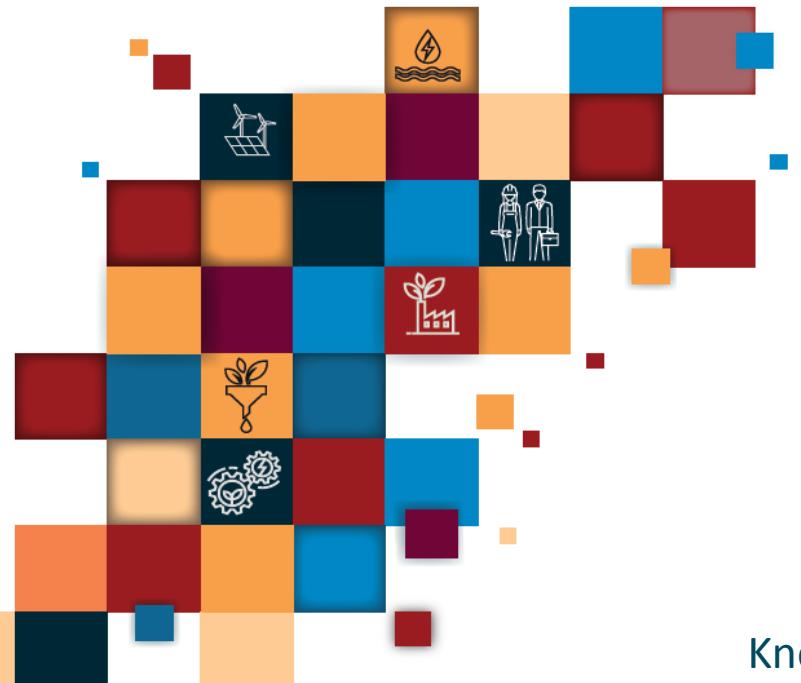




International Renewable Energy Agency

# Power system organizational structures for the Renewable Energy era



Xavier Garcia Casals  
Knowledge, Policy and Finance Centre, IRENA

# IRENA's Work on Market Design and Socio-economic footprint of Renewables

2013 2014 2015 2016

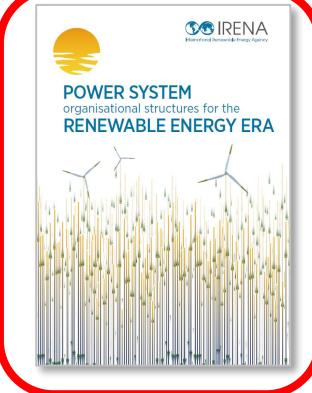
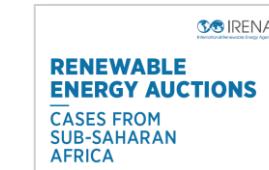
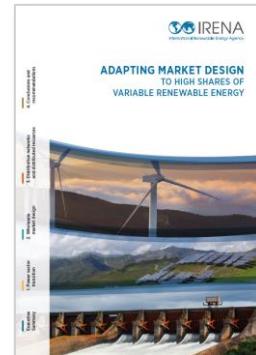
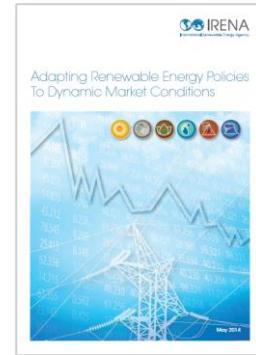
2017

2018

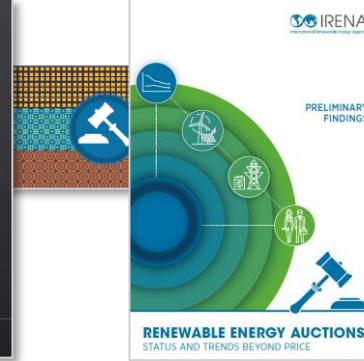
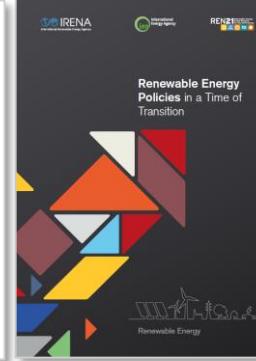
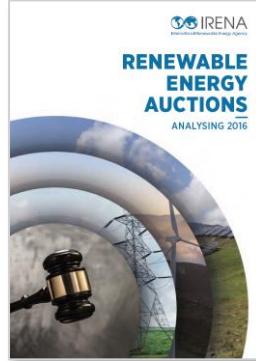
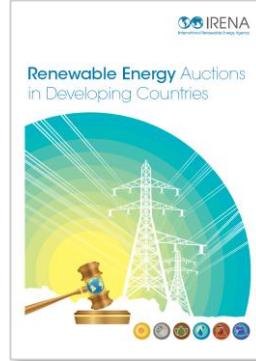
2019

2020

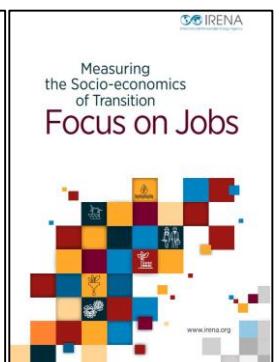
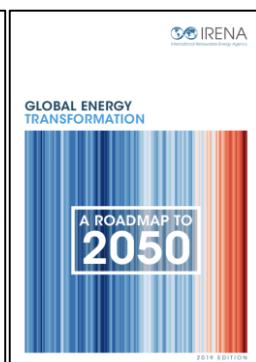
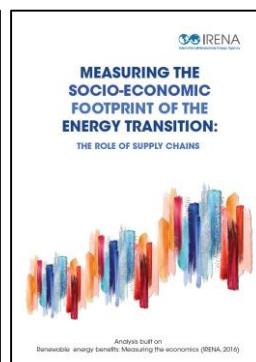
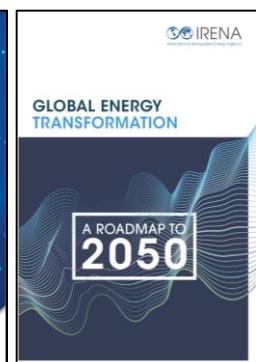
## ★ Power Market design



## ★ Auctions and Policies

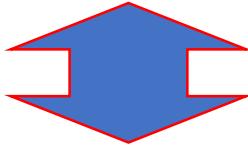


## ★ Measuring the Socio-economic footprint



*wider systemic links and feedbacks*

- Earth and Climate
- Economy



## *Energy Transition*

- FF
- non-integrated
- few stakeholders
- centralized
- unidirectional
- democratization
- FF Era



- RE
- EE
- EF

## *Systemic changes*



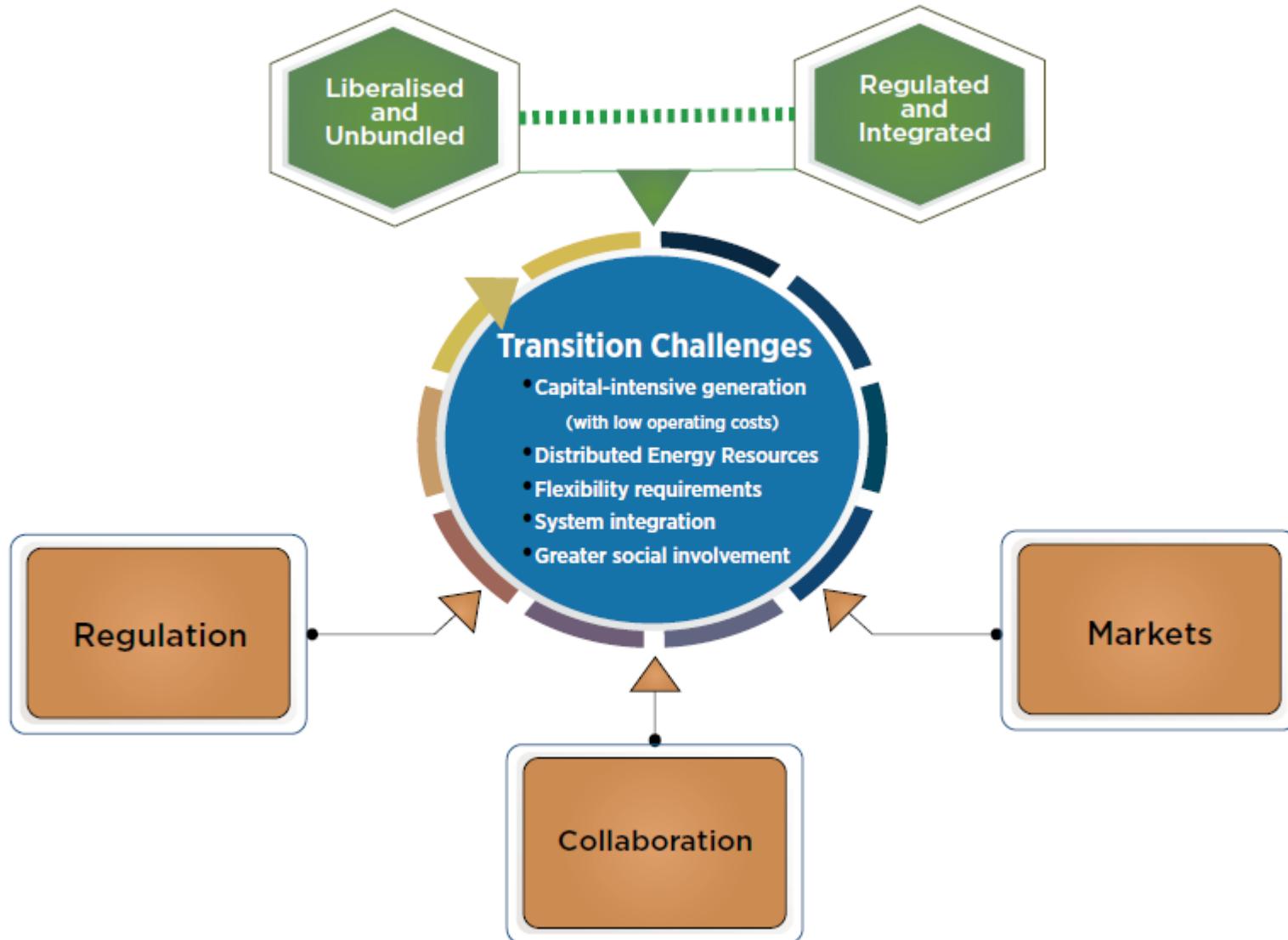
- integration
- participation
- bidirectional
- distributed
- democratization

## *Organizational structures (markets...)*

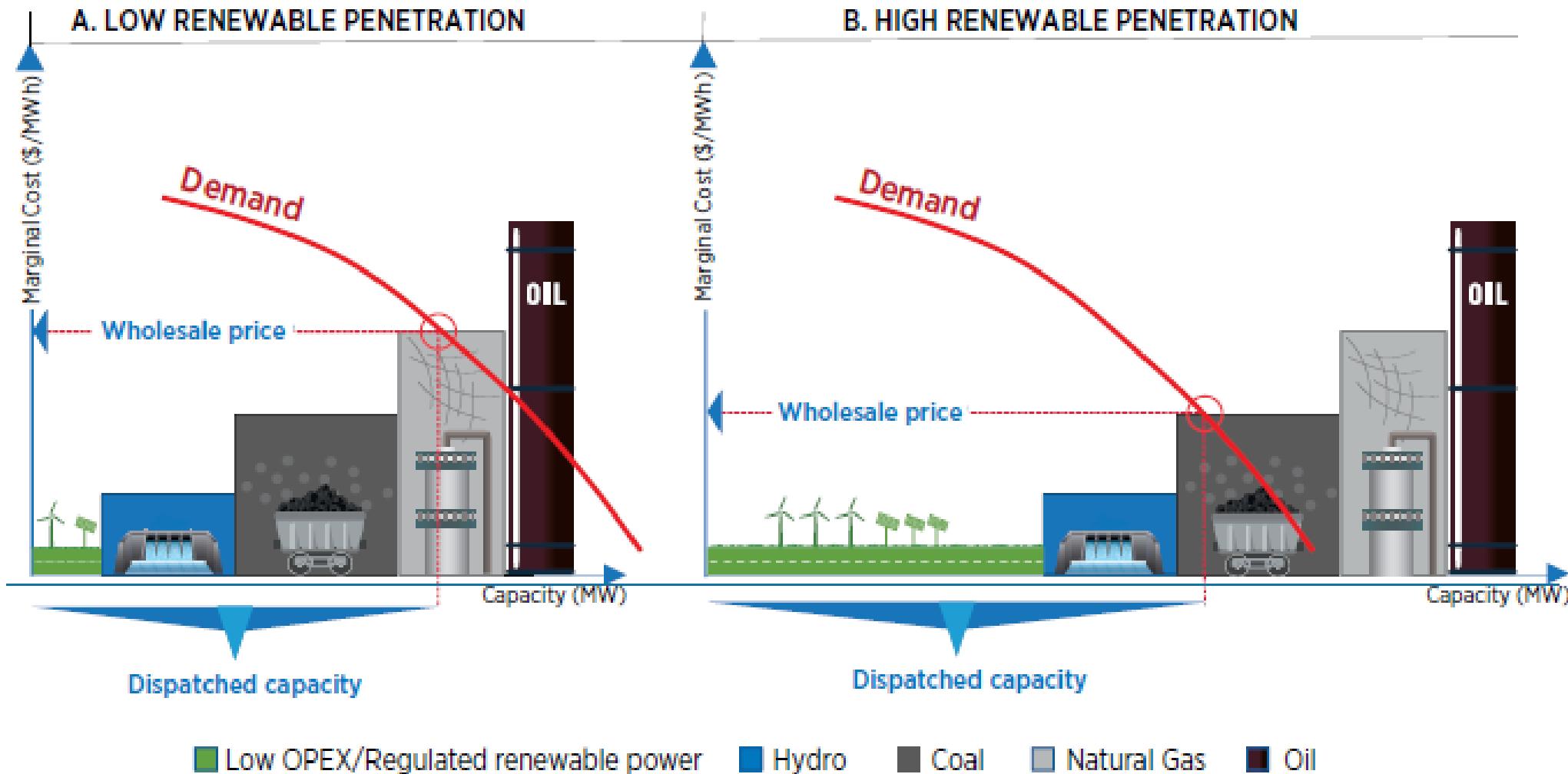


- RE Era

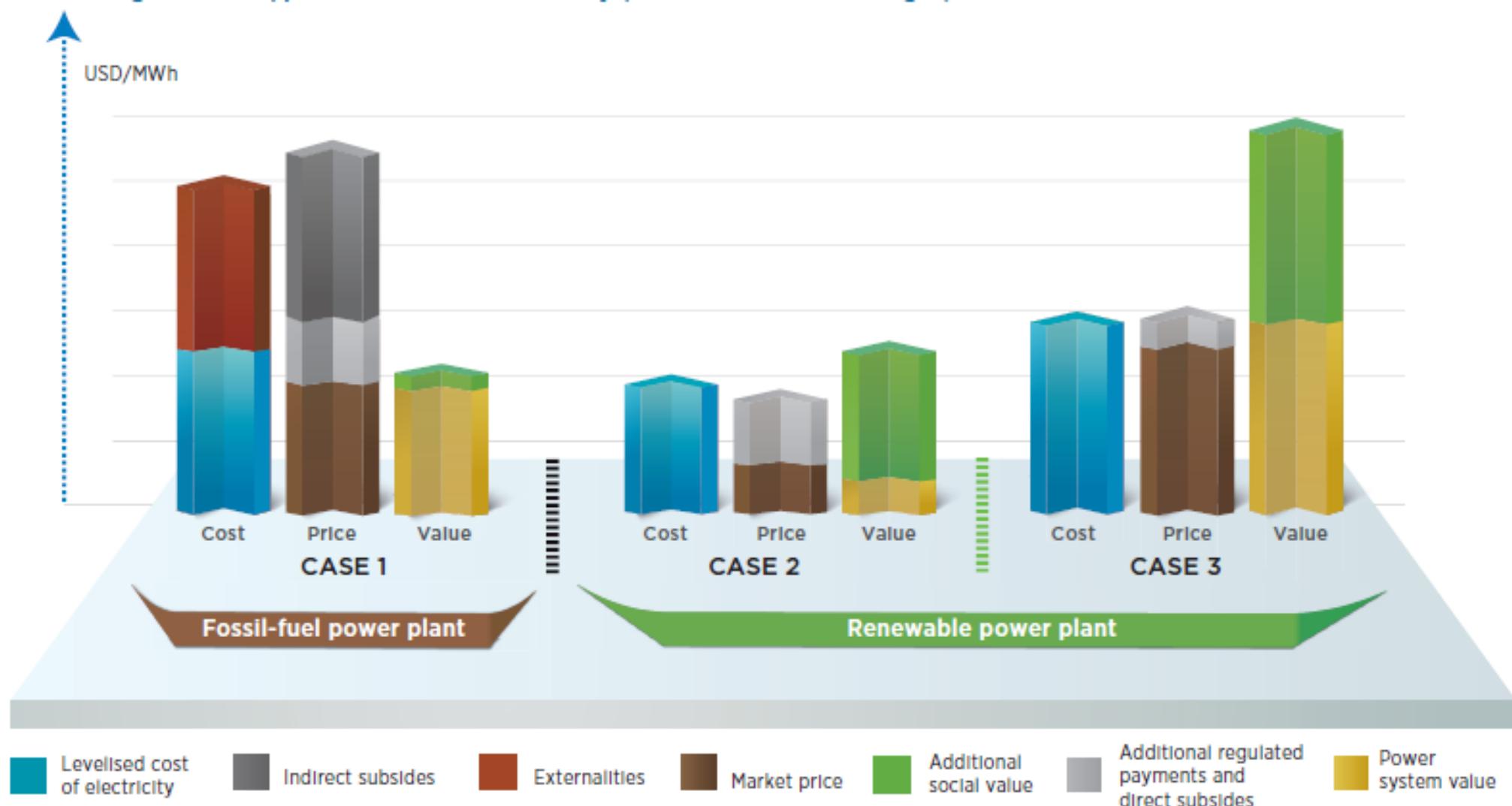
# Transition challenges common to all system structures



# Wholesale market misalignments

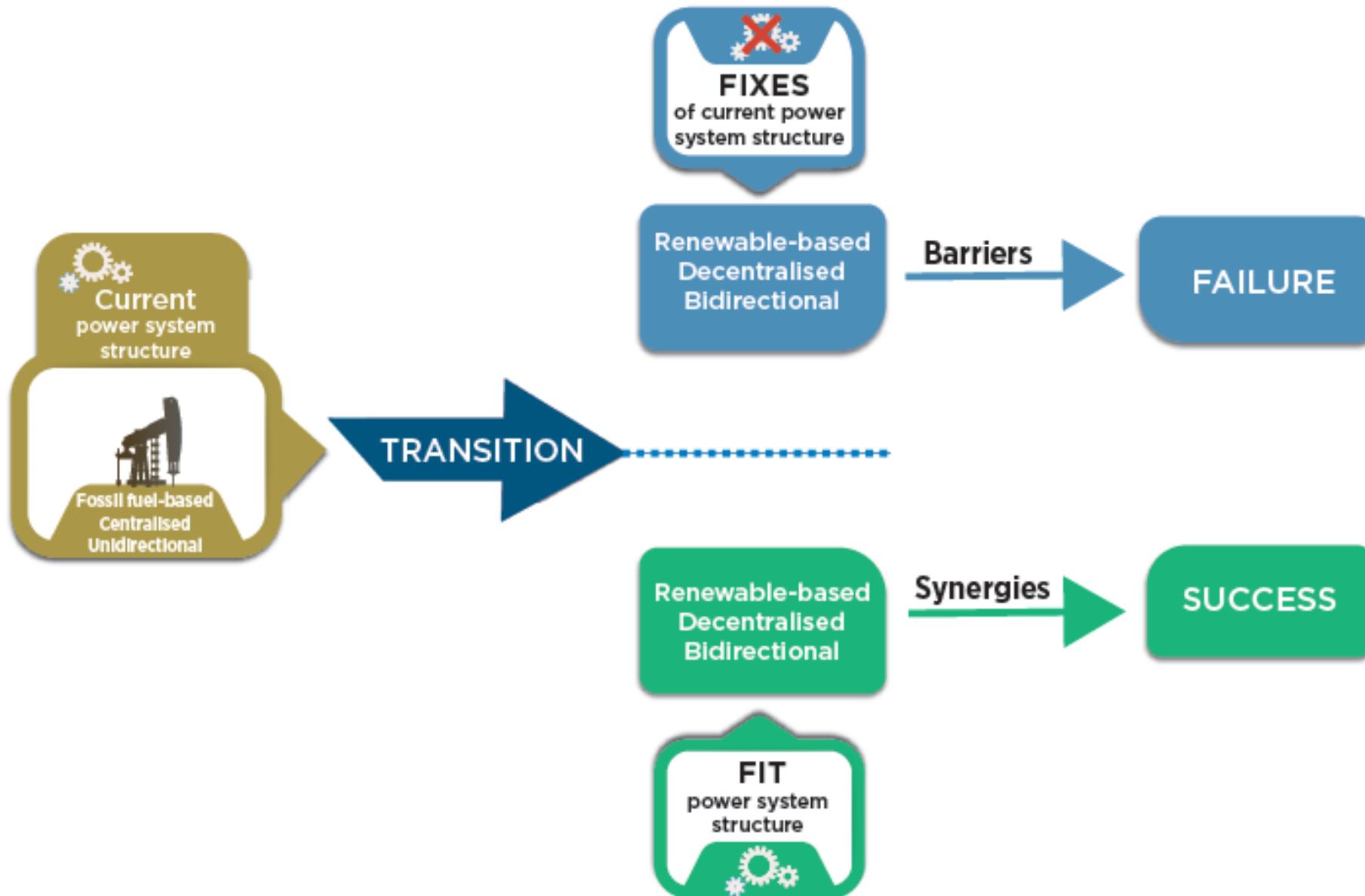


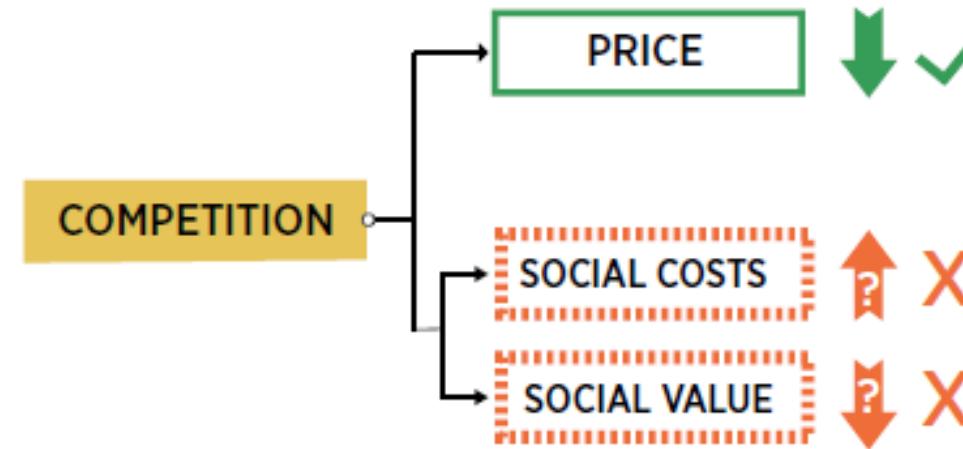
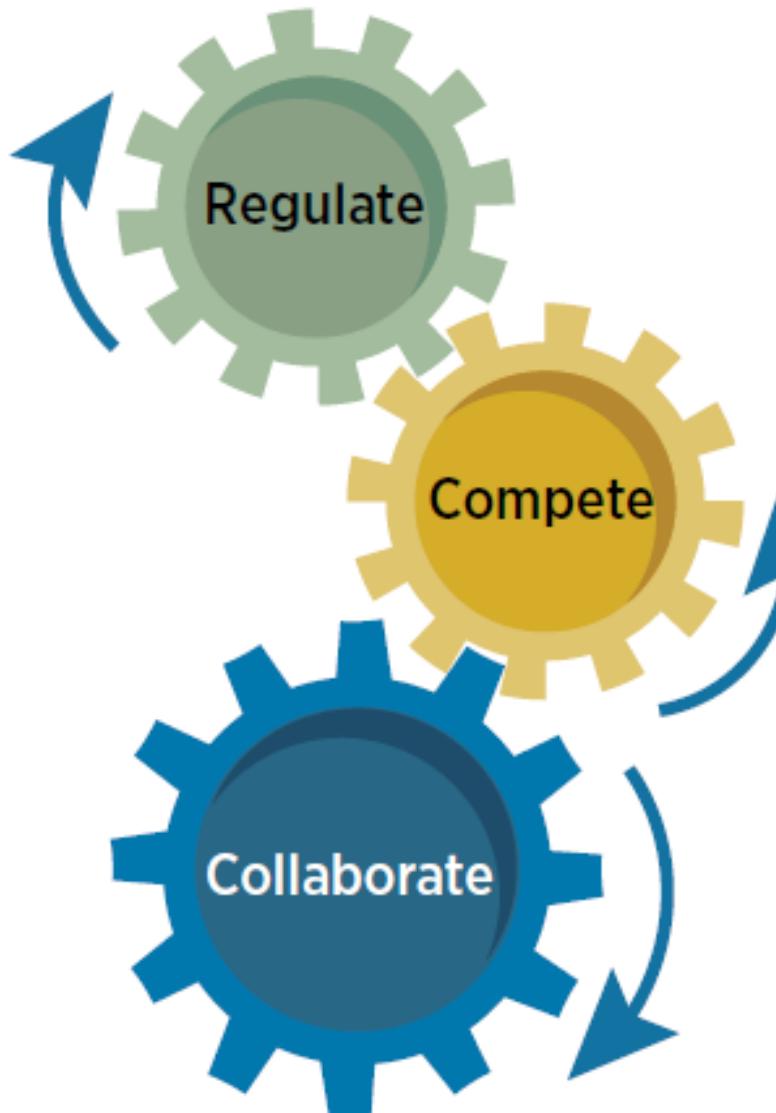
# The value-price-cost misalignments



Note: FF = fossil fuel; LCOE = levelised cost of electricity; RE = renewable energy; MWh = megawatt hour.

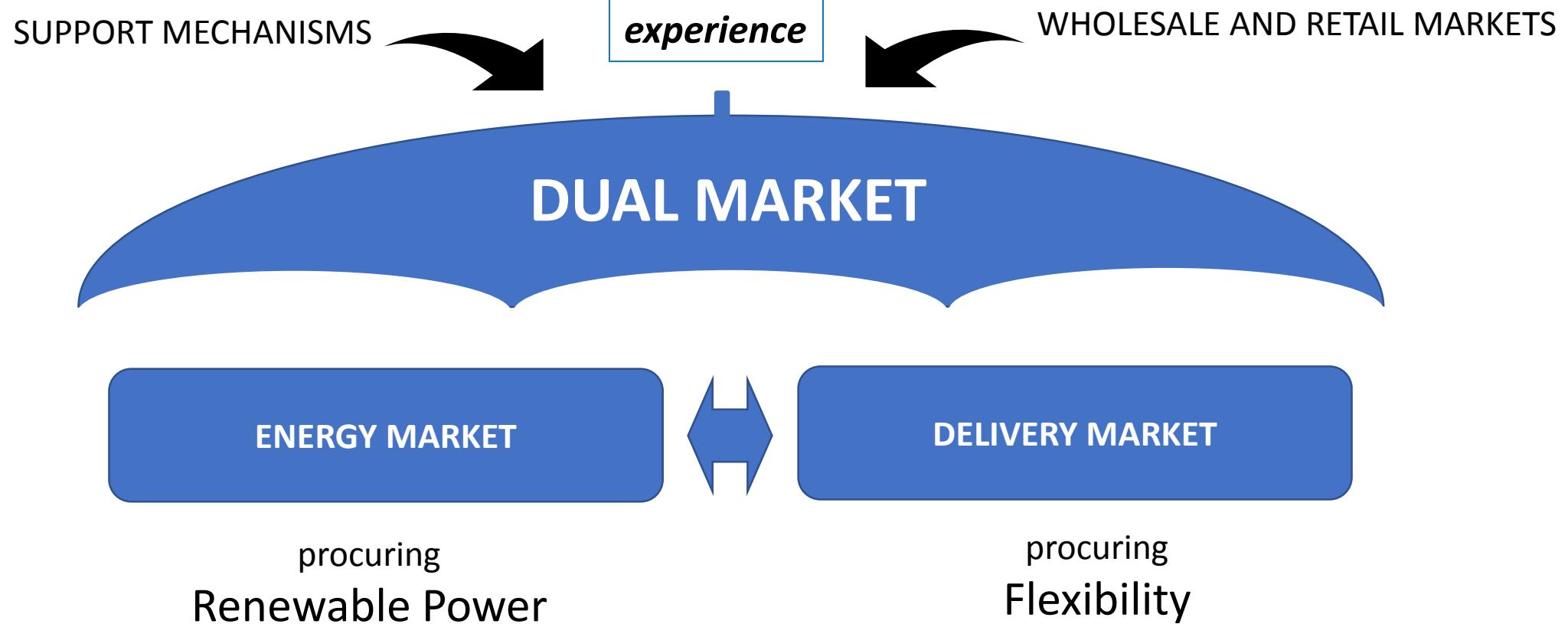
# Fixes versus redesigning to be fit





Undesirable effects of competition can be minimised through a proper balance with collaboration and regulation that will:

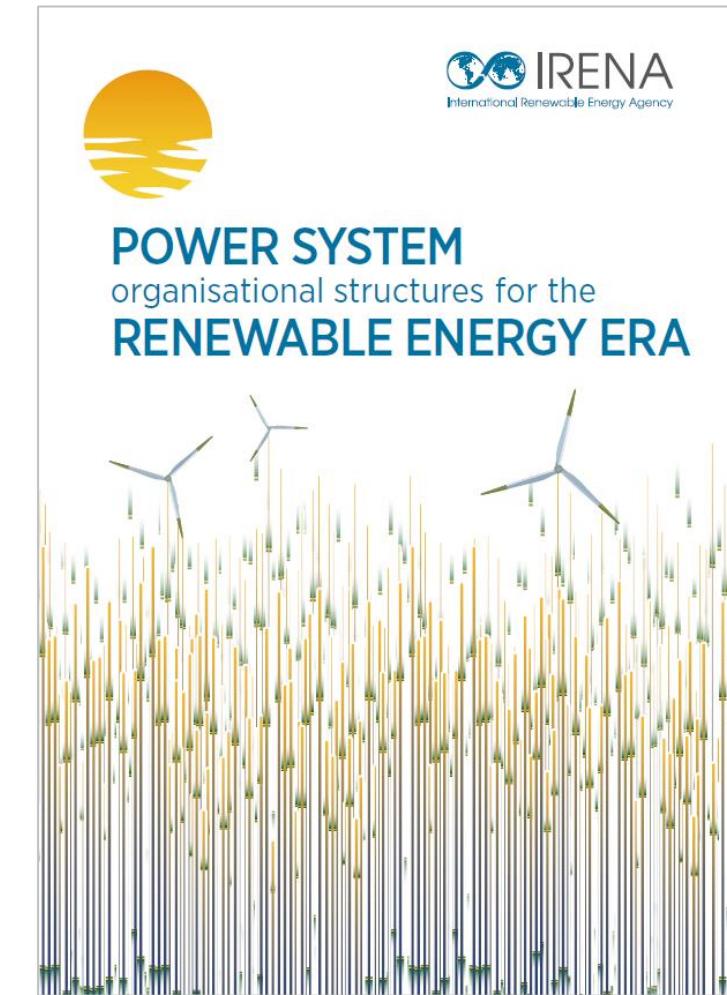
- Increase participation
- Reduce inequality
- Align competitive drivers with social goals





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Thank you!



<https://www.irena.org/publications/2020/Jan/IRENA-Power-system-structures>