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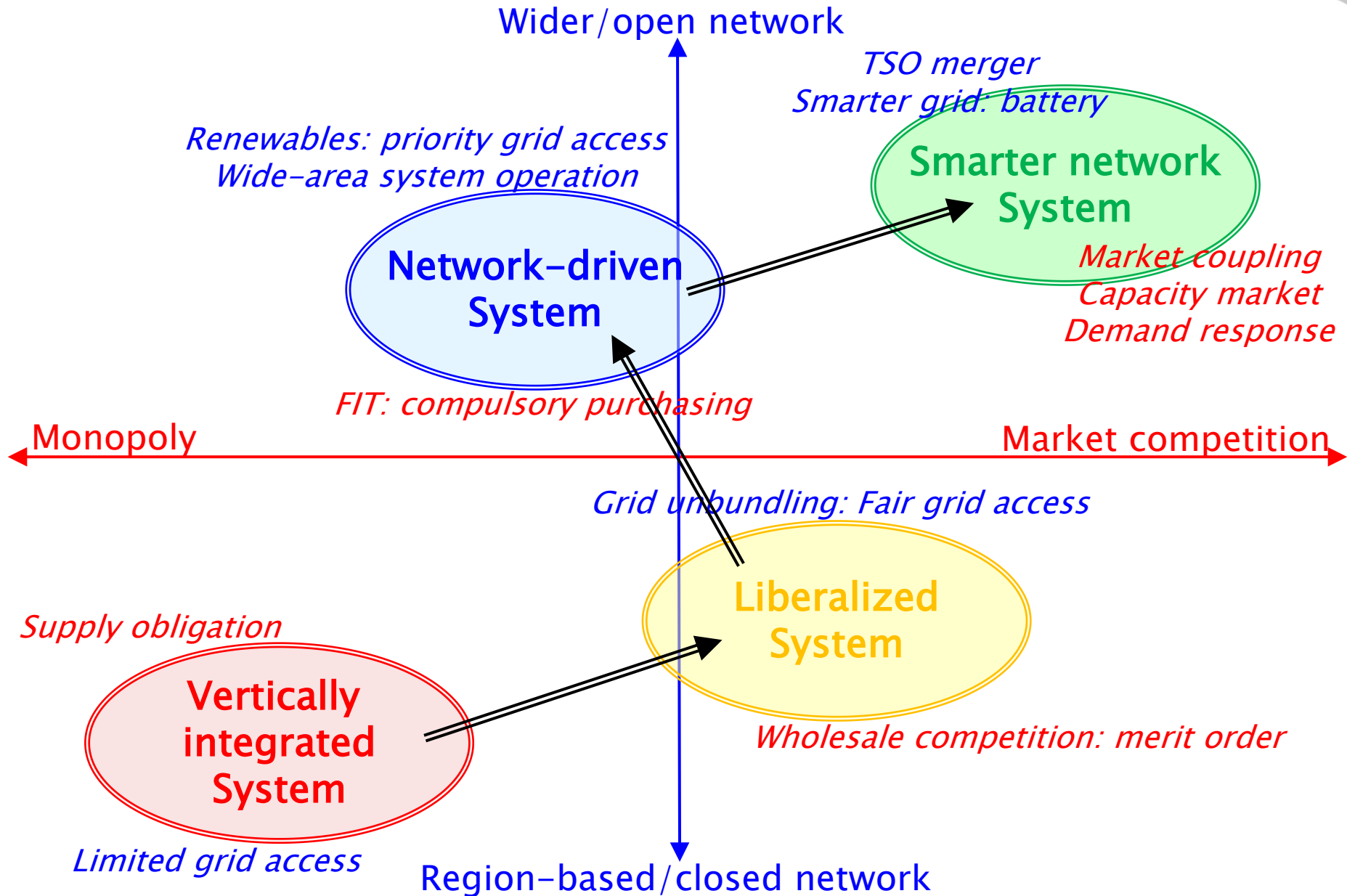
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# Reforming Japan's Electricity System for Distributed Generations

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# Evolution of Electricity Systems



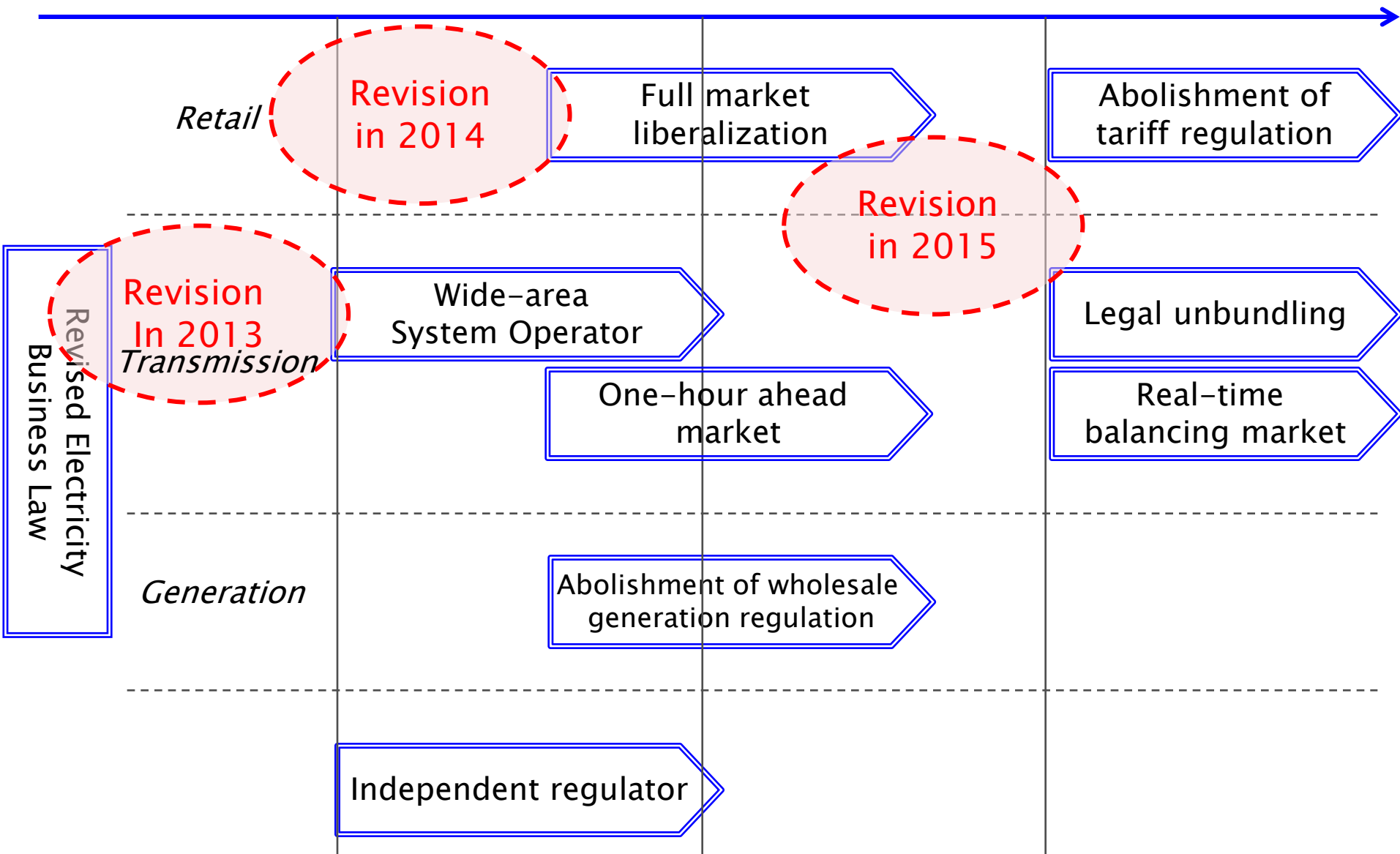
# Learning from Japan's Rolling Blackout

## Causes of Large-scale Rolling Blackout in March 2011

1. Heavy dependence on large-scale centralized generations
  - ⇒ need more distributed generations : fair grid access
2. Limited interregional power flow
  - ⇒ need a mechanism of wide-area system operation
  - ⇒ need larger capacity of interregional grid
3. Limited use of price mechanism
  - ⇒ need competitive market
  - ⇒ need a smarter mechanism of demand response

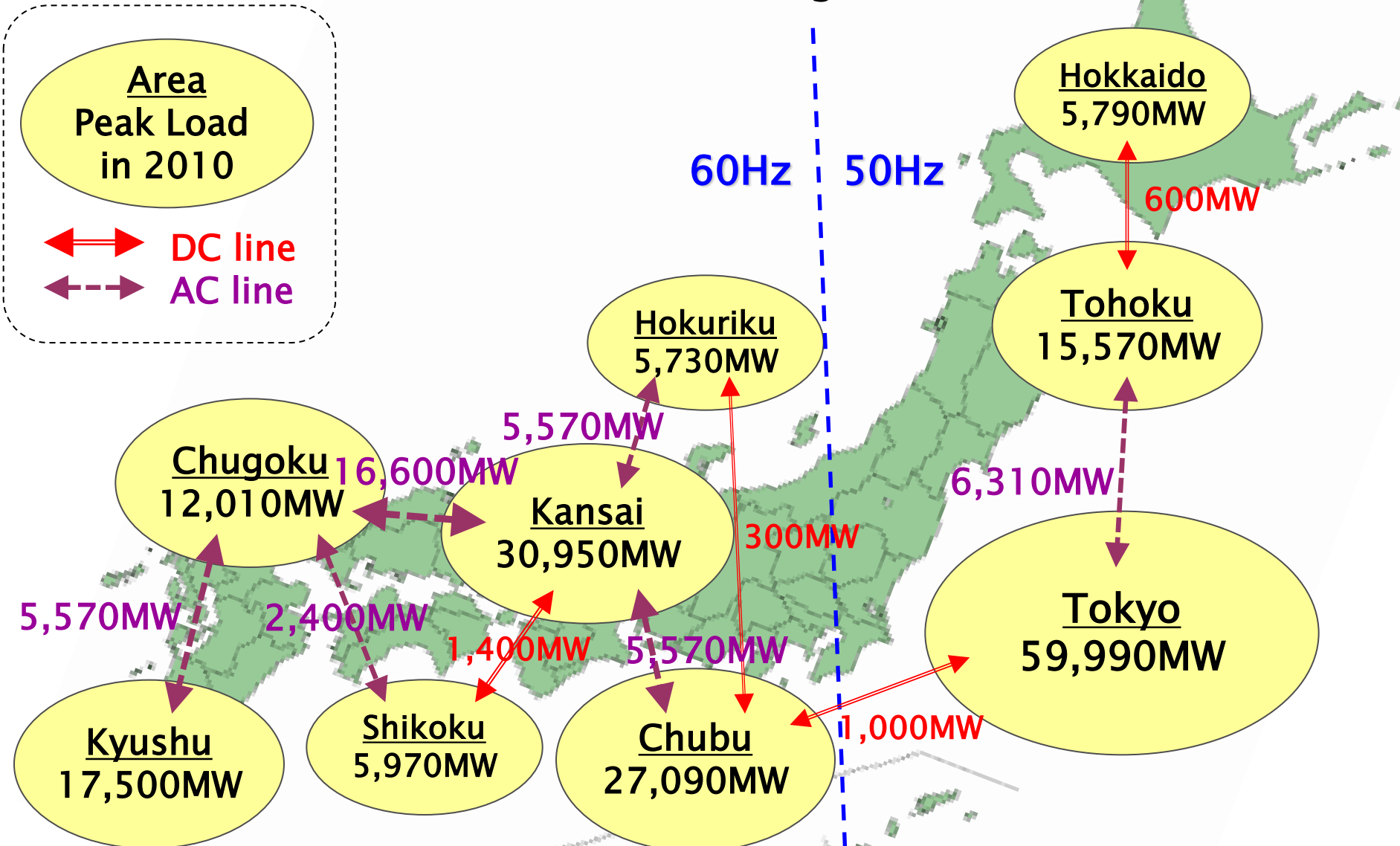
# Flowchart of Electricity System Reform

FY2013    FY2014    FY2015    FY2016    FY2017    FY2018    FY2019    FY2020

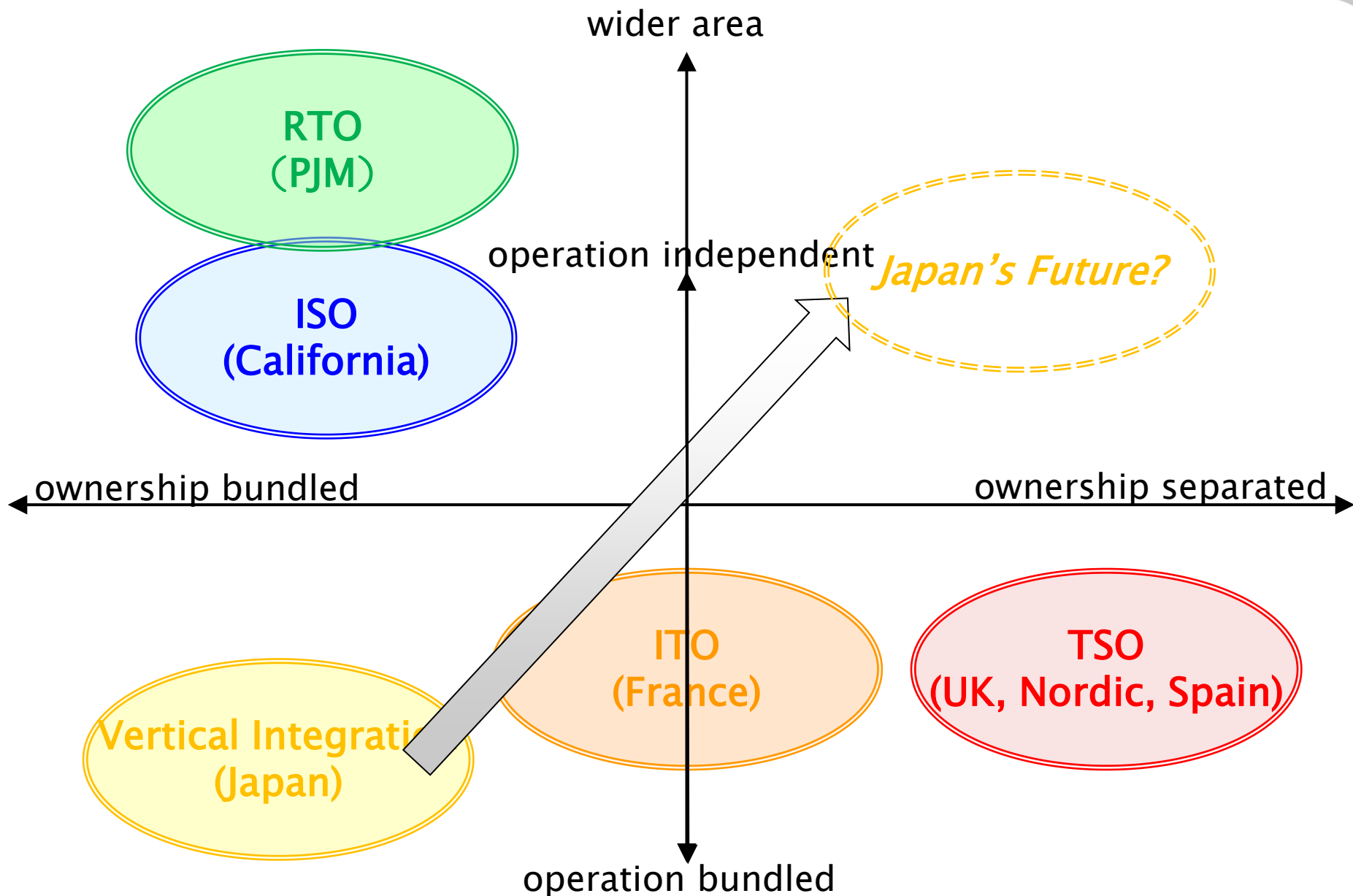


# Limited Power Flow across Regions

- 9 Utilities and Inter-regional Grid -

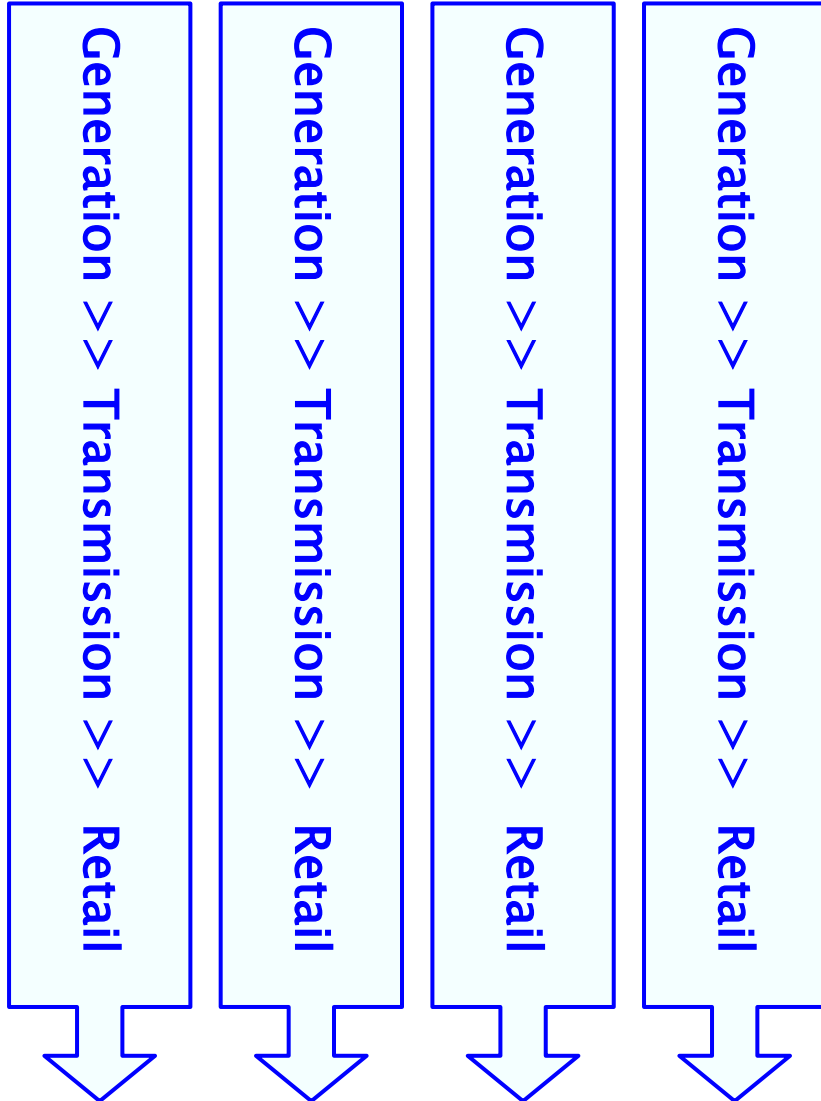


# Purposes of Grid Unbundling

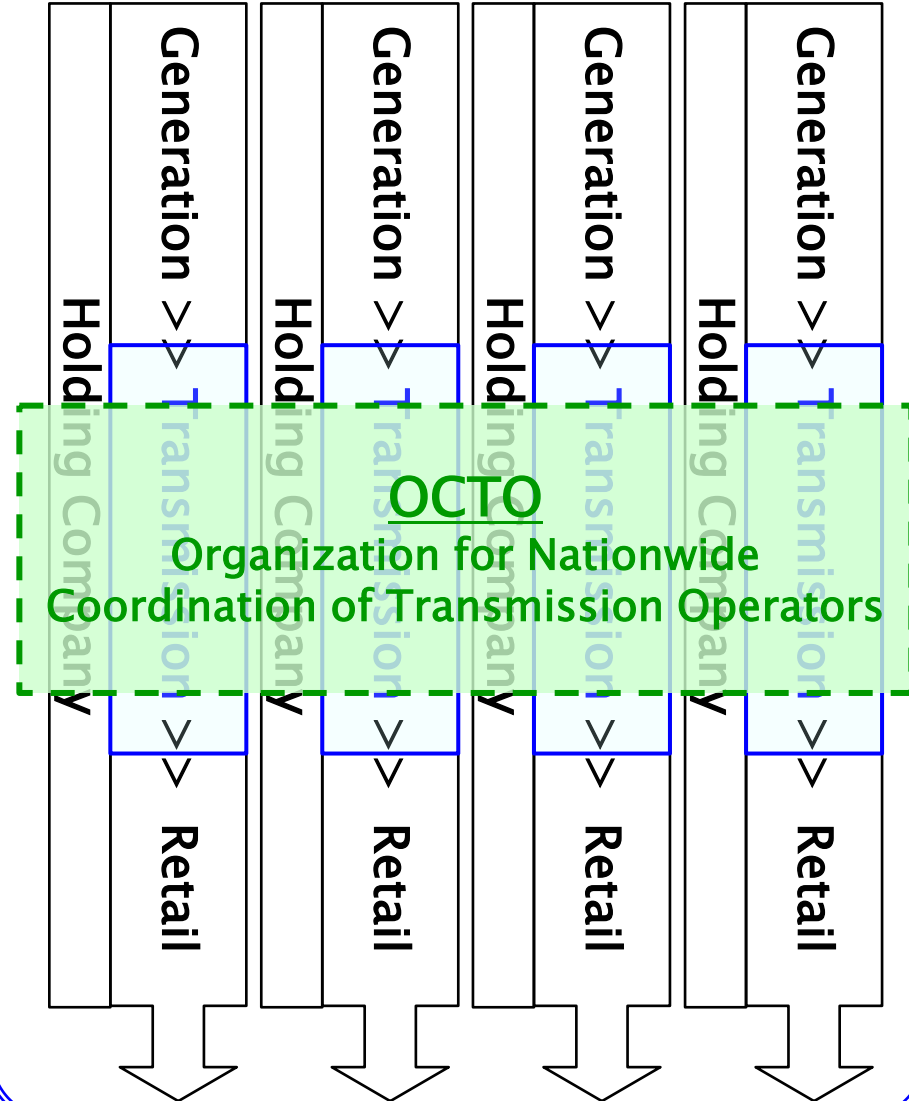


# Neutral + Wide-area System Operation

## Present: Vertical Integration

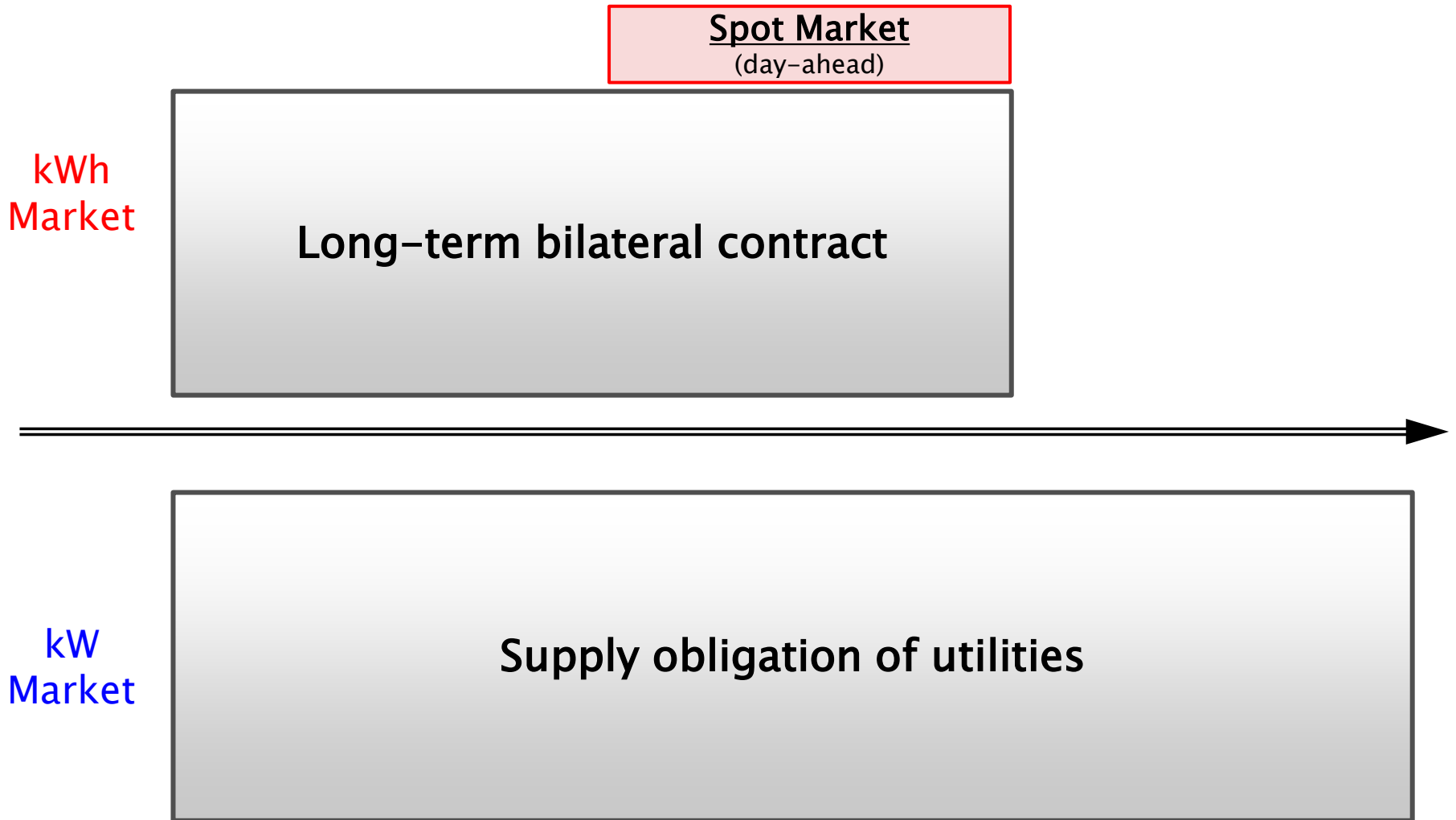


## Post-unbundling



# Design of Power Market

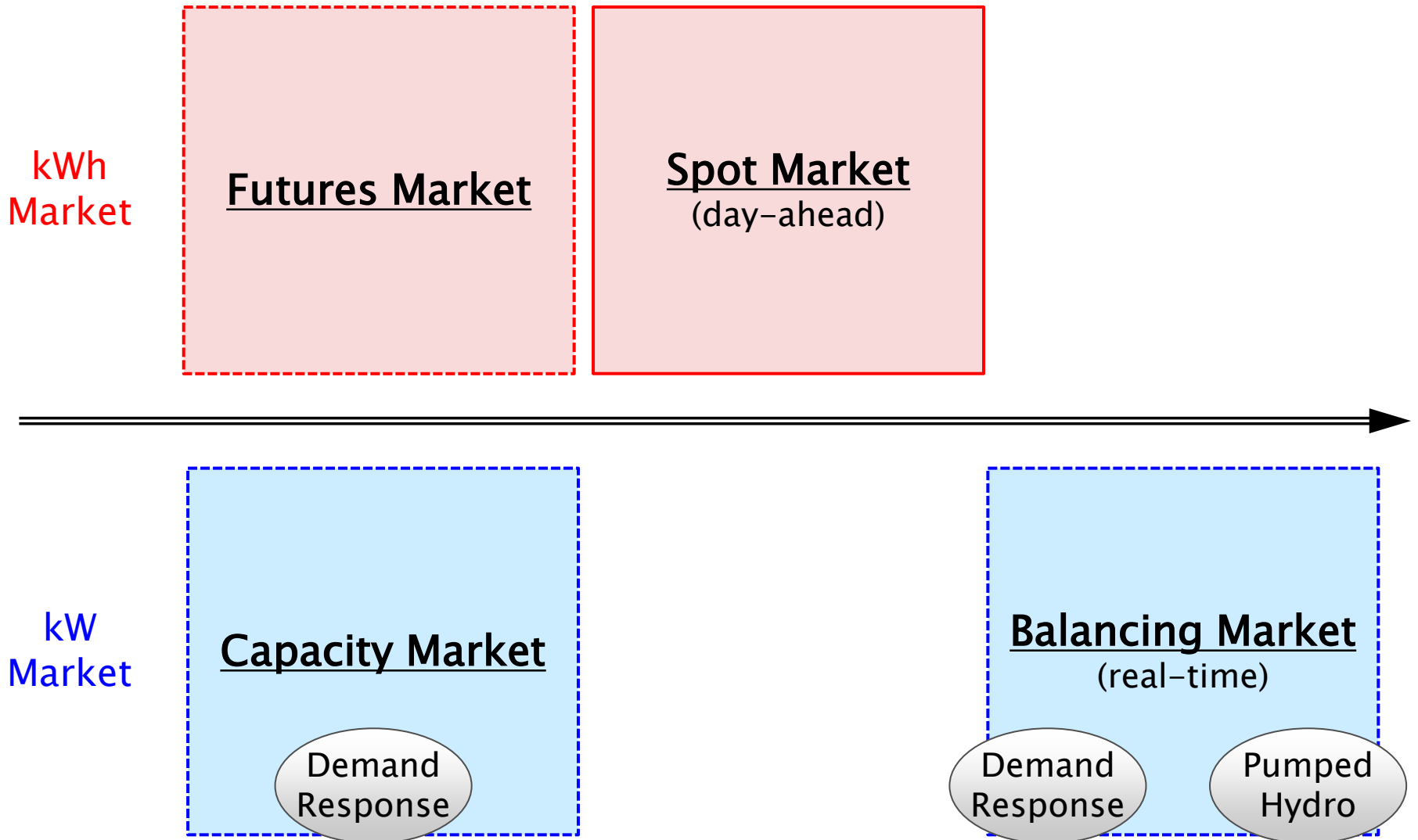
## Japan: Vertically Integrated System





# Design of Power Market

## Post-reform: Smarter System



# Proposals for the Successful Reform

## OCTO

- Higher authority for interregional operation and grid expansion
- Neutrality of personnel

## Legal Unbundling

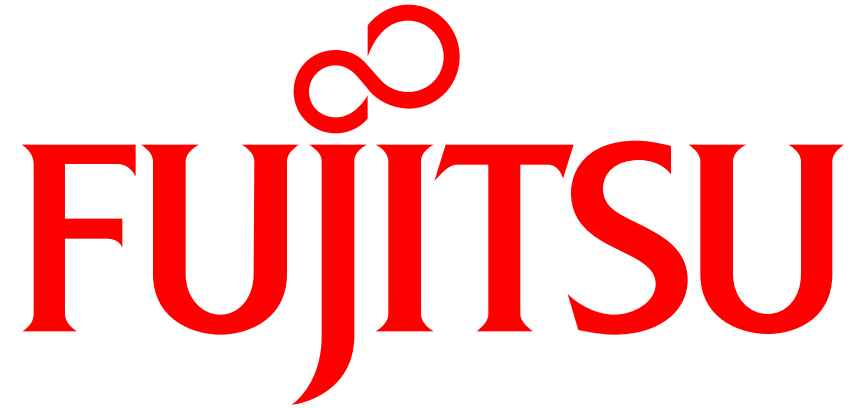
- Stricter behavioral regulation
- Accelerated implementation
- Transition to ownership unbundling

## Design of Power Market

- Compulsory tendering of surplus capacity
- Partial divestiture of generation capacity
- Introduction of capacity market

## Independent Regulator

- Higher neutrality and specialty
- Higher authority to promote competition



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