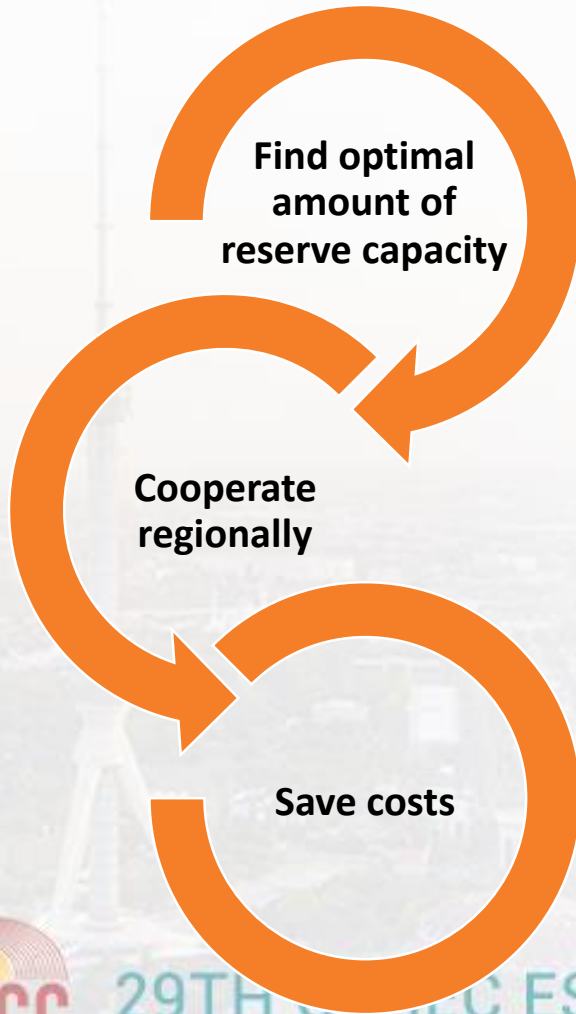
Vision and Approach



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Is there a **regional** solution to mitigate renewable energy intermittency in Central Asia?

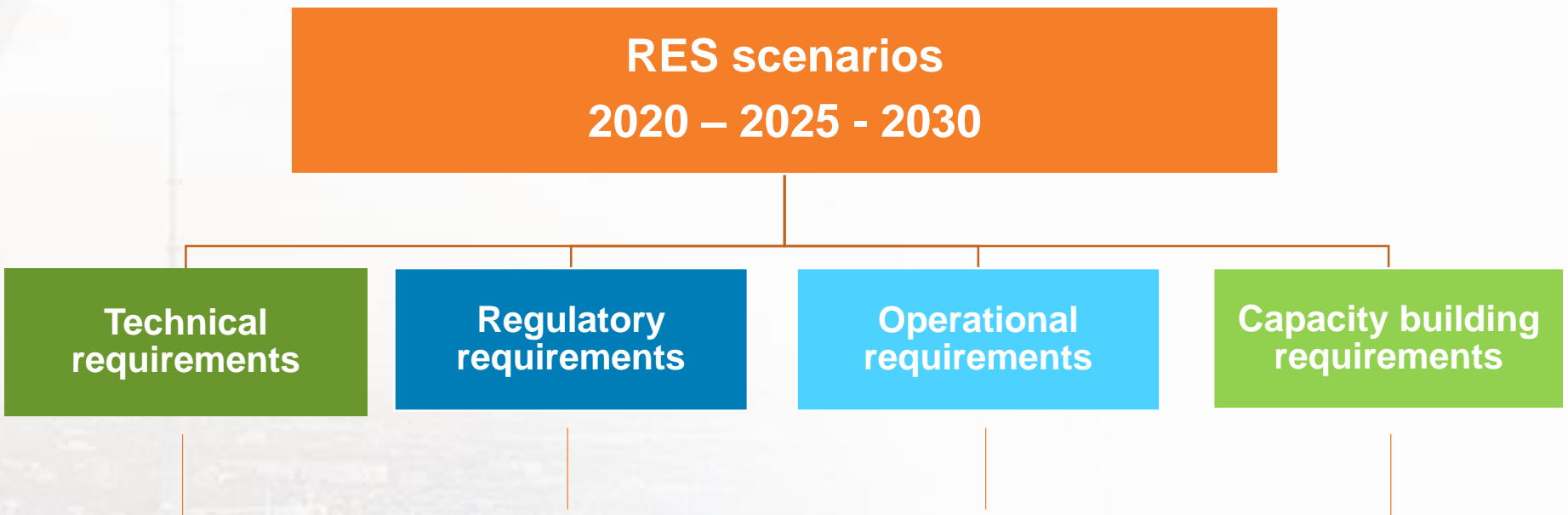


How much back-up capacity will be needed when renewables take off in Central Asia?

How much savings can each country make by sharing its reserves regionally?

What are the key ingredients for making regional cooperation work?

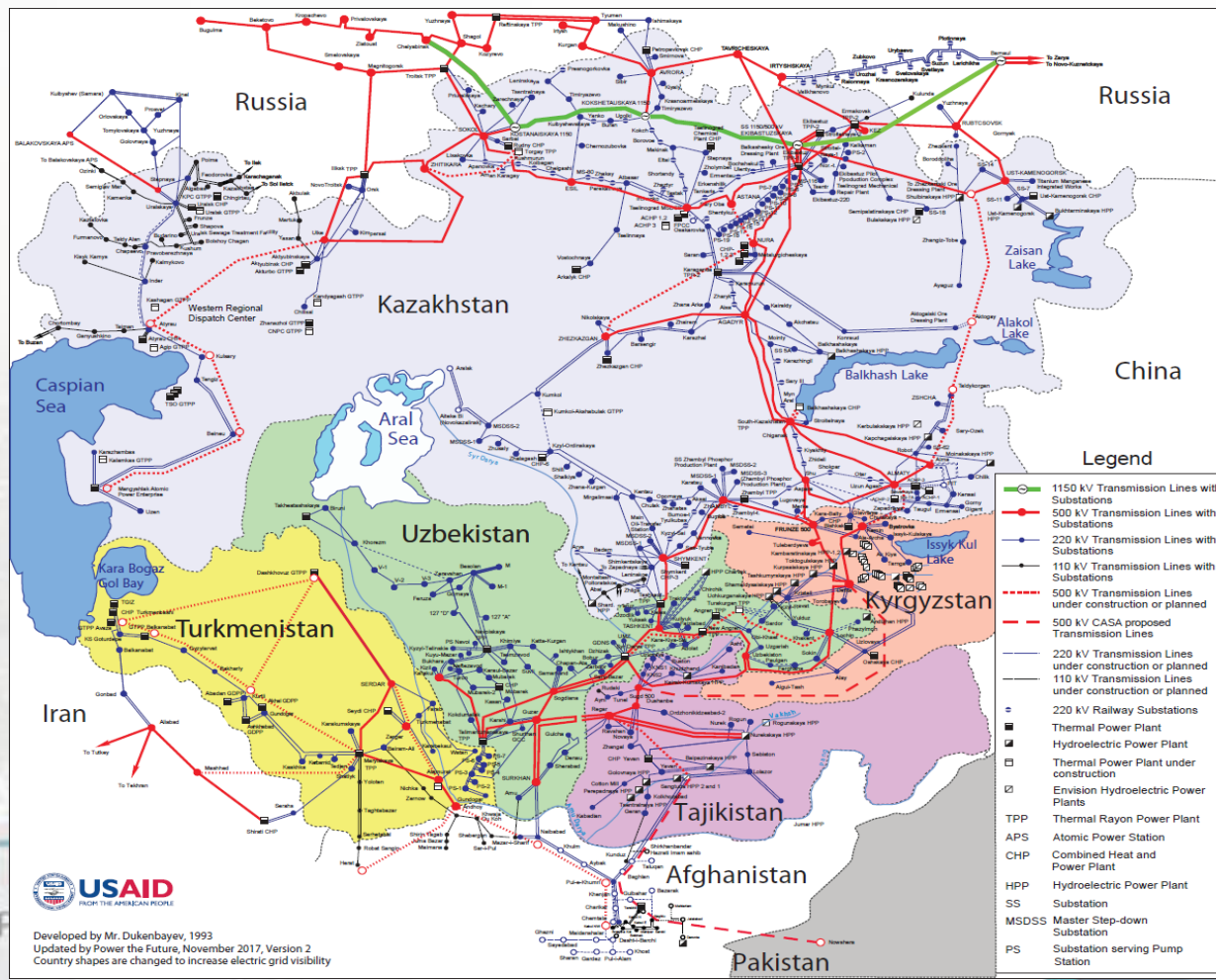
Comprehensive Approach



Cost comparison with regional cooperation versus without cooperation

Comprehensive Approach

Regional TA “Regional Cooperation on Renewable Energy Integration to the Grid” covers 7 geographically adjacent countries - Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan, Turkmenistan, Afghanistan, Pakistan





Progress / Outcome

- First outcomes of the project expected over the coming months
- Show solutions for mitigating renewable intermittency
- Pros and cons of various regional cooperation possibilities
- Benefit in terms of costs
- Roadmap for renewable energy integration in the region



Regional Coping Mechanisms for Intermittent RES



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Examined Capacity Reserves



Integration of renewable energy increases the need for balancing capacity reserves

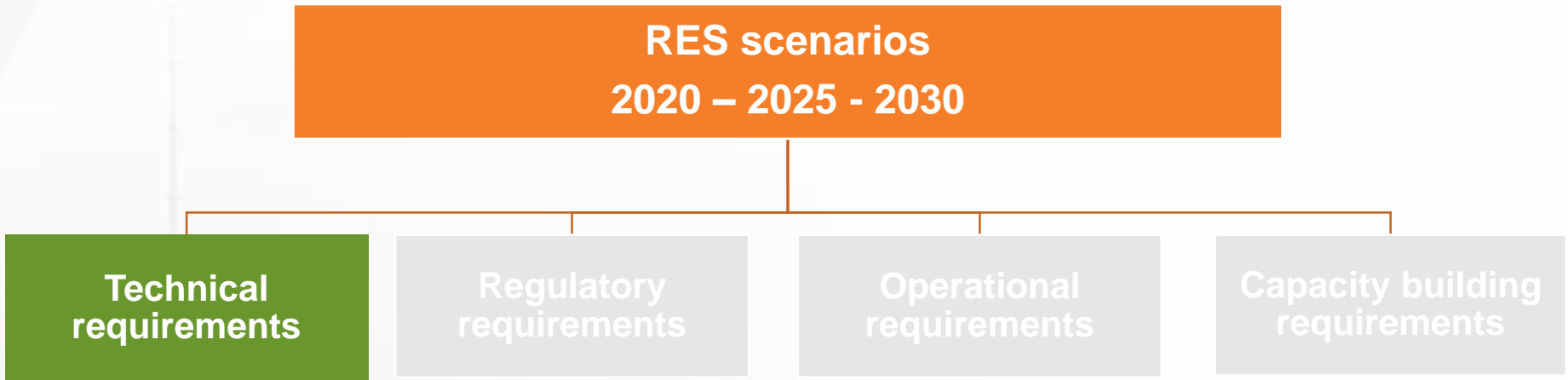
- Frequency Containment Reserve - FCR (primary reserve)
 - Activated within 30 seconds following tripping of generation or load rejection
 - Russia provides FCR to all countries operating in synchronous mode - Kazakhstan, Kyrgyzstan, Uzbekistan, (Tajikistan), Afghanistan
- Frequency Restoration Reserve – FRR (AGC/secondary reserve and manual fast tertiary reserve)
 - Activated within 15 minutes, restores frequency to 50Hz after stabilization by primary reserve and restores power balance to the scheduled value
 - Primary focus of TA “Regional Cooperation on Renewable Energy Integration to the Grid”
- Replacement Reserve - RR
 - Activation time longer than 15 minutes; no mandatory reserve requirement



Examined reserve sharing scenarios

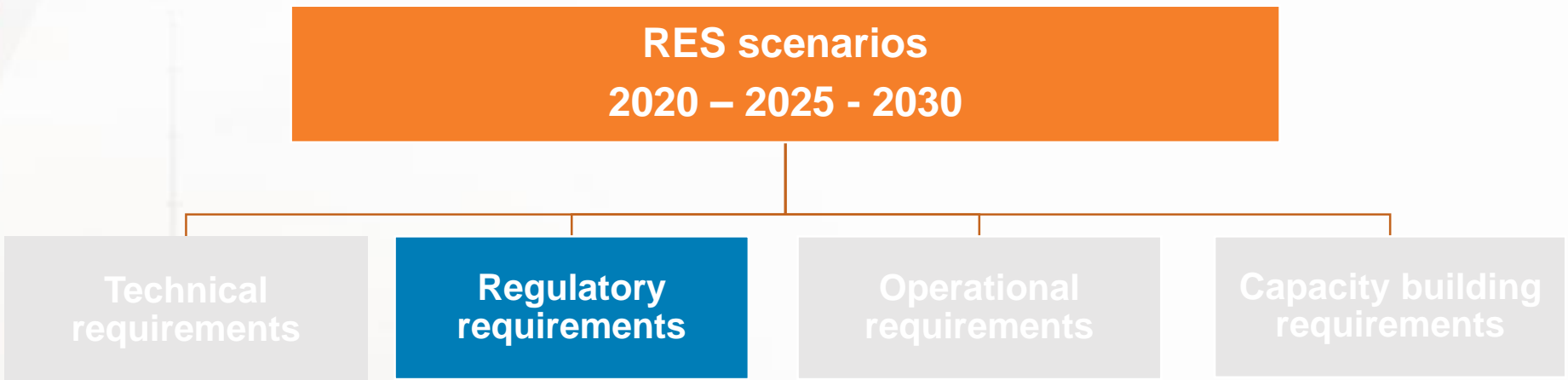
	No regional cooperation	<ul style="list-style-type: none">• each country provides for its own reserve
	FRR cross-border procurement	<ul style="list-style-type: none">• countries procure reserve from other interconnected countries• generation costs are saved at home by purchasing reserves where they are cheapest
	FRR sharing	<ul style="list-style-type: none">• countries establish a regional reserve pool• overall size of reserves (and costs) drastically reduced as need for full FRR does not occur in each country at the same time

Technical Analysis



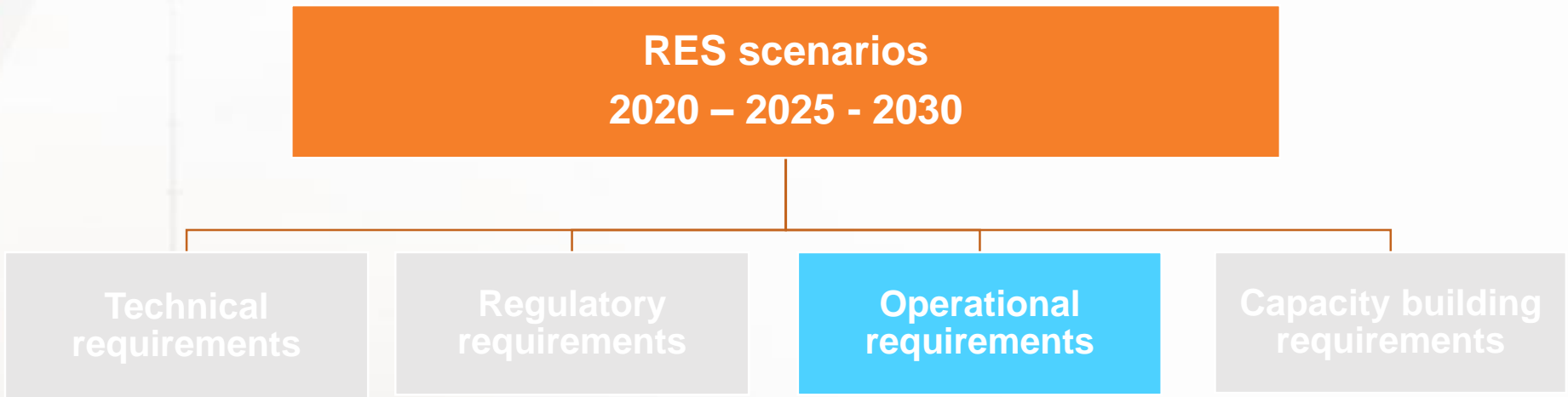
- Assessment of balancing capacity reserve size (with and without regional cooperation)
- Development of sharing mechanisms for entire region or sub regions
- Identification of necessary generation/storage investments
- Identification of necessary grid investments
- Identification of operation tools necessary investments (forecasting services, SCADA/EMS...)

Policy Review



- Identification of grid codes needed on national level
- Identification of bottlenecks for RE growth (private investor participation to the power sector)
- Identification of technical rules to ensure reliable operation of the interconnected system
- Recommendations on institutional/governance arrangements for cooperation
- Other necessary regional agreements

Operation practices / Operational Tools



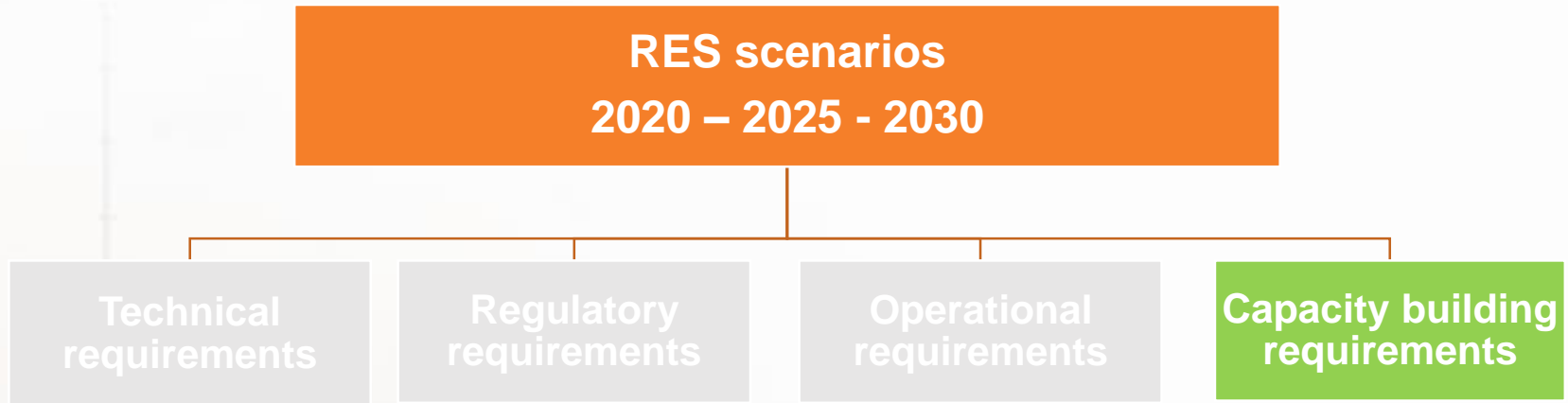
- Assessment of dispatching operation practices

-> OPERATION IMPROVEMENT FOR ESTABLISHING A REGIONAL COOPERATION ON FRR

- Renewable energy is intermittent but not unpredictable: TA comprises **pilot testing of a forecasting tool in Kazakhstan** Predictions are compared with real generation outputs and historical data

-> LESSONS LEARNED IN KAZAKHSTAN TO BE SHARED WITH REST OF THE COUNTRIES

Knowledge Building



- A permanent Working Committee composed of regional transmission operators was created
- Working committee forms integral part of results development process
- Regular capacity building workshops on best practices of RES integration and cooperation are held

-> **WORKING COMMITTEE TO POTENTIALLY FORM REGIONAL COORDINATION ORGANIZATION**