

Developing Technology to Reduce Emissions

At the Mitigation Work Group on August 18, the members discussed emerging technologies, and watched a presentation from the Maryland Energy Administration.¹

Key Findings:

Carbon Capture Utilization and Storage/Sequestration (CCUS)

- Key Point: this is about permanent sequestration. The goal is to permanently store CO₂, such as in concrete or underwater reservoirs, rather than sent to a use where the CO₂ is eventually released, like in beverages.
- CCUS refer to technology that prevents CO₂ from being released into the atmosphere, transport it, and sequester it
 - Transport by either CO₂ pipelines (preferably) or by truck
 - Captured from more than just power generation – it's also gleaned from industry like cement or fertilizer production
- Bioenergy with Carbon Capture and Storage (BECCS) and Direct Air Carbon Capture and Storage (DACCS) are potential negative emissions technologies. The CO₂ is transported and sequestered in a similar manner to CCUS

Batteries and Energy Storage

- Energy storage allows renewables to be used in greater quantities
- The key is that stored energy can be used on demand, allowing for peak load shifting and backup power
- Peak load shifting grants further monetary benefit, as energy produced outside peak hours is sold at a cheaper rate
- Increases grid reliability
- MEA has a program to incentivize energy storage in Maryland that refunds 30% of the total installation costs – up to \$5,000 for residential, or \$75,000 for commercial property
- The cost is expected to drop in the next decade

Small Modular Reactors (SMR)

- SMRs are small nuclear fission reactors
- Safety features:
 - Process is highly automated, can go 1+ weeks without human interaction
 - SMR's make use of "passive" safety features, i.e. using gravity instead of a mechanical component that may fail
 - Smaller size leads to lower power density limits, and less large piping that could rupture or lead to coolant accidents
 - Container is underground or underwater, helping with heat management

¹mde.maryland.gov/programs/Air/ClimateChange/MCCC/MWG/Emerging%20Energy%20Technologies%20MEA%2018.20.pdf

- Both in the United States and around the world, people are prepared to fund SMRs
- The federal government is working to lower cost by targeting relevant technical and licensing through an SMR Research & Development program

Hydrogen

- Blue Hydrogen is hydrogen created from natural gas. Green Hydrogen is hydrogen generated through electrolysis and renewable electricity
 - European countries in particular are excited about green hydrogen's potential, and are planning to generate hydrogen off of wind power
 - Green hydrogen can be thought of as another way to store energy
- Hydrogen can be used for electricity, energy storage, vehicle fuel, industrial input, fertilizer, and metal processing

