

# 2002 SECA CORE REVIEW

## Fuel Processing Overview

David A. Berry

National Energy Technology Laboratory

&

David King

Pacific Northwest National Laboratory

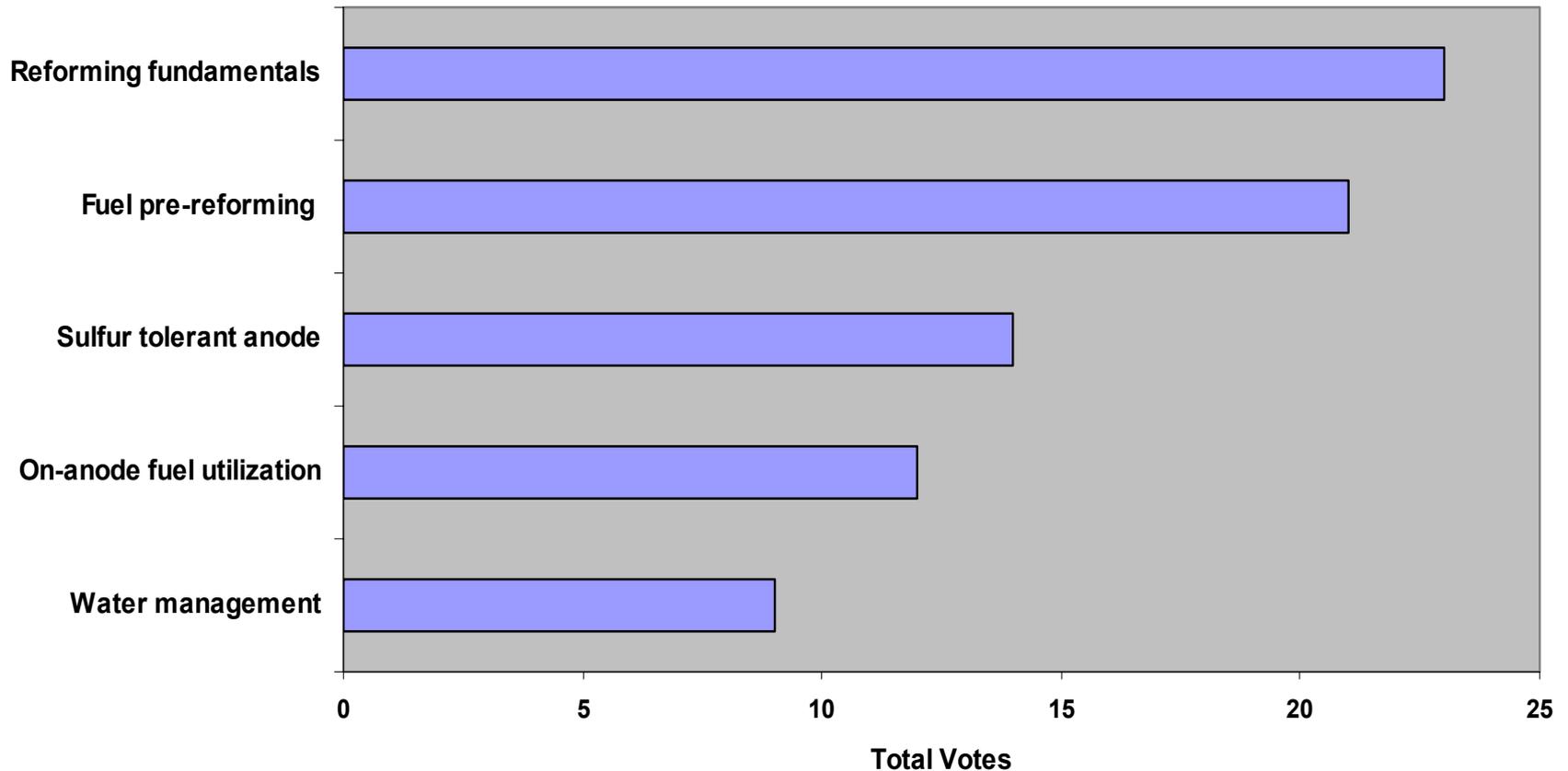


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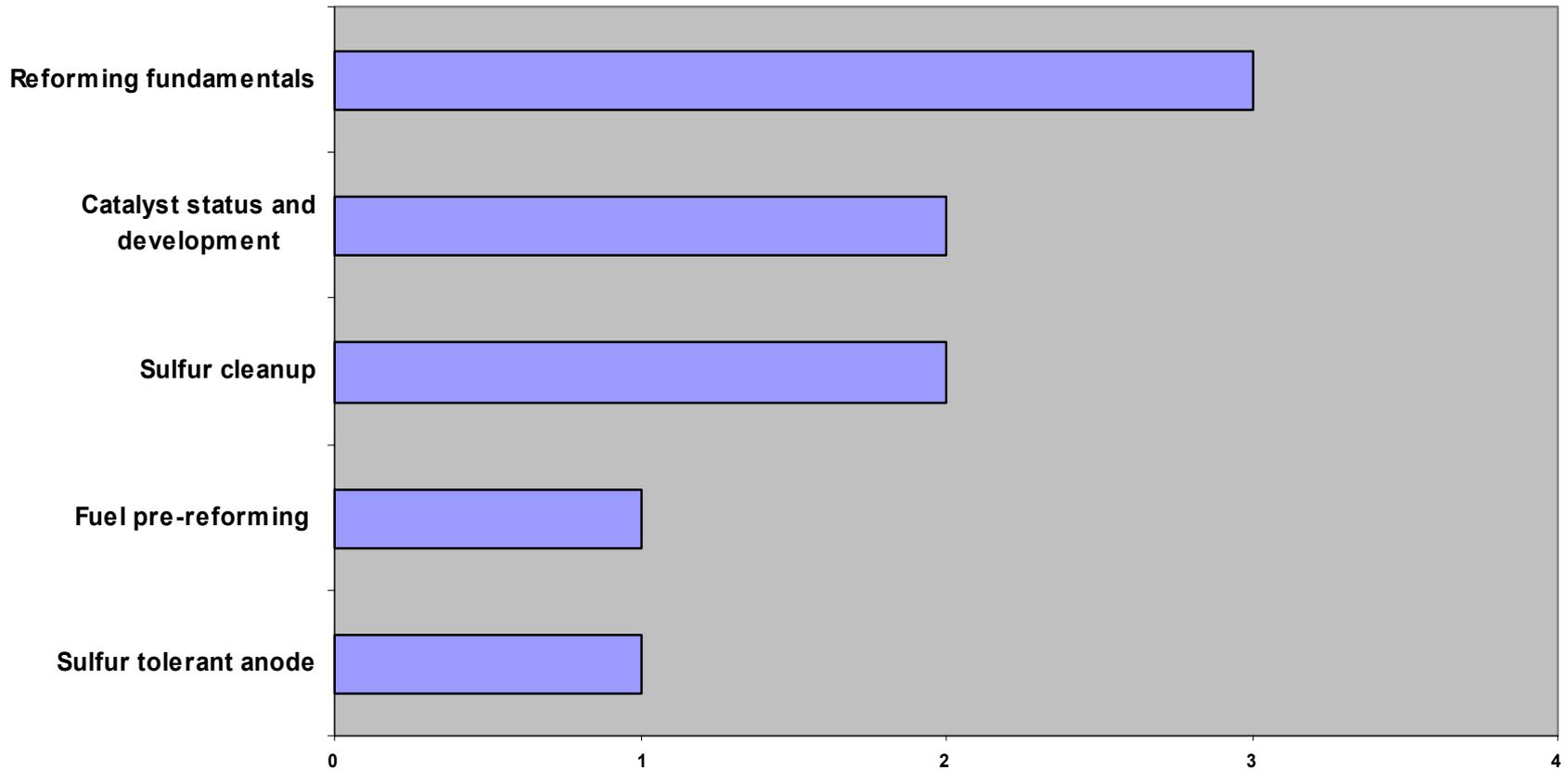


# Fuel Processing Needs for SECA Program

*Expressed Prior to Selection of Vertical Team Awards*



# Reforming Needs Based on Vertical Team Feedback



# Topic Area 1 Details: Fuel Reforming Fundamentals

The following is of interest for the major reforming approaches (SMR, ATR, CPOX)

- Catalyst activity, cost
- Kinetics, mechanisms
- Effects of fuel type on performance
- Deactivation by sulfur, carbon
- Reaction/reactor models



# Topic Area 2 Details: Catalyst Status and Development

- **Need for improved catalysts in the following areas**
  - Dual function catalysts for CPOX, ATR
  - Dry reforming catalysts to reduce H<sub>2</sub>O
  - Multi-fuel catalysts
  - Assistance with catalyst characterization, especially post-mortem
  - Faster light-off times for CPOX
- **Identify state-of the-art in fuel reformation, especially diesel reformation**



# Topic Area 3 Details: Sulfur Cleanup

## Broad-based needs to handle several sulfur issues

- Desulfurization of liquid fuels
- High temperature H<sub>2</sub>S removal (between sulfur tolerant reformer, anode)
- Identify sulfur tolerance limits for reformer, anode
- Higher capacity, more effective natural gas desulfurization



# SECA Solicitation Addressed Some Core Technology Needs

- **High temperature sulfur removal**
  - Sulfur tolerant reforming catalysts create sulfur contamination of fuel cell anode
  - High temperature H<sub>2</sub>S removal obviates energy losses from lower temperature absorbents (ZnO)
- **Contaminant-resistant fuel cell anodes and reforming catalysts**
  - Sulfur
  - Carbon
  - Other impurities



# Current Core Technology Efforts to Address Vertical Teams Needs in Fuel Processing

- **Summary list of government supported fuel processing efforts will be provided to vertical teams**
- **Current efforts at Los Alamos**
  - Target diesel reforming for APU
  - Study parameters affecting fuel processor life and durability
- **NETL activities on kinetics, modeling of diesel reforming**
- **NETL activities on desulfurization**

