

Item 9: Hydrogen Blending and Lower Oxides of Nitrogen Emissions in Gas-Fired Generation (HyBLOX) - GFO-22-504

January 24, 2024 Business Meeting

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- Gas-fired generation using high blends of hydrogen (H₂) >30%
- Mitigation of greenhouse gas (GHG) and oxides of nitrogen (NOx) emissions

• Efficient performance and durability



Source: Axepas12, CC BY-SA 4.0 https://commons.wikimedia.org/wiki/File:Engine_explosion.gif via Wikimedia Commons





Adapted from: gov.ca.gov

- Environmental & Health: Reduced GHG and NOx emissions
- **Cost:** Improved efficiency and reliable and resilient generation systems
- **Safety:** Improved standard procedures for handling and operation





Split-cycle reciprocating engine using H_2 gas blends >30%

- Independently optimizes the power cycle steps
- Hybrid micro-combined heat and power









Source: Tour Engine

Noble Thermodynamic Systems, Inc.

Argon Power Cycle using H_2 gas blends >30%

- Retrofittable conventional reciprocating engine
- Zero GHG and NOx emissions



thermodynamics





Source: Noble Thermodynamic Systems



Enchanted Rock, LLC

Optimized reciprocating engine using H_2 gas blends >30%

- In-cylinder combustion
- Cooled high pressure Exhaust Gas Recirculation





ENCHANTED ROCK The Power is On.



Source: Enchanted Rock



- Adopt staff's determination that these actions are exempt from CEQA.
- Approve three grant agreements with:
 - Tour Engine, Inc.
 - Noble Thermodynamic Systems, Inc.
 - Enchanted Rock, LLC.