

Introduction to Breakout #2: **Cross-Cutting/Enabling Technologies**

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teaming with:

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Recap: Breakout #1 - Yesterday:

- We have discussed in Breakout #1 several design concept examples
- Instrumentation, sensors and controls are identified as key technologies
- Solid-state heat to electricity conversion can be an enabling technology for MMR systems
- We have identified several regulatory challenges
- We **fully appreciate** these challenges

Technology vs Policy/Regulation

ARPA-E supports transformative and disruptive technology development

- We can leverage technology innovations to help address the regulatory requirements
- We can make recommendations enabled by innovations
- We do not create programs for the sake of policies or regulations

Breakout #2 - today:

- We need to open our minds to **collectively** identify the **overarching/cross-cutting technical challenges and opportunities**
- We need now to think a level above what we did yesterday
 - be design agnostic
 - identify the pinch points
- **Assume that in an ideal world all regulatory requirements are worked out and will be taken care of → enable “outside of the box” thinking**
- What are the intrinsic benefits of small size?
- How to optimize the systems to scale? → Is 10 MW_e the best/right size?

Key Focus Topics for Breakout #2

- ▶ **Systems integration** of enabling technologies (not COTS technologies)
- ▶ Systems must have **load-following capability**
 - What are the overarching/cross-cutting needs for **sensors and controls?**
- ▶ Key **optimization strategies** for different **scale/size** reactors (e.g. < 1 MW, 1-10 MW, 10-25 MW, >25 MW)
- ▶ Enabling systems with **minimum human intervention**
- ▶ Cost metric: **≤ \$0.10/kWh** without regulatory burden
- ▶ Surface area/volume optimization – needs more discussion

Jet engine example again



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