Harnessing AI to Accelerate Clean Energy Deployment
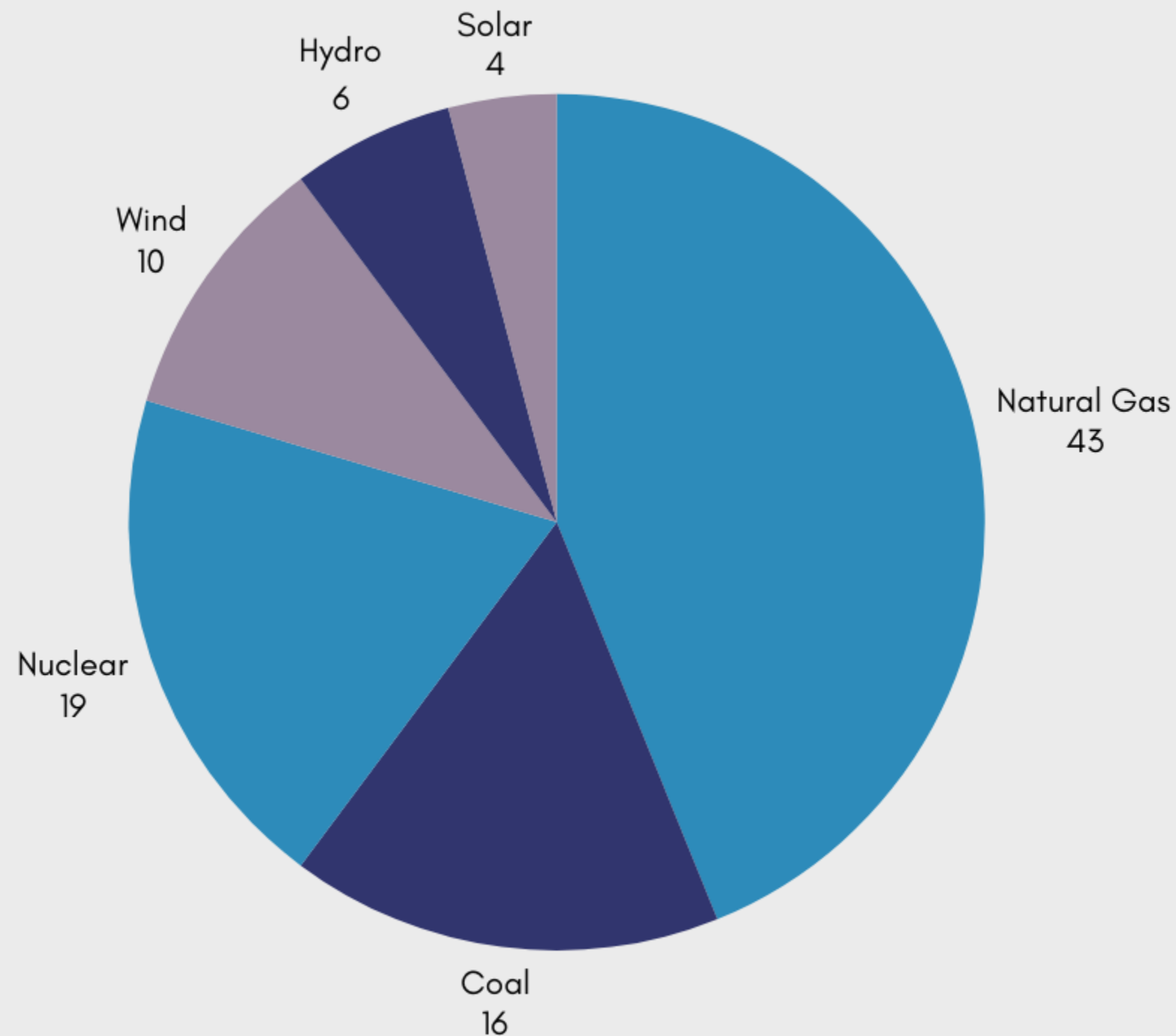
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The Challenge

Closing the Delta

2023 Generation Mix

- To achieve a carbon-free grid, wind and solar would have to provide **60% to 80%** of generation, with a mix of nuclear, new hydro, geothermal, and storage (2022 NREL Report)

- Interconnection queues are backlogged: there are 1570 GW of generation in interconnection queues, and 1030 GW of storage

- For a variety of reasons, it is very hard to build regional and interregional high voltage backbone transmission

- Concurrently, driven by data centers/AI, electrification, and industrial needs, load is increasing in many parts of the United States
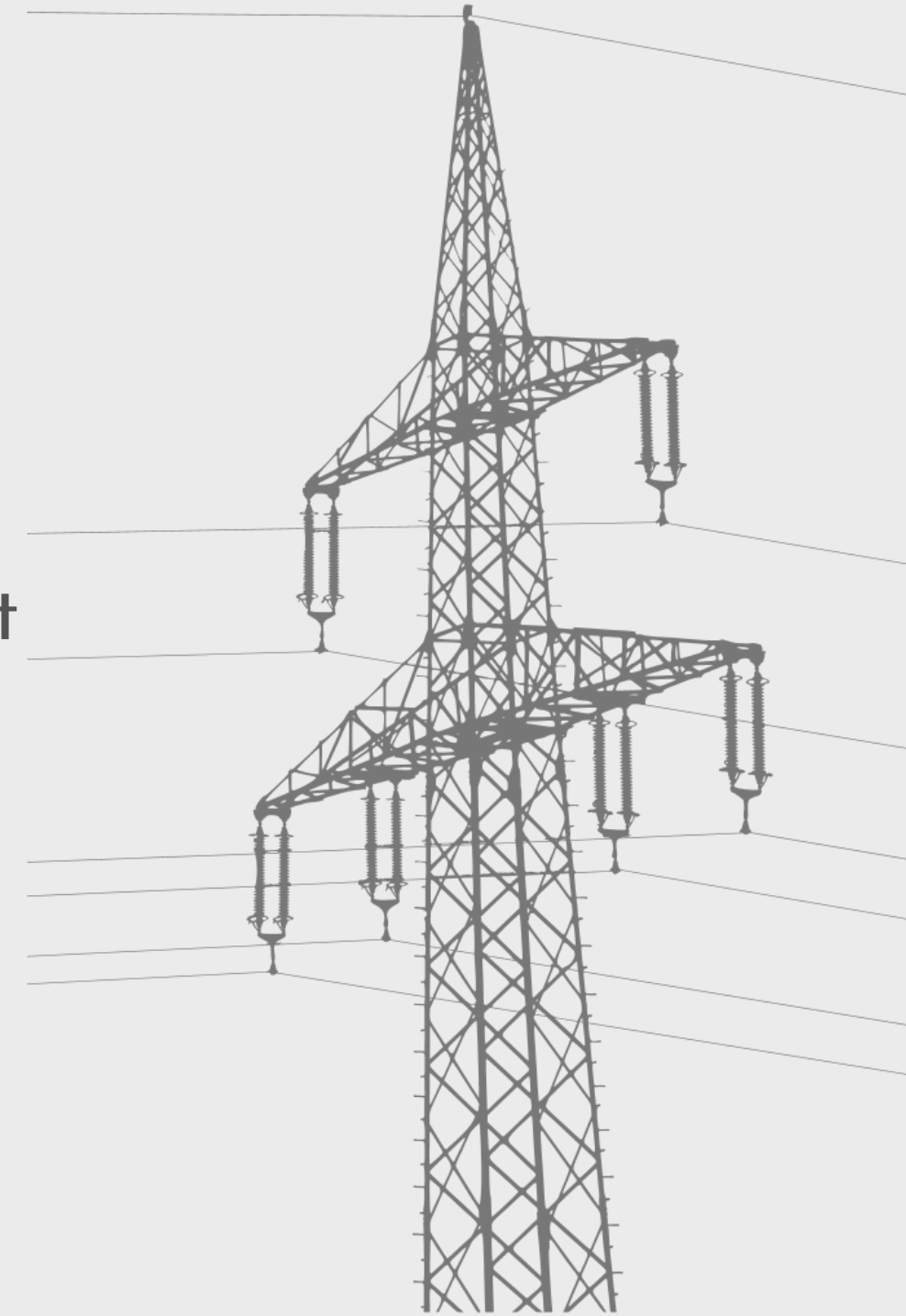
Methodology

A broad range of input

1. Government: DOE Office of Policy

2. Technology Company: Microsoft

3. Trade Association: Americans for a Clean Energy Grid (ACEG)

4. Consultant: Analysis Group

5. Renewables Developers: EDF Renewables, Invenergy, Avangrid

6. Independent System Operator: California ISO

7. Research Organization: Electric Power Research Institute, Inc. (EPRI)

Findings

- Use of AI in the energy industry is early stage

- The highest value use cases must be identified, AI tools must then be developed, tested, and deployed

- AI tools must be developed carefully so as to build trust and to avoid creating new risks

- AI tools will amplify and augment, not replace, the exercise of a subject matter expert's technical judgment

- Management of the grid is becoming more complicated

- The potential benefit of AI for clean energy deployment is far reaching

Potential Use Cases

Streamline permitting

Accelerate interconnection studies

Enhance transmission planning

Support public participation and community engagement

Improve reliability

Challenges

Data Access and Security	Applicability
Trust and Acceptance	**AI Deployment Incentives**

Recommendations

Foster increased data transparency and standardized data platforms

Develop AI pilot projects

Engage the National Labs and use DOE's status as a convener

Promote public-private collaborative R&D initiatives

Encourage DOE funding

Launch public engagement campaign