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System Integration of Renewables Roadmap for Moldova

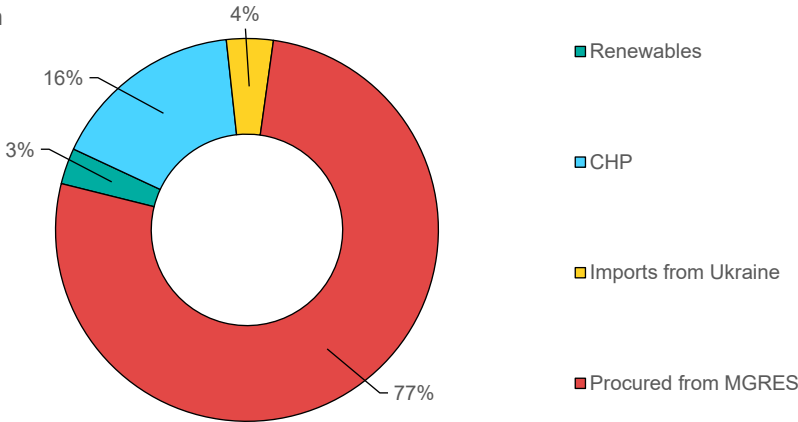
Craig Hart, Renewable Integration and Secure Electricity Unit

Paris, 15 March 2022

The context of the power sector in Moldova

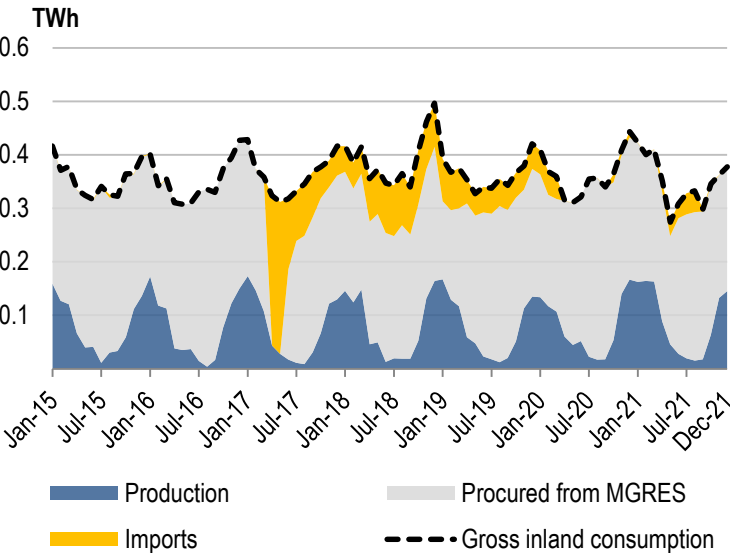
Share of generation sources for electricity supply in 2020

Total: 4.24 TWh



Note: Renewable energy includes hydro (1.5%), biogas (0.7%), wind (1.0%) and solar PV (0.7%) generation.
Source: IEA (2021a), World Energy Balances 2021 (database).

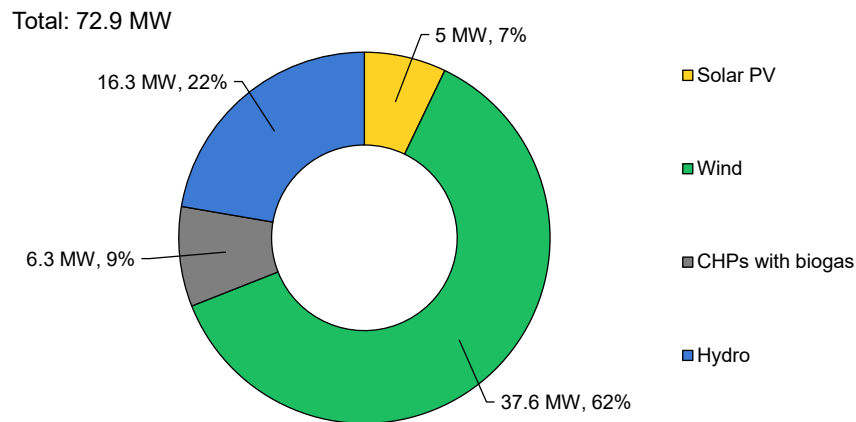
Monthly supply of electricity for Moldova (2015-2021)



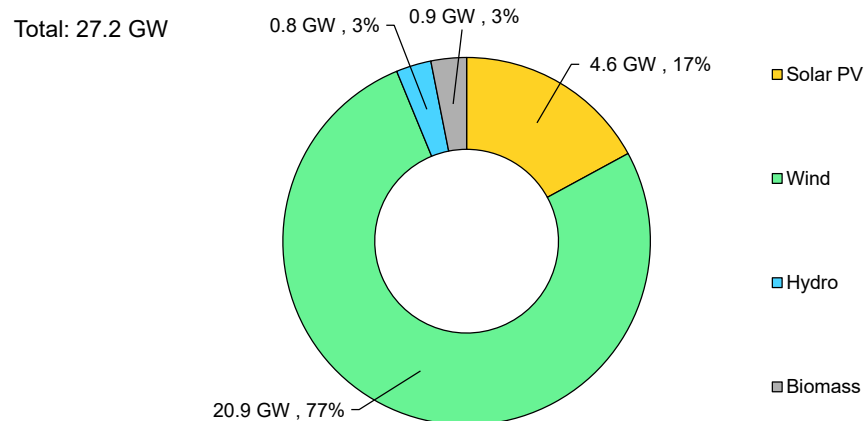
The electricity system in Moldova is characterised by its reliance on imports, either of electricity or gas for domestic production from CHPs

Moldova has a large amount of untapped renewable potential

Installed RE capacity in Moldova (as of December 2020)



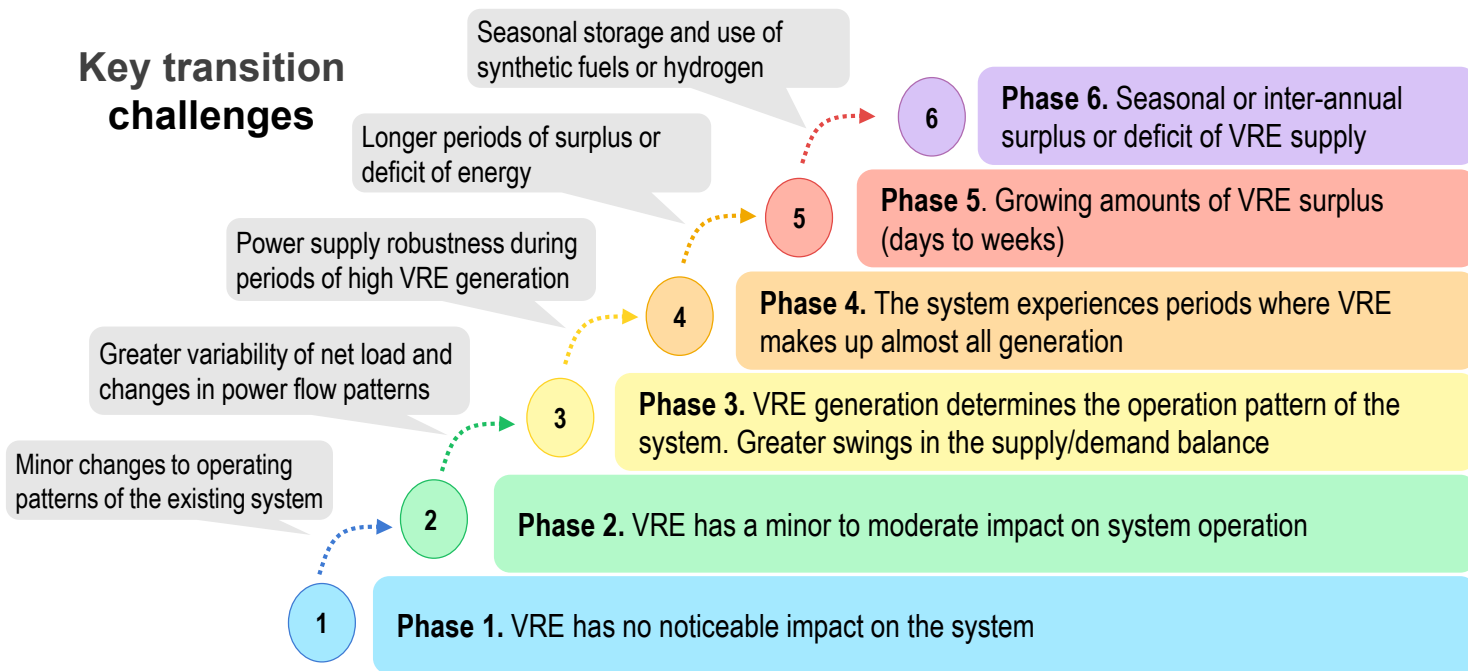
Technical potential of RE generation by technology in Moldova



Despite the large potential for wind and solar power, its deployment has been very modest to date, with only 72.9 MW of installed capacity at the end of December 2020

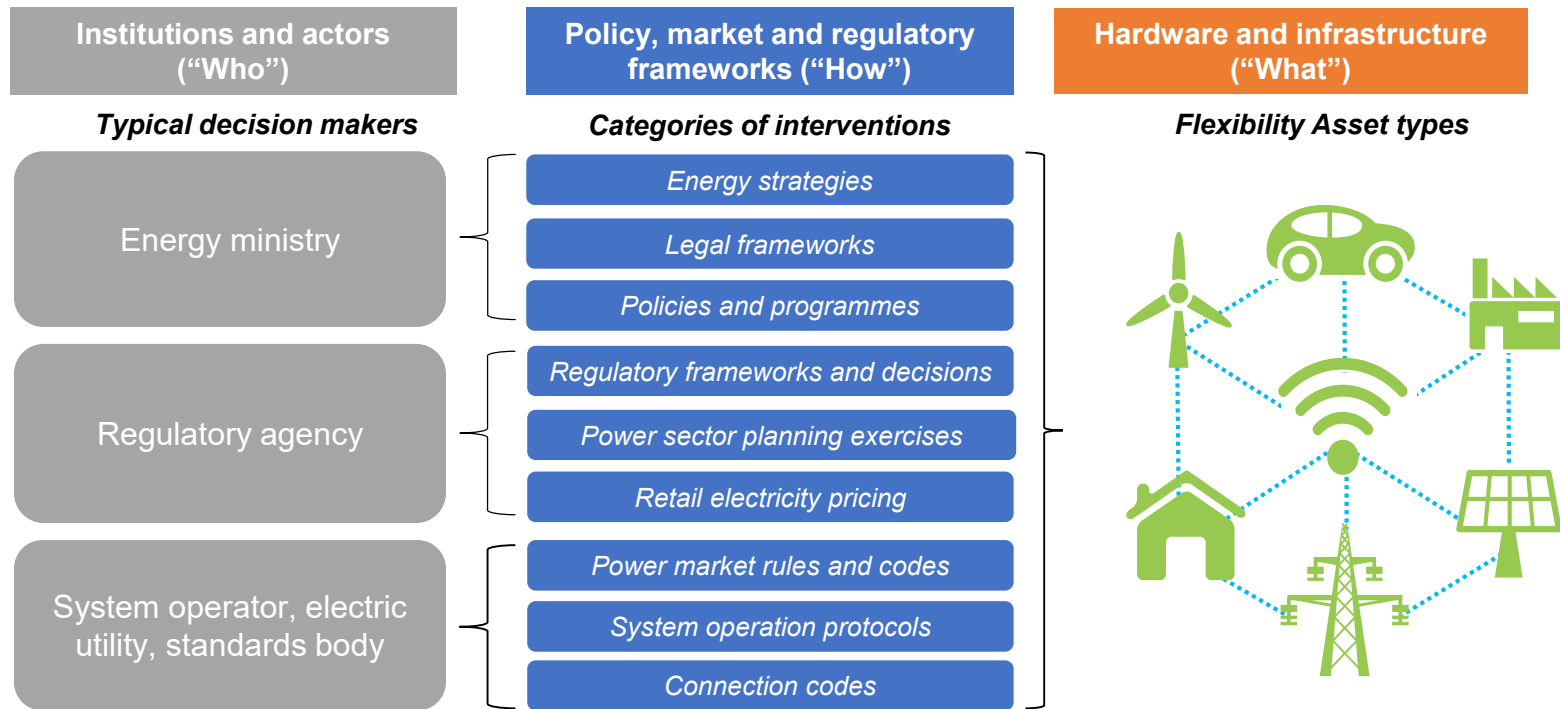
Mapping a pathway towards system integration of renewables in Moldova

Phases of system integration and evolving priorities



Key challenges in each phase that should be addressed for moving up to higher levels of integrating VRE in the power system

System flexibility: Identifying and engaging with the right actor is key



Key challenges in each phase that should be addressed for moving up to higher levels of integrating VRE in the power system

- 1. Removal of regulatory barriers and increasing attractiveness to investors**
- 2. Establishment of flexible electricity markets with enhanced regional co-ordination**
- 3. Enhancing technical flexibility of power systems**

Key
overarching
principles

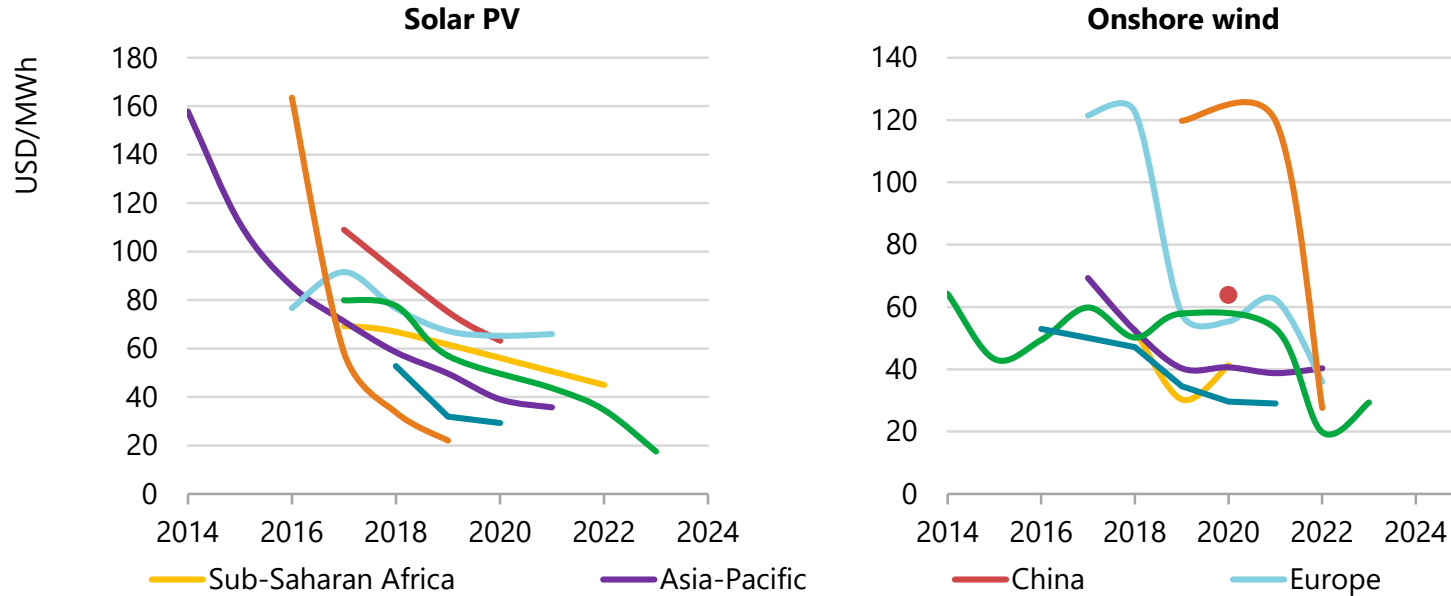
Removal of entry barriers

Integrated planning

***Procurement of
renewables and flexibility***

Removal of regulatory barriers & increasing attractiveness to investors

Competitive procurement mechanisms both attract competition and drive down costs



Source: IEA (2019), Renewables 2019.

Competitive procurement mechanisms attract competition and drive down costs by both offering investor confidence and allowing price discovery through competition

Key
overarching
principles

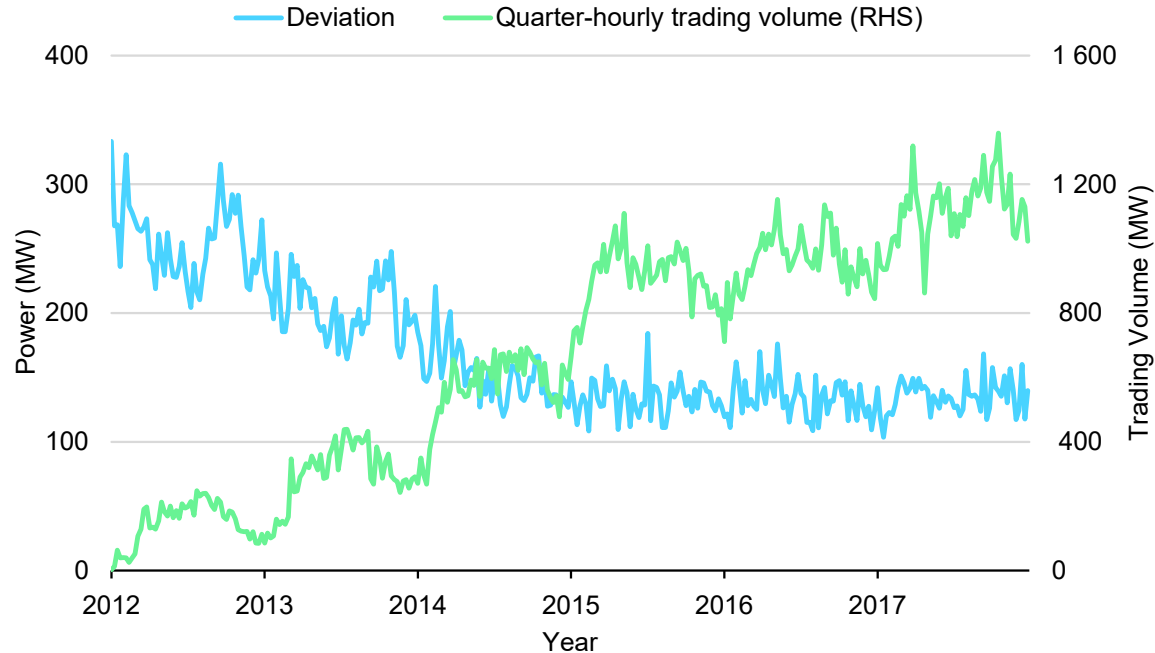
Public-private stakeholder engagement

System operation should enable flexibility

Regional markets are needed that incentivise flexibility

Establishment of flexible electricity markets with enhanced regional co-ordination

Effect of quarter-hourly trading on the need for reserves in Germany, 2012-2017

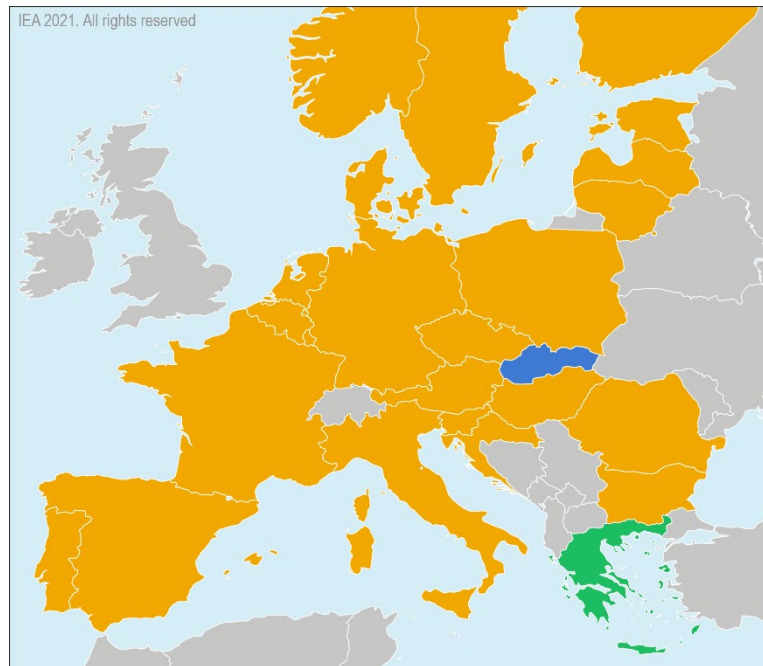


Source: Based on IEA (2021), Secure Energy Transitions in the Power Sector.

Moving operational decisions closer to real time can unlock flexibility for the power system

Establishment of flexible electricity markets with enhanced regional co-ordination

The geographical scope and implementation phases of the Single Intraday Coupling (SIDC) in Continental Europe



- Countries coupled in 1st, 2nd and 3rd go-live
- Countries to be coupled in 4th go-live (TBD)
- Country to be coupled in 5th go-live (end 2022)

Note: Luxembourg is part of the Amprion Delivery Area. Market participants in Luxembourg have access to SIDC through the Amprion Delivery Area.

Source: All NEMO Committee (2021), Single Intraday Coupling.

Regional integration of markets can provide system flexibility through better access to flexibility resources and smoothening of variability in both supply and demand

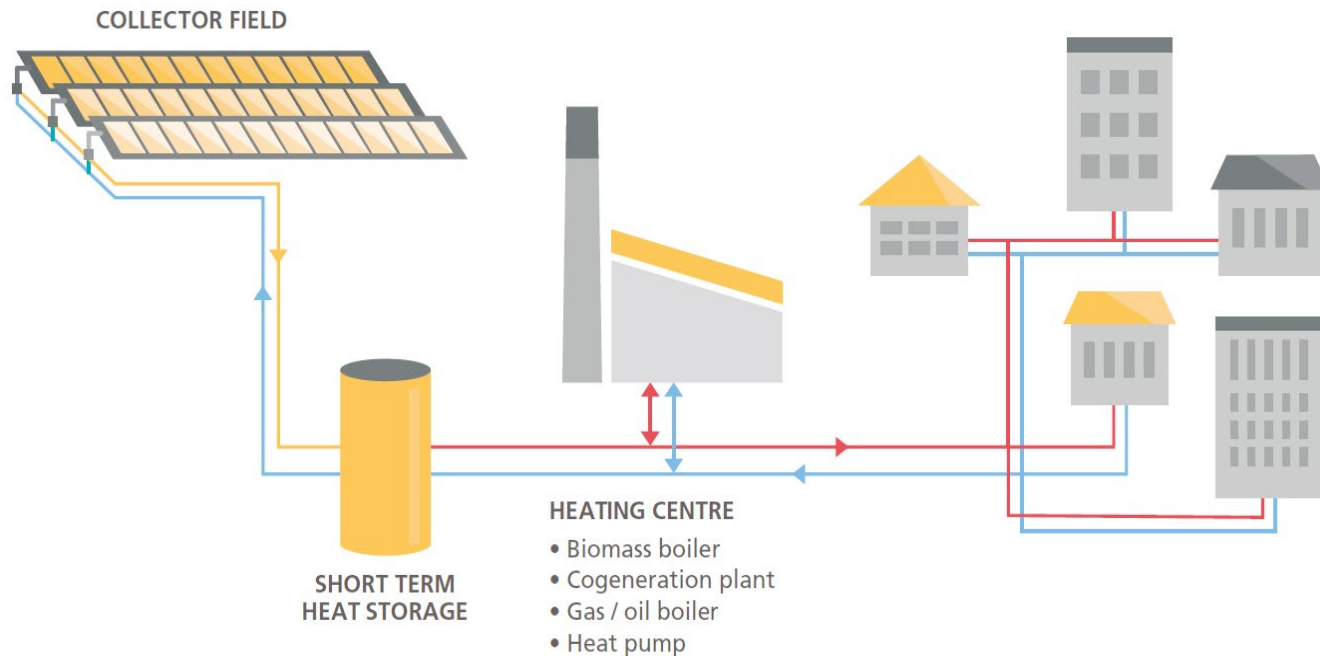
Key
overarching
principles

***Encourage public-private
dialogue and sharing of best
practice***

***Incentivise a range of
flexibility solutions***

***Consistently re-evaluate
system flexibility needs***

Example of a typical solar district heating network with short-term storage



Moving operational decisions closer to real time can unlock flexibility

The Vision for Moldova's Electricity System

POLICY AND STRATEGY

Short term
Mid term
Long term

Remove Regulatory Barriers, Increase Attractiveness to Investors

Formal government recognition of clean electricity as a priority for energy security



Public-private consultations to better understand barriers to entry



Development of the capacity for local banks to finance wind and solar projects, and reduction of investment risks for private financing



Development of RE roadmap and its integration into a national energy plan to better mobilise funds



Establish Flexible Electricity Markets, Enhance Regional Co-ordination

Implementation of unbundling and establishment of a new wholesale market to enable and incentivize flexibility



Enhance cross-border trade and co-ordination with Romania and Ukraine, and strategise around interconnection with Continental Europe



POLICY AND STRATEGY

Short term
Mid term
Long term

Enhance Technical Flexibility of Power System

Roll-out advanced forecasting tools within the system operator that allow better representation of VRE in the operation of the electricity market and the minimisation of balancing requirements



Continued assessment of system flexibility requirements



Ensure infrastructure, policies and regulation allow for flexibility from new demand-side resources



Invest in upgrading the grid and existing power plants to comply with ENTSO-E standards with the aim towards synchronisation the Continental Europe system



An extended set of policy recommendations is included in the full roadmap

Report and brochure available online



The Vision for Moldova's Electricity System

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POLICY AND STRATEGY

Remove Regulatory Barriers, Increase Attractiveness to Investors

	Short Term	Mid Term	Long Term
Formal government recognition of clean electricity as a priority for energy security	●		
Public-private consultations to better understand barriers to entry	●		
Development of the capacity for local banks to finance wind and solar projects, and reduction of investment risks for private financing	●		
Development of RE roadmap and its integration into a national energy plan to better mobilise funds	●	●	●

Establish Flexible Electricity Markets, Enhance Regional Co-ordination

	Short Term	Mid Term	Long Term
Implementation of unbundling and establishment of a new wholesale market to enable and incentivize flexibility	●		
Enhance cross-border trade and co-ordination with Romania and Ukraine, and strategies around interconnection with Continental Europe	●	●	●

Enhance Technical Flexibility of Power System

	Short Term	Mid Term	Long Term
Roll-out advanced forecasting tools within the system operator that allow better representation of VRE in the operation of the electricity market and the minimisation of balancing requirements	●		
Continued assessment of system flexibility requirements		●	●
Ensure infrastructure, policies and regulation allow for flexibility from new demand-side resources	●	●	●
Invest in upgrading the grid and existing power plants to comply with ENTSO-E standards with the aim towards synchronisation the Continental Europe system		●	●

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System Integration of Renewables in Moldova: A Roadmap

Discover Moldova's potential to increase domestic renewable electricity generation and establish a flexible power system.

Experience the full roadmap at iea.org/programmes/eu4energy

<https://www.iea.org/reports/system-integration-of-renewables-in-moldova-a-roadmap>



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