Status Update & Survey Results: ERRA Study on Navigating Power Grid Scarcity in the Age of Renewable Energy

Goga Daraselia
ERRA Secretariat

ERRA ET COM Virtual Meeting
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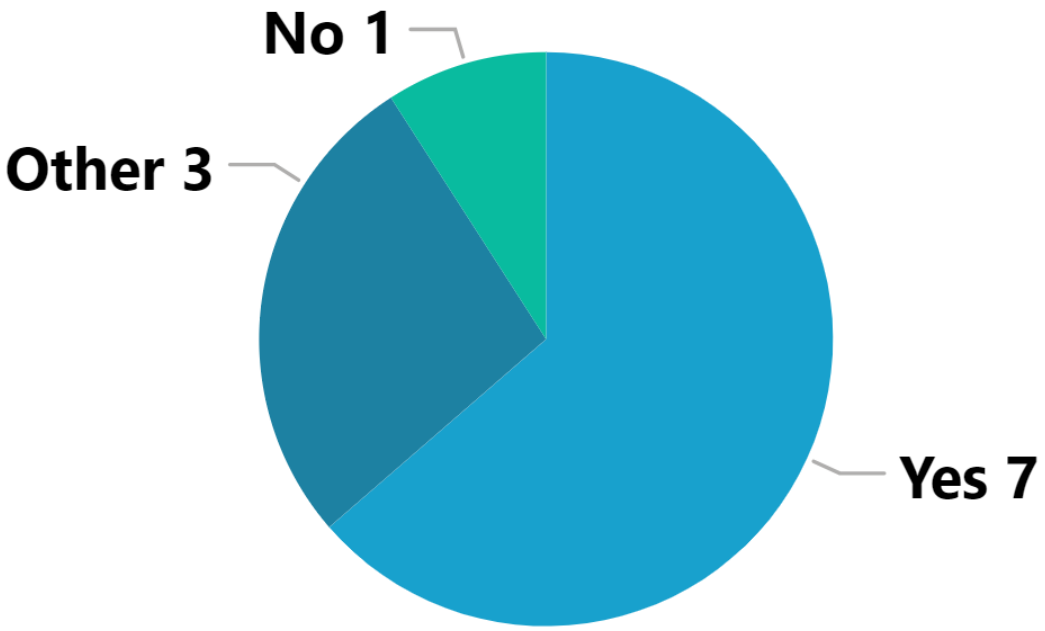
ERRA Survey on Grid Scarcity

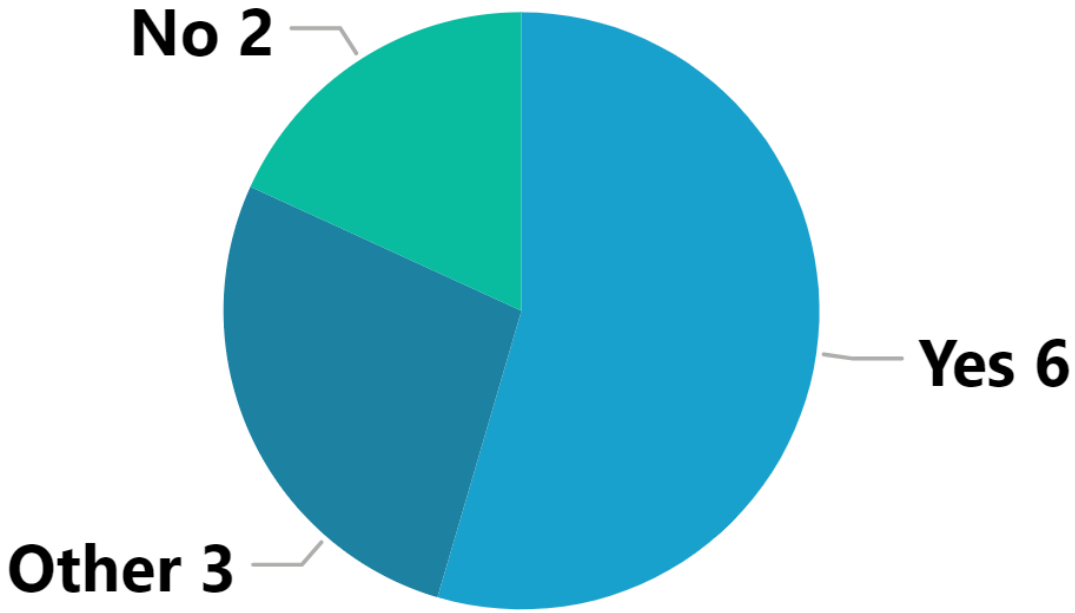
Capacity Scarcity – Transmission and Distribution Levels

Count of Country by GRID Capacity Scarce on **Transmission** Level



- Yes *(AL, GE, GR, HU, LT, PL, TR)*
- No *(OM)*
- Other *(AZ, FR, TH)*

Count of Country by GRID Capacity Scarce on **Distribution** Level

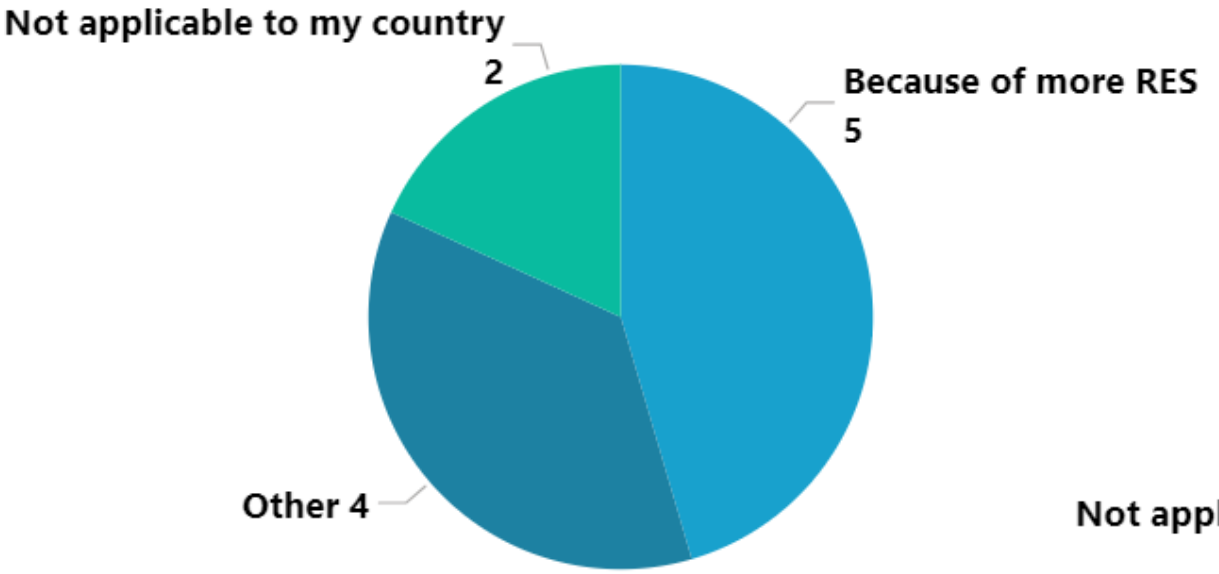


- Yes *(AL, GE, GR, HU, LT, PL)*
- No *(OM, TR)*
- Other *(AZ, FR, TH)*

ERRA Survey on Grid Scarcity

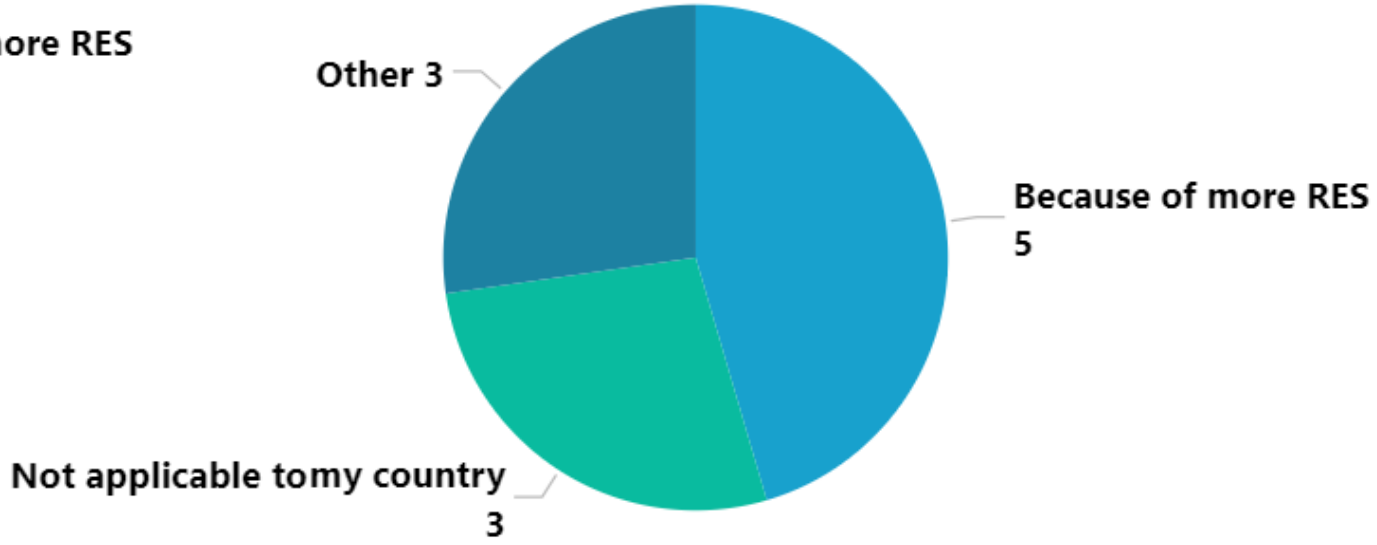
Capacity Scarcity Prime Reason – Transmission and Distribution Levels

Prime Reason of GRID Capacity Scarcity on **Transmission** Level



- Not applicable to my Country *(AZ, OM)*
- Because of more RES *(AL, GR, HU, LT, PL)*
- Because of more load *(None)*
- Other *(FR, GE, TR, TH)*

Prime Reason of GRID Capacity Scarcity on **Distribution** Level

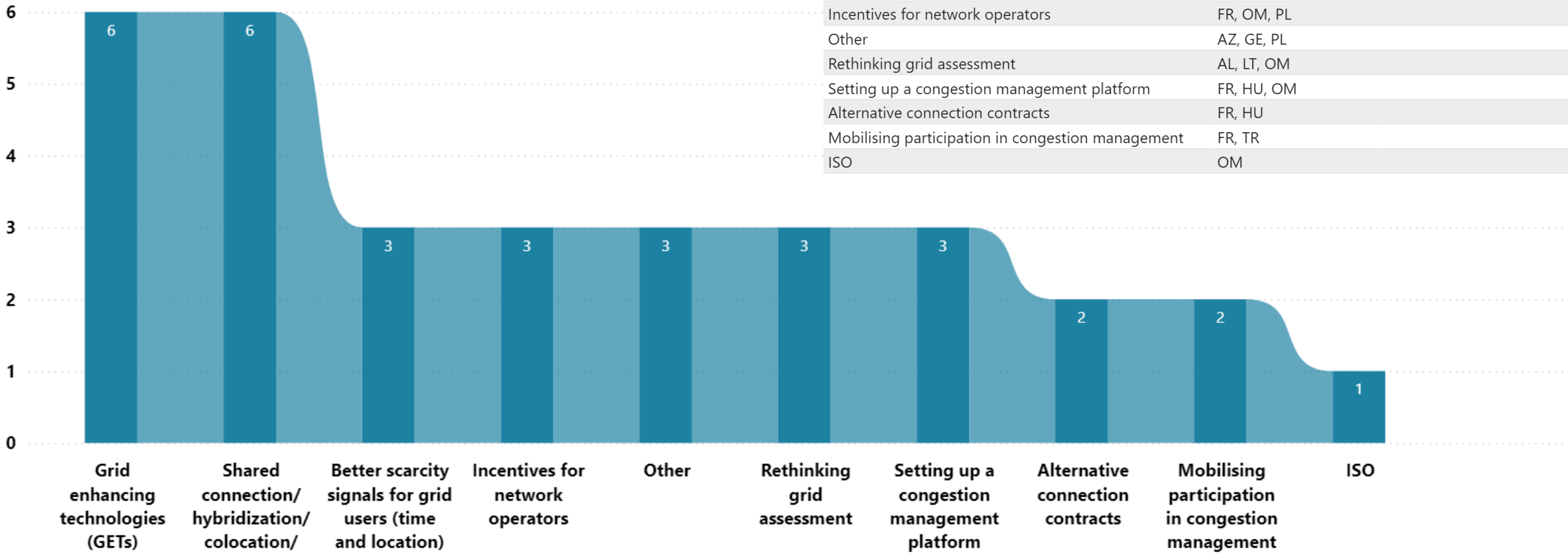


- Not applicable to my Country *(AZ, OM, TR)*
- Because of more RES *(AL, GR, HU, LT, PL)*
- Because of more load *(None)*
- Other *(FR, GE, TH)*

ERRA Survey on Grid Scarcity

Regulatory Actions for Better use of Existing Grids

Regulatory Action	Number of Countries	Sum of Number of Countries
Grid enhancing technologies (GETs)	FR, GR, HU, LT, OM, TR	6
Shared connection/ hybridization/ colocation/ pooling	FR, GR, HU, LT, PL,TH	6
Better scarcity signals for grid users (time and location)	FR, OM, TR	3
Incentives for network operators	FR, OM, PL	3
Other	AZ, GE, PL	3
Rethinking grid assessment	AL, LT, OM	3
Setting up a congestion management platform	FR, HU, OM	3
Alternative connection contracts	FR, HU	2
Mobilising participation in congestion management	FR, TR	2
ISO	OM	1



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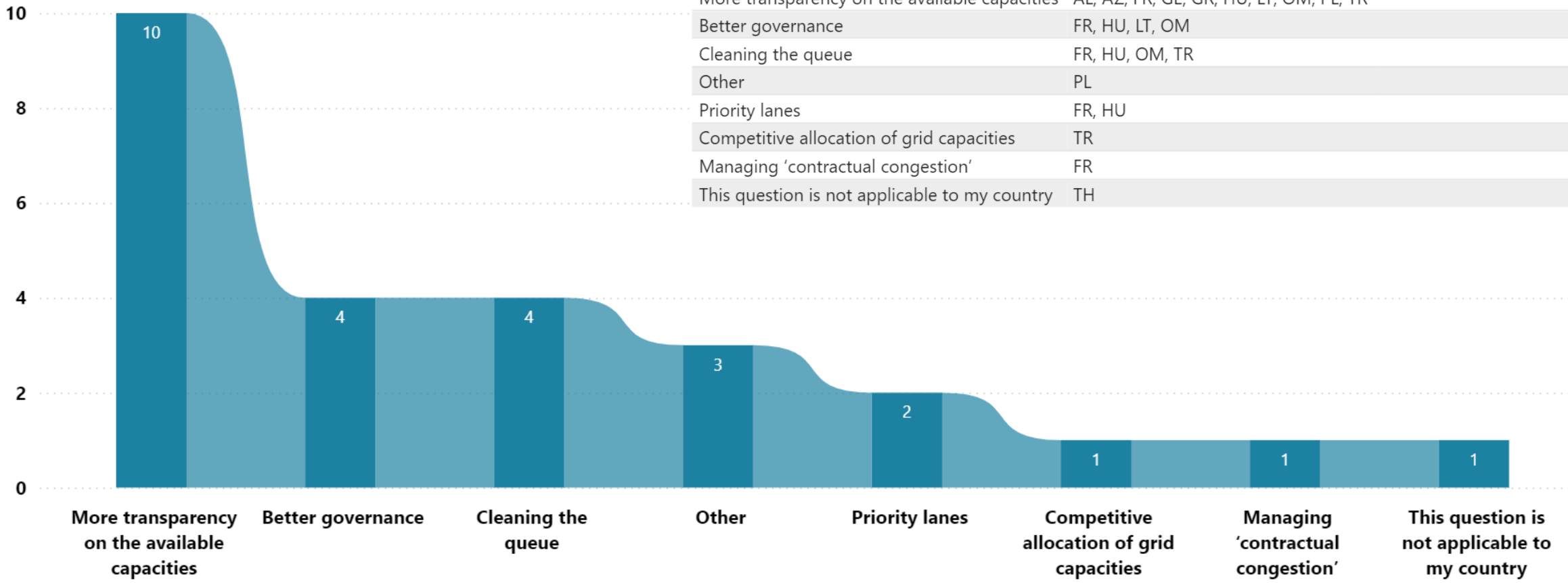
Regulatory Actions for Better Allocation of Existing Grid Capacities

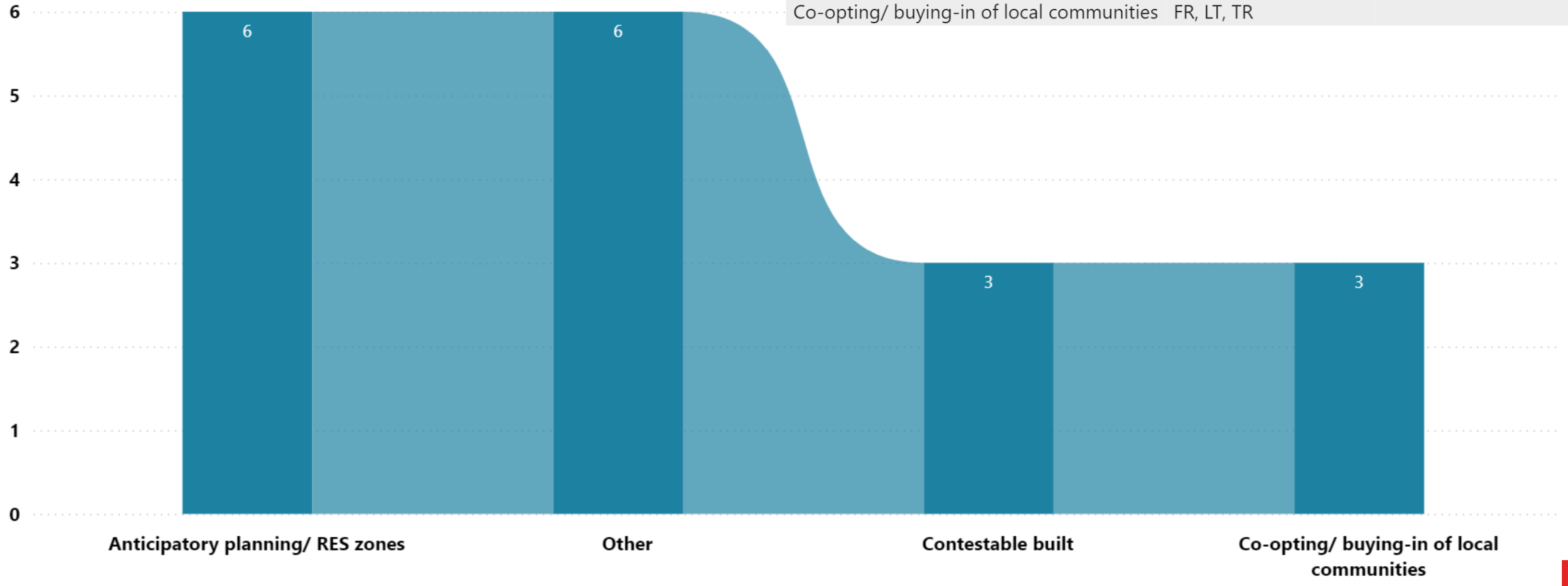
Regulatory Action	Countries	Sum of Number of Countries
More transparency on the available capacities	AL, AZ, FR, GE, GR, HU, LT, OM, PL, TR	10
Better governance	FR, HU, LT, OM	4
Cleaning the queue	FR, HU, OM, TR	4
Other	PL	3
Priority lanes	FR, HU	2
Competitive allocation of grid capacities	TR	1
Managing 'contractual congestion'	FR	1
This question is not applicable to my country	TH	1



ERRA Survey on Grid Scarcity

Regulatory Actions for Expediting the Construction of New Grids

Regulatory Action	Countries	Sum of Number of Countries
Anticipatory planning/ RES zones	AL, AZ, FR, HU, OM, PL	6
Other	AZ, GE, GR, PL, TR, TH	6
Contestable built	LT, OM, TR	3
Co-opting/ buying-in of local communities	FR, LT, TR	3



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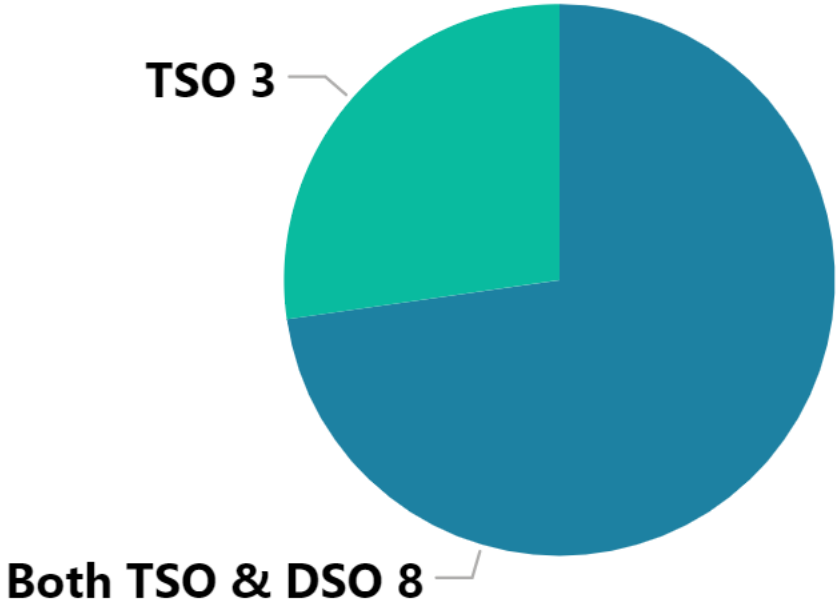
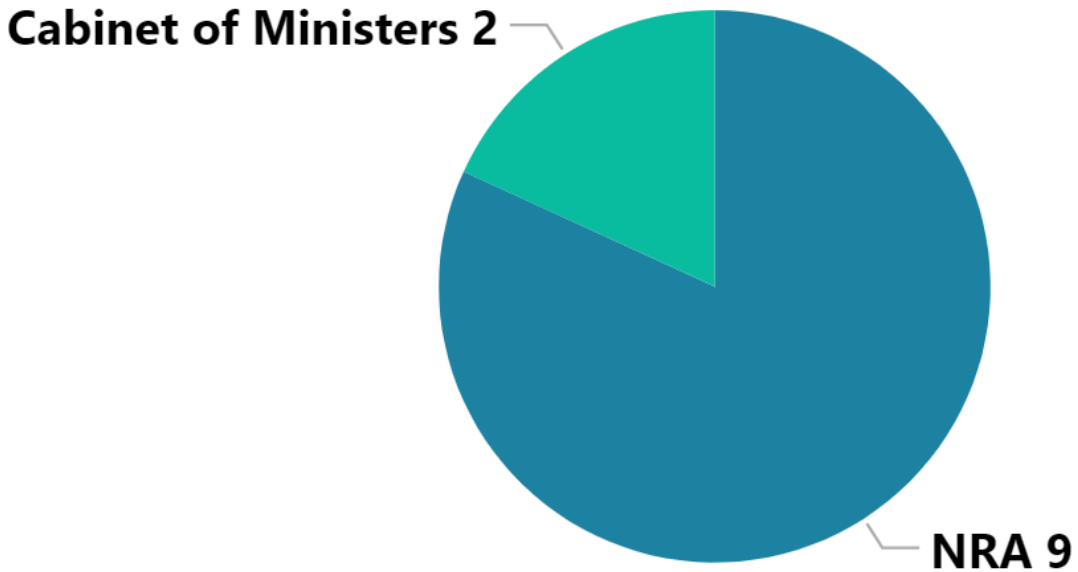
Governance of GRID planning

Who prepares the grid planning?



- TSO *(AL, OM, TH)*
- Both TSO & DSO *(AZ, FR, GE, GR, HU, LT, PL, TR)*

Who approves it?



- Cabinet of Ministers *(AZ, TH)*
- NRA *(AL, FR, GE, GR, HU, LT, PL, OM, TR)*

ERRA Survey on Grid Scarcity

Annual Investment (CAPEX) into GRID Infrastructure for past 5 years

		2017	2018	2019	2020	2021	2022	2023	2024
Albania	DSO			Mainly by TSO: 99.1 million Euro					
	TSO								
Azerbaijan	DSO			202,2 mln USD	145,9 mln USD	171 mln USD	284,6 mln USD	376,1 mln USD	
	TSO								
France	DSO			> 4.4 billion €2021					
	TSO			1456 M€	1529M€	1578M€	1722 M€	2077 M€	
Georgia	DSO	80,000,000 GEL on average annually							
	TSO	155, 000, 000 GEL on average annually							
Greece	DSO				1.2 billion €				
	TSO				3.0 billion €				
Hungary	DSO			HUF 114 billion	HUF 140 billion	HUF 163 billion	HUF 180 billion	HUF 234 billion	
	TSO								
Lithuania	DSO		257 million						
	TSO								
Oman	DSO		450 Million Omani Rial (OMR)						
	TSO								
Poland	DSO						8 103, 588 mln PLN		
	TSO						1 269,5 mln PLN		
Thailand	DSO	4,028 mill EURO							
	TSO								
Türkiye	DSO			7.7 billion $					
	TSO			2.64 billion $					

ERRA Survey on Grid Scarcity

Projected Annual Investment (CAPEX) into the GRID for next 10 years

		2022	2023	2024	2025	2026	2027	2028	2030	2031	2034
Albania	DSO										
	TSO			220 million Euro							
Azerbaijan	DSO			~ 358,3 mln USD							
	TSO										
France	DSO						5 billion €				
	TSO			2286,7€	2875,7€	3435,0€	3968,4€				
Georgia	DSO			196, 000, 000 GEL on average annually							
	TSO			128, 000, 000 GEL on average annually							
Greece	DSO			4-5 billion €							
	TSO										
Hungary	DSO			HUF 362 billion	HUF 435 billion	HUF 478 billion	HUF 326 billion	HUF 505 billion			
	TSO										
Lithuania	DSO	€2.38 billion EUR									
	TSO	€2.03 billion EUR									
Oman	DSO										
	TSO										
Poland	DSO		9,927,355 zl	12,117,754 zl	12,737,557 zl	12,134,522 zl	12,687,607 zl	13,057,041 zl			
	TSO										
Thailand	DSO										
	TSO										

COP29 Proposed Paper: Navigating Power Grid Scarcity in the Age of Renewable Energy

Preserving system stability with increased penetration of renewable energy sources is a major challenge to a successful decarbonization of the energy sector.

In the light of COP29 summit in Azerbaijan, ERRA aims to give guidance to policymakers and member regulators on how policies and regulation need to adapt to support the integration of renewables energies.

The Study's purpose is to:

- Provide a snapshot of grid management issues among ERRA member countries, including Azerbaijan
- Analyse best practice for grid congestion management, via case studies and a practical regulatory toolbox
- Formulate policy and regulatory recommendations on grid management in the light of increased penetration of RES.

In cooperation with: RAP Regulatory Assistance Project

Publication date: October 12

Main Contents of the Paper

ERRA Survey on Grid Scarcity	A snapshot of the status of grid scarcity and available and planned tools of select ERRA member countries.
Case Studies on Best Practices	Case studies on management of grid scarcity at transmission and distribution levels.
Status of Renewable Energy in Azerbaijan	A snapshot of the status-quo of renewable energy deployment in Azerbaijan and the related plans.
RAP's Regulatory Toolkit	Regulatory options for national regulators, network companies and grid users to ease grid congestion.
Recommendations	1. How to design policies that promote reliable power systems. 2. How to effectively design incentives for improvements in managing grid scarcity.

THANK YOU FOR YOUR ATTENTION!

goga.daraselia@erranet.org

secretariat@erranet.org