



It's Not Just About the Megawatts - ARC Industry Forum, The Future of Power Generation

June 2022

Changing the World's Energy Future

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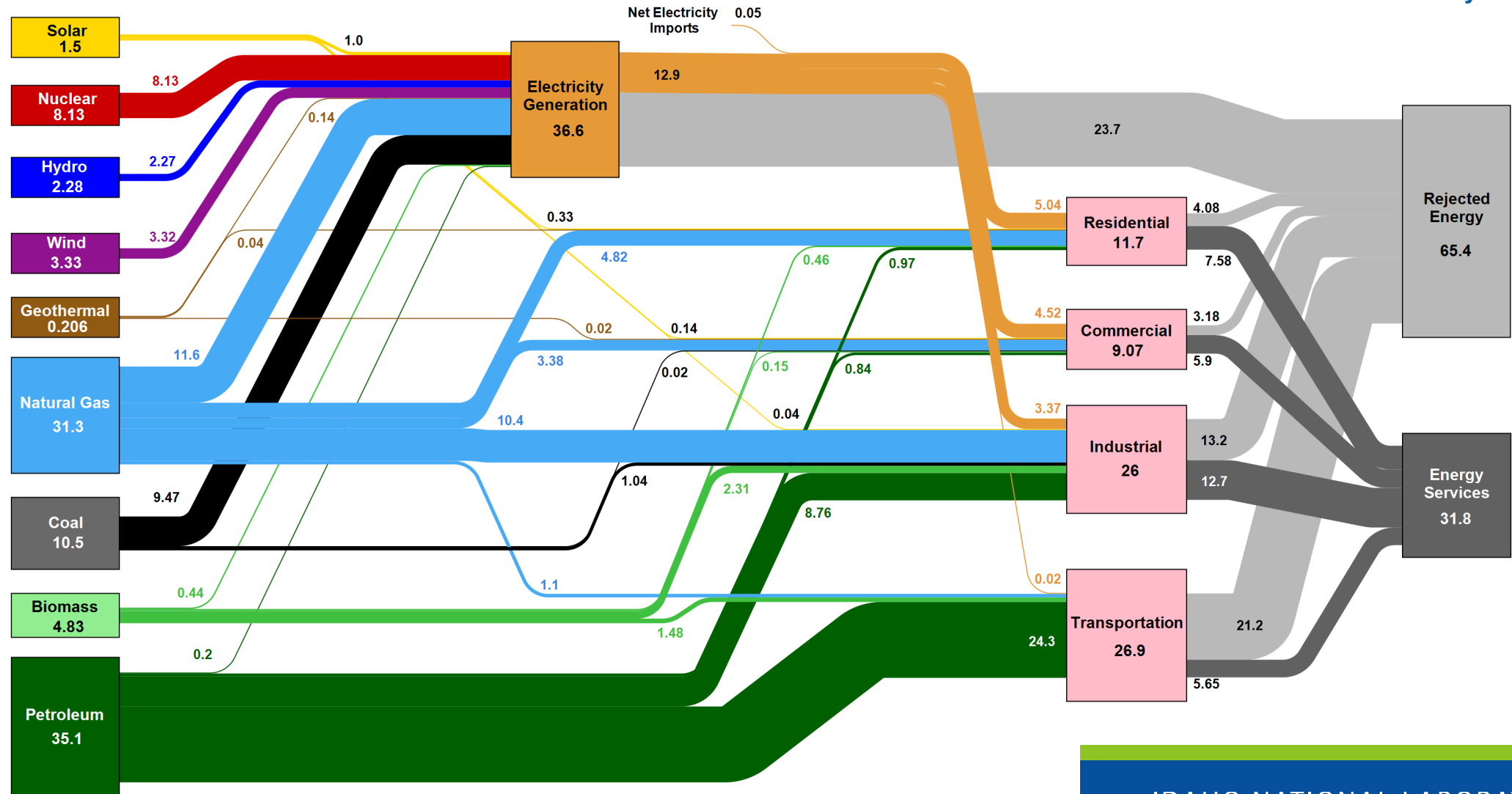
Technical Relationship
Manager

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Track 2 – The Future of Power Generation

Conversion efficiency and consumption changes

Estimated U.S. Energy Consumption in 2021: 97.3 Quads



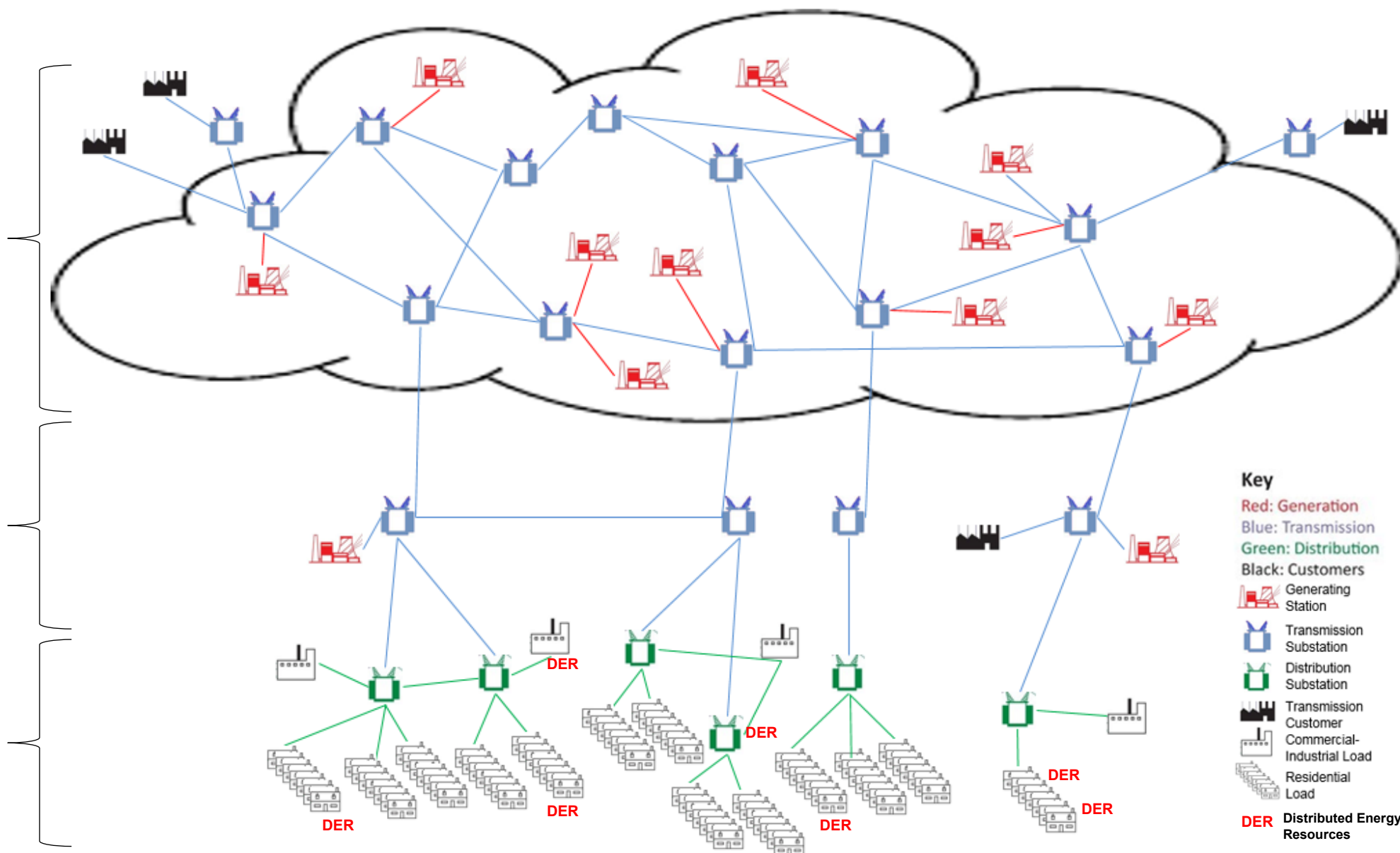
Source: DOE/Lawrence Livermore National Laboratory, <https://flowcharts.llnl.gov/>

Power delivery and resource siting

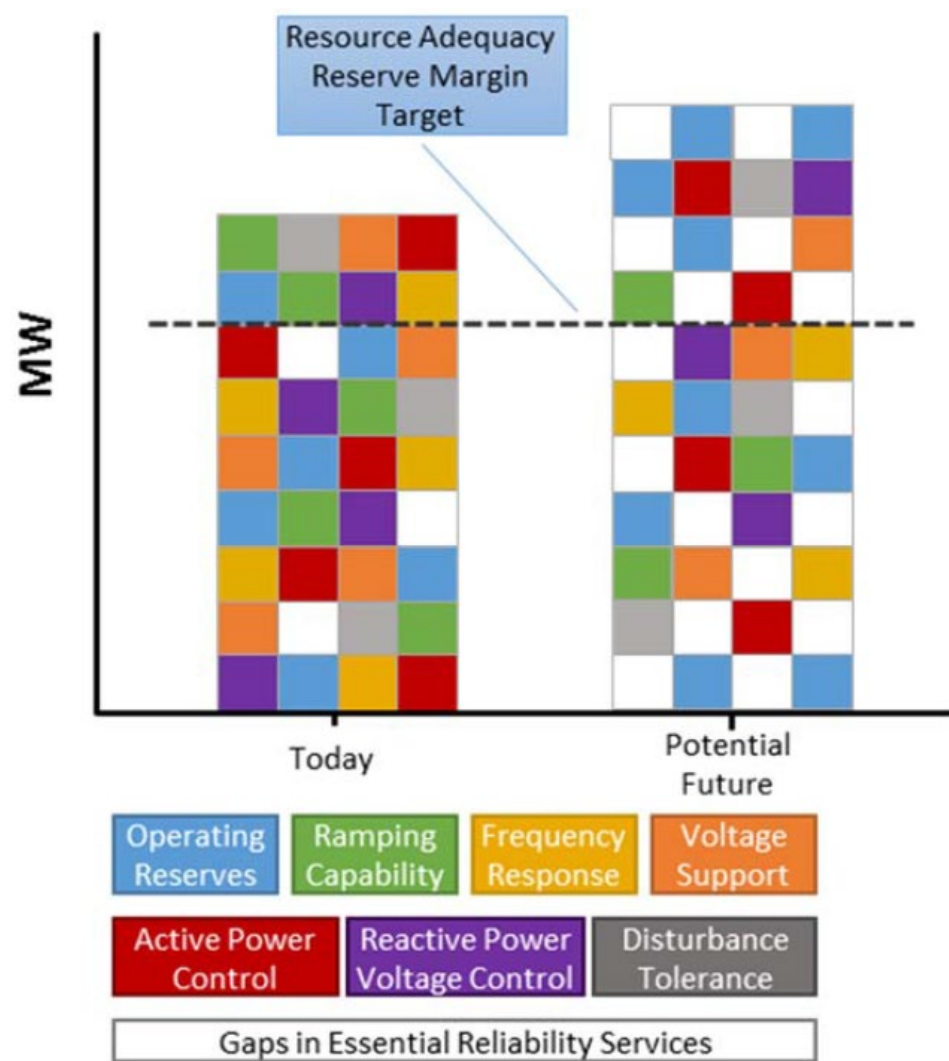
Bulk Electric System (BES): densely interconnected, highly reliable, redundant, NERC-regulated

Subtransmission: series-parallel paths from the BES to the lowest-voltage substations

Distribution: radially connected load and Distributed Energy Resources (DERs)

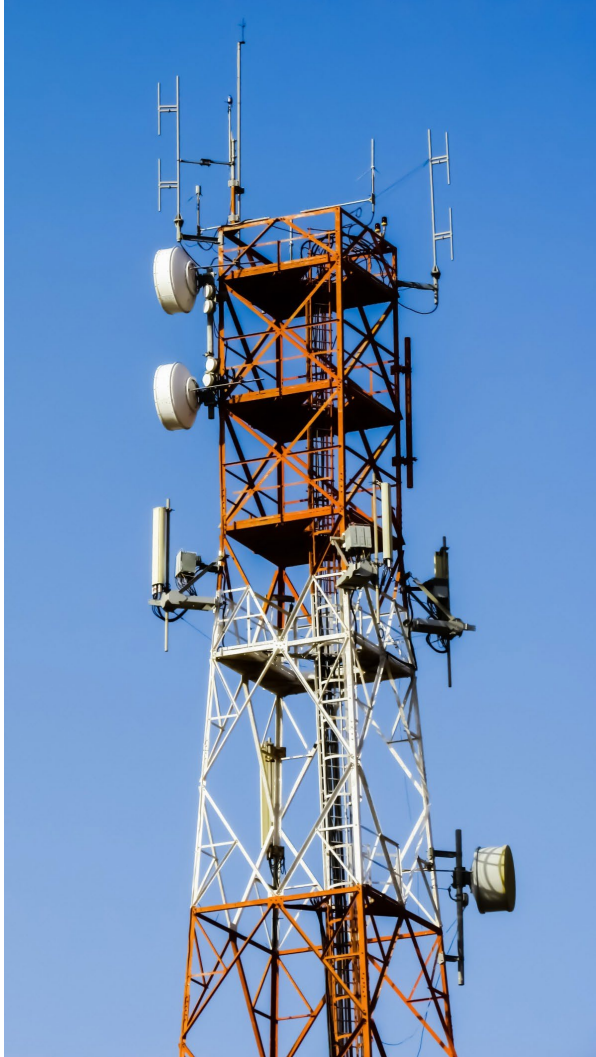


Essential reliability services



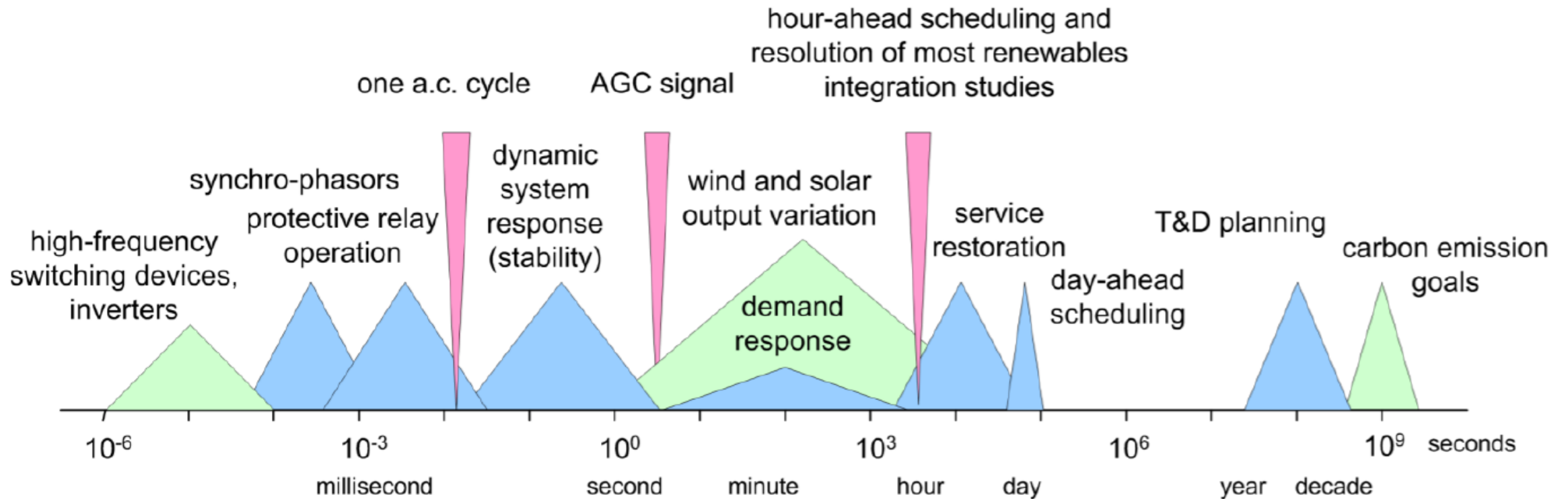
- Inertia
- Active power control and frequency support (primary, secondary, tertiary)
- Reactive power control and voltage support
- Ramping
- Reserves (regulating, spinning, load following, contingency, supplemental)
- Disturbance ride-through
- Blackstart

Consequence-aligned communications



- Reliability
- Latency
- Capacity
- Redundancy
- Security

Governance for operations and planning



Source: A. von Meier, Integration of renewable generation in California: Coordination challenges in time and space, in U.S. DOE 2020 Smart Grid System Report, January 2022, https://www.energy.gov/sites/default/files/2022-05/2020%20Smart%20Grid%20System%20Report_0.pdf



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