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Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

# H2@Scale: Important Partner to the Circular Carbon Economy (CCE)

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## *presented 7/25/2018* H2@Scale: Large Scale H<sub>2</sub> from Diverse Sources

### Enabling affordable, reliable, clean and secure energy across sectors

#### **HYDROGEN**

- Can be produced from *diverse domestic resources* for use *in multiple sectors,* or for export
- Has the highest energy content by weight of all known fuels, and is a critical feedstock for many chemicals, including liquid fuels
- With fuel cells can enable zero or near zero emissions in transportation and stationary power applications
- Can enable grid stability and energy storage, and increase utilization of power generators, including nuclear, coal, natural gas, and renewables
- Can enable innovations in domestic industries across sectors

The U.S. produces over 10 million tonnes of hydrogen, one sixth of the global supply, primarily for oil refining and fertilizer



For more information, please see: https://energy.gov/eere/fuelcells/h2-scale

## presented 7/25/2018 Beyond NG: Renewable Products from H<sub>2</sub> + CO<sub>2</sub>



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## presented 7/25/2018 CCE + H2@Scale: Near- and Long-Term View

#### Methanol Example

#### Large Scale CO<sub>2</sub> and H<sub>2</sub> Utilization

## Production from NG $CH_4 + H_2O \rightarrow CO + 3H_2$ $CO + 2H_2 \rightarrow CH_3OH$

### **Beyond Cheap NG**

#### + renewable resources





conversion technology

- Converts renewable energy into liquid fuels compatible with existing infrastructure
- Decouples renewables from the electric grid
- Large storage capacity avoids curtailment issues
- Creates value and market for captured CO<sub>2</sub>
- Gradually supplements fossil feedstocks
- Helps enable a Circular Carbon Economy

## presented 7/25/2018 CCE + H2@Scale: Near- and Long-Term View





Offers new pathways to utilize diverse domestic energy resources and feedstocks to meet current and future demands across sectors

Offers new pathways to bridge diverse regional domestic resources with the nation's primary demand centers leveraging both electric and chemical-based energy transmission

## ENERGY Energy Efficiency & Renewable Energy

## THANK YOU!