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# Insights on planning for power system regulators

**IEA Committee on Energy Research and Technology  
EXPERTS' GROUP ON R&D PRIORITY-SETTING AND EVALUATION**

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RAP believes competitive energy markets, properly framed, are best able to deliver a low-carbon power system at the lowest reasonable cost

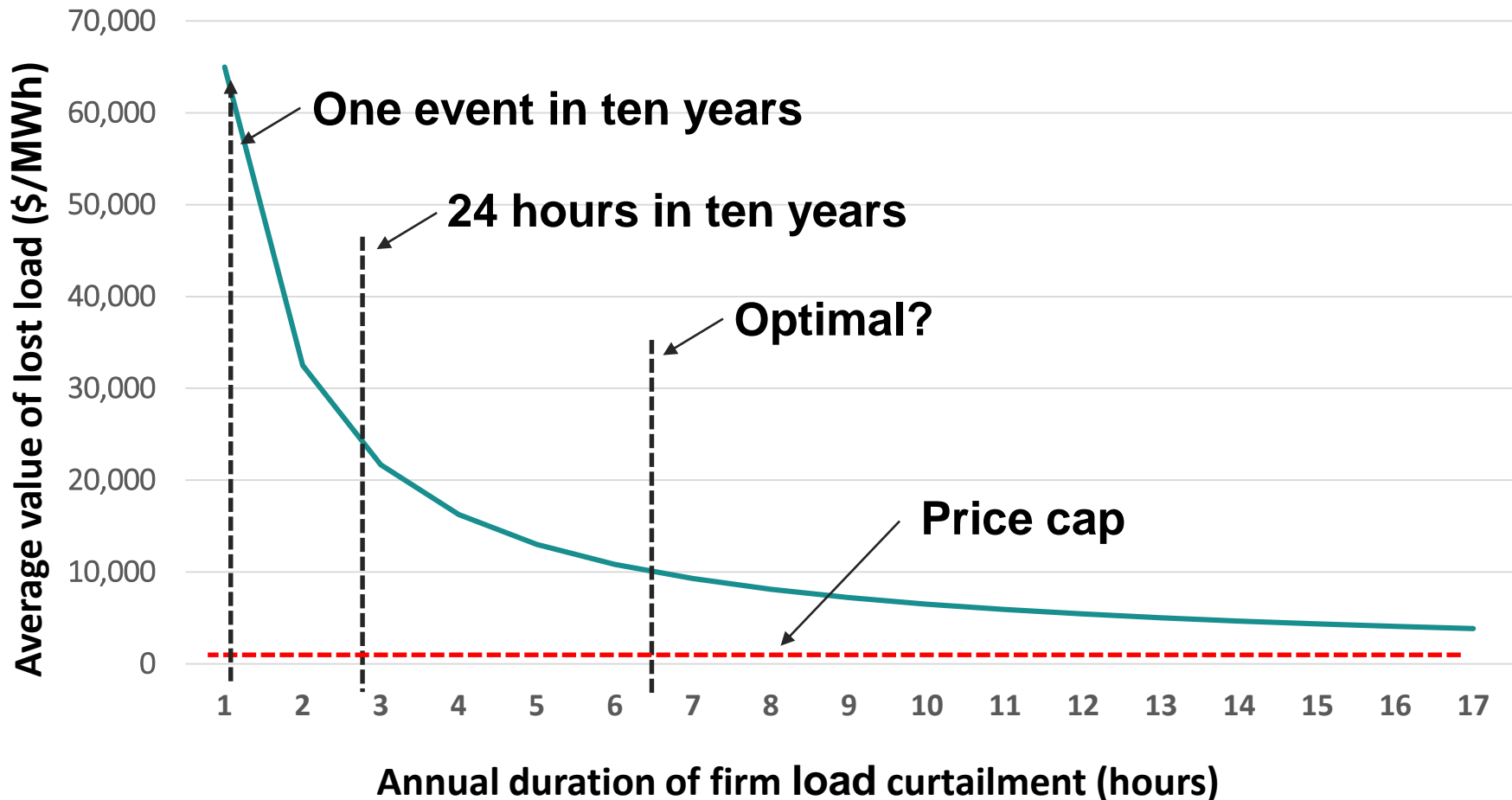
Lessons learned from many jurisdiction prove for required examples

- Reliability - definition and mechanism
- Location matters
- Need for flexibility
- Demand side integration

# 2a

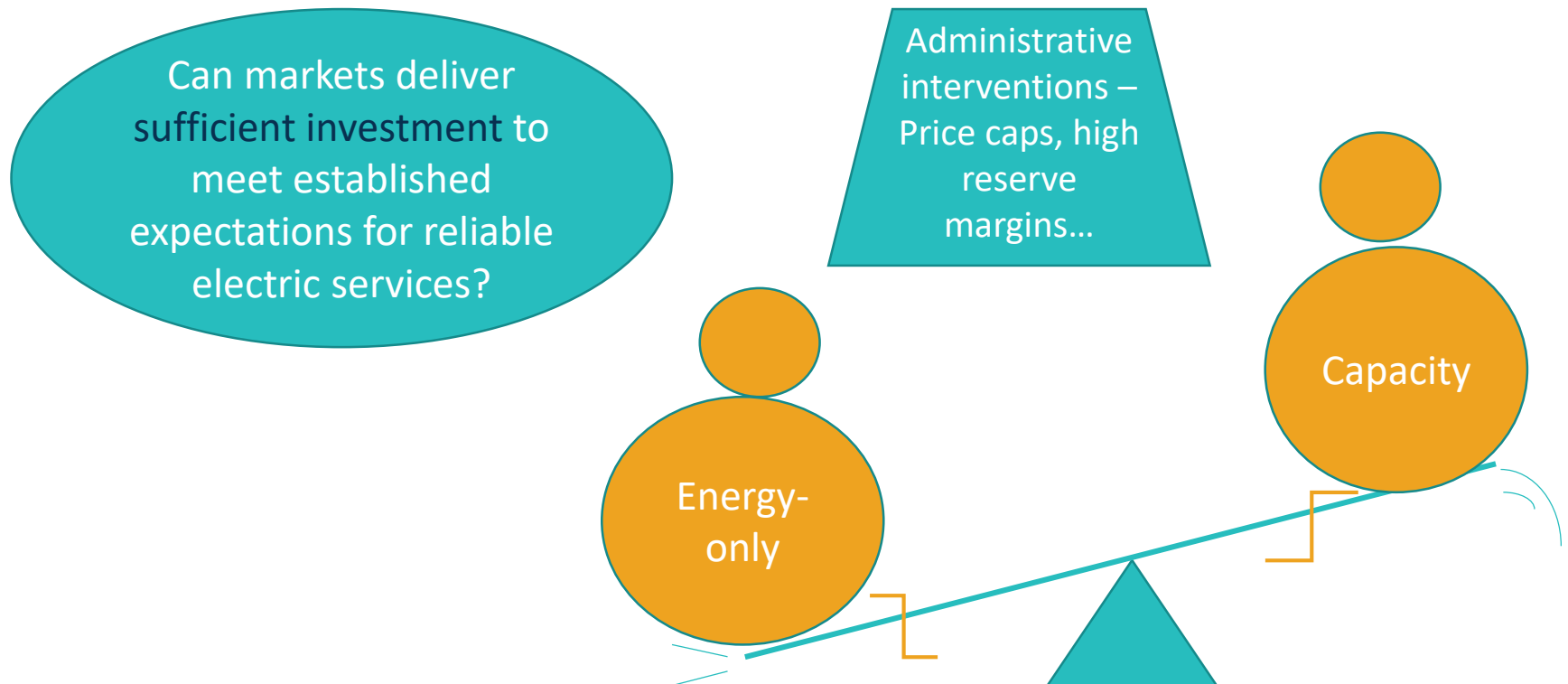
## Delivering reliability at least cost

# Reliability, objectively

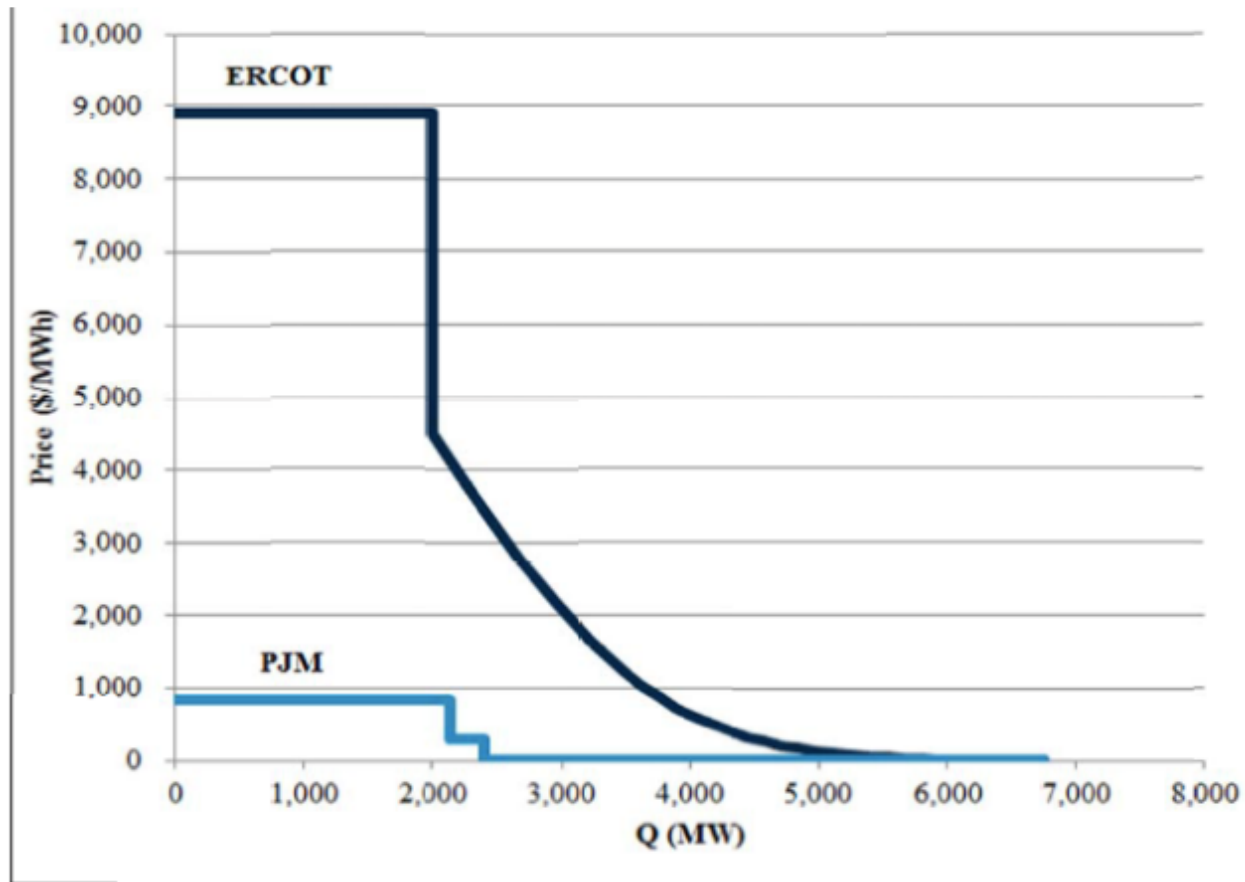


# What is the role of markets?

Deliver reliability at least cost

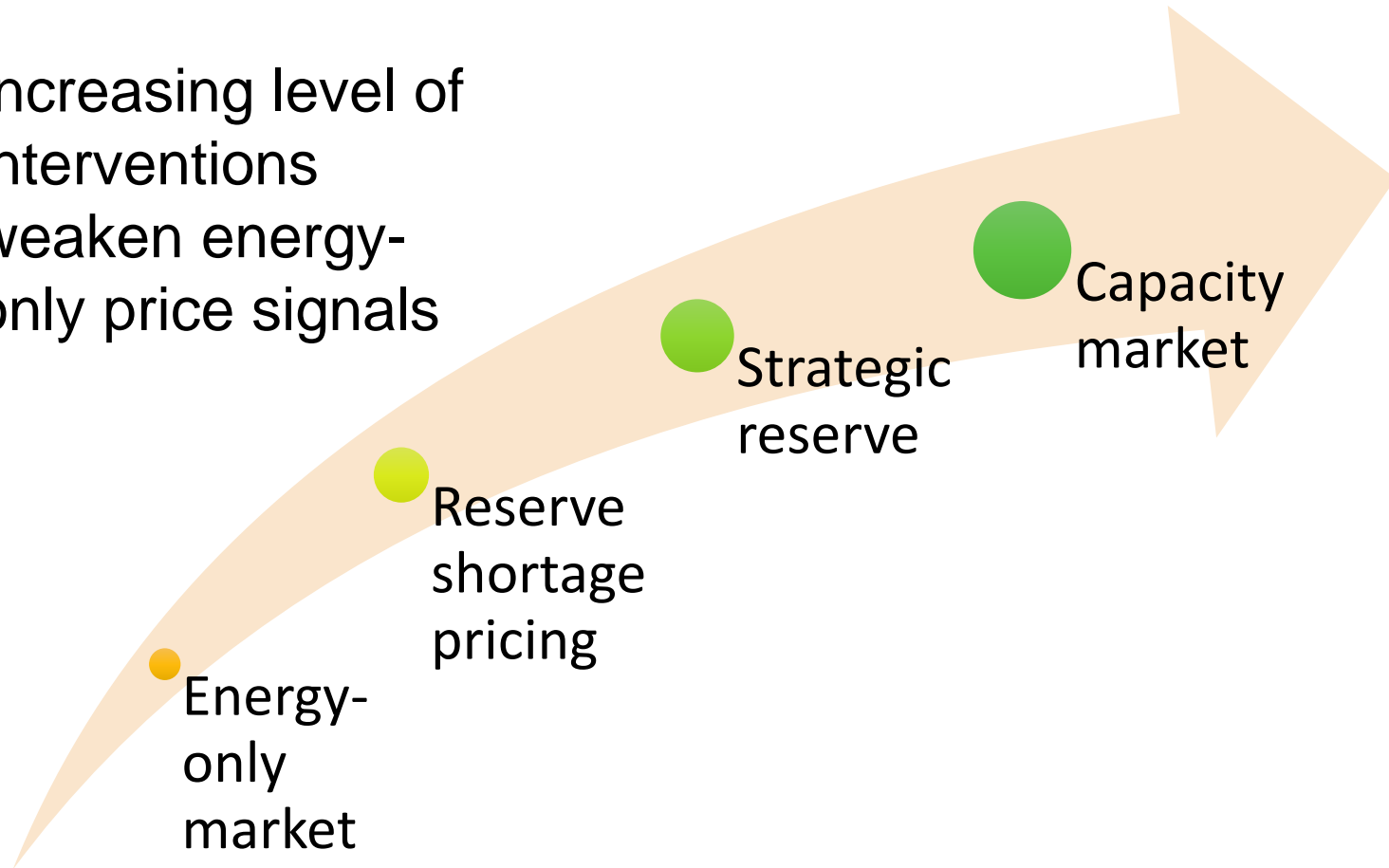


# Operating Reserve Demand Curve in Texas/ERCOT and PJM



# Increasing administrative “reliability” interventions harm market benefits

⇒ Increasing level of interventions weaken energy-only price signals

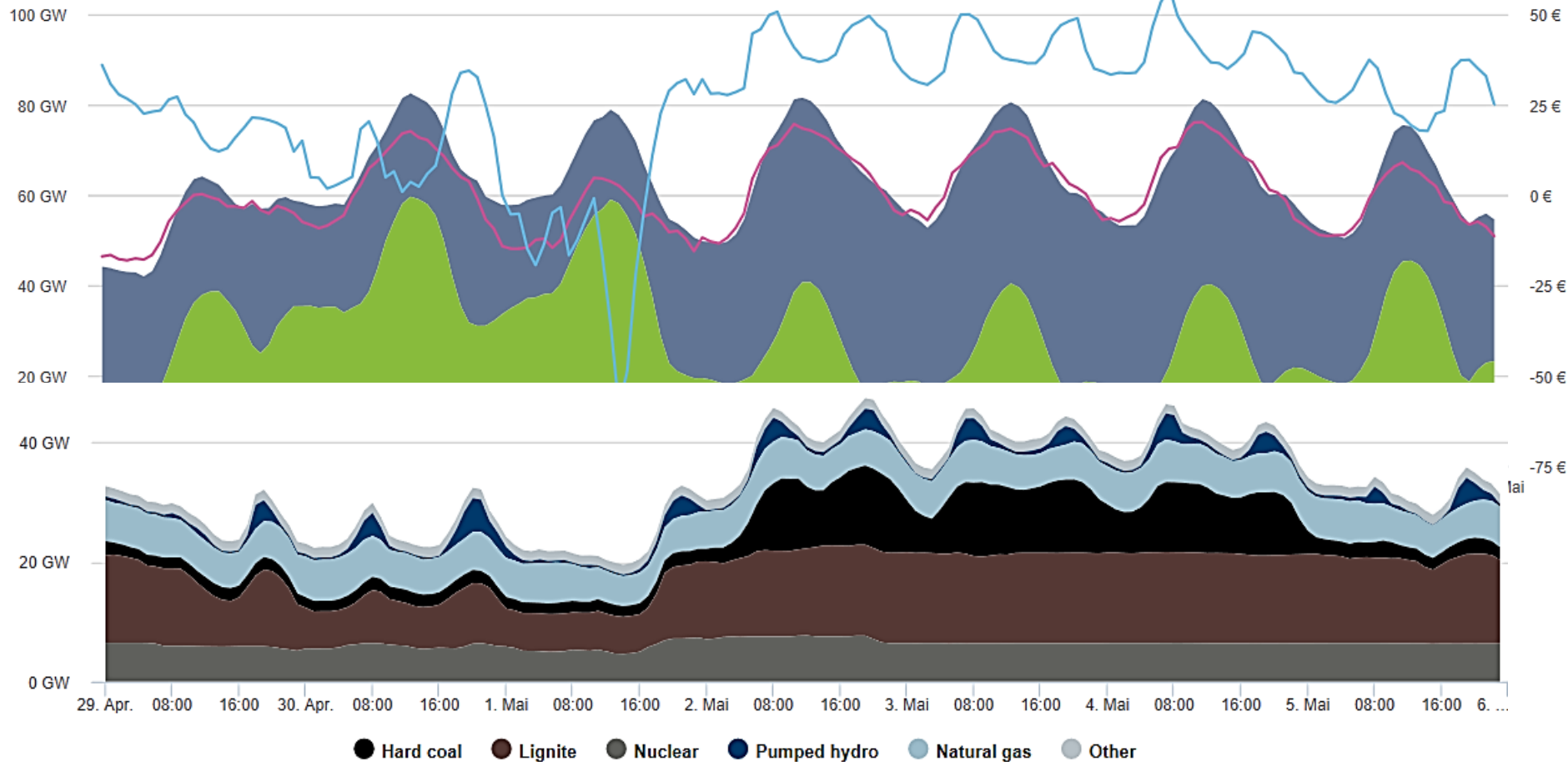




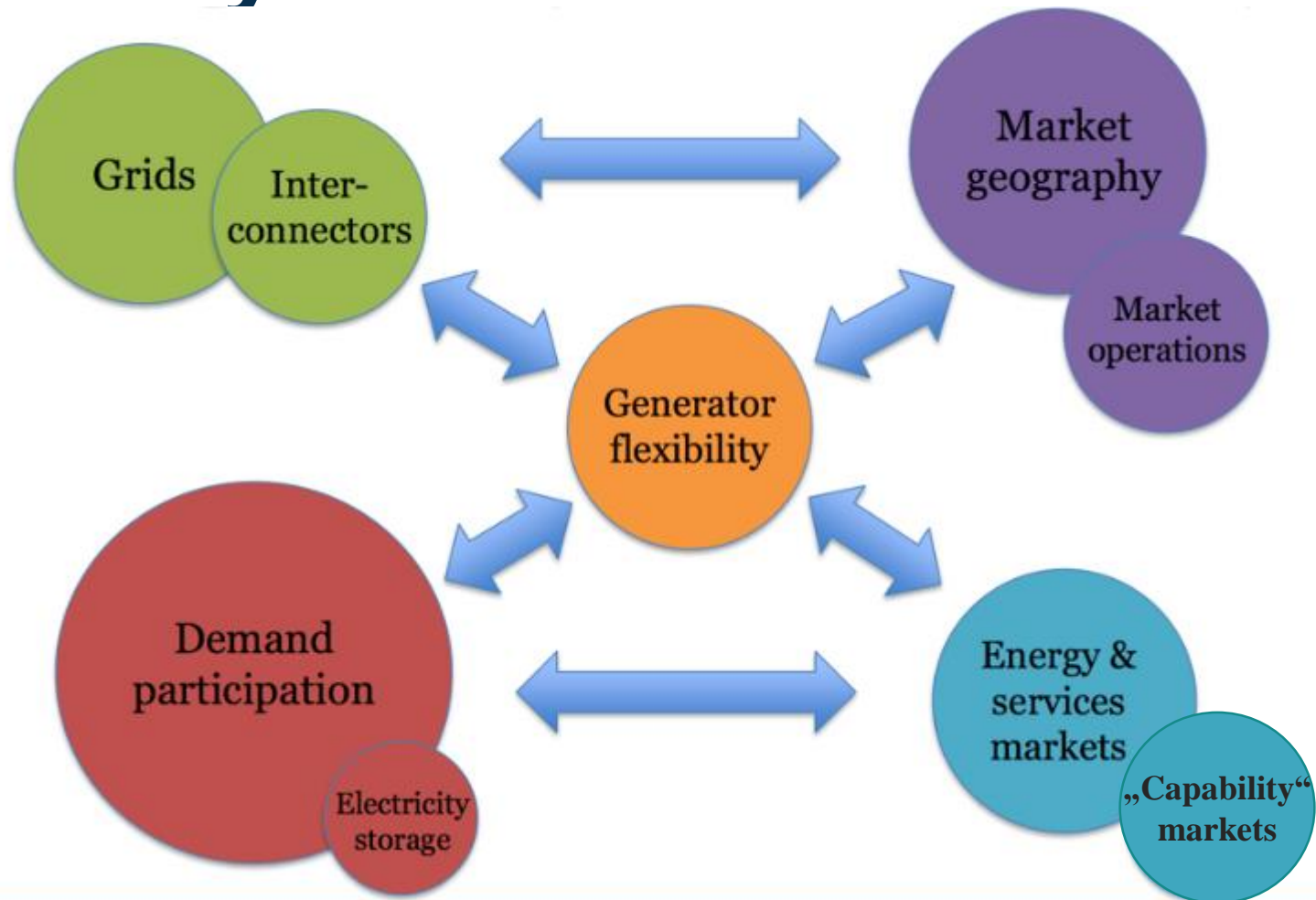
# 2b Increasing need for flexibility



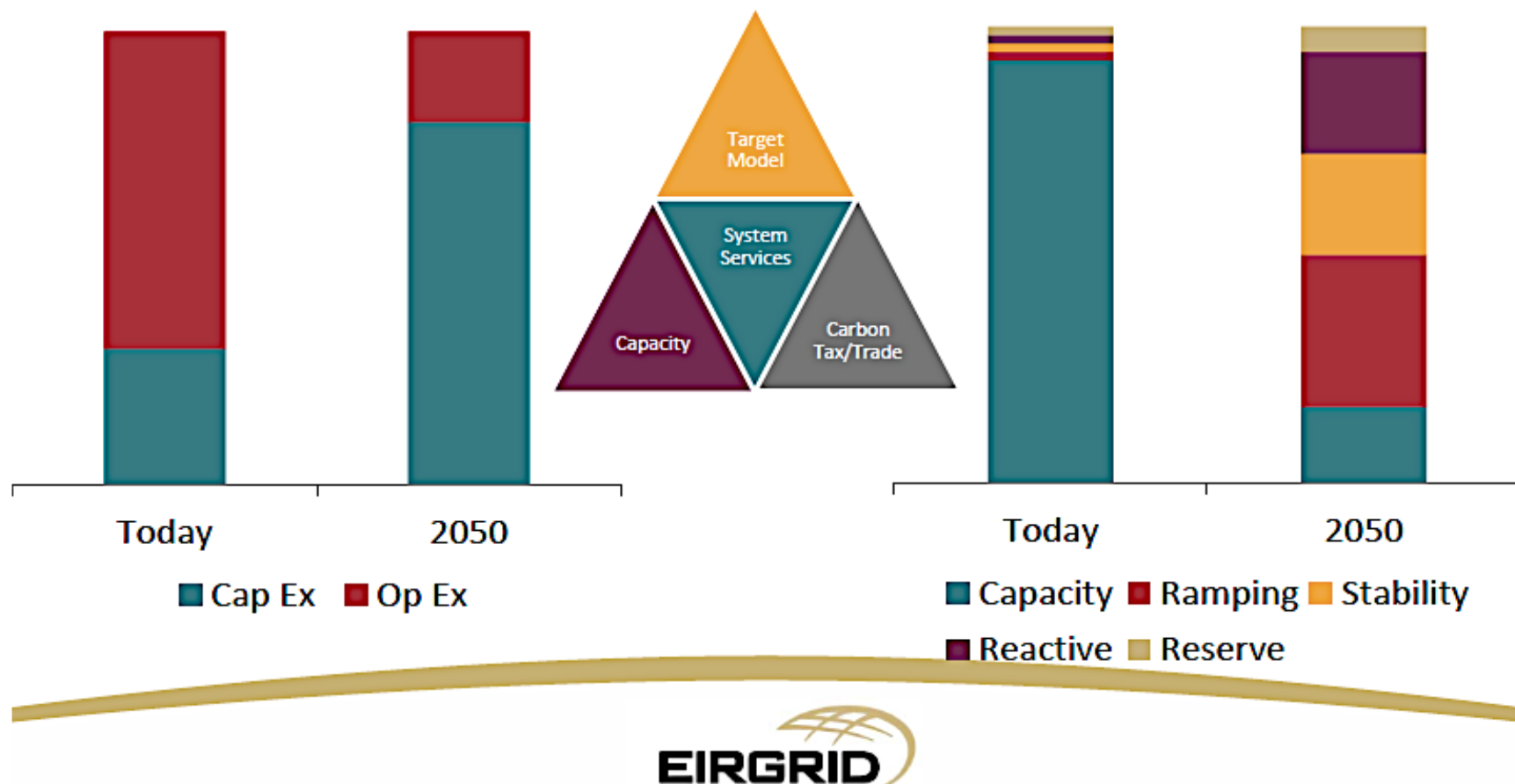
# RE supply drives need for flexibility and power prices, e.g. in Germany



# There are many sources of flexibility



# Toward capability, not capacity



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# Regulatory requirements

To achieve system security and resource adequacy (the two dimensions of reliability) at least cost, flexibility is key.

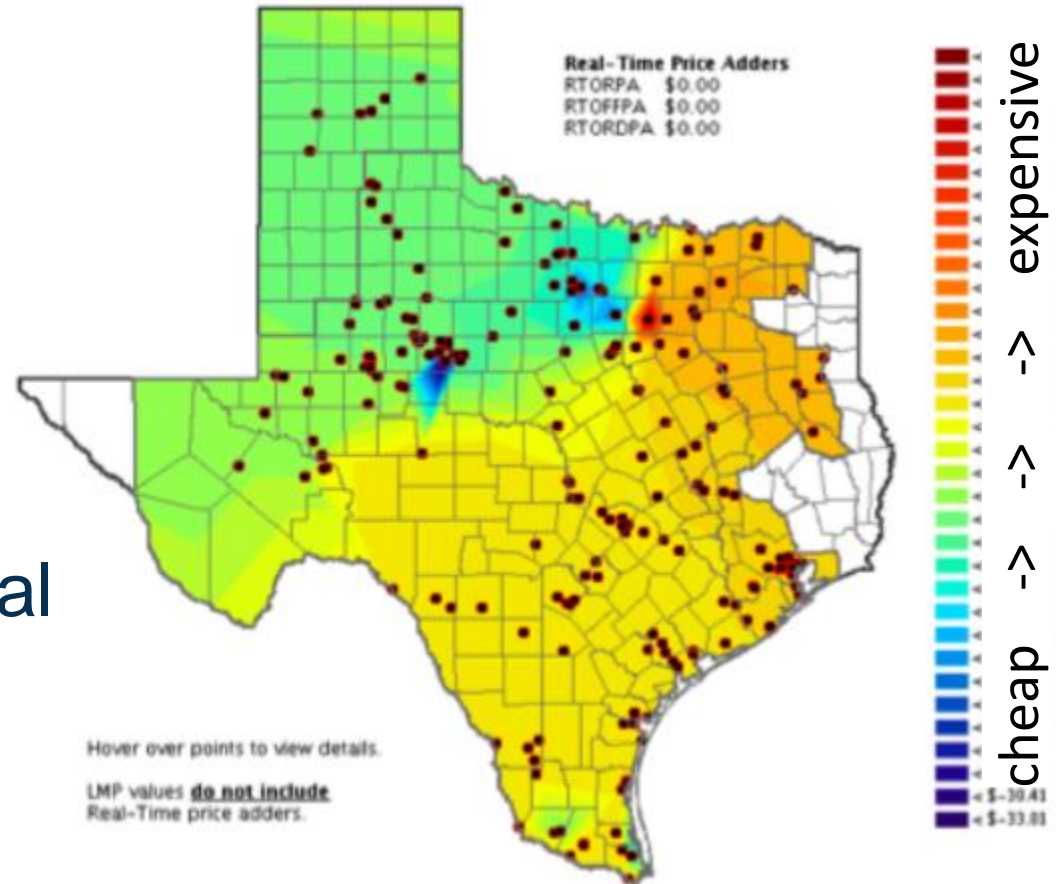
- Focus on capability instead of capacity
- System services with ramping quality
- Storage e.g., along with supply and demand
- Increase balancing areas (to limit flexibility need)
- Shorten dispatch intervals

# 2c Considering locational value

# Locational value

The value of power supply is linked to location, due to availability of (un-) congested networks

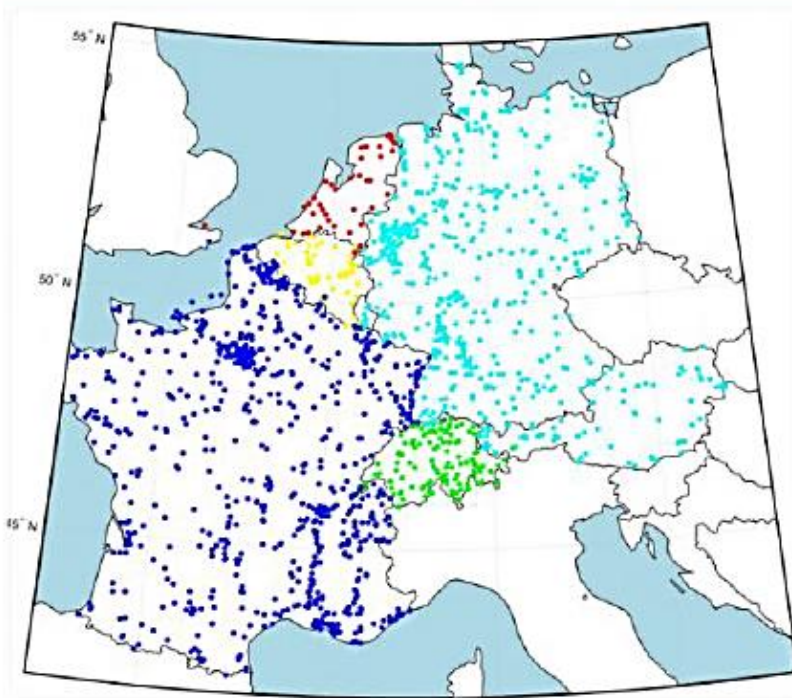
This locational marginal pricing (LMP) is addressed by nodal pricing, e.g. in the US



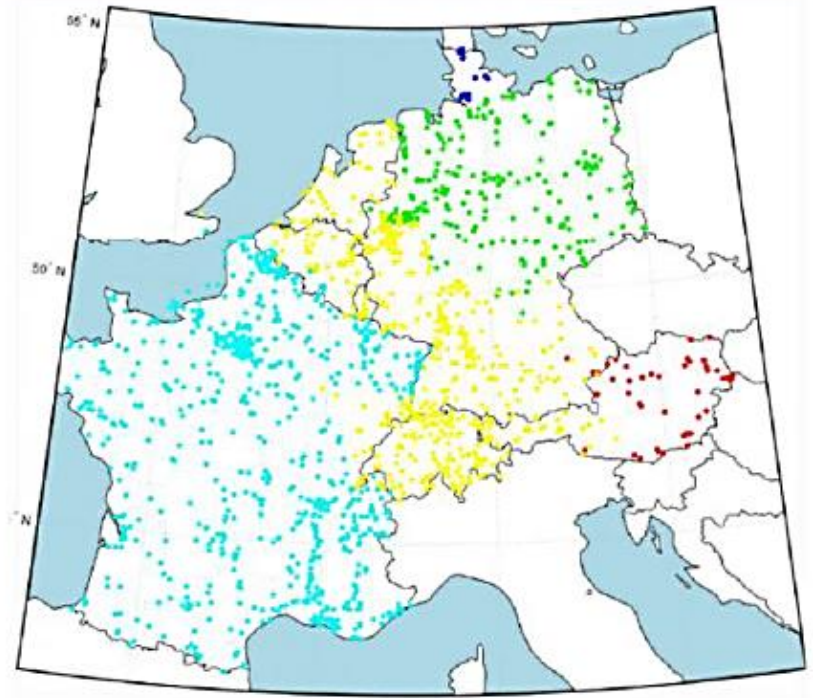


# Europe: Locational value not reflected in national bidding “zones”

Current Configuration



Optimized 5-zone Configuration



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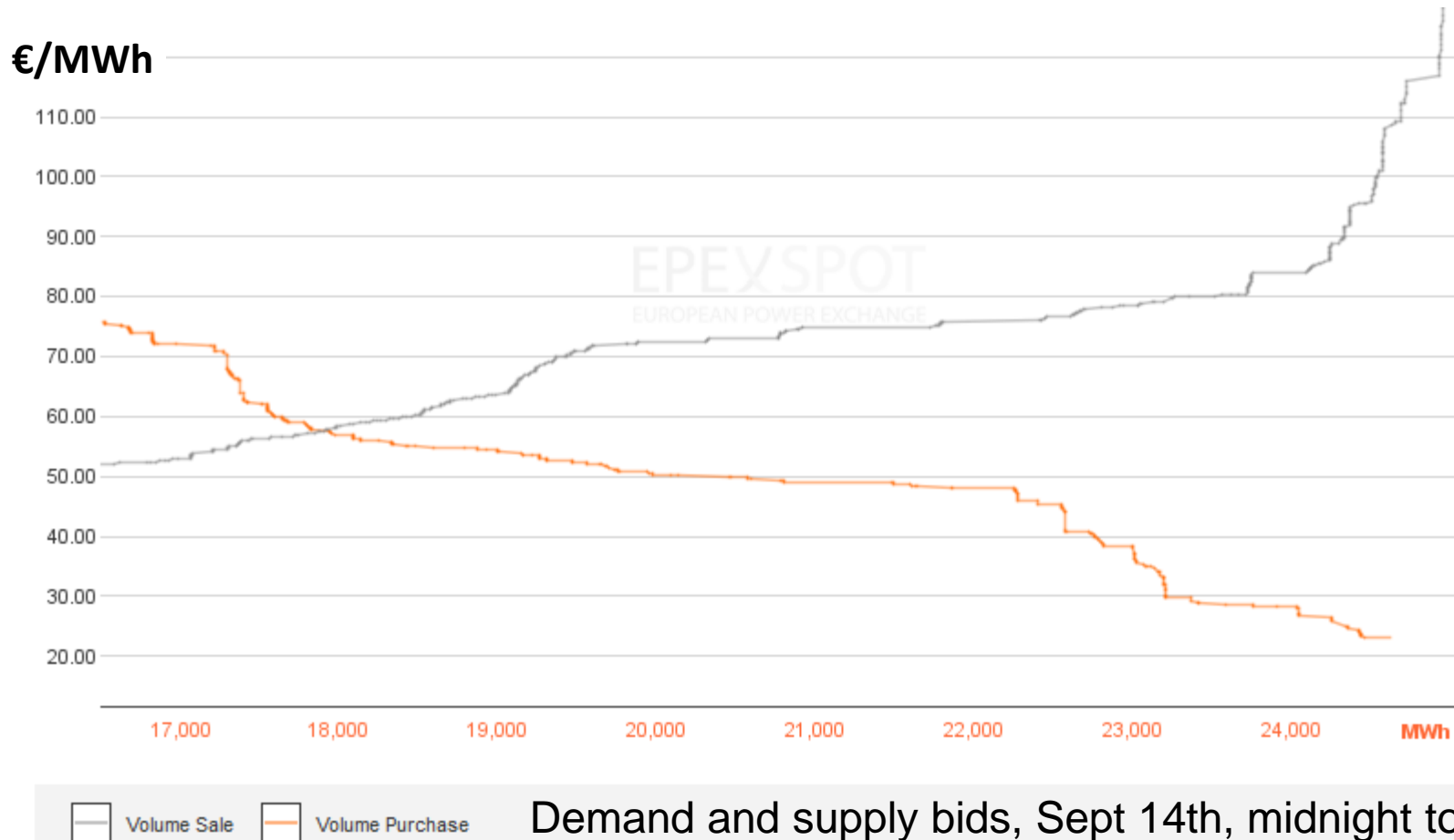
# Regulatory considerations

- Location-related marginal costs need to be reflected in market prices
- Transition from one to another system is difficult/expensive
- Bidding zones only as a quick fix/interim solution
- In the long run, nodal pricing is the only cost-efficient solution

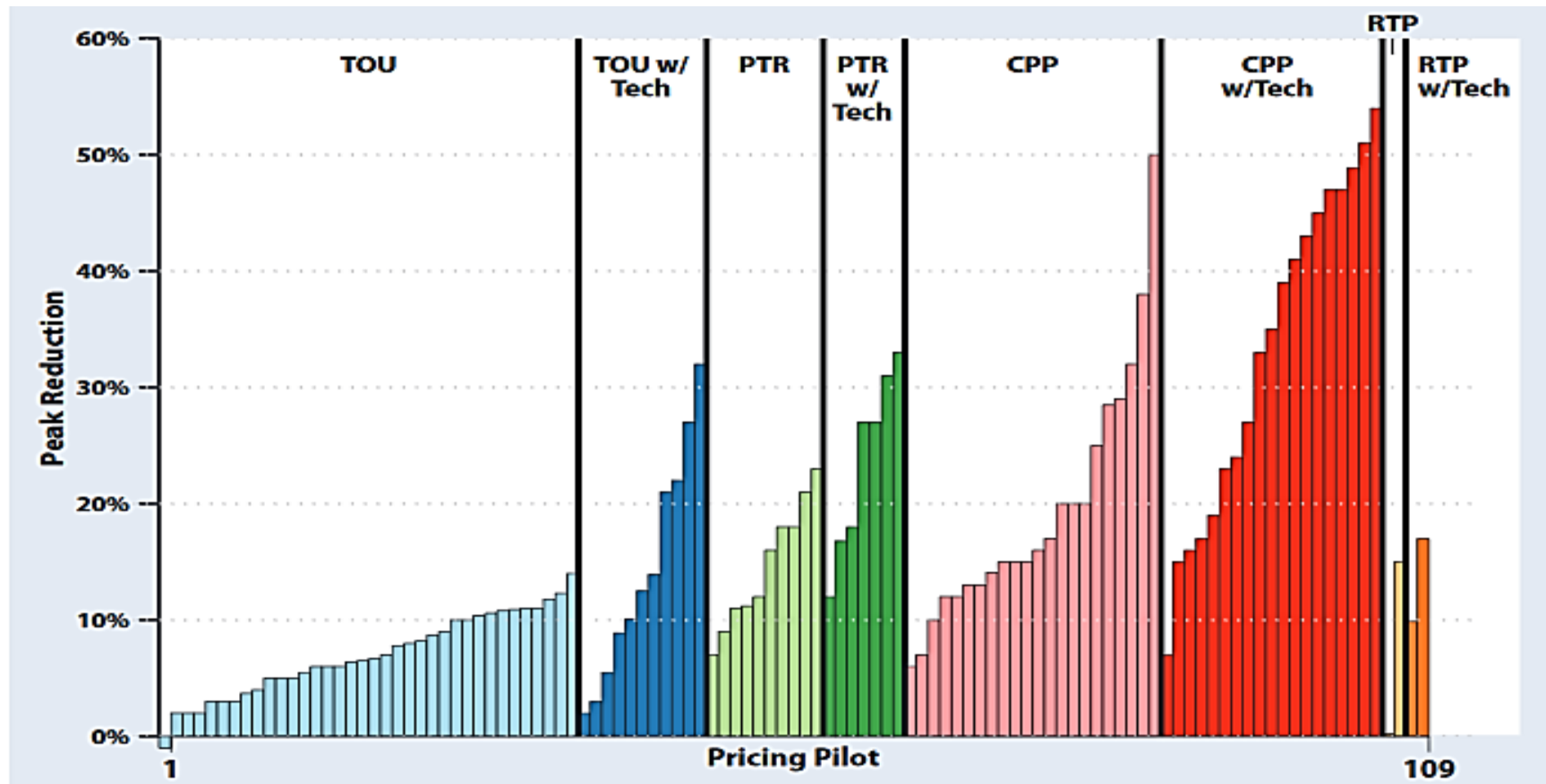
# 2f

## Benefits from demand side resources

# Demand is willing to respond – screen shot of German demand



# Customers' peak demand reduction from time-varying rate pilots



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# Regulatory consideration

Because supply is not an end in itself, it is needed to satisfy demand:

- Consider the benefit of savings and the shift in load compared to supply and transmission investments
- Create markets with fair competition for all resources, including demand-side resources



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# Key message

- Optimizing overall system **flexibility** is the key to cost-effective reliability
- Of the many possible sources of flexibility, flexible **demand** is likely to be the lowest cost, the most readily available and the least well developed
- **Well-regulated** competitive markets that price energy, based on its true **locational marginal cost** and drives those price signals to all customers able and willing to respond to them is essential

# About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at [raponline.org](https://raponline.org)



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