

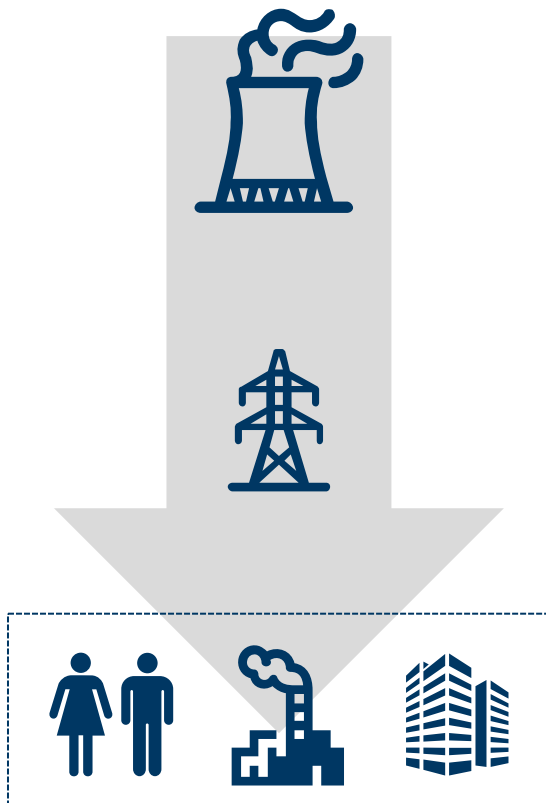


# Electricity transmission planning

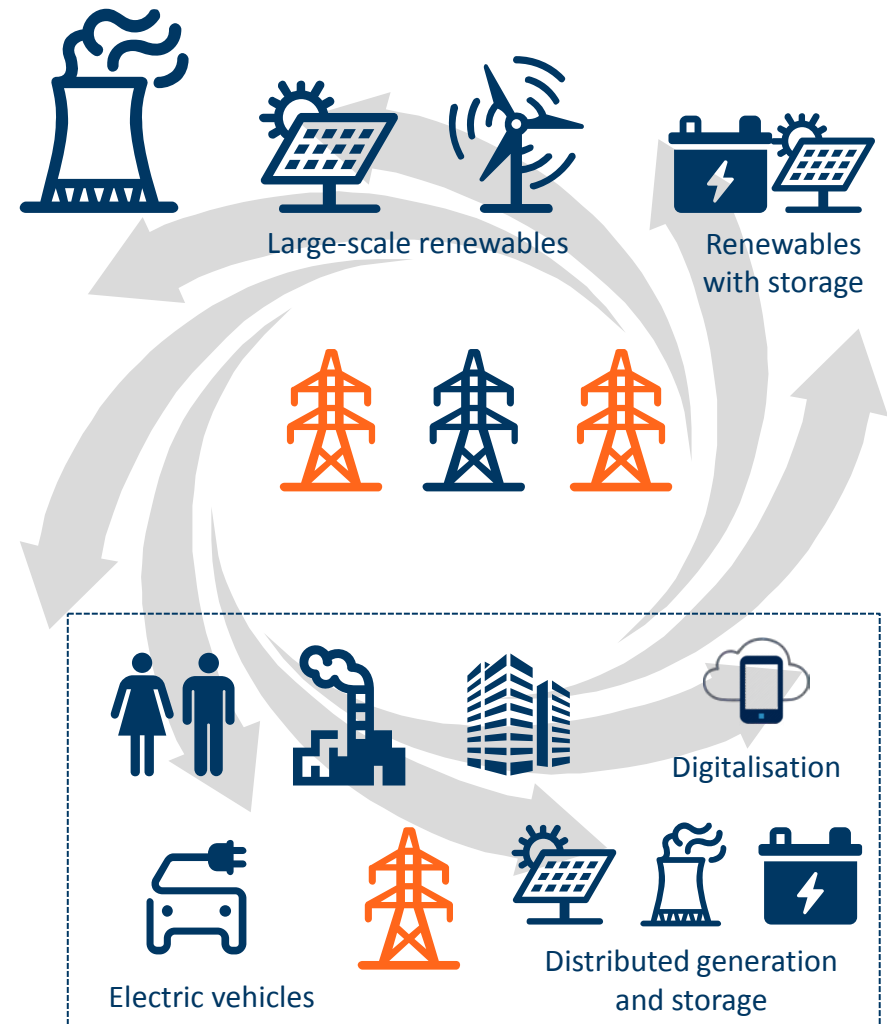
*A perspective from Australia and the US*

# The 'energy trilemma' is common across the world, now with the added challenges of decentralisation and digitalisation

## Traditional one-way power flows...



## ...are increasingly replaced by complex flows

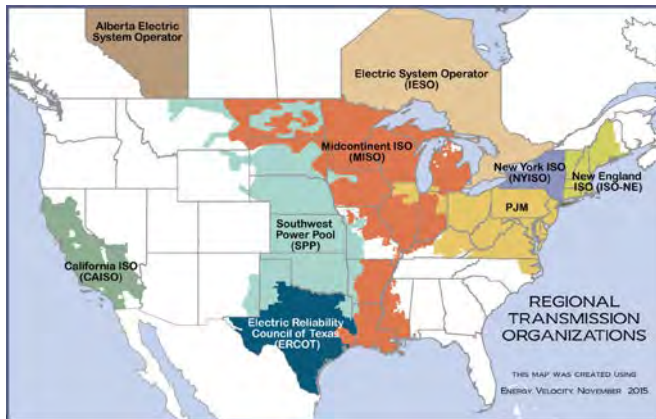


# Countries are constrained in how they address these issues by the wider structure of the markets and the regulatory focus

## US ISO model



- Nodal pricing



- Economic, reliability and public policy criteria

## Europe



- Zonal pricing (often whole country)...
- ...but calls for LMPs (Poland?)

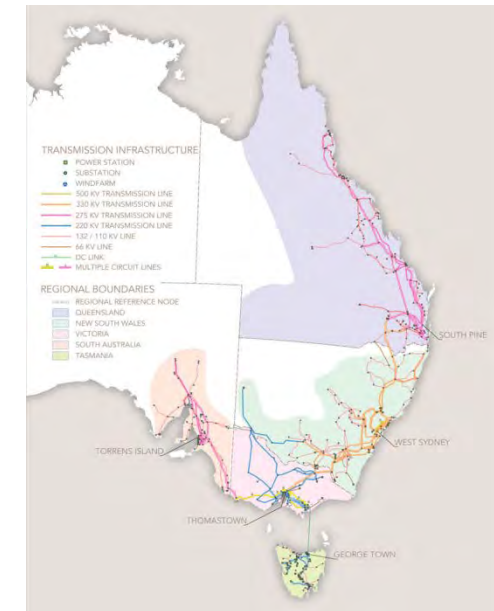


- Socio-economic welfare ...
- ...but some regulators focus on consumers (e.g. Ofgem)

## NEM



- Zonal pricing (Regional Reference Nodes)



- Socio-economic welfare...
- ...historical shift away from consumer emphasis

# US and Australia face the same problems of technological change and intermittency, but the approaches to planning differ significantly

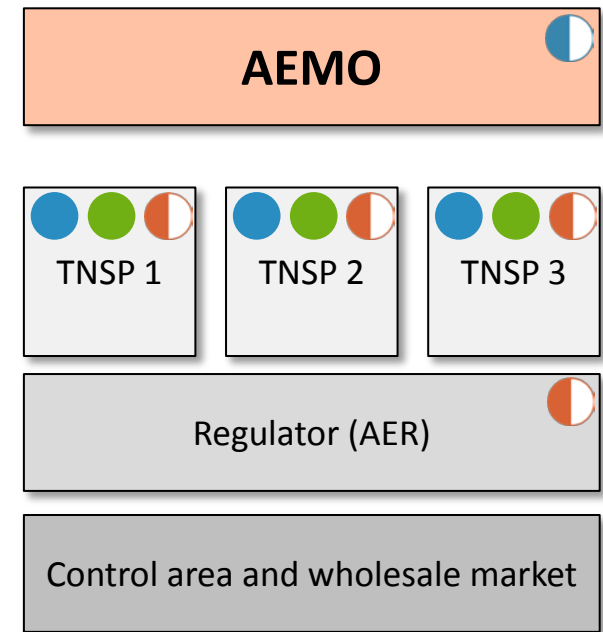
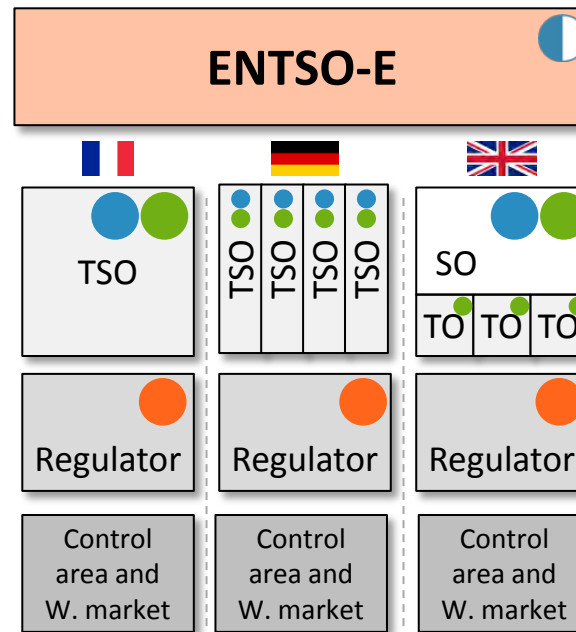
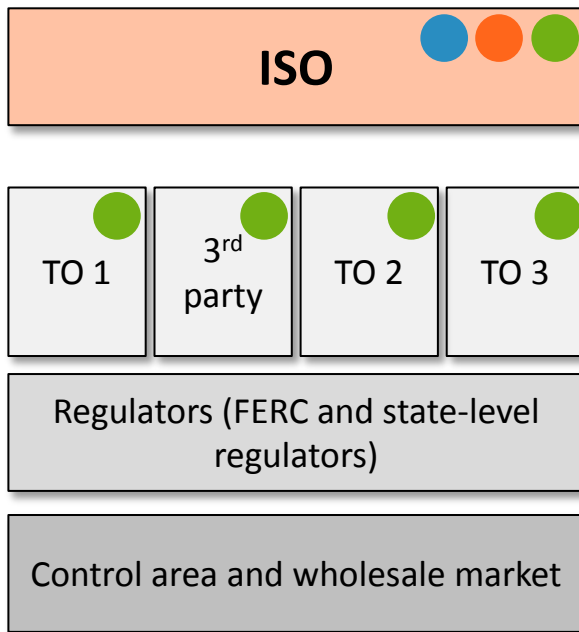
US ISO model



Europe



NEM



Legend:



Scenario development and identification of system needs



Optioneering and identification of possible solutions



Decision-making on the preferred solution

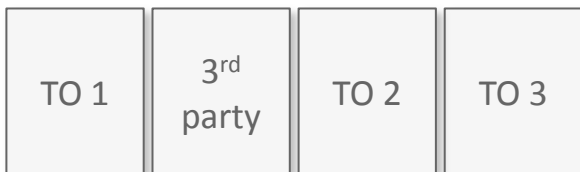
# Market design can be adapted to improve outcomes, but policy makers need to make a concerted effort to deliver change

## US ISO model



Incentives for ISOs to be less conservative?

ISO



Regulators (FERC and state-level regulators)

Control area and wholesale market

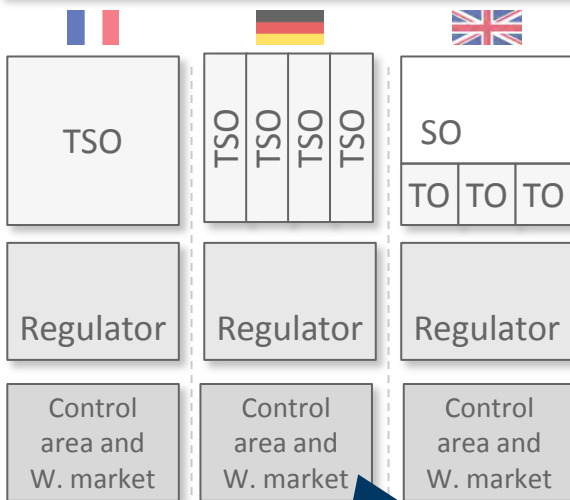
Improved coordination between ISOs (e.g. FERC Order 1000)?

## Europe



Pan-European system operator?

ENTSO-E



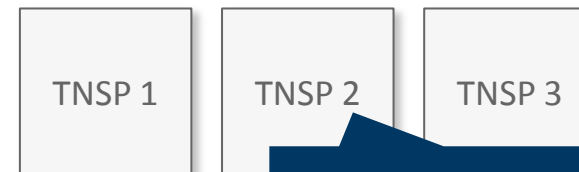
LMPs or more granular price zones?

## NEM



Stronger role for AEMO in coordinating stakeholders?

AEMO



Regul

Control area and wholesale market

Greater role for non-TSO Tx developers?



Any questions?

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**Martina Lindovska**  
*Senior Director*

**London, UK**  
Martina.Lindovska@fticonsulting.com

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