

Coordination of Gas and Power Systems

*UVIG 2018 Spring Technical Workshop
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Polaris Systems Optimization

Energy systems are structured around 3 forms of energy:

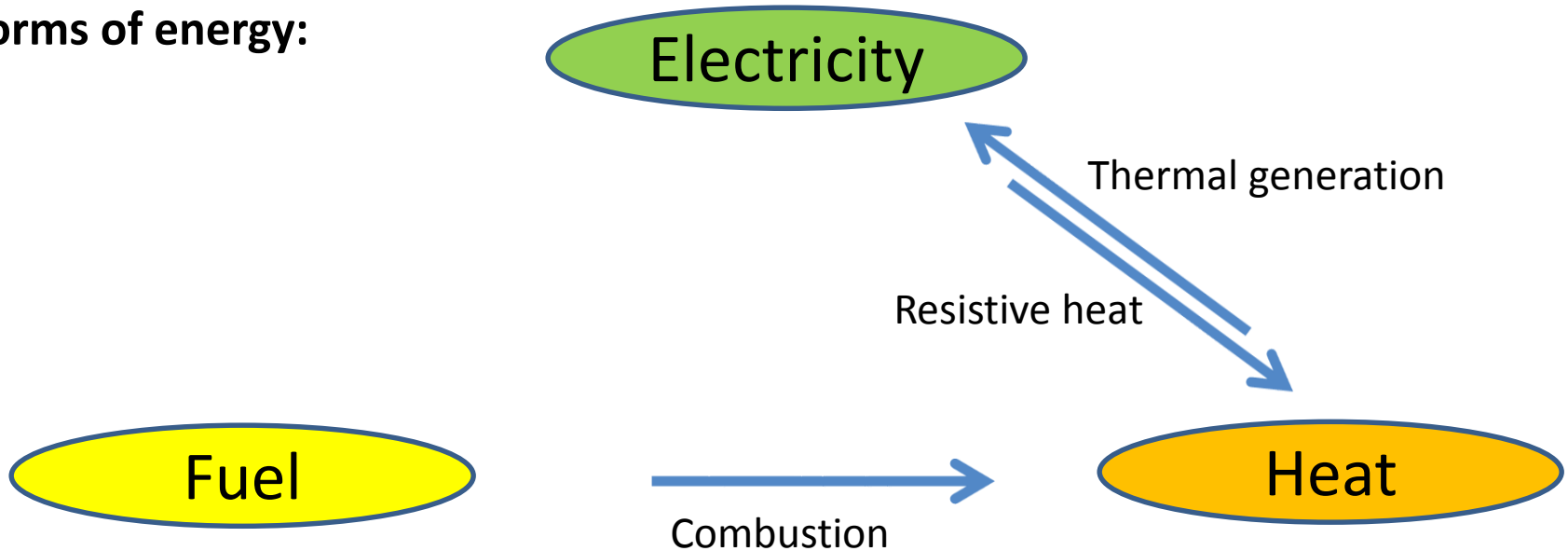


Electricity

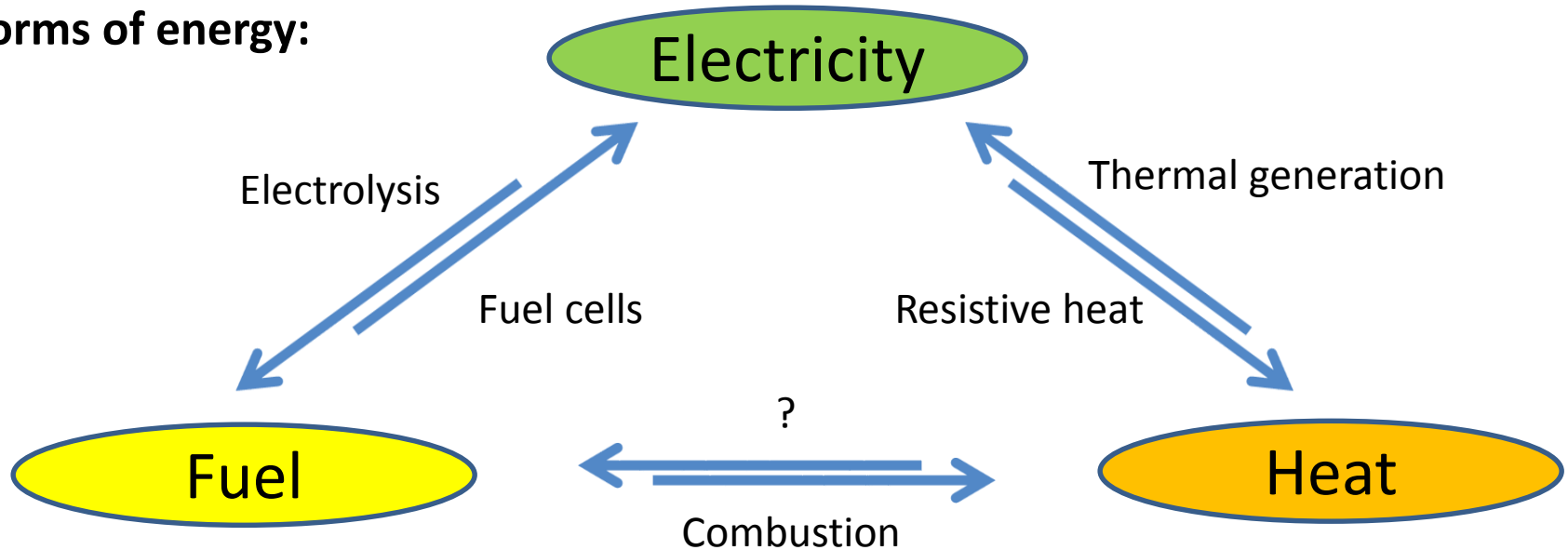
Fuel

Heat

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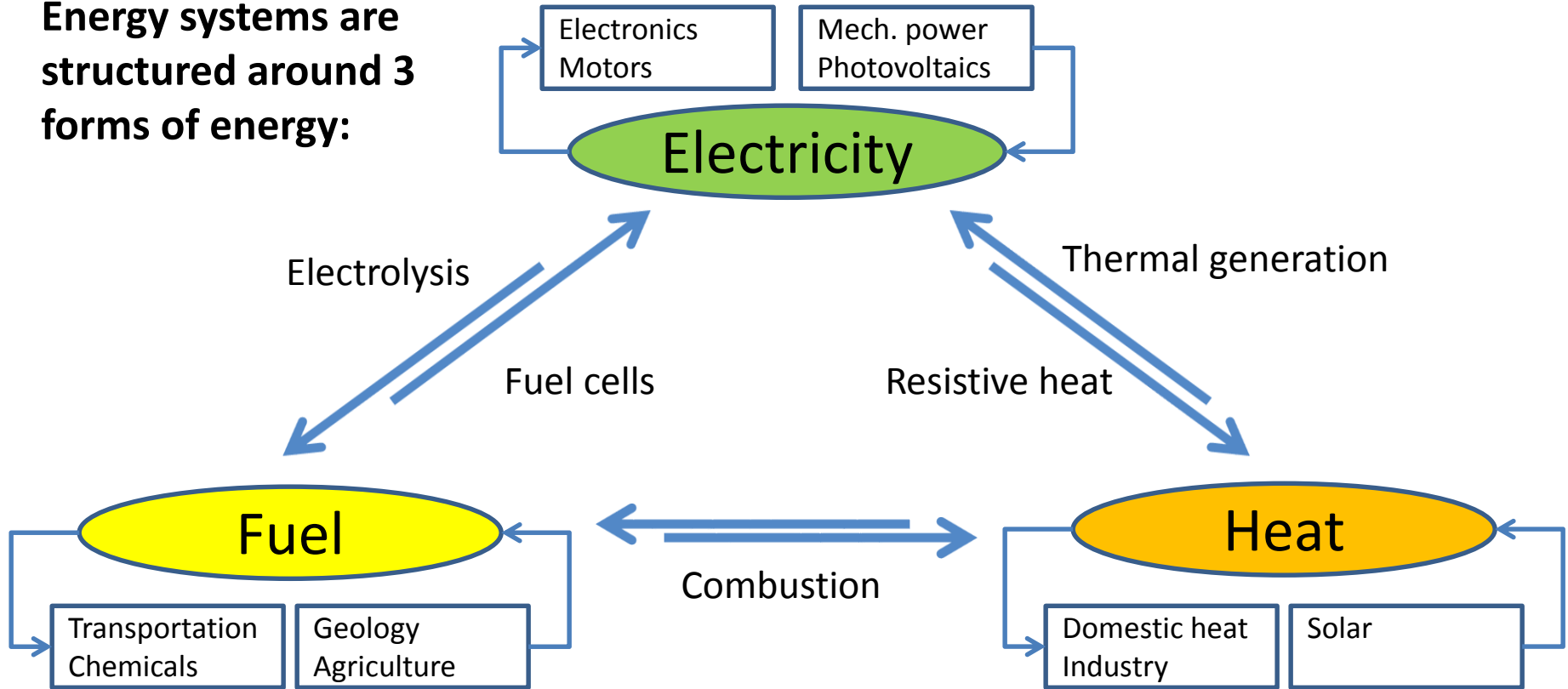


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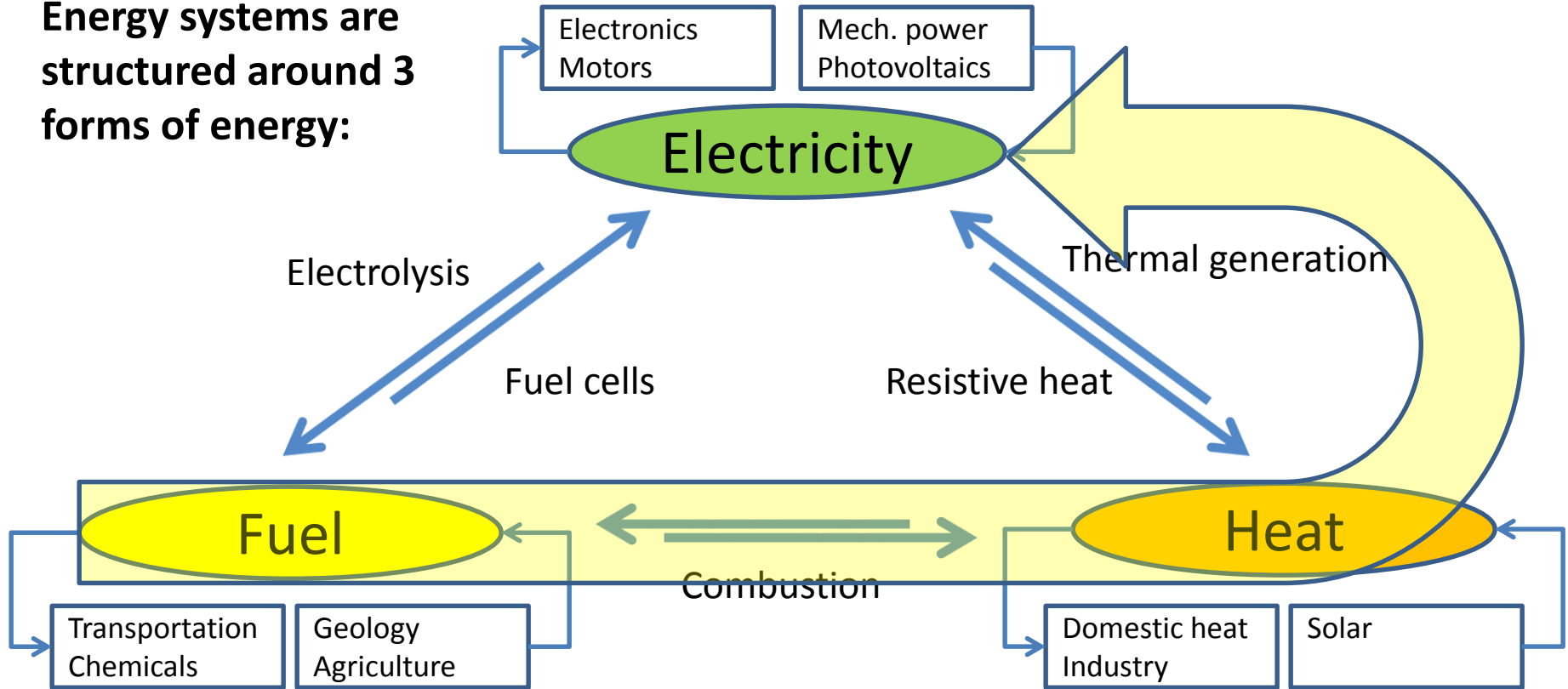
Energy Systems Integration

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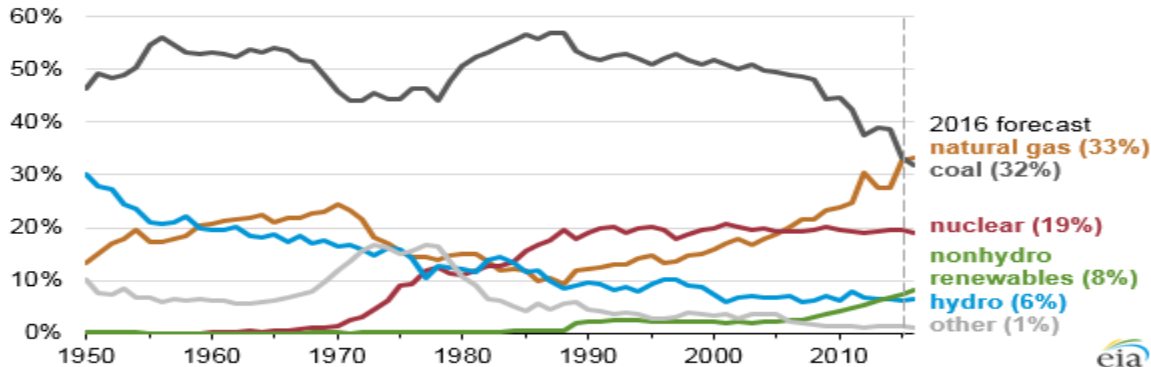
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Challenge: Increasing Gas and Power Coordination

U.S. electricity generation by energy source (www.eia.gov)

Annual share of total U.S. electricity generation by source (1950-2016)
percent of total



- **2016: Natural gas (34%), Coal (30%), Nuclear (20%), Renewables (15%)**
- **“Dance partner” for renewables (... at least until storage is cost effective)**

Impacts

- **New vulnerabilities for reliability**
- **New constraints and costs on operations**
- **New constraints and costs on planning**

Gas Electric Co-Optimization (GECO)

Project organized to address challenges

- Project funding under APRA-E 2016 “Open” solicitation

Team



Objectives include development of

- novel methods, algorithms and software for simulation modeling and optimization of natural gas pipeline operation at the day-ahead and intra-day time scale;
- a novel mechanism for pricing of natural gas delivered to end users and in particular to gas-fired power plants; and
- novel mechanisms for coordinating natural gas and electric operations both day ahead and in real-time, based on locational prices of natural gas and electricity.

NERC's Assessment Activities on Gas Coordination and Retirements

- **Tom Coleman, *Director of Reliability Assessment*, NERC**

Current Gas System Operating Practices and Constraints

- **Daniel Baldwin, *Gas Control Engineer*, Kinder Morgan**

Incorporating Gas System Vulnerabilities into Reliability Assessment and System Control

- **David Schweizer, *Manager Power System Coordination*, PJM**

New Tools for Coordination of Gas and Electric System Planning

- **Anatoly Zlotnik, *Research Scientist*, LANL**