

Hydrogen Separations and Purification Working Group (PURIWG) Kick-Off



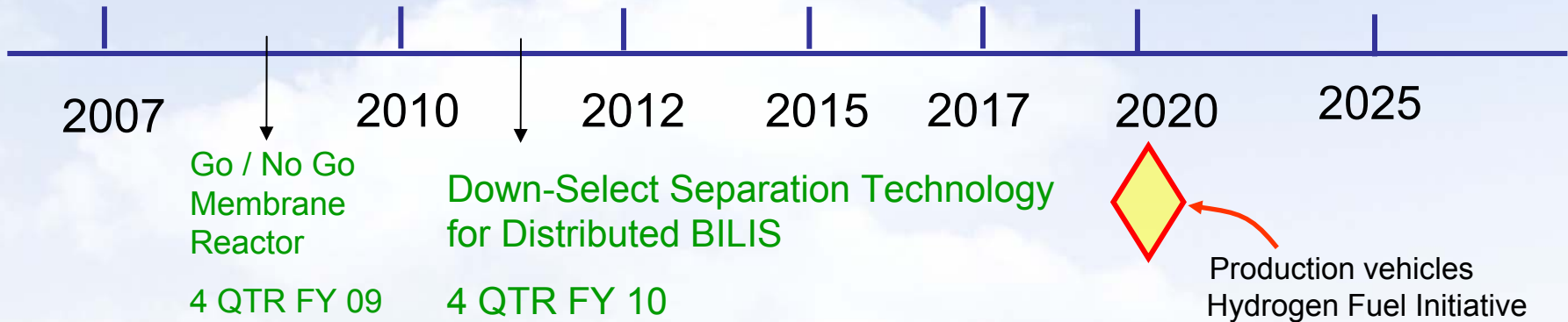
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Hydrogen Separations and Purification

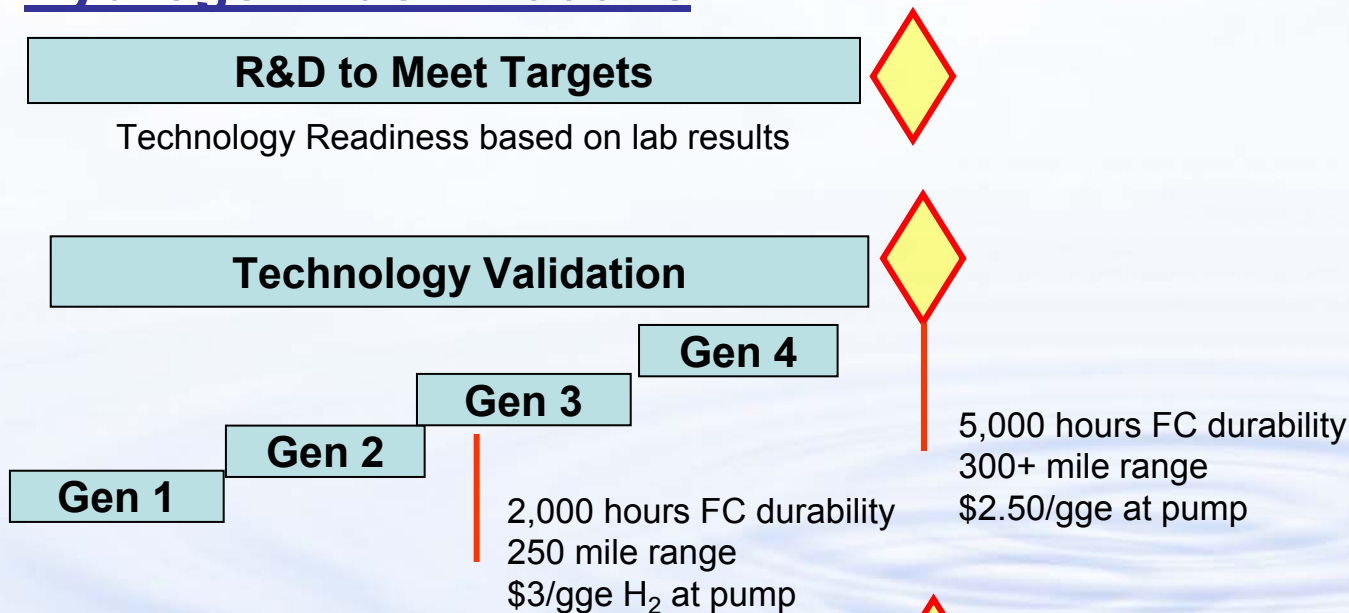
Working Group (PURIWG)

- Comprised of hydrogen separations and purifications researchers
- The main objective is to review research with a collective focus on achieving DOE technical targets and providing feedback to DOE regarding RD&D efforts. This will be achieved through information sharing and where feasible collaborative research efforts.

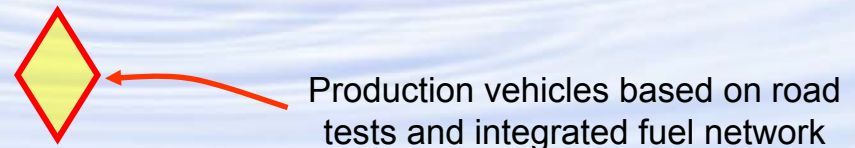
Key Separations Decisions



Hydrogen Fuel Initiative



Alternative Scenario Analyses



2010 Technical Targets

Dense Metallic Membranes

- **Flux Rate: 250 scfh/ft²**
- **Module Cost: \$1,000/ft² of membrane**
- **Durability: 26,280 hours**
- **Operating Capability: 400 psi**
- **Hydrogen Recovery: > 80%**
- **Hydrogen Quality: 99.99 % of total (dry) gas**

2010 Technical Targets

Microporous Membranes

- **Flux Rate: 200 scfh /ft²**
- **Module Cost: \$200 /ft² of membrane**
- **Durability: 26,280 hours**
- **Operating Capability: 400 psi**
- **Hydrogen Recovery: > 80%**
- **Hydrogen Quality: 99.5 % of total (dry) gas**

Hydrogen Quality

- HFCIT Hydrogen fuel quality guidelines based on the Society of Automotive Engineers' (SAE) specification in *SAE-2719* currently in the ratification process.
- The primary purpose of this specification is to ensure acceptable fuel cell performance and durability in current demonstration vehicles.
- It does not take into account the economic impact of producing hydrogen of this quality. The limits are upper limits except for the hydrogen fuel index, which is a lower limit.

H₂ Fuel Quality Guidelines

MYRD&D Plan Appendix C

Hydrogen fuel index vol% >99.99%

Non-hydrogen constituents

▪ Total Non-Particulates	μmol/mol	100
▪ Water	μmol/mol	5
▪ Total hydrocarbons	μmol/mol	2
▪ Oxygen	μmol/mol	5
▪ Helium, Nitrogen, Argon	μmol/mol	100
▪ Carbon dioxide d	μmol/mol	1
▪ Carbon monoxide	μmol/mol	0.2
▪ Total sulfur e	μmol/mo	0.004
▪ Formaldehyde	μmol/mol	0.01
▪ Formic acid	μmol/mol	0.2
▪ Ammonia	μmol/mol	0.1
▪ Total halogenates f	μmol/mol	0.05
▪ Max. Particulate Size	μm	< 10
▪ Particulate Concentration	μg/L	1

Production Tech Team Research Reviewers

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