Expert Assessments of the Cost and Expected Future Performance of Solid Oxide Fuel Cells for Stationary Power Applications

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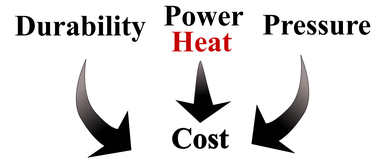
Introduction and Research Questions

We seek to inform future solid oxide fuel cell (SOFC) R&D:

- **How much does an SOFC system cost?**
- **What are the degradation rate and optimal operating pressure of an SOFC?**
- **What is the timeline for achieving SOFC technical breakthroughs?**



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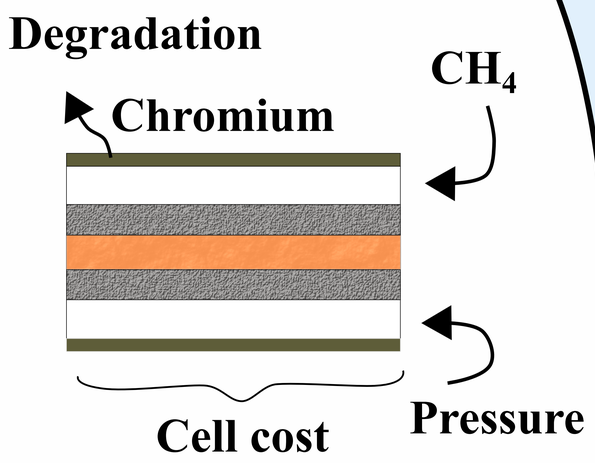
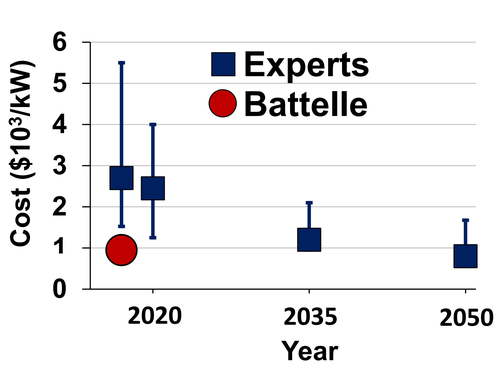
Metrics

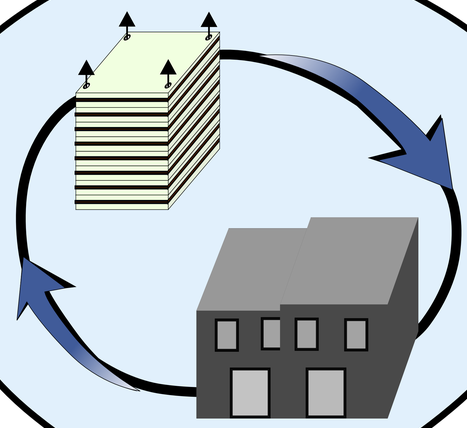


System Cost

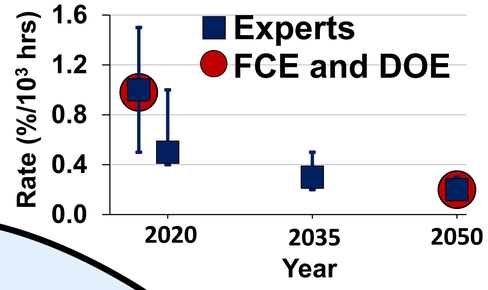


Battelle values from (Battelle, 2017)

- Experts' 2017 cost is $2,700/kW
- Experts' costs exceed DOE values



Degradation Rate



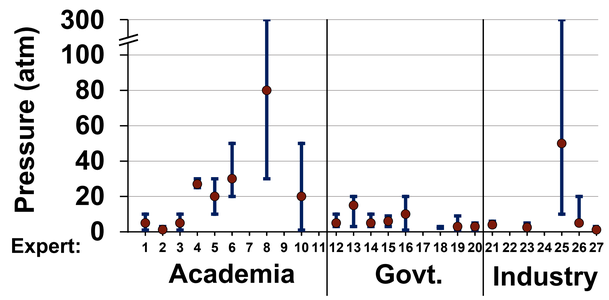
2017 value from (Ghezel-Ayagh, 2011)
2050 value from (NETL, n.d.)

- Experts agree with DOE values from 2017–2050
- Experts think stack degrades at 1%/1,000 hrs. in 2017

Interviews

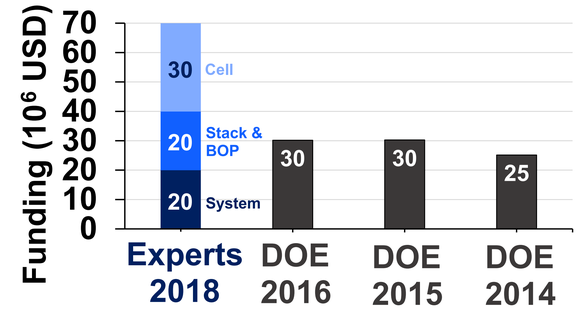
- Experts chosen based on work experience, patents, publications, and academic training
- We conducted 27 interviews across academia, industry, and government
- We monitored bias (e.g., anchoring)

Pressure



- Experts provided values near 5, 25, and 300 atm
- Government experts predicted lower values

Funding Recommendations



DOE values from (NETL, 2017), using WebPlotDigitizer, v. 4.1.

- Experts recommended $70 million total
- Experts emphasized fuel cell development

Summary

- SOFC system costs $2,700 and degrades at 1%/1,000 hrs.
- Pressure ranges widely (3–300 atm)
- Cost and durability will improve through 2050

Acknowledgment and References

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