



ELECTRIC POWER RESEARCH INSTITUTE



# Low Carbon Fuels for Power Generation

**Robert Steele EPRI -** Technical Executive



 Image: marked base of the second s

### **Need Low-Carbon Fuels Beyond 2030**







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### **LCRI** Core Technical Scope







**QTI** 

## **LCRI Technical Subcommittees**

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	LOW-CARBON
1. 11.010.1	RESOURCES INITIATIVE

Group	
Executive Council	
Technical Advisory Group	
Electrolysis	
Hydrocarbons	
Renewable Fuels	
Storage and Delivery	
End Use: Transportation, Industrial and Residential	
Power Generation – R Steele (EPRI lead)	
Integrated Energy Analysis	
Safety and Environmental Aspects	

### Use of Ammonia will be addressed by all subcommittees



## **Power Generation Technical Subcommittee**

- Objective: Confirm the viability of alternative energy carriers as fuels for power generation – both in pure or blended forms
- Current Approach: Review and assess power generation technologies as related to burning low-carbon fuels with emphasis on Ammonia and Hydrogen
  - Include summary of key worldwide players and projects
  - Identify R&D gaps and collaboration opportunities
- 2021 Deliverables:
  - Short Technology Insight Reports (in progress):
    - Gas Turbines, HRSG Duct Burners, Electric Generation and Industrial Applications Boilers, Reciprocating Engines, Fuel <u>Cells</u>
  - Establish collaboration with worldwide universities and research organizations
  - Finalize multi-year roadmap .... WILL INCLUDE AMMONIA
    FUEL STANDARD



Instantaneous laminar flame images at  $\emptyset = 1.0$ , for E%NH<sub>3</sub> of (a) 20, (b) 50 and (c) 80. (Courtesy of lowa State University)



Vattenfall Magnum H2 Combined-Cycle Demo





.epri.com

## **Comparison of Fuel Characteristics**





Ammonia will require extensive R&D before widespread use as a fuel source for Power Generation



## Ammonia as a Fuel has Potential in Many Industries













#### Introduction of Ammonia will start as an additive with natural gas

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**Qtl** 

#### Together...Shaping the Future of Electricity



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