COVID-19:
A Perspective on Japan's Future Electric Power System

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COVID-19 lessons for system aspects of power grid

1. Decreased consumption : 2-10% in April, May and June
   → Surplus of photovoltaics and need of more “Flexibility”

2. Reduction in CO2 emissions as the economy worsens
   → “Energy transformation” needed for de-carbonization (not patient energy saving negatively impacting economy)

3. Natural disasters caused by severe weather under the pandemic
   → Energy system resiliency with the help of DERs

5D's bring Energy Transformation

Utility 1.0 : Vertically Integrated Utility

Deregulation -> Democratization

Utility 2.0 : Unbundling Network Business

Decarbonization

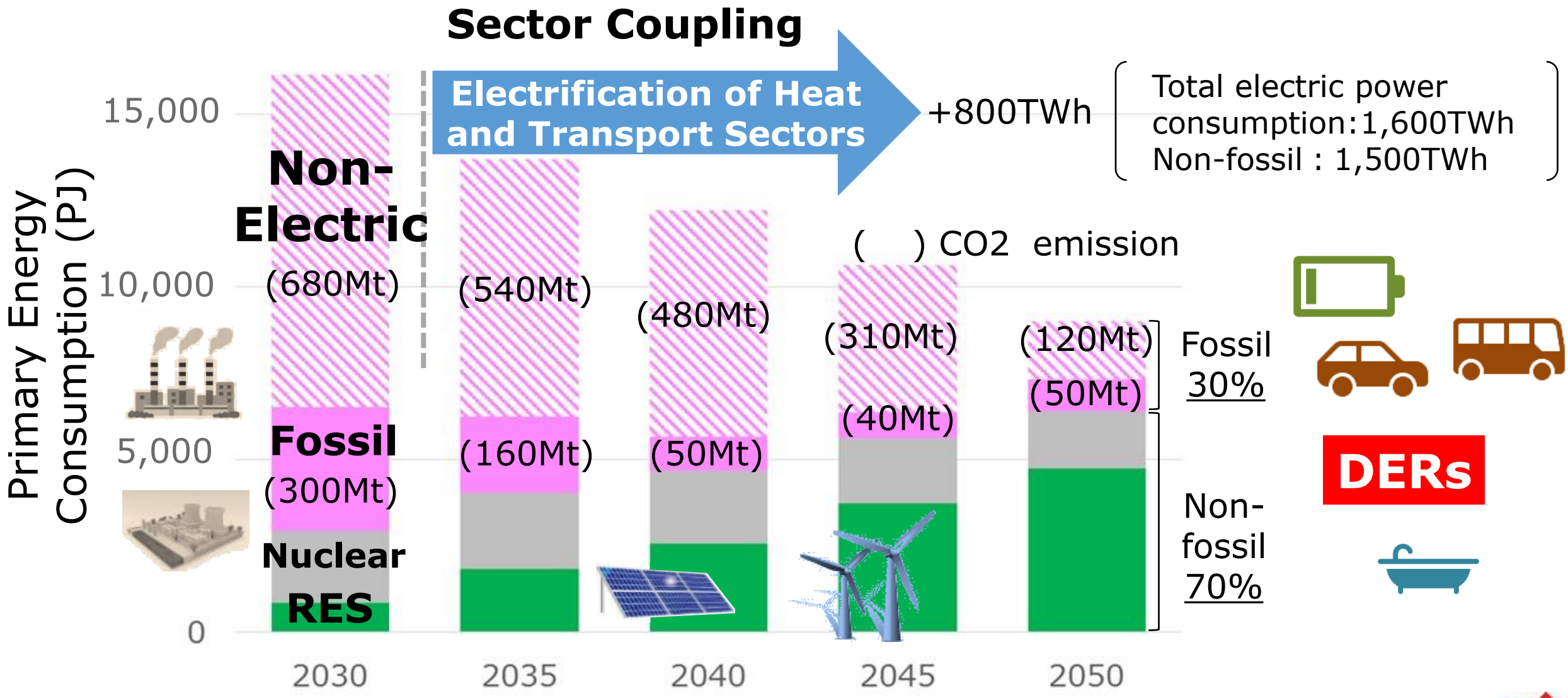
Decentralization

Digitalization

Depopulation

Utility 3.0 : Integration with Other Platformers

Energy Transformation in Japan



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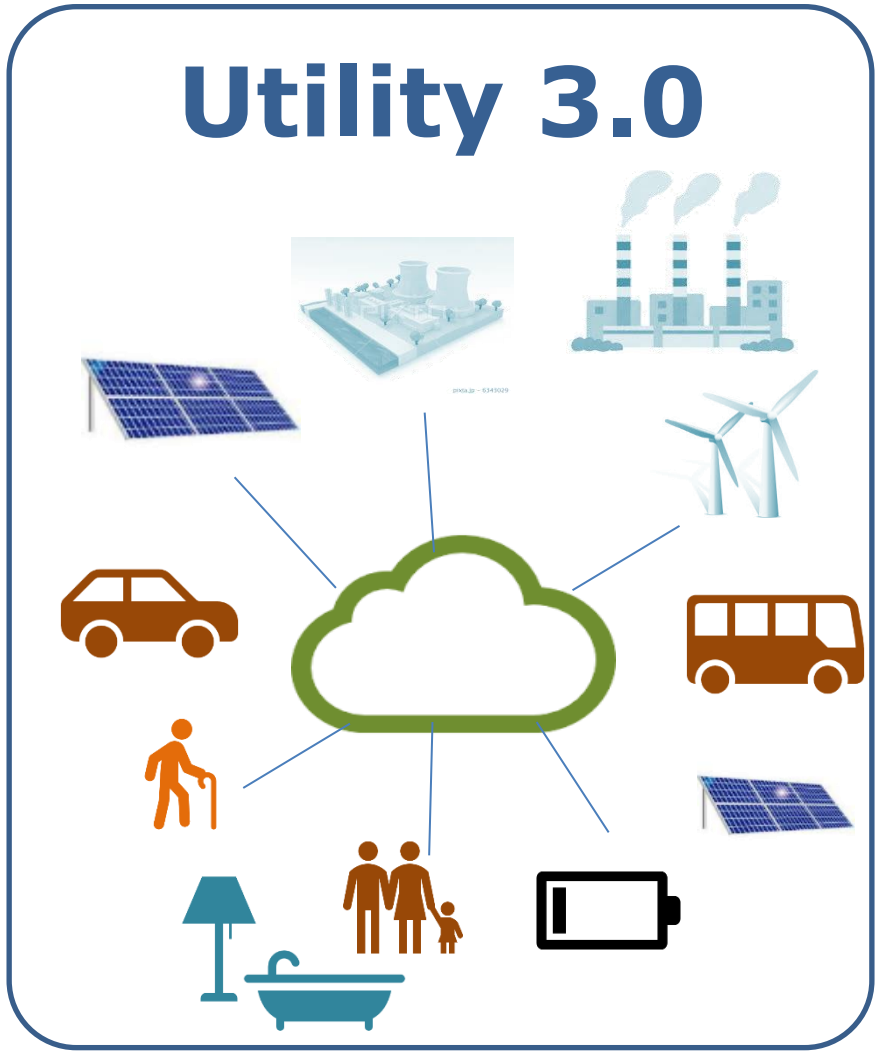
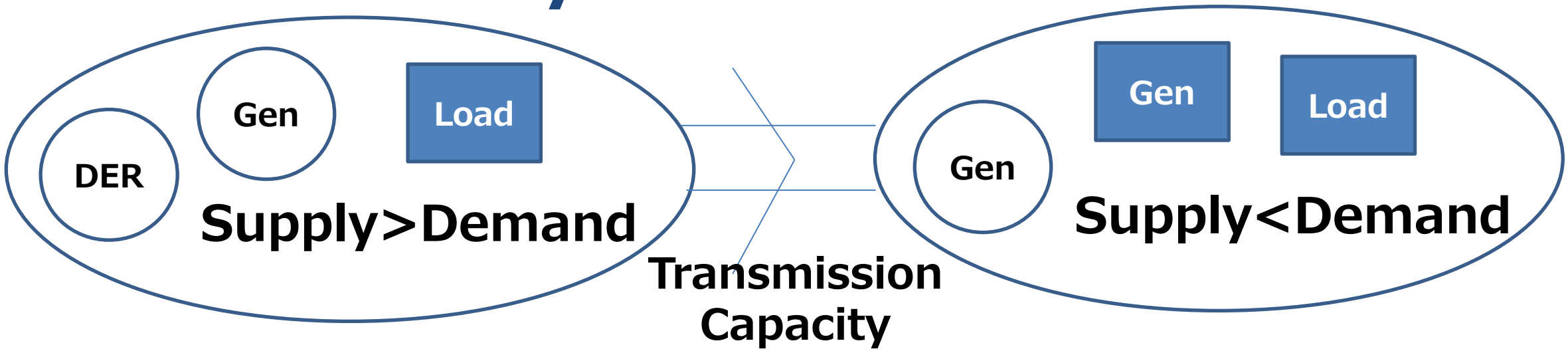
Future Role of Power Grid for Cyber-Physical Society



Infrastructure for Cyber-Physical Society with Grid Edge Devices (DER, mobility, heat and others) which are

- **connected**
- **autonomous**
- **shared**
- **electric**

Congestion management with DERs as local flexibility resources



Security Constrained Transmission Capacity

- Increase capacity by emergency controls

Monitoring of Network

- Dynamic Rating

Real-time Congestion Management

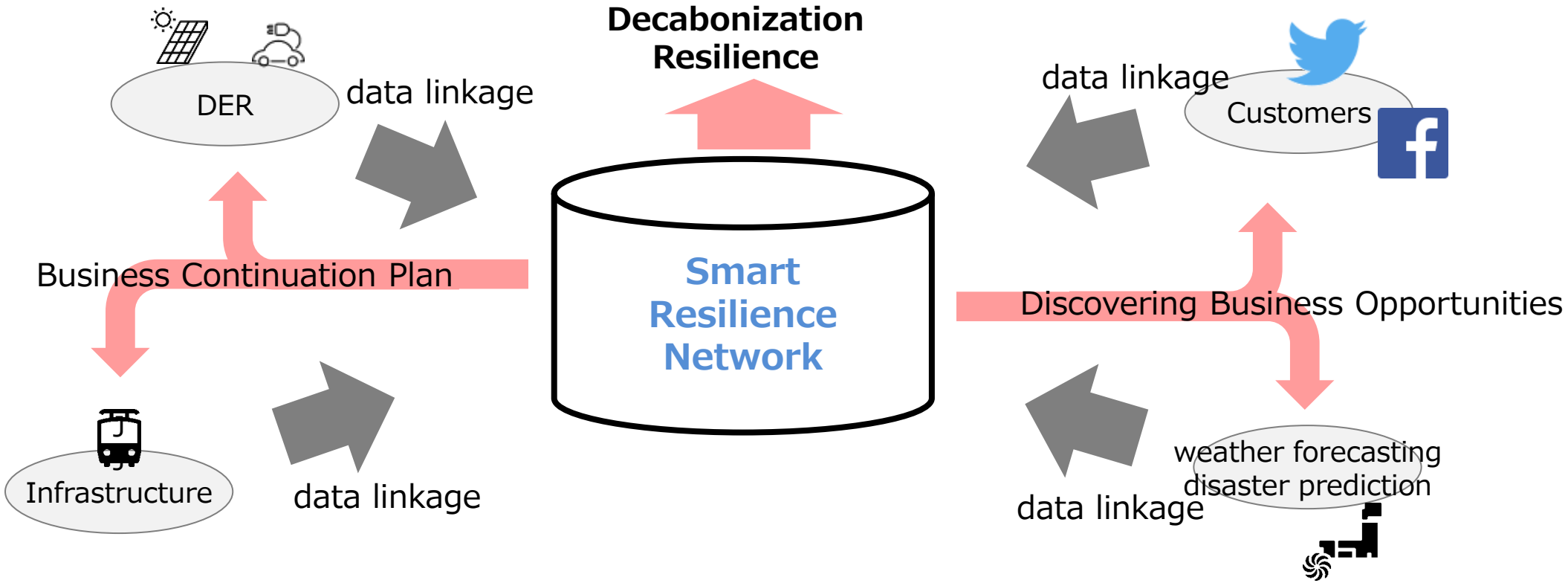
- **Control of Generation and Demand**

Emergency Control

- **Emergency control of NW/Gen/Load**

Smart Resilience Network

- "Smart Resilience Network" was established with experts and Kansai Electric Power T&D to serve as a foundation for social co-creation by linking various social data and distributed resources and collaborating across business and industry boundaries.



Conclusions

1. Megatrends of 5D's will accelerate electrification in heating, transportation and IoT activities.
2. Energy management is important for realizing a supply-demand transitions and maximizing synergies with supply and demand technologies.
3. TEPCO Power Grid will continue to develop the platform for future energy management and collaboration to engage customers with partners.