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Small size of a national system, the potential problems and the solution: regional markets.

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Bredesen Consulting

Webinar Series: Wholesale Electricity Market Design and Challenges in Developing Economies
May 23-26, 2022 | Online format

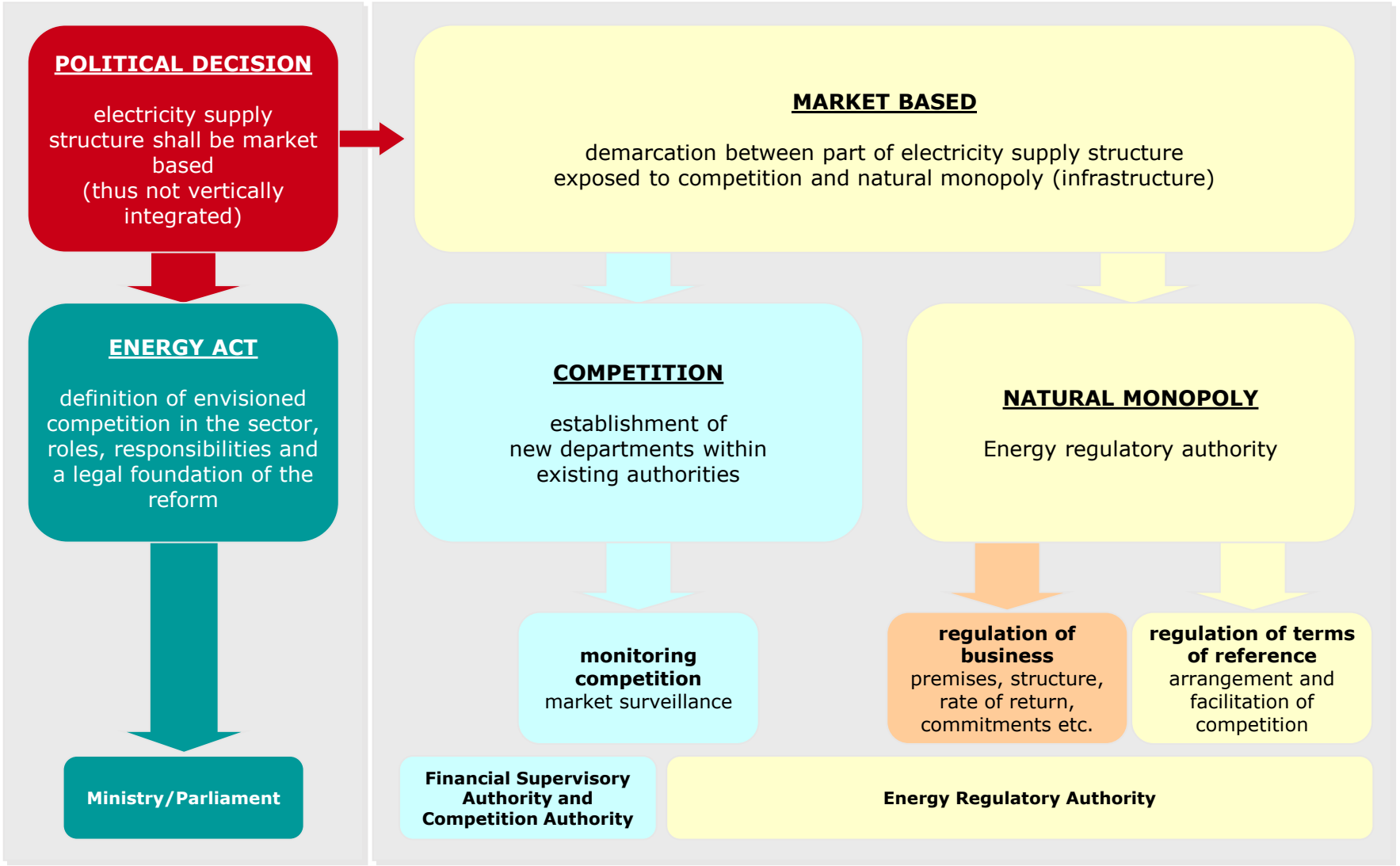
Problem statement:

- A small system is vulnerable
  - There are few generators – often based on few technologies and local market power
  - To maintain flexibility is challenging to security of supply
  - Meeting the green transition is a huge challenge
  - Investments in new generation and transmission is challenging due to many reasons:
    - Hard to make a business case for the individual projects – will almost always require some form of governmental guarantees
    - The national project (or business case) is too small to make it viable
    - Weak national balance sheets makes it harder
    - Higher risk "premiums" in the investment cases
  - … and smaller countries often end up being reliant on a bigger neighbour(s) for system services at high costs
    - Seen in Africa, South-Asia, South-east Europe, Central Asia, Caucasus etc

Solution: Regional cooperation!

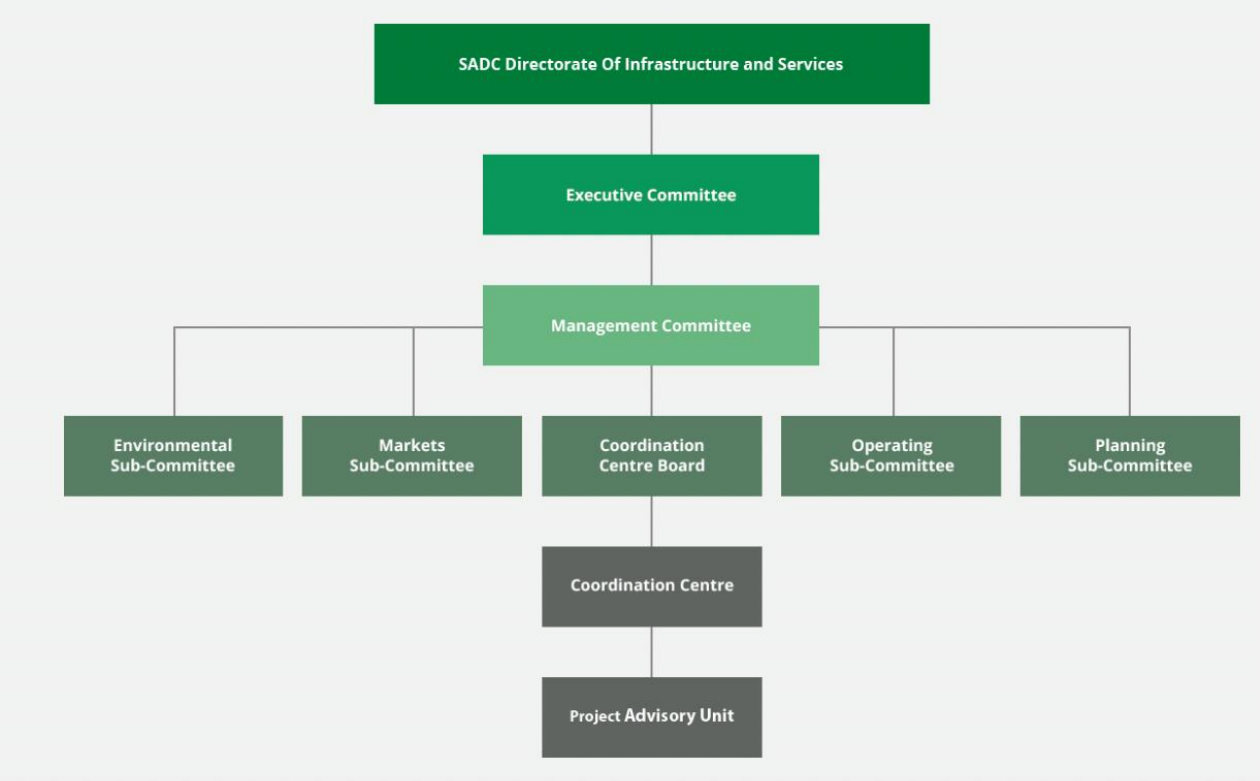
- This needs to be based on political support
- Governance is a key to keep a stable focus
- … but solutions to be made by the ones who knows
- There are good examples of these bodies being established, but varying success
- Some examples is being displayed in the next slides

Legal and regulatory framework – Scope, laws provisions



Solution: Regional cooperation - SAPP

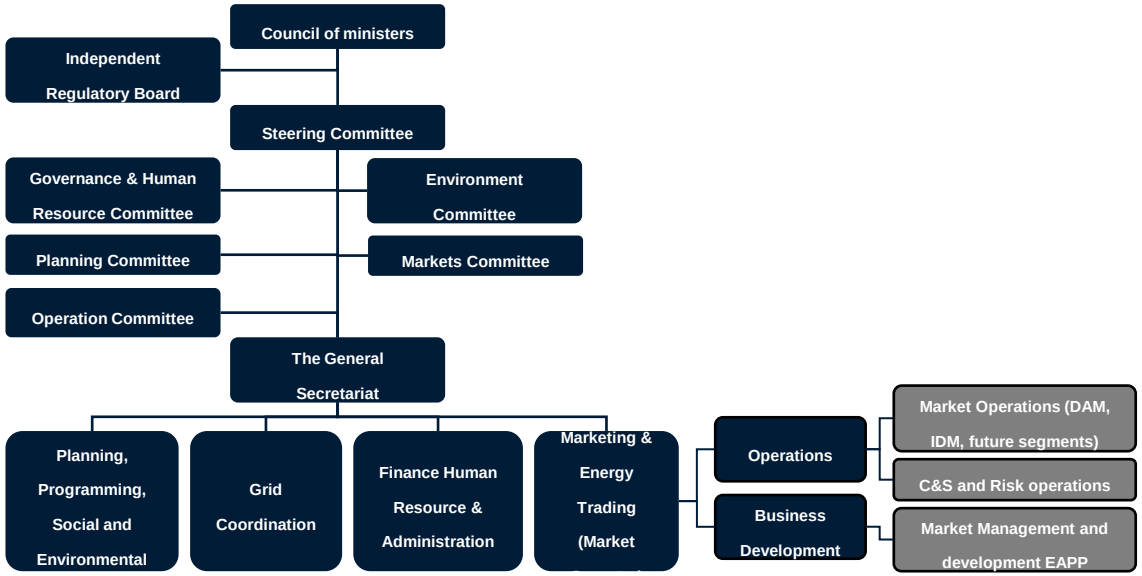
- Well-established (since 1995)
- Limited political influence
- Consensus-driven
- Owned by the National utilities
- Should have more “own voice”
- In forefront of African power pools



Source: SAPP website

Solution: Regional cooperation - EAPP

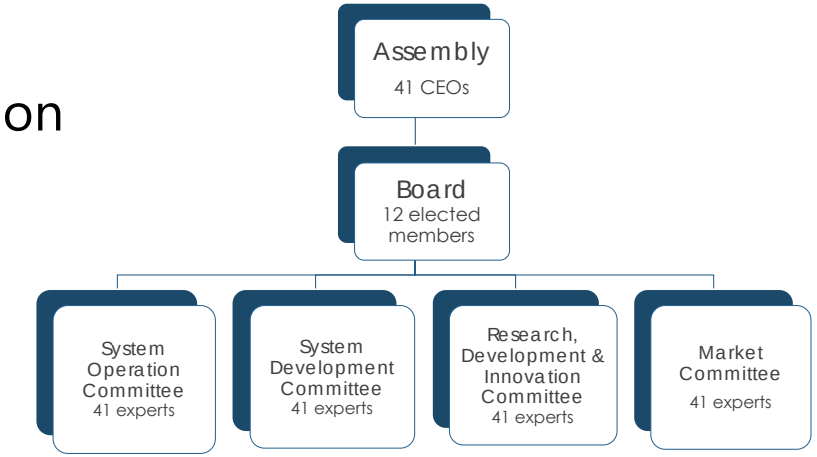
- Well-established (since 2005)
- Too much political influence
- Consensus-driven, but hampered by political issues in "all" discussions
- Owned by the National utilities
- Secretariat too weak
- Are developing a market, looking for coupling with SAPP



Source: EAPP

Solution: Regional cooperation – European cooperation

- Started as a "bottom-up" cooperation
- Driven by regional initiatives
- After EU 3rd energy package – top-down approach
- Clear governance, but also complex (many parties) "comitology"
- Has strong political support



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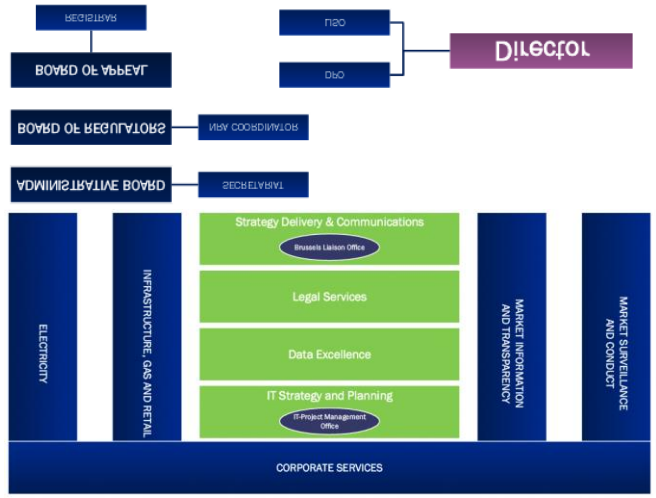

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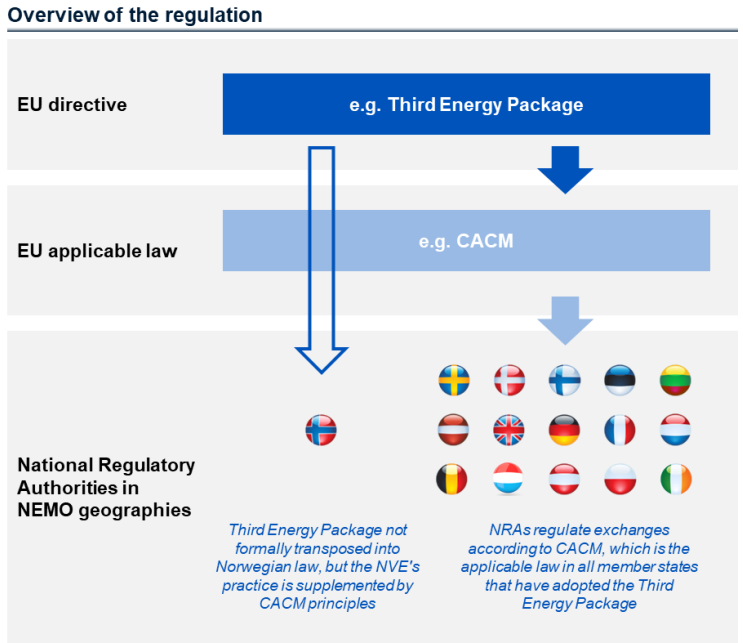


Solution: Regional cooperation – PJM governance

- With a different market model, more centrally managed
- Strong federal (and detailed) regulation
- Delivering good results in a different environment from EU
- 2-tier regulation (federal and state)

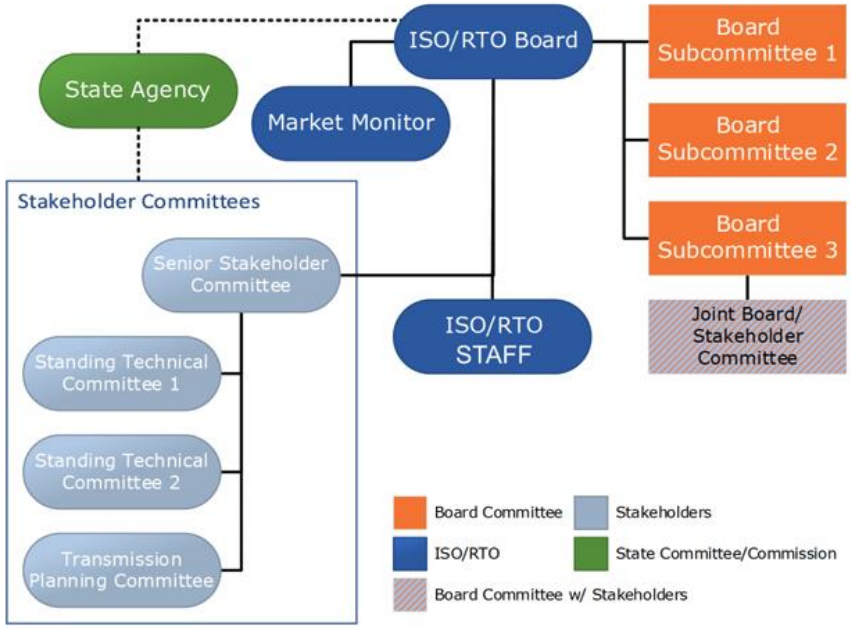
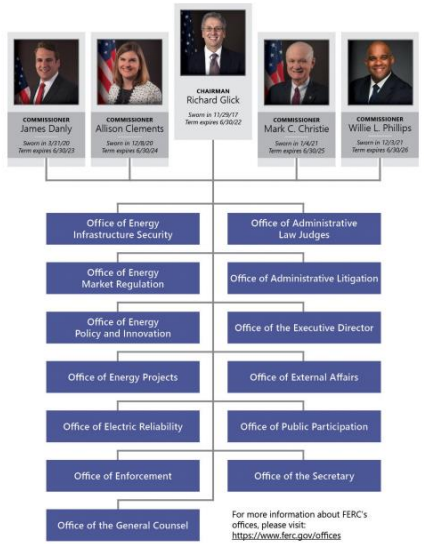


Figure 2: A generic structure of RTO governance. Actual structures vary by RTO.

Source: Exeter Associates, for NESCOE.



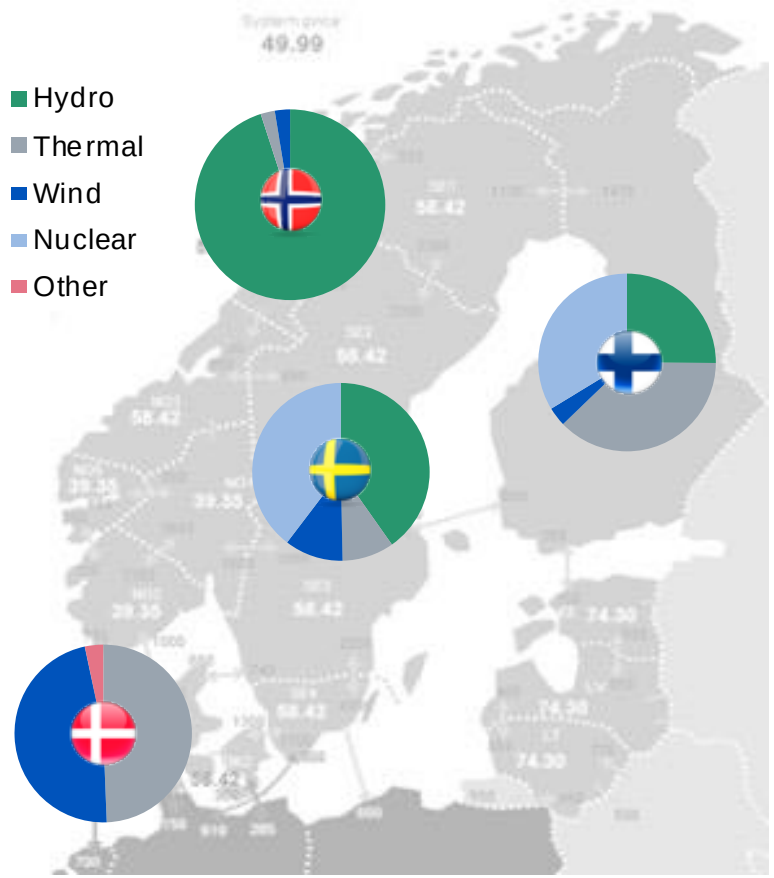
FERC organisation

Source: FERC website

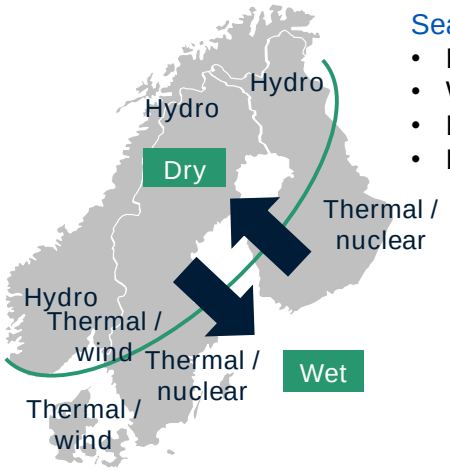
Key benefits of regional markets

Utilising the value of differences secures optimal use of resources and more stable prices and allows for better integration of RES

Nordic power production capabilities

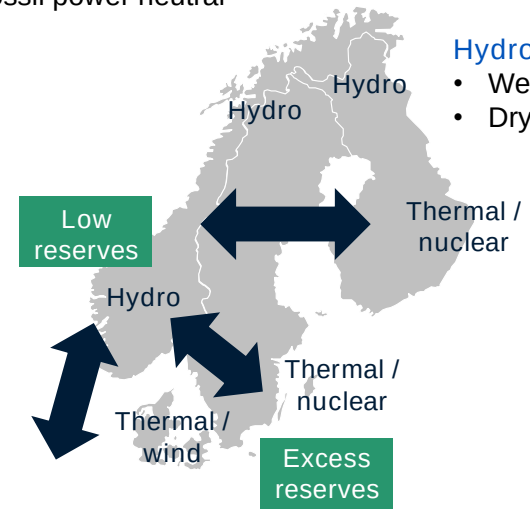


Connecting markets with differing production profiles provides stability to the system



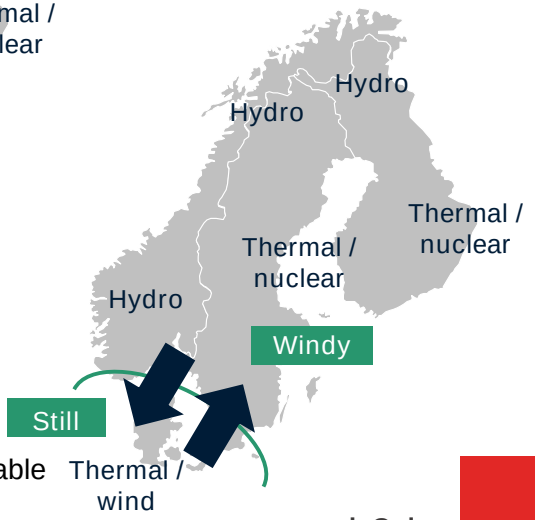
Seasons

- Hydropower highly seasonal
- Wind power highly seasonal
- Nuclear neutral
- Fossil power neutral



Hydrology

- Wet year – more hydro production
- Dry year – less hydro production



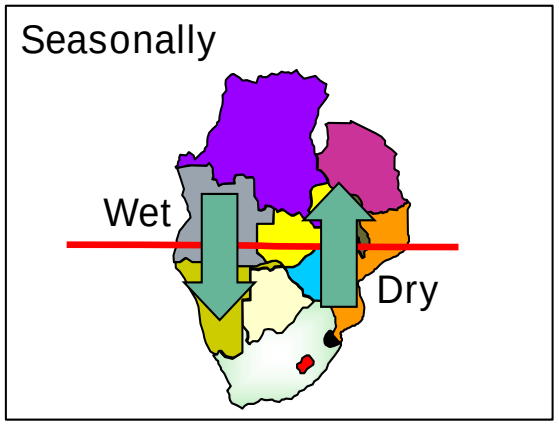
Daily weather situation

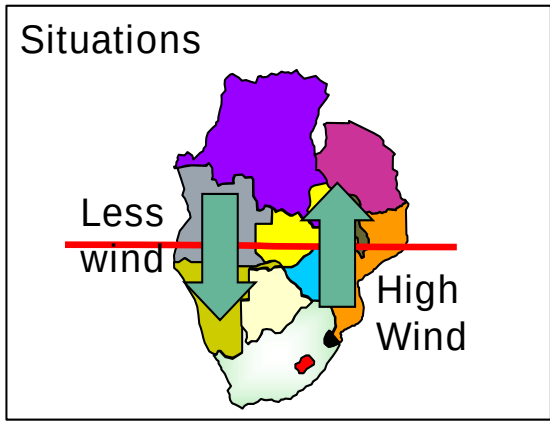
- Wind power not flexible or storable
- All other sources flexible

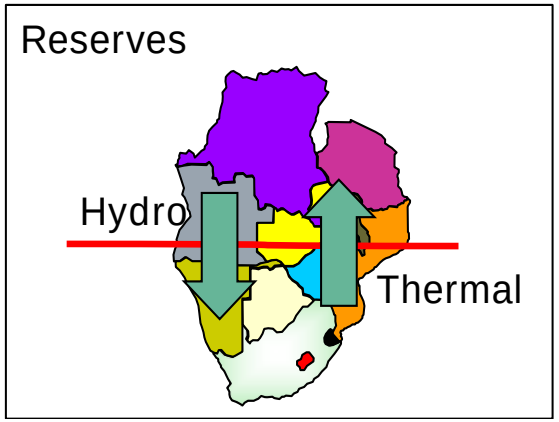
Key benefits of regional markets

Utilising the value of differences secures optimal use of resources and more stable prices and allows for better integration of RES

… and this can be the case in all regions (SAPP example)



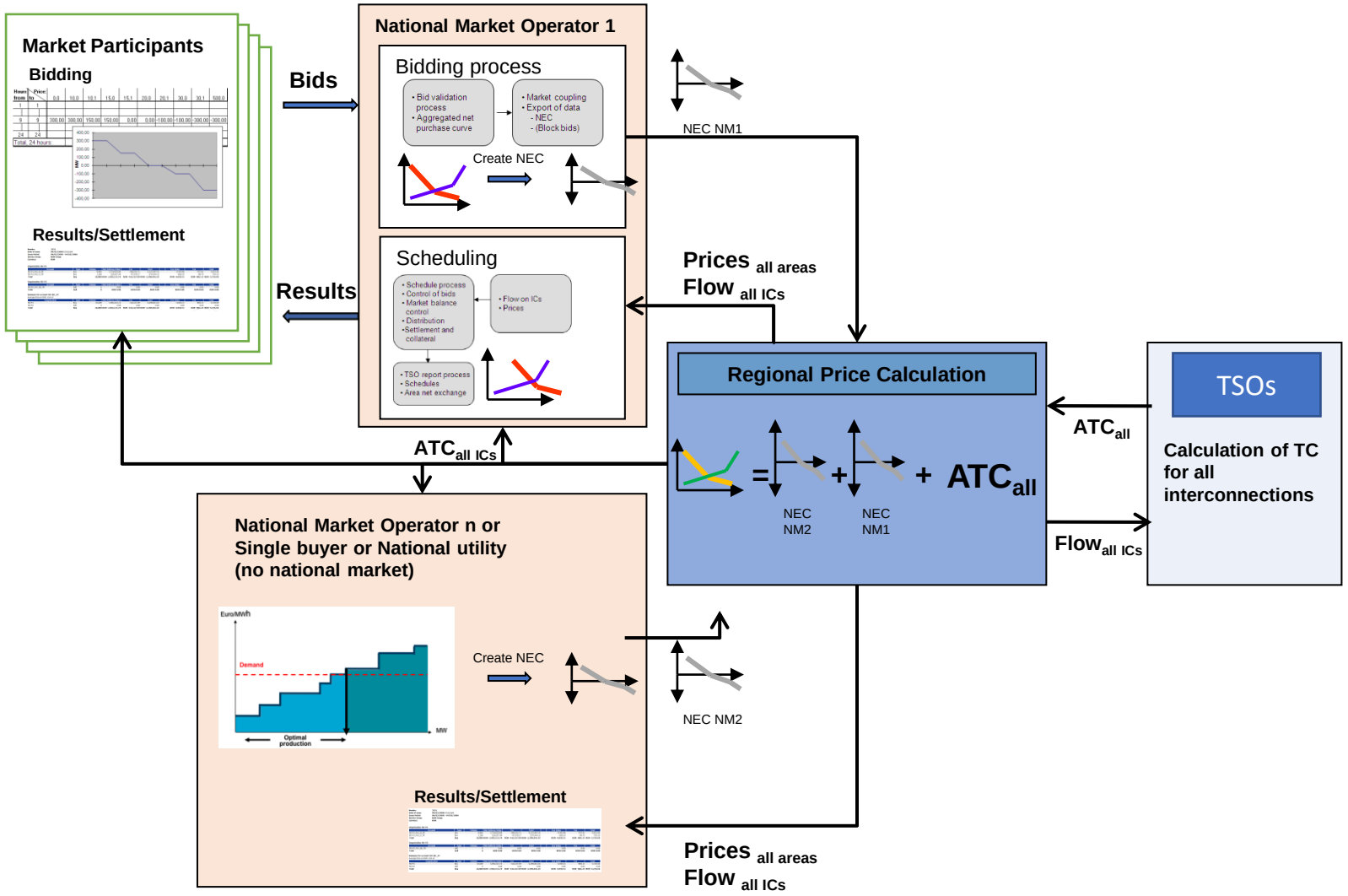




- Complementary production
- Increased security of supply
- Cost synergies

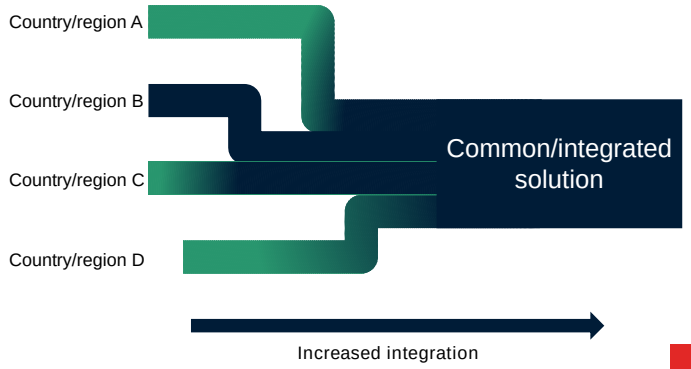
Regional markets – the need for a flexible approach

Allowing for regional cooperation, but maintaining national control of the assets



Flexibility is needed in:

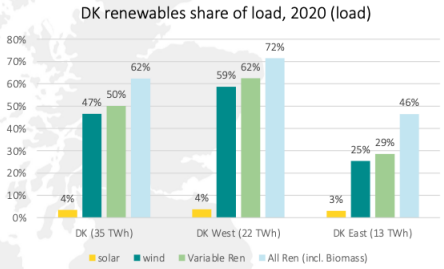
- **Market design –** allowing future evolution of markets
- **Market Rules –** easy access to markets to new players
- **Market Platforms –** managing changes in the market framework
- **Legacy contracts –** respecting these
- **Market opening –** not a big bang where all join at the same time

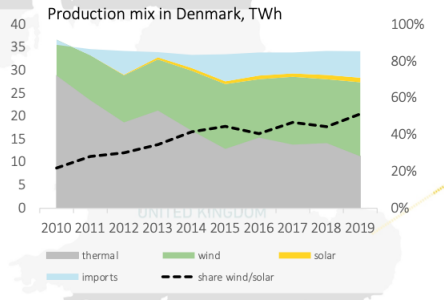


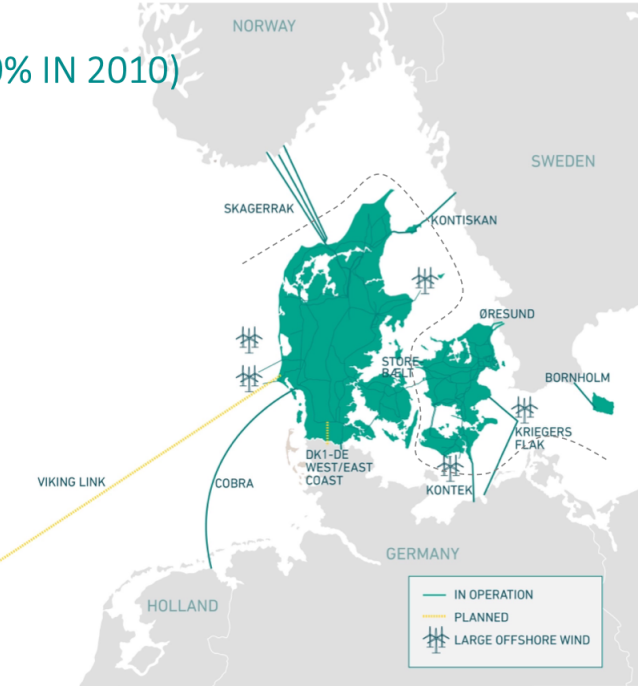
Regional markets – providing higher security of supply

Example from Denmark – they rely on the well-integrated European regional market

50% VARIABLE RES-E IN 2020 (20% IN 2010)



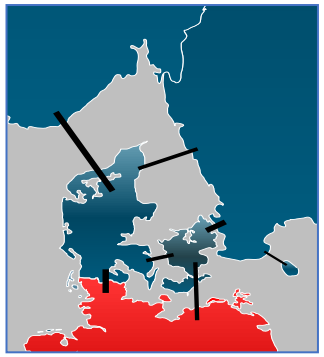




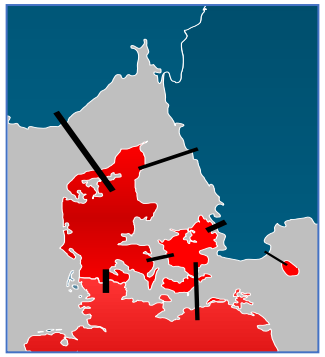
.....YET HIGH SECURITY OF SUPPLY

Danes have electricity 99.9% of the time

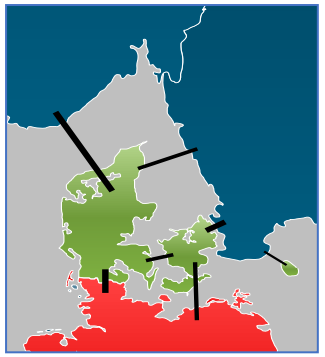
Common price 20% of time



Common with Nordics 50%



Common price with DE – 20%



Own price – only 10%

Source: ENERGINET

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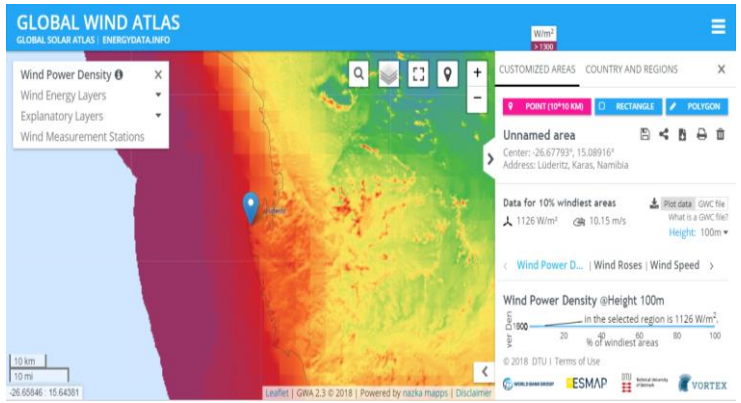
Regional markets – WB project on Introducing RES in SAPP

In SAPP, single buyer market models dominate, but these are evolving.

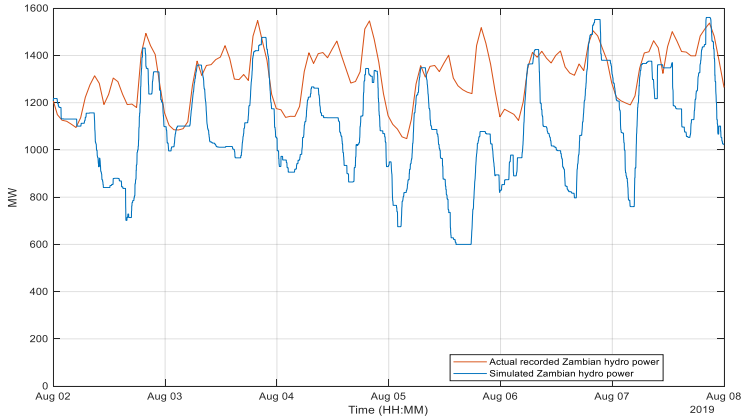
Power exports and imports are mainly undertaken by the national power utilities, but IPPs are now able to export under the Namibian MSB market model.



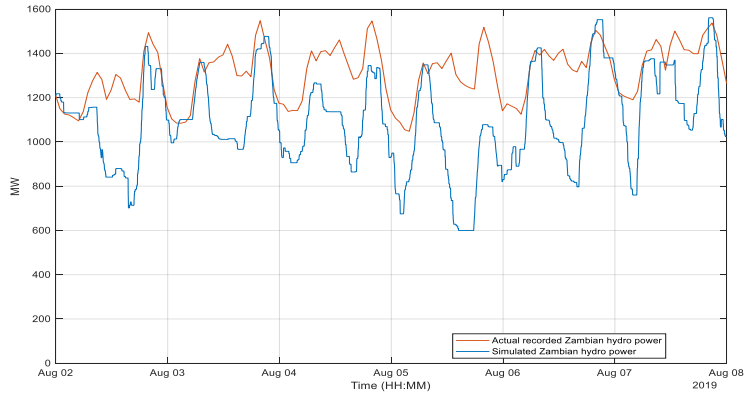
The Namibian electricity market design – the MSB model – appears to offer the most flexibility for renewable IPPs entering the market.

Output with additional 400 MW of wind and 400 MW of solar power

Zambian Hydro power plant



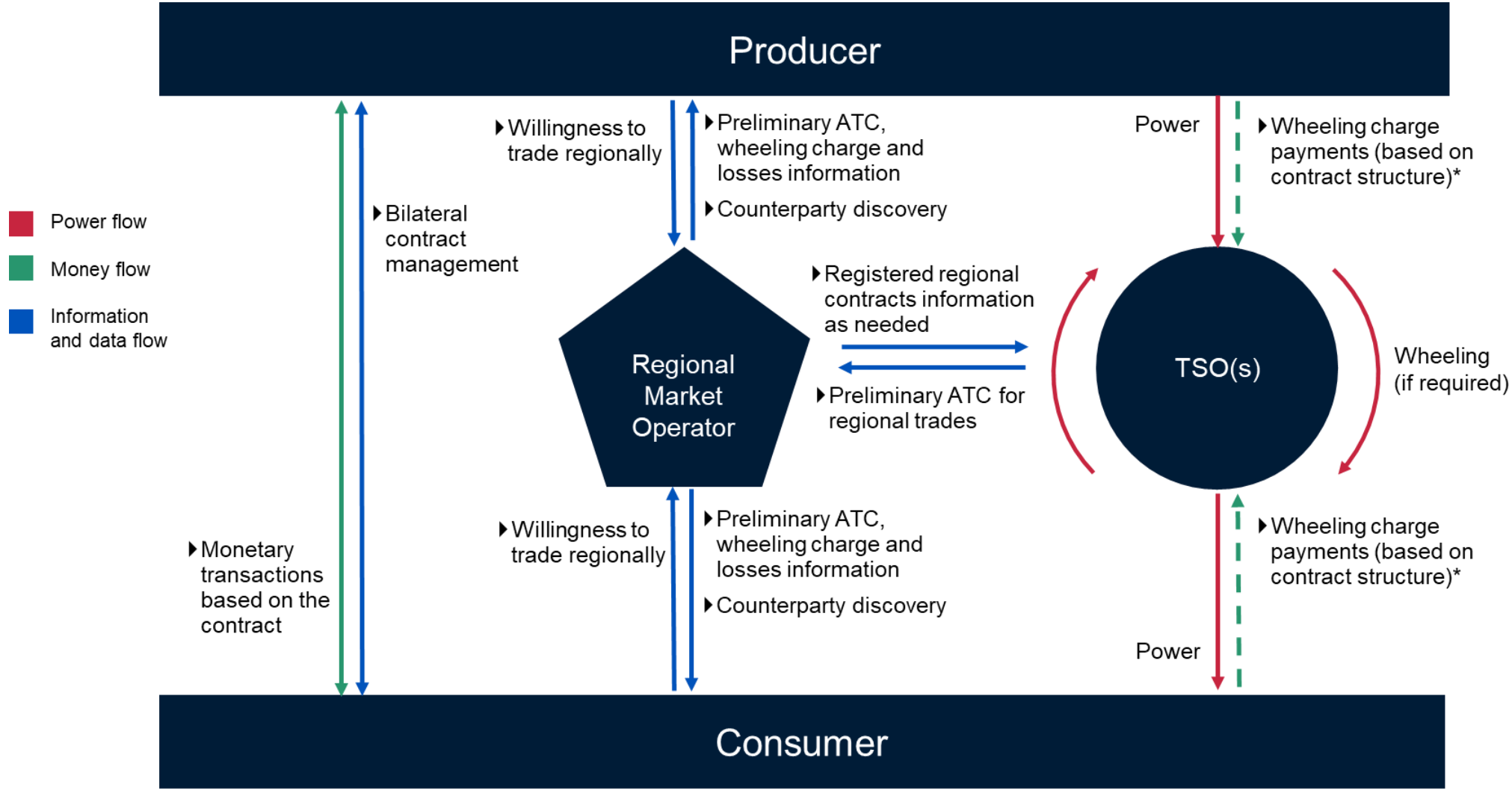
Interconnector flows Namibia-Zambia



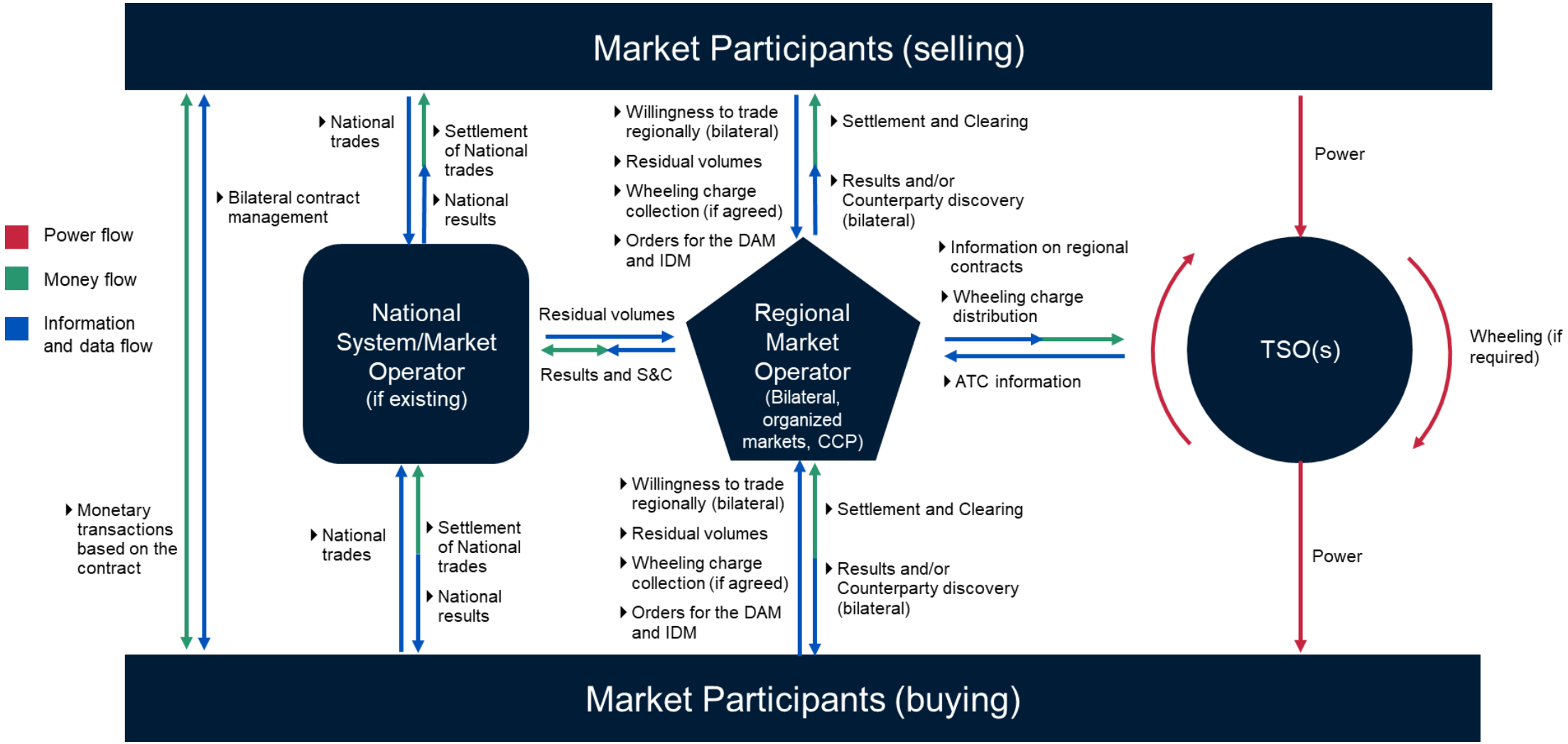
The modeling shows that there are a lot of untapped possibilities, but to make this viable, access to the SAPP regional markets is vital

… and this is now happening in Namibia (and Zambia)

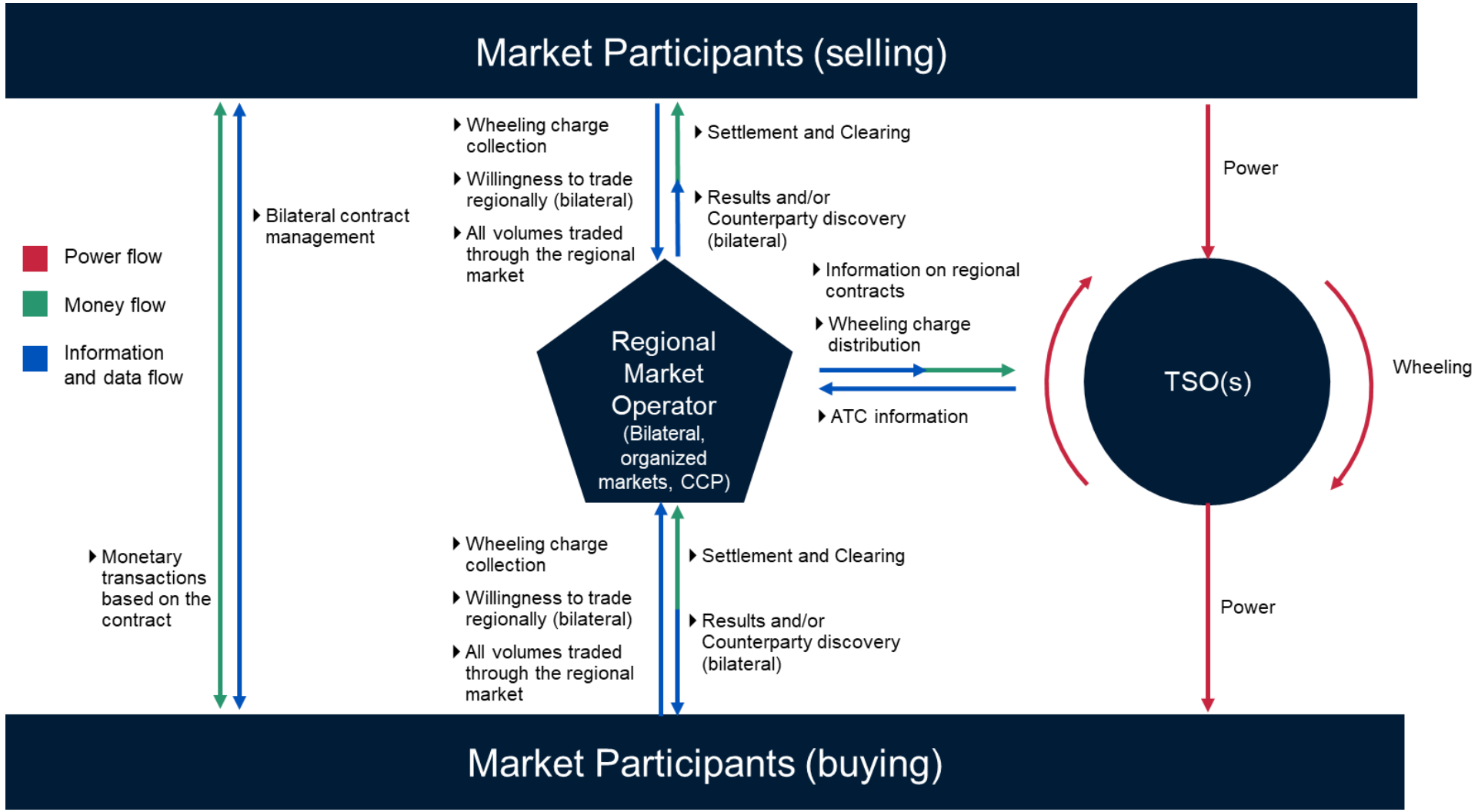
Different types of regional markets: Multinational Standardized Regional Bilateral Trading



Different types of regional markets: Multilateral regional market



Different types of regional markets: Fully integrated regional market



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THANK YOU FOR YOUR ATTENTION!

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