



Demand Response

- As the Tool of Flexibility -

DK Kim

Senior Energy Specialist (Smart Grids)

SDSC-ENE/SDCC



Contents

- I. Background
- II. Unlocking System Flexibility
- III. Demand Response
- IV. Recommendation

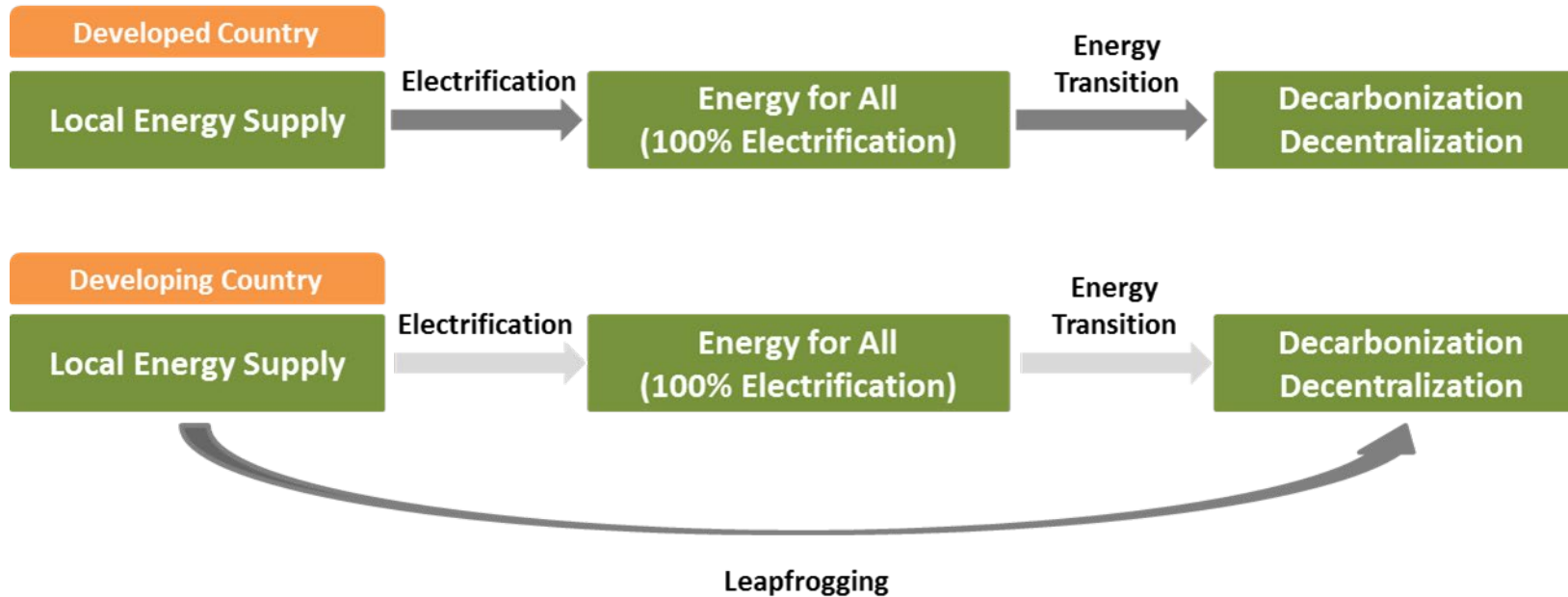


Background



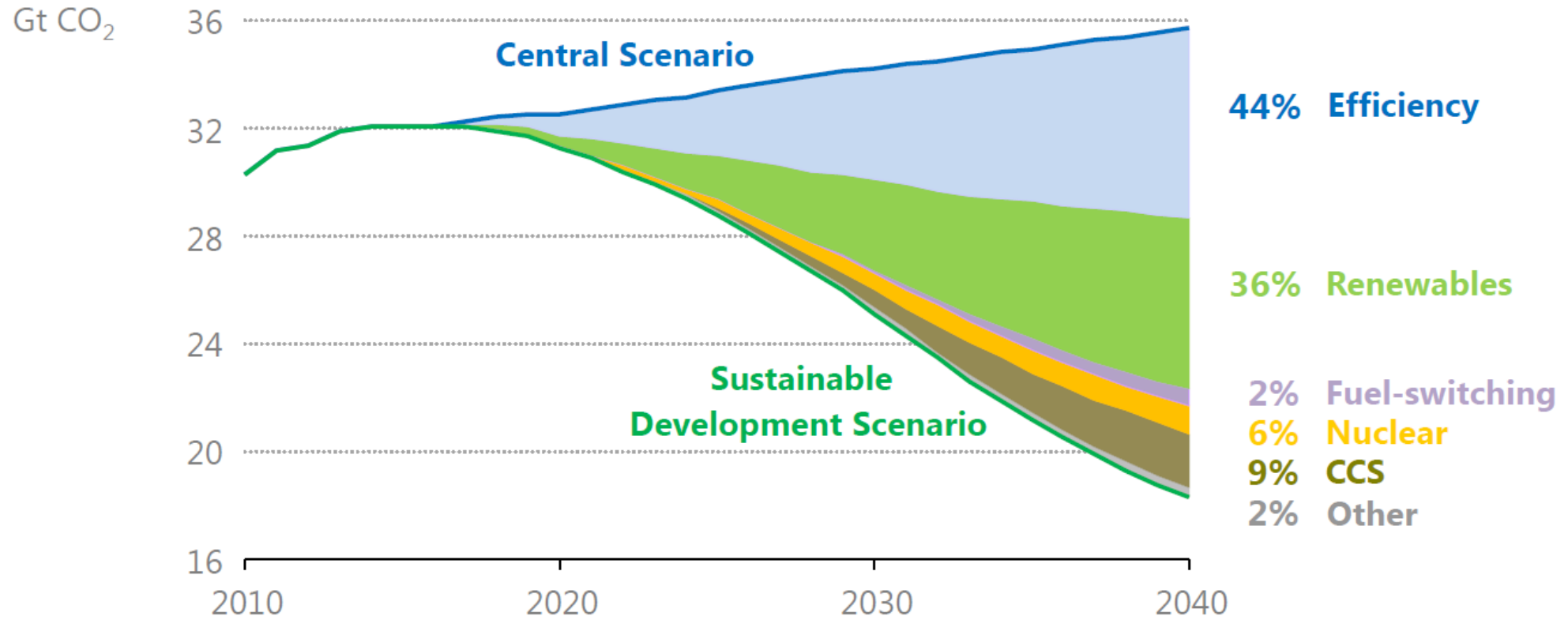
Energy Transition

□ Energy transition is generally defined as a long-term structural change in energy systems.



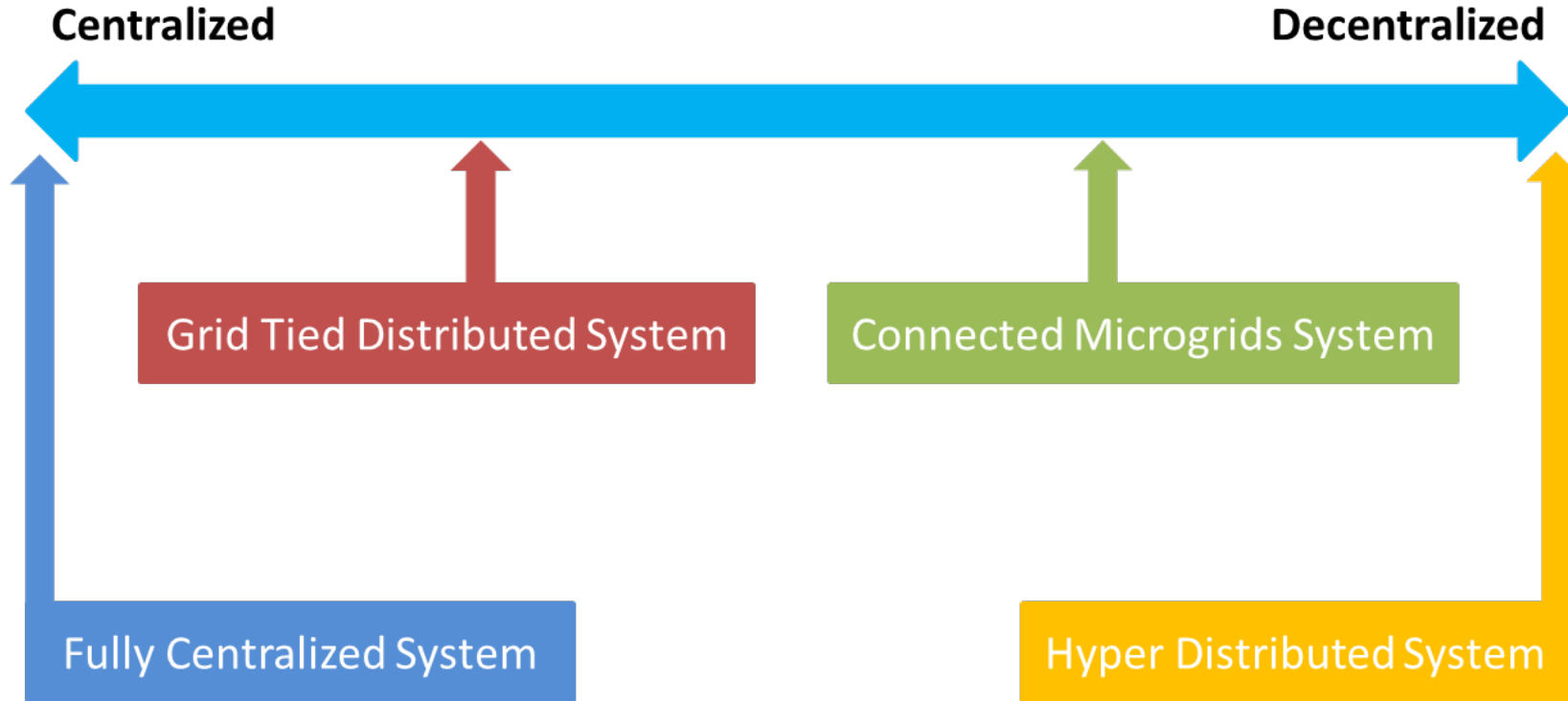


Decarbonization



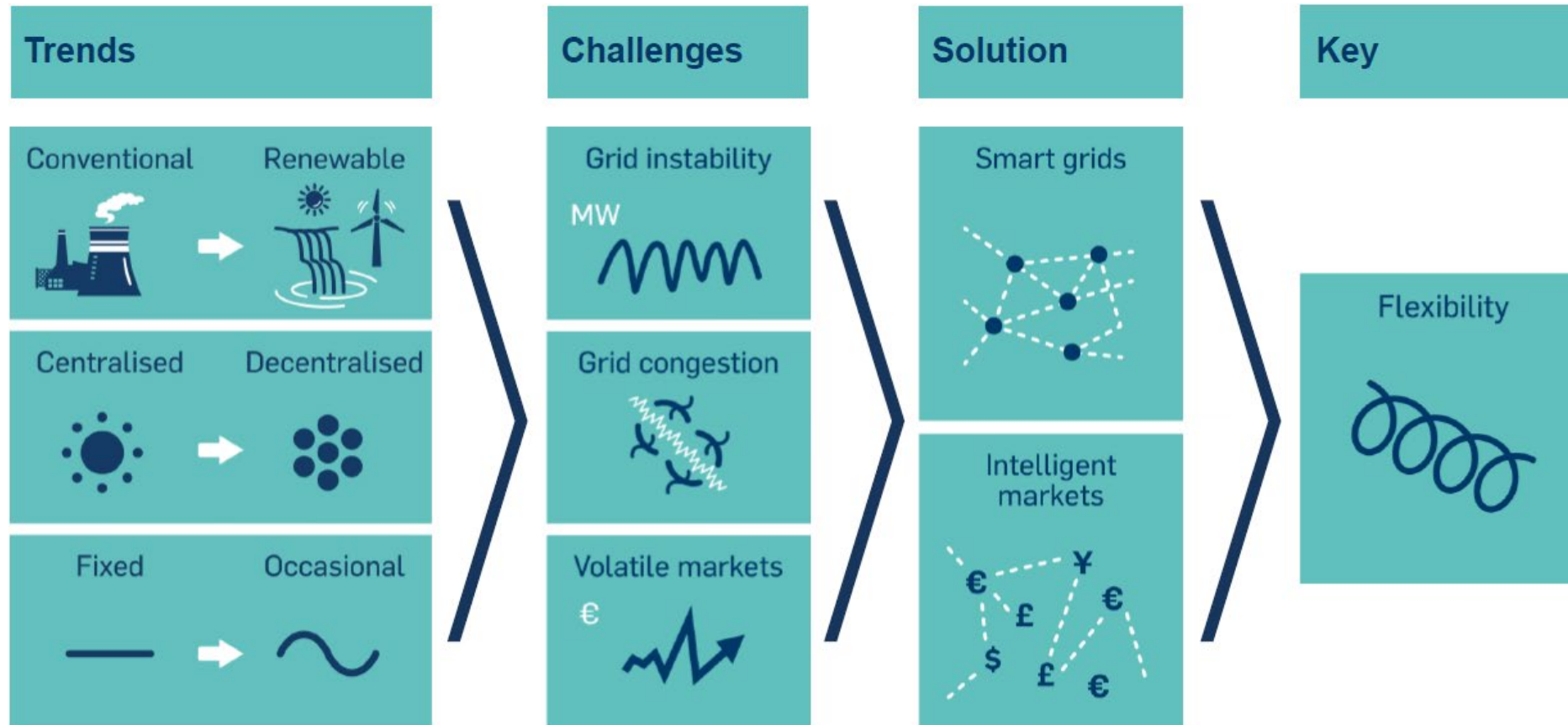


Decentralization





Flexibility is Key in Future Energy Systems



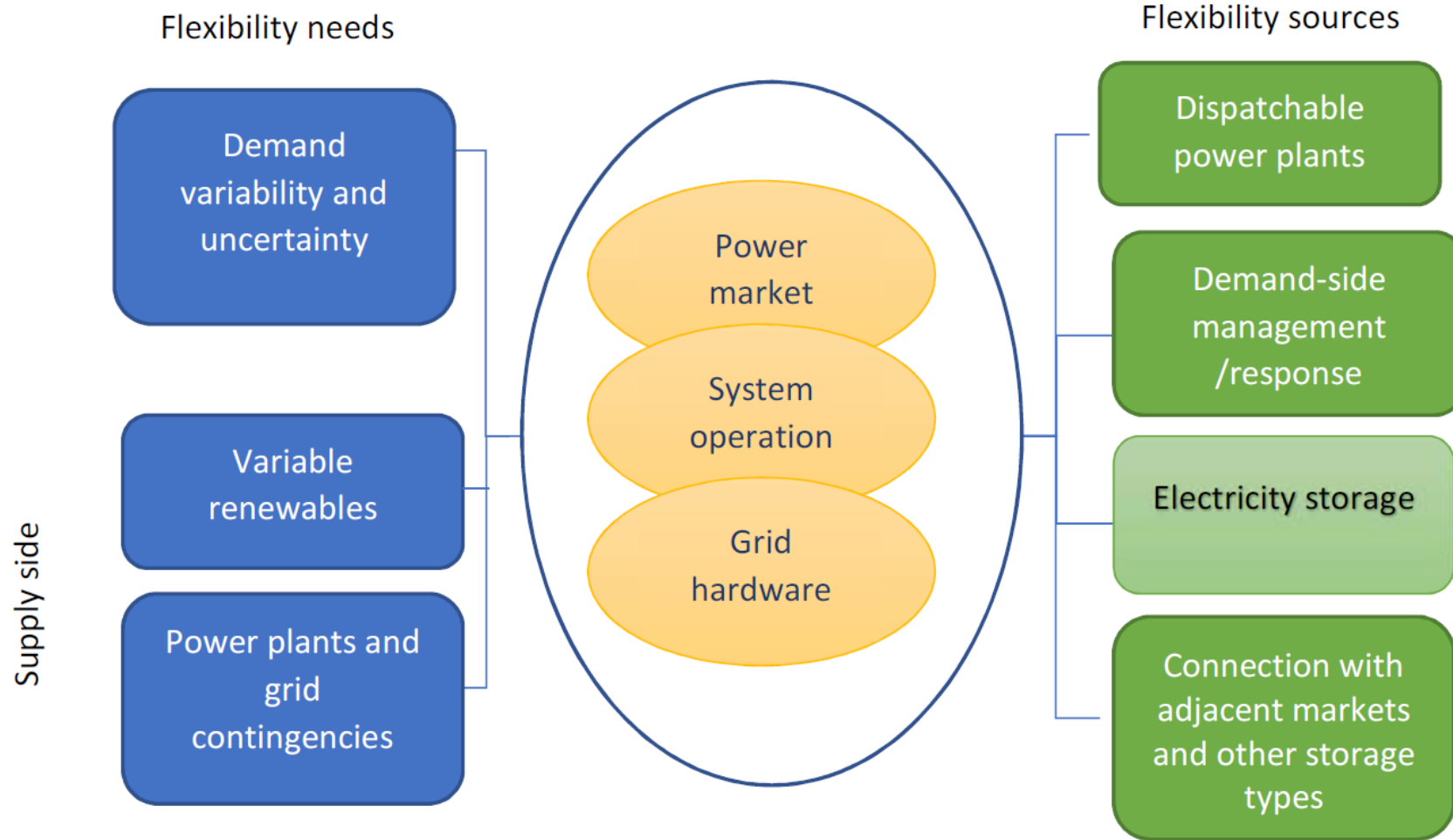
From: http://www.gaccsouth.com/fileadmin/ahk_atlanta/Bilder/Consulting/Federal_Projects/Energiedialog/8_DEUCHERT_-_Ancillary_services_etc..pdf



Unlocking System Flexibility



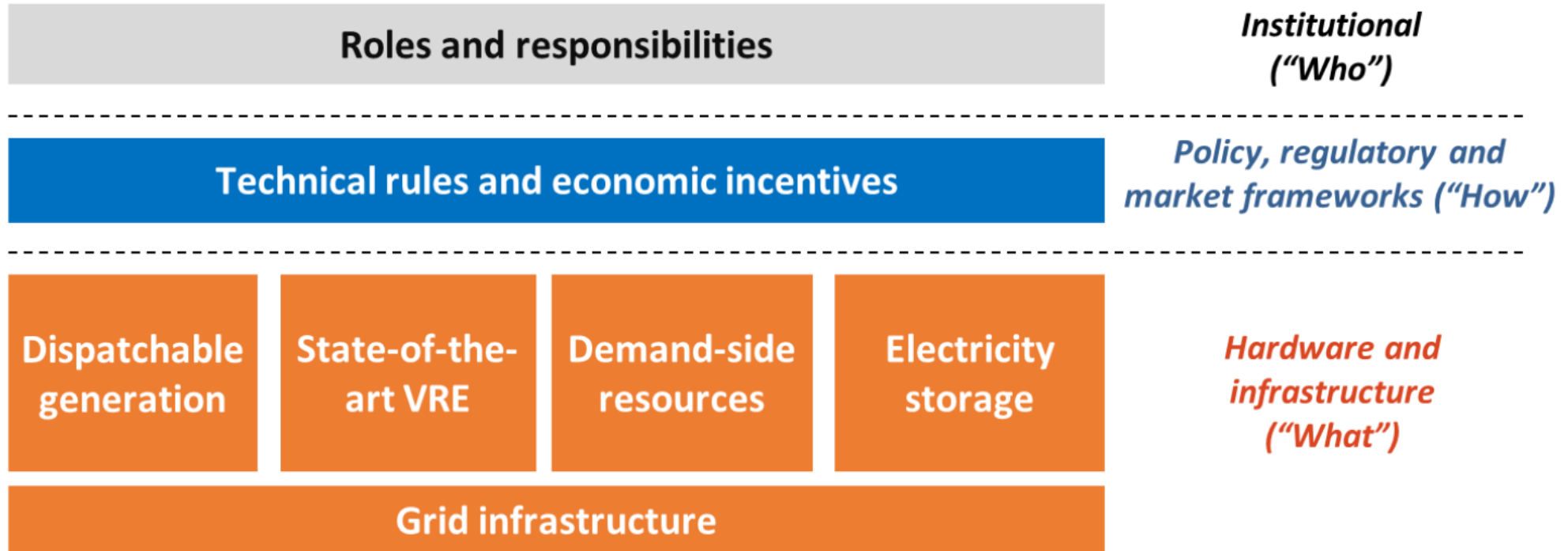
Flexibility Needs/Sources



From: REEEM Innovation and Technology Roadmap: Energy Storage Application, REEEM, 2017



Relevant Dimensions for Unlocking System Flexibility



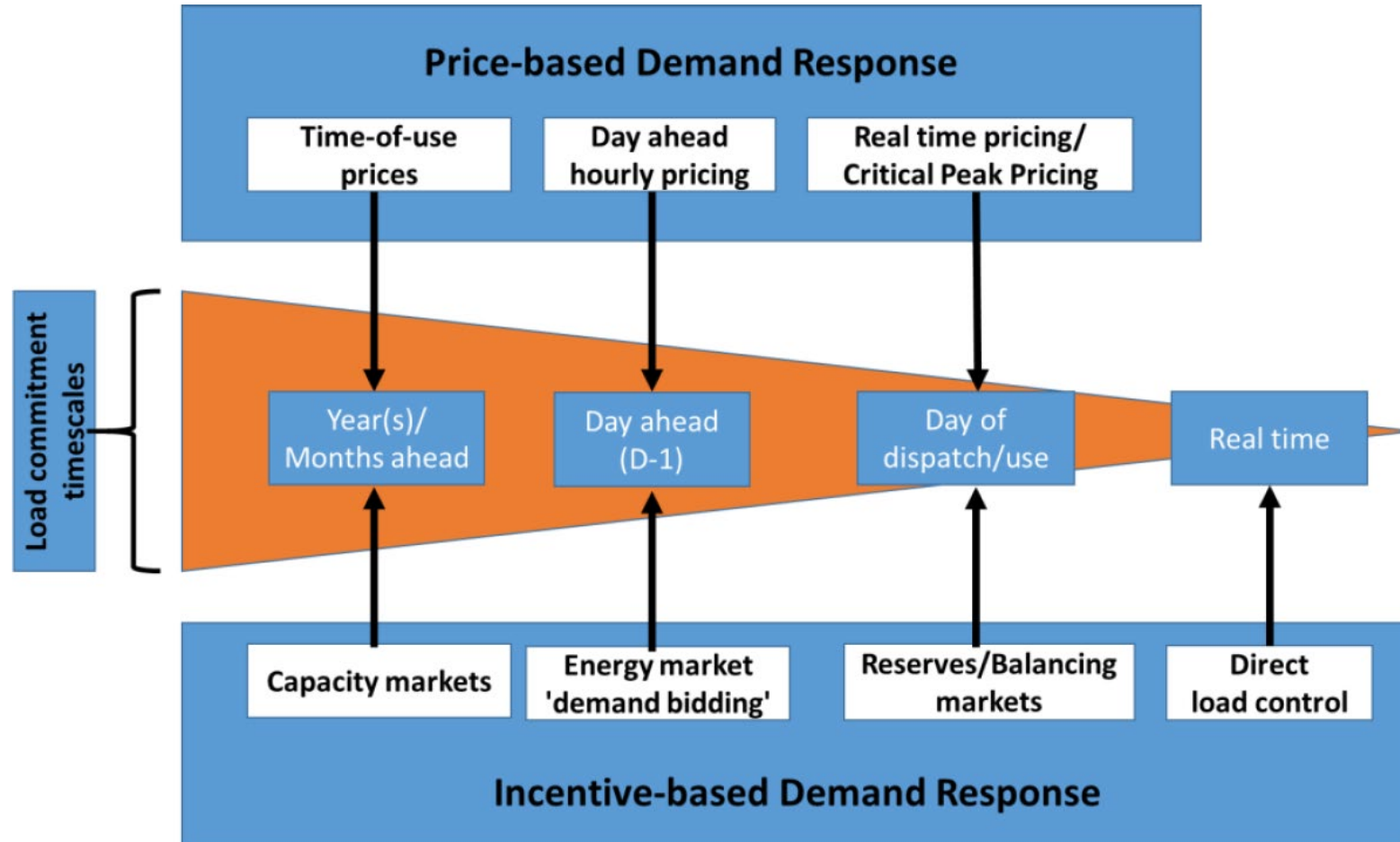
From: Tracking Clean Energy Progress, IEA, 2018



Demand Response



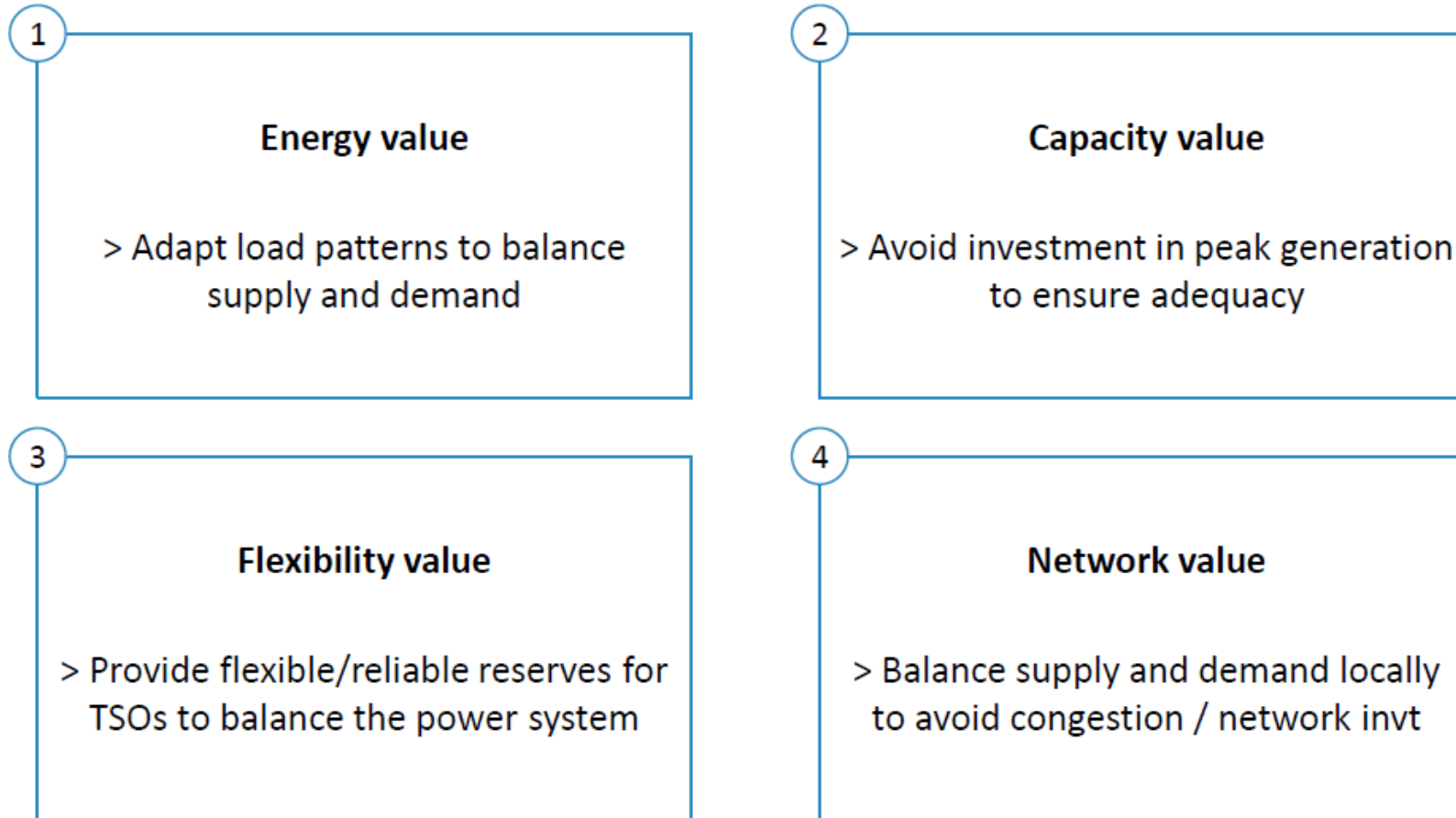
Types of Demand Response



From: https://ec.europa.eu/energy/sites/ener/files/documents/demand_response_ia_study_final_report_12-08-2016.pdf



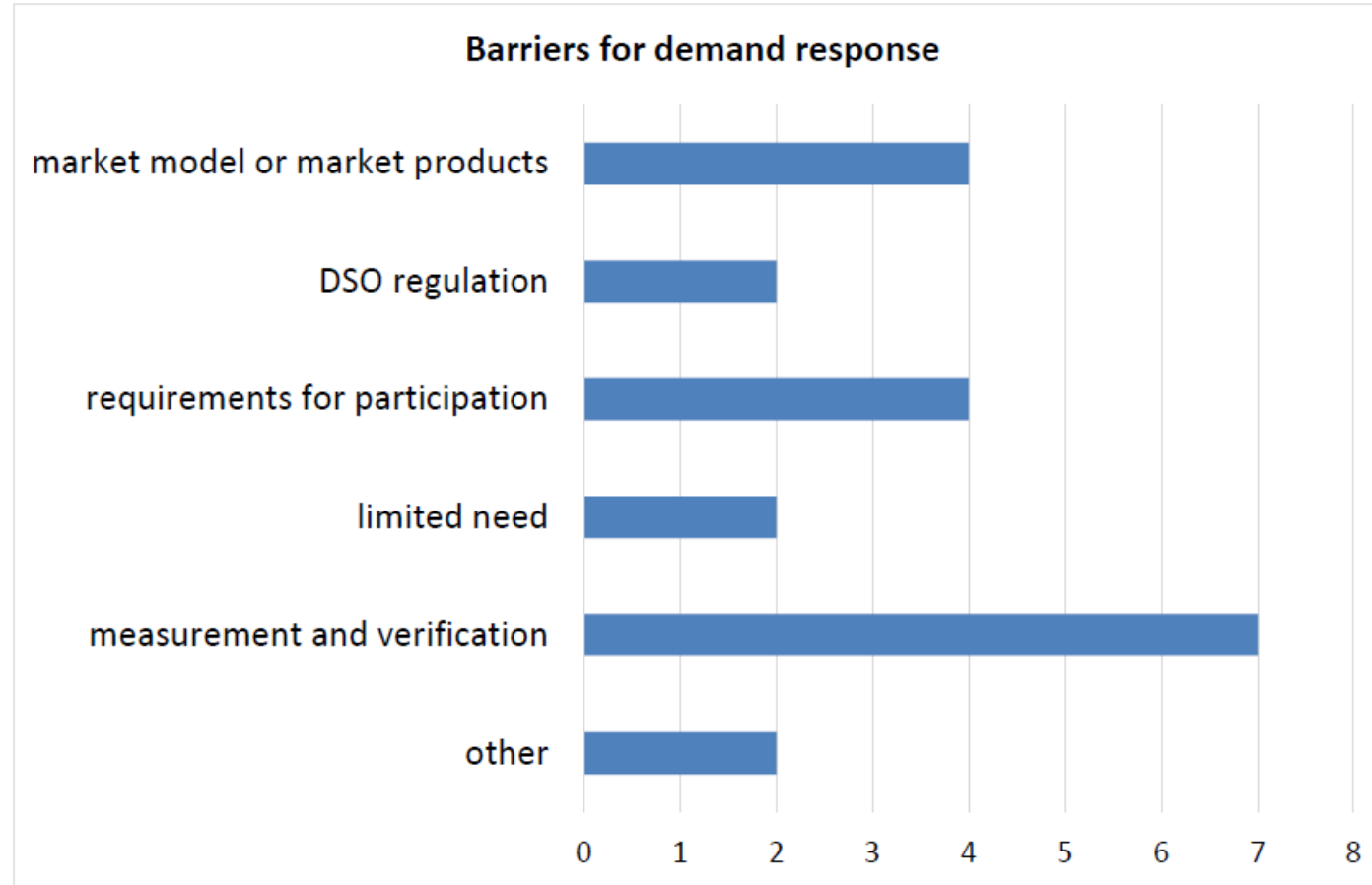
Value of Demand Response



From: http://www.europarl.europa.eu/cmsdata/119723/2_Verhaeghe_%20ITRE_300517.pdf



Barriers for Demand Response



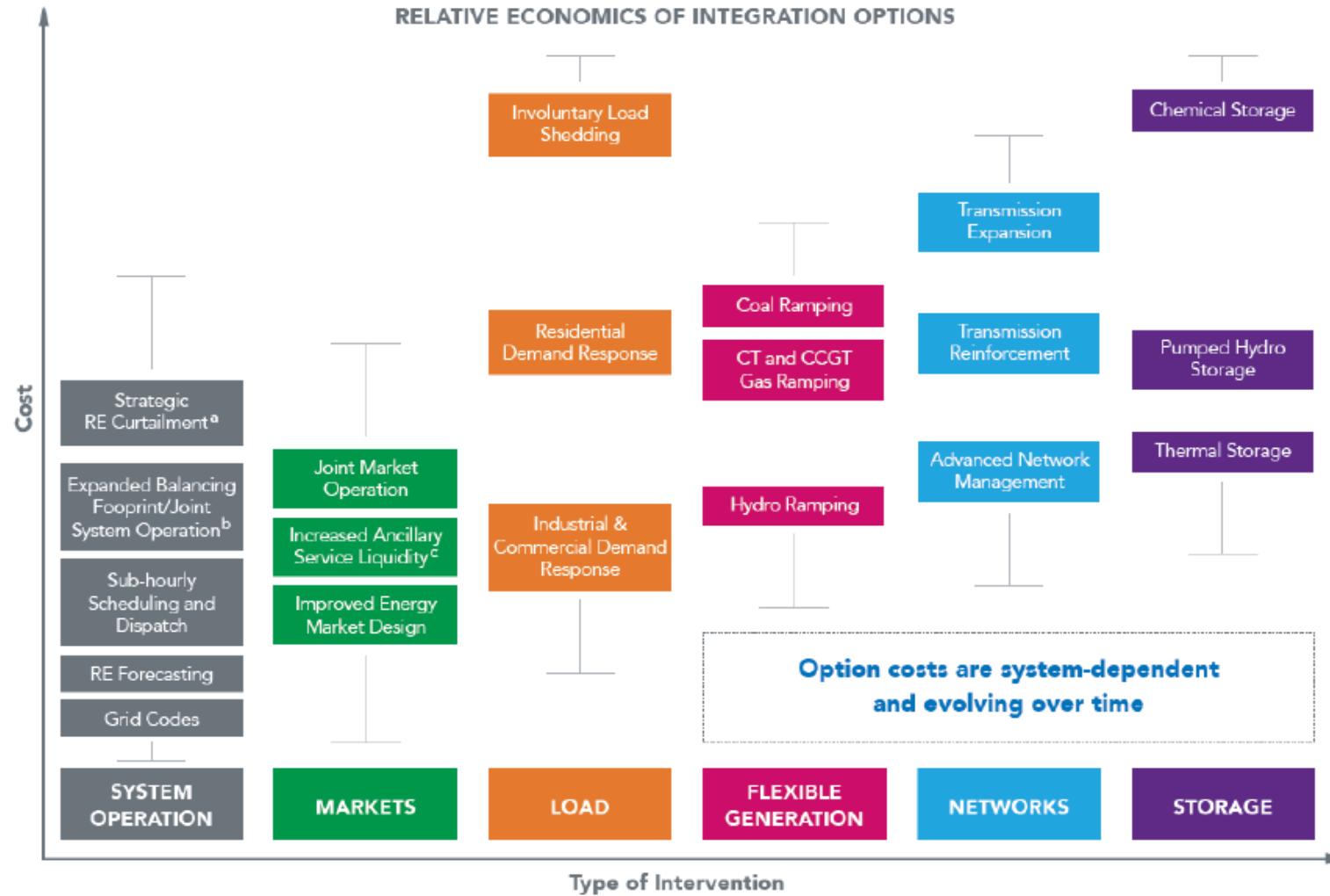
From: <https://economie.fgov.be/sites/default/files/Files/Event/170912%20ISGAN/Session-2-Flexibility-around-the-world-Pieter-Vingerhoets.pdf>



Recommendation



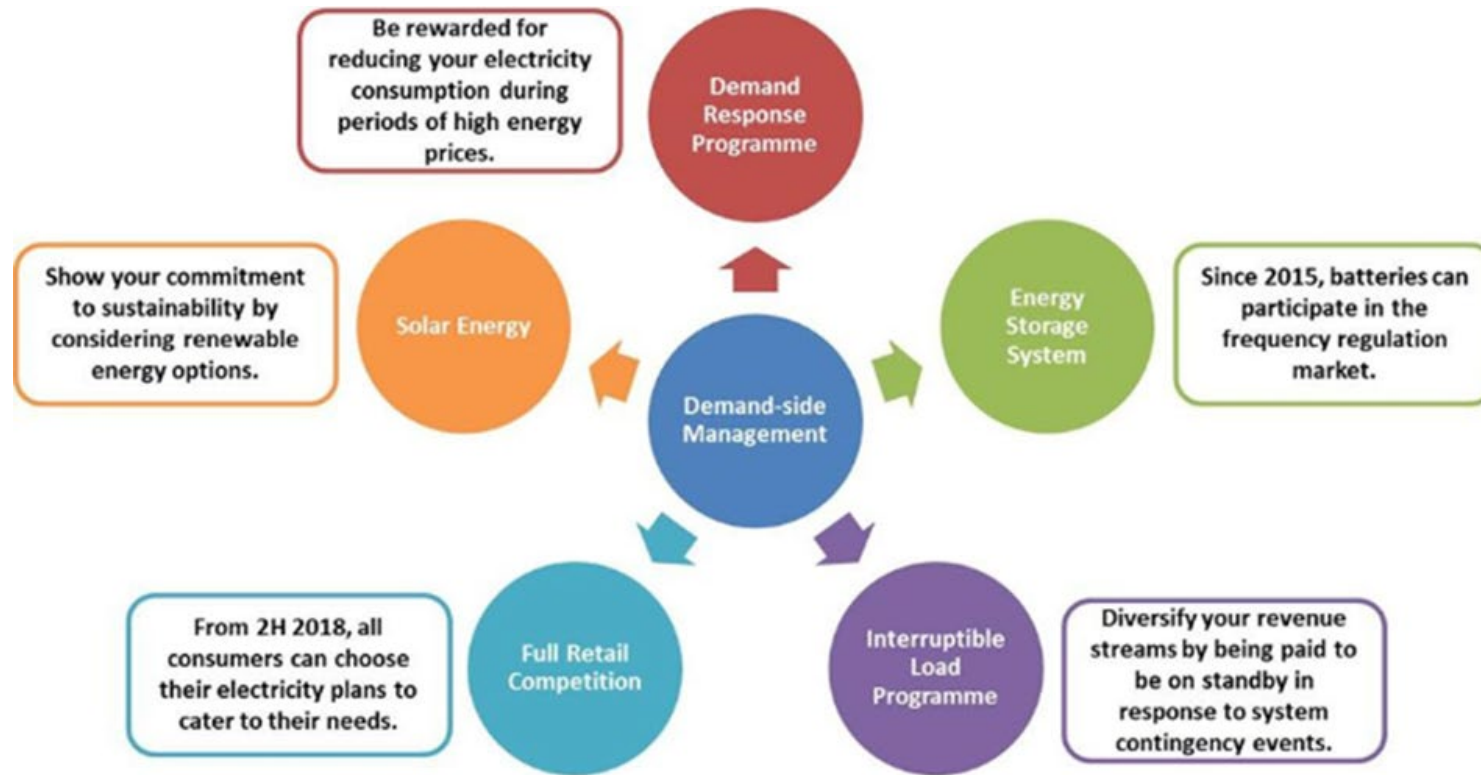
No Silver Bullet



Source: NREL (2014)

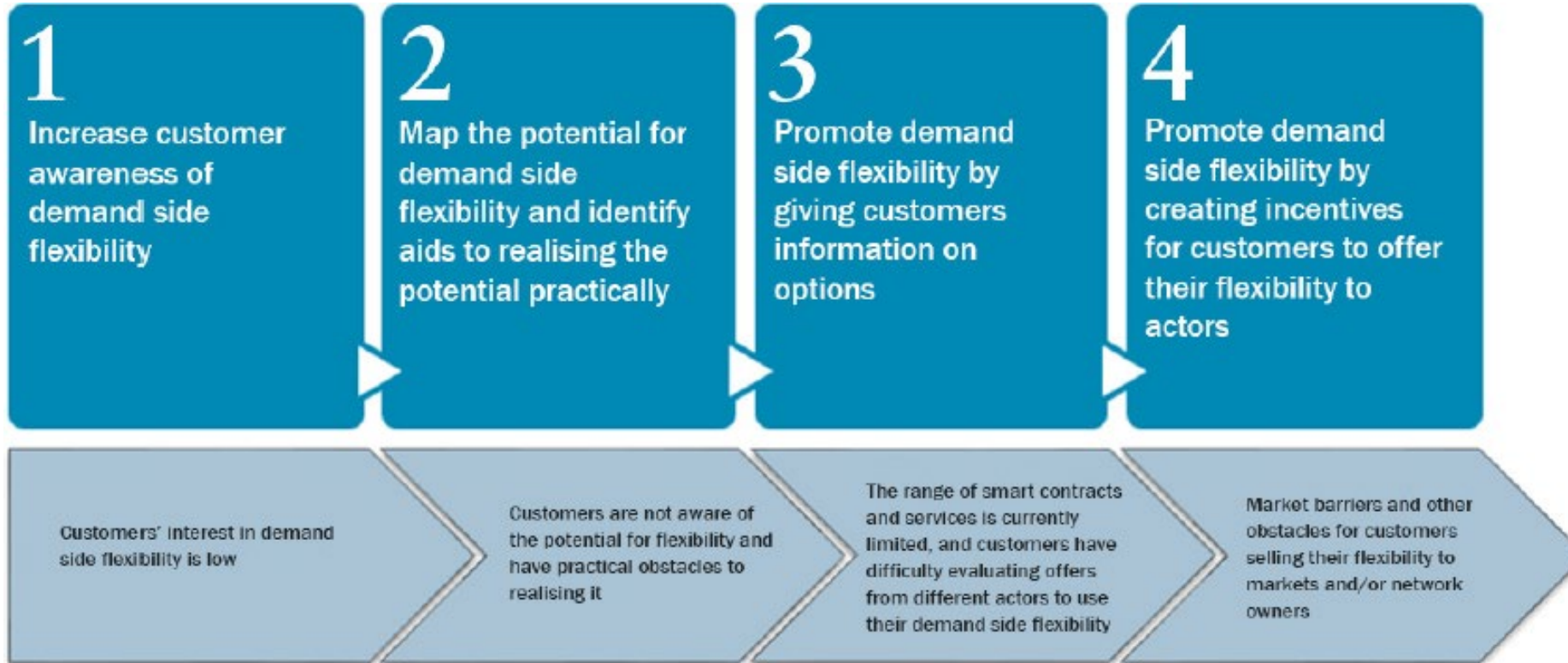


Consumer Participations





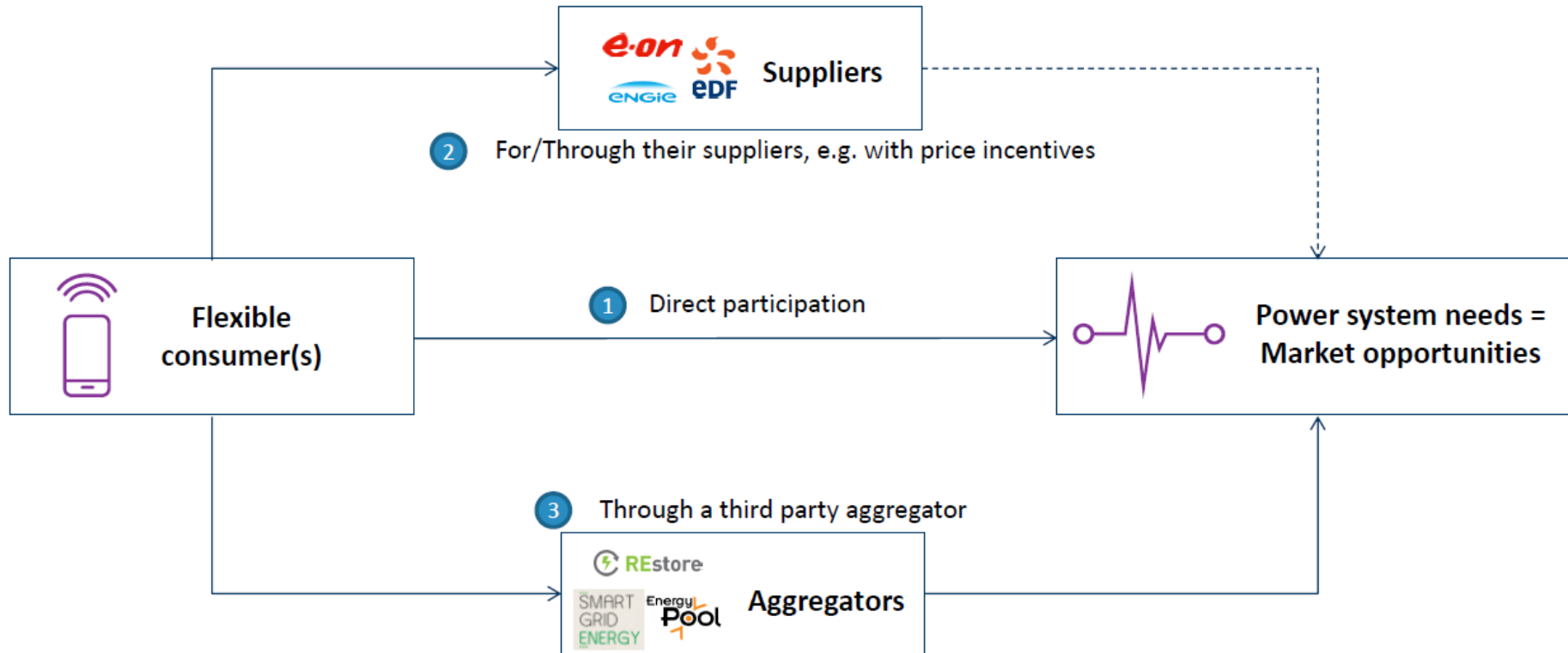
Structured Action Plan



From: https://www.ei.se/Documents/Publikationer/rapporter_och_pm/Rapporter%202017/Ei_R2017_10.pdf



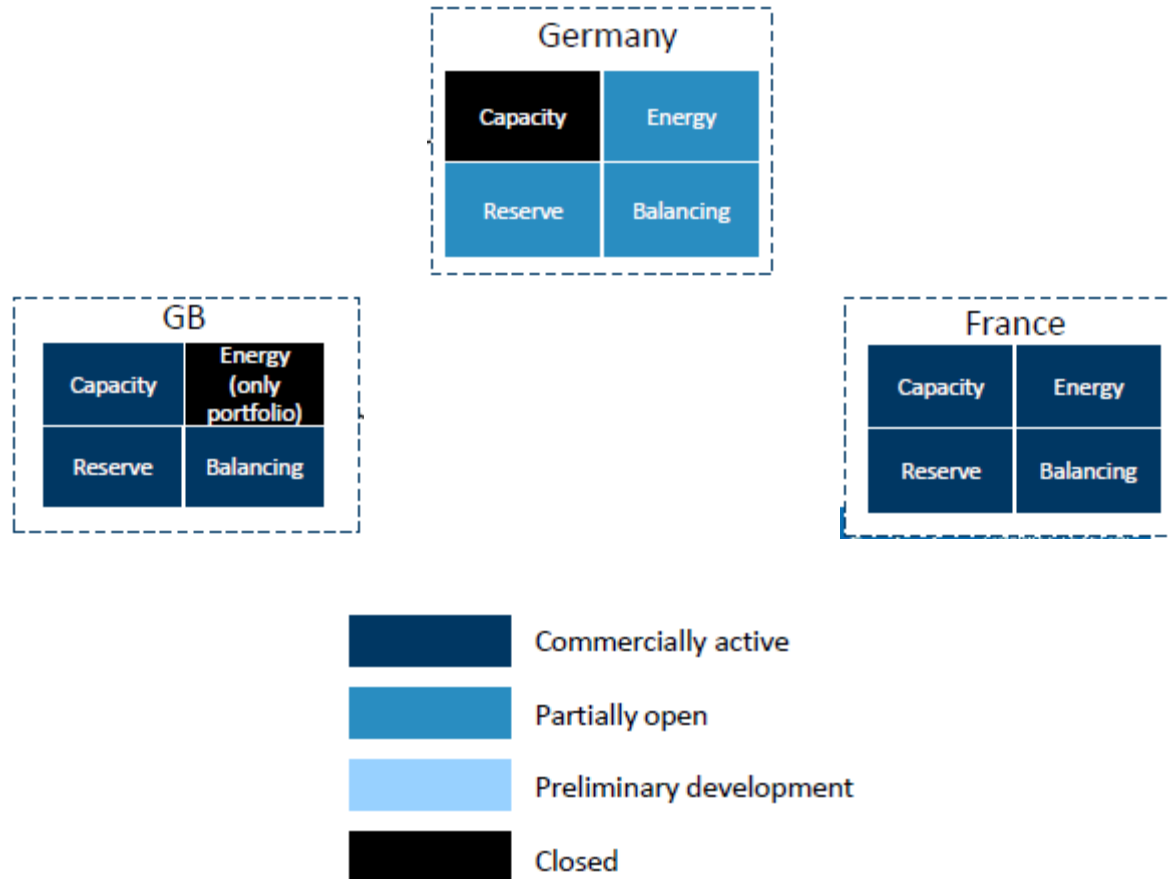
Market Design (1)



From: http://www.europarl.europa.eu/cmsdata/119723/2_Verhaeghe_%20ITRE_300517.pdf



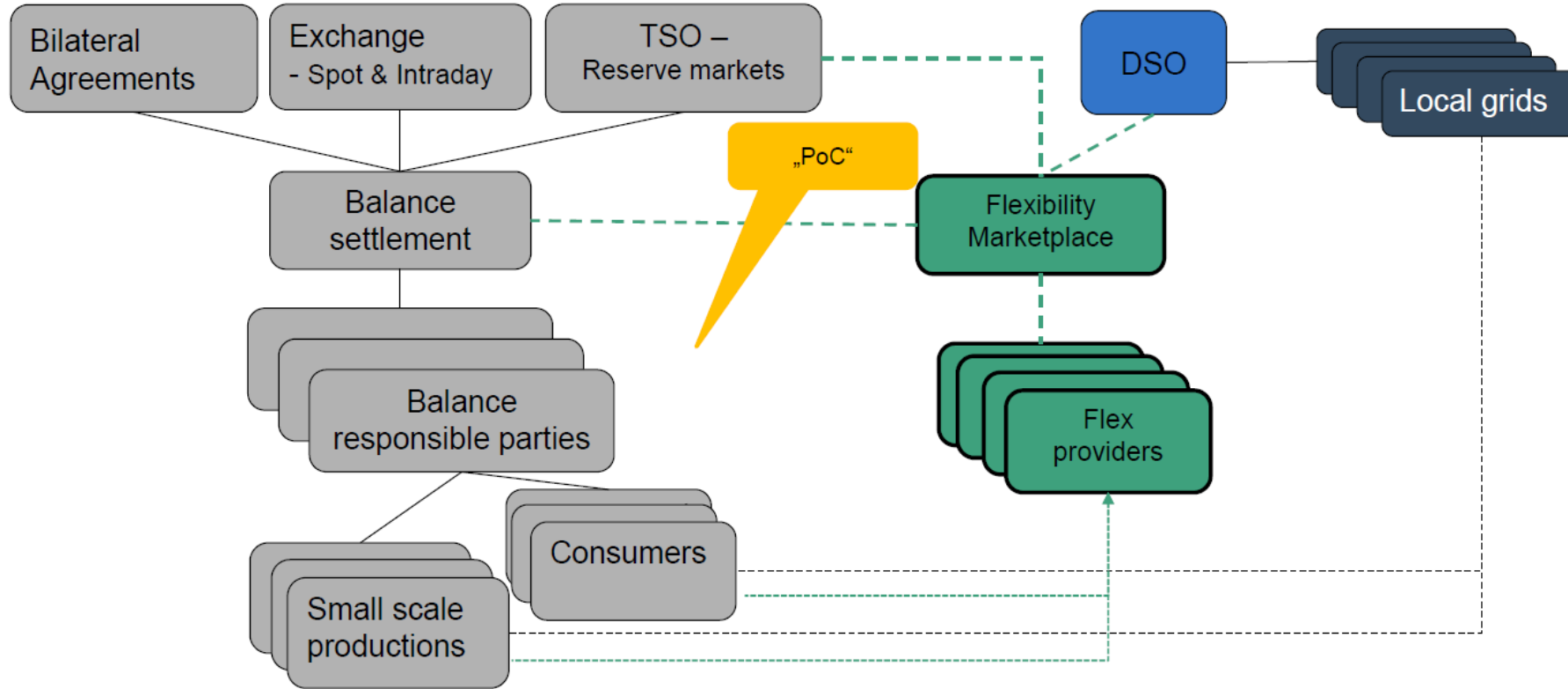
Market Design (2)



From: http://www.europarl.europa.eu/cmsdata/119723/2_Verhaeghe_%20ITRE_300517.pdf



Market Design (3)



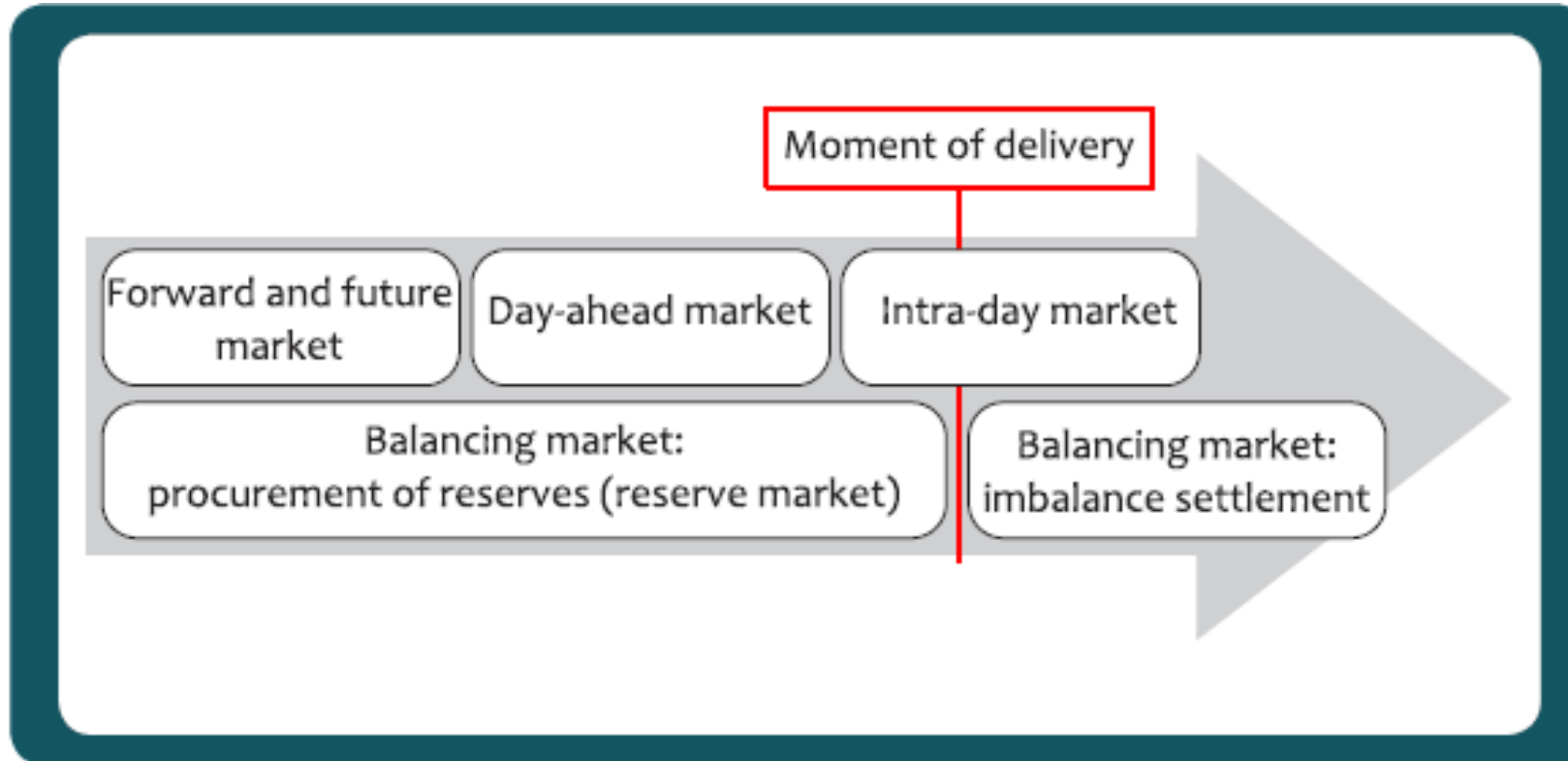
From: http://www.europarl.europa.eu/cmsdata/119723/2_Verhaeghe_%20ITRE_300517.pdf



Thank you!



Ordering of Different Electricity Market

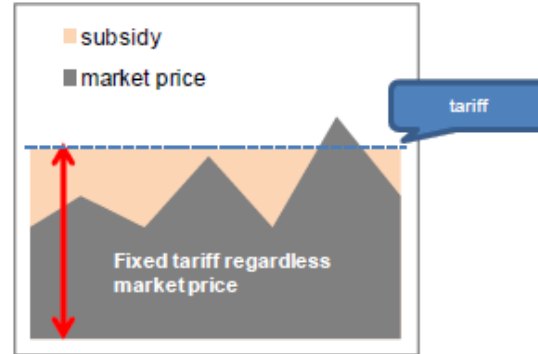


From: https://set.kuleuven.be/ei/images/EI_factsheet8_eng.pdf/



Supports for Renewable Energy

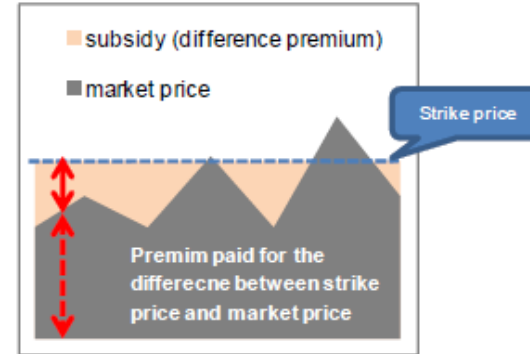
(1) FIT



Purchase obligation

Example: Japan(2012-)

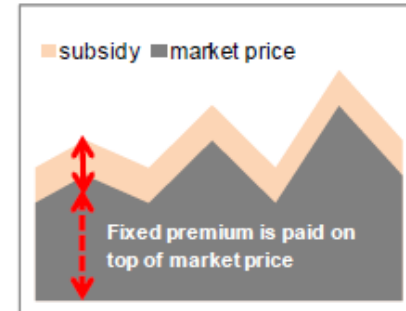
(2) FIP (difference)-CfD



Obligation) Direct marketing

Example: Germany(2014-)-U.K. (2013-)

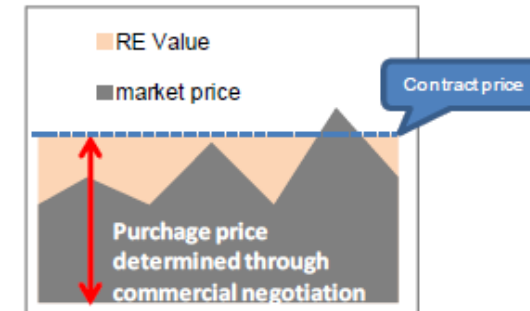
(3) FIP (fixed)



Optional) Direct marketing

Example: Spain(1998-2012)

(4) RPS



Procurement of obliged amount

Example: Japan(2003-2012)

From: <https://eneken.iecej.or.jp/data/6330.pdf>