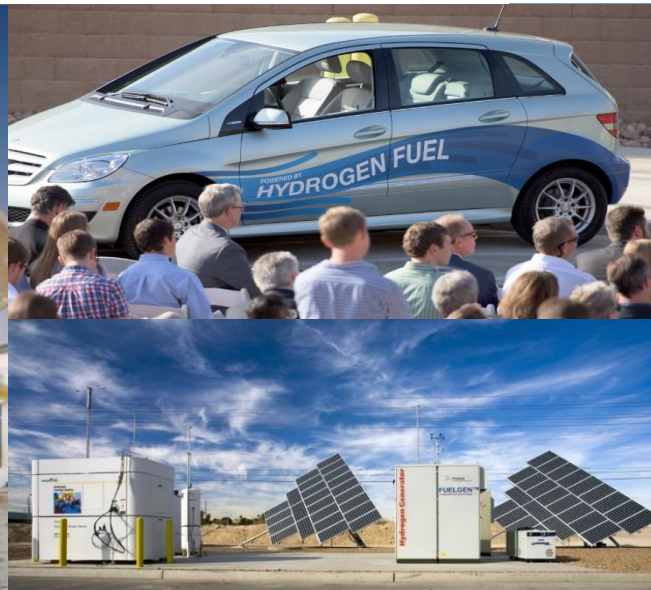


# U.S. Department of Energy's Hydrogen and Fuel Cell Perspectives

Dr. Sunita Satyapal, Director, U.S. Dept. of Energy Fuel Cell Technologies Office

Korea National Assembly Forum

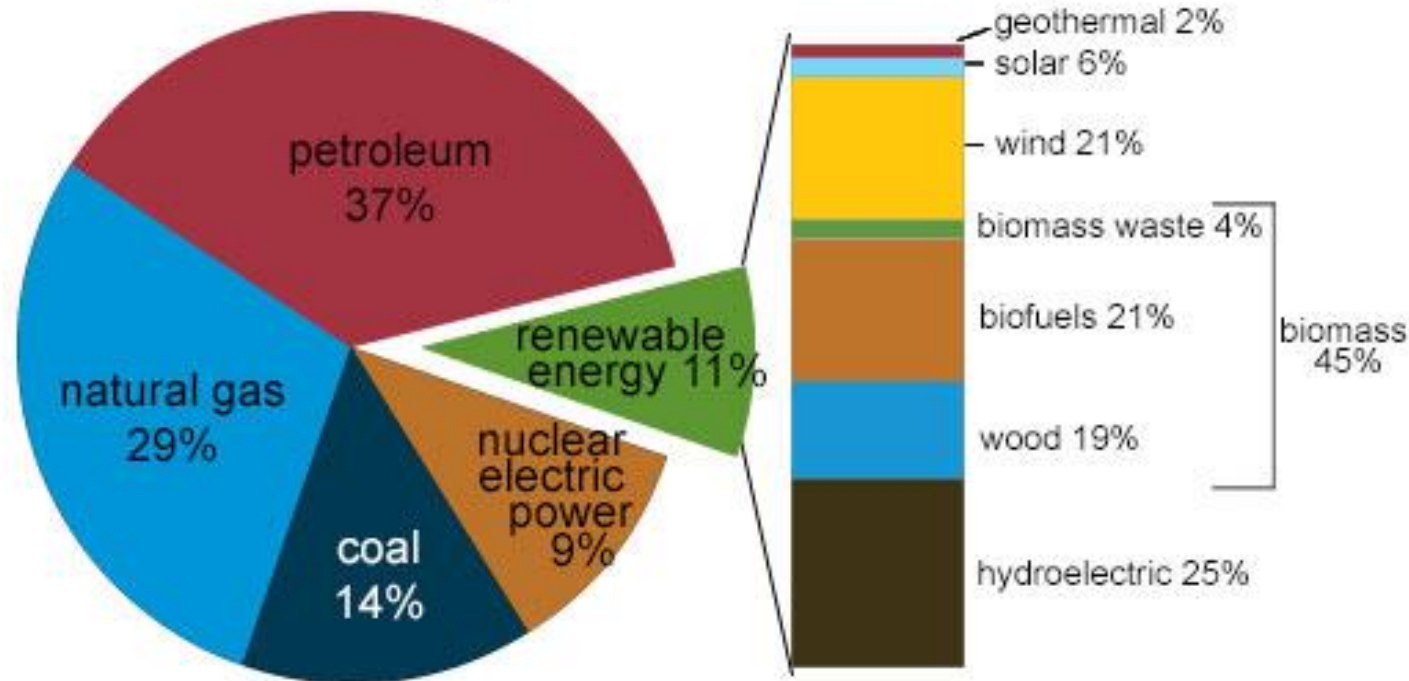
October 25, 2019 – Seoul, Korea



# U.S. Energy Portfolio

## U.S. energy consumption by energy source, 2017

Total = 97.7 quadrillion  
British thermal units (Btu)








Note: Sum of components may not equal 100% because of independent rounding.  
Source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 1.3 and 10.1, April 2018, preliminary data

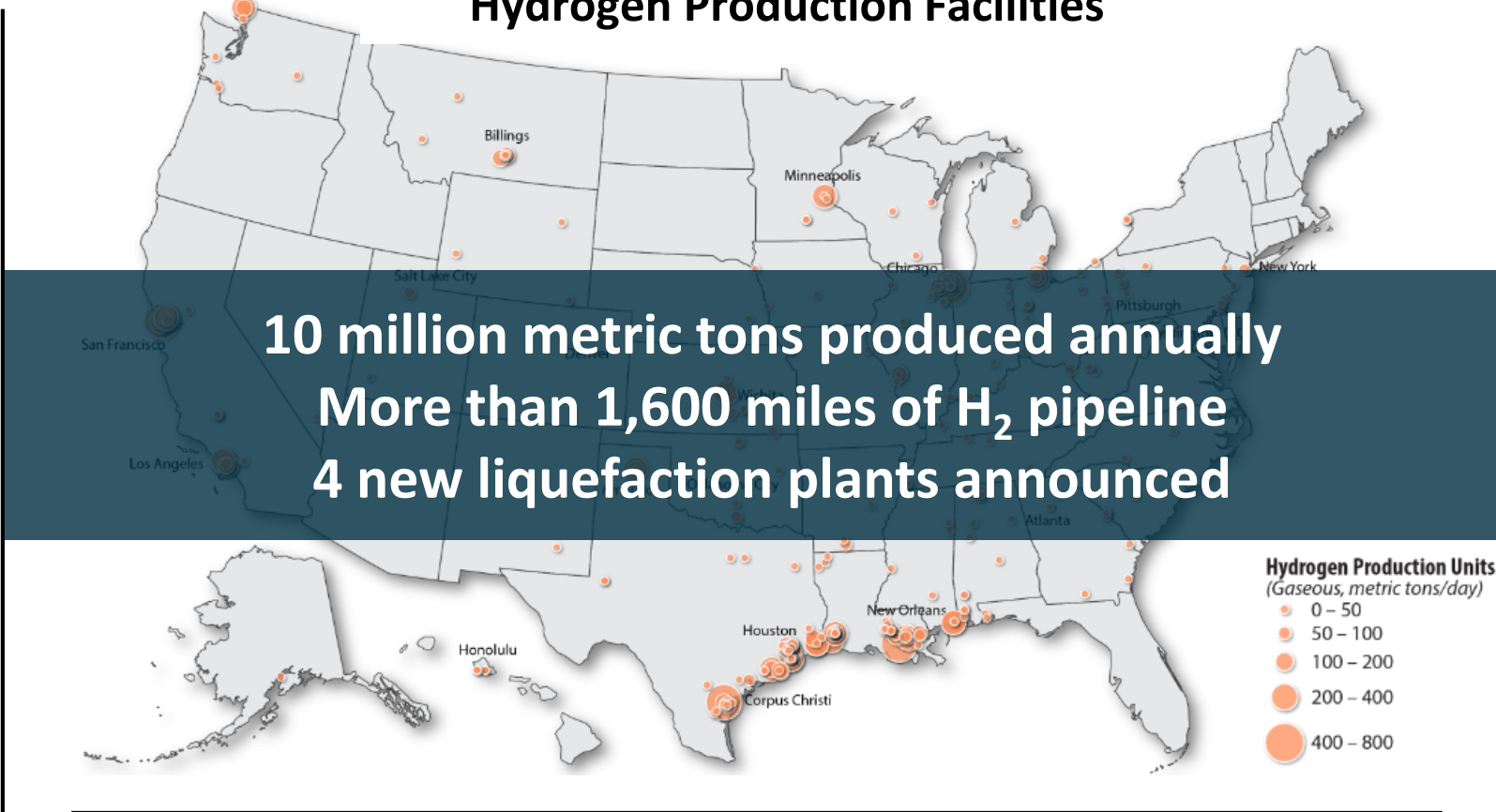


# Snapshot of Hydrogen and Fuel Cells Applications in the United States

## Examples of Applications

	<b>&gt;500MW</b> Stationary Power
	<b>&gt;26,000</b> Forklifts
	<b>&gt;30</b> Fuel Cell Buses
	<b>&gt;40</b> H <sub>2</sub> Retail Stations
	<b>&gt;7,800</b> Fuel Cell Cars

## Hydrogen Production Facilities



## Hydrogen Stations: Examples of Plans Across States

**California**  
1,000 stations by 2030

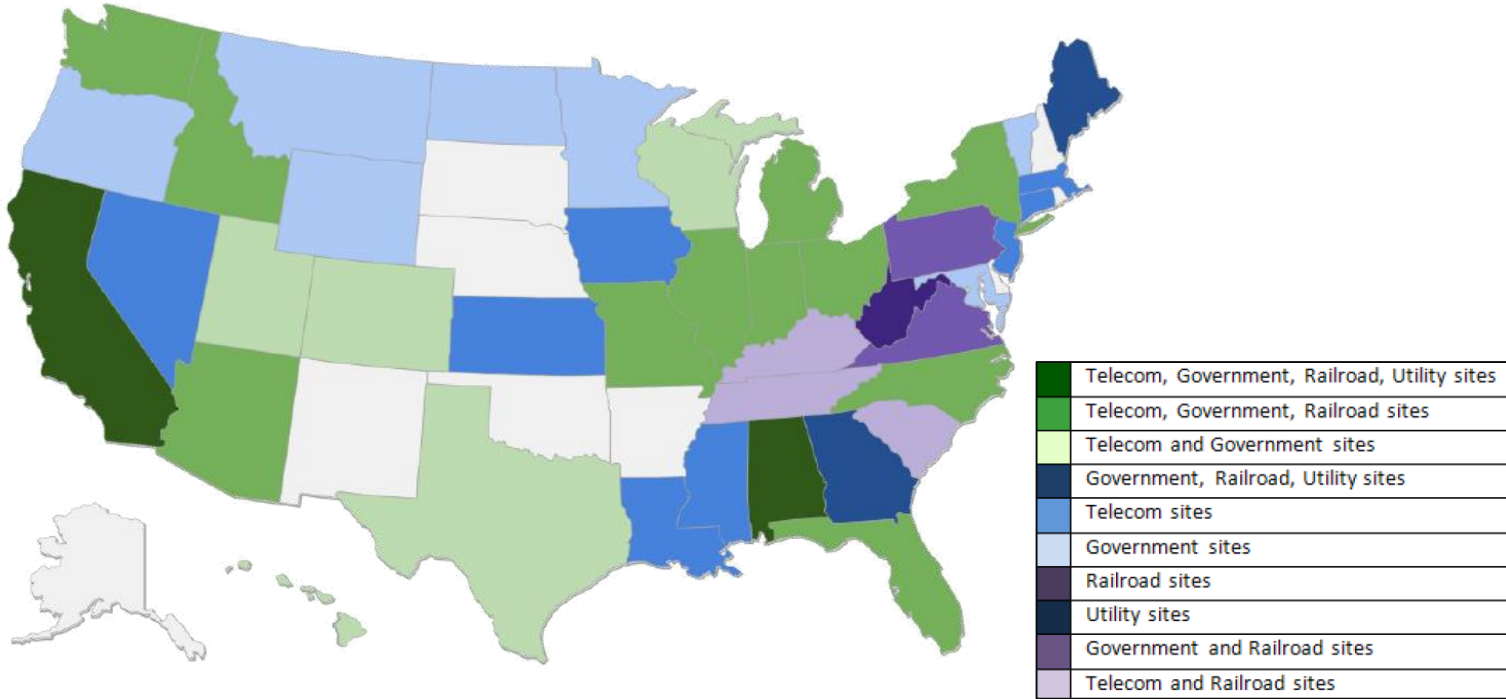
**Northeast**  
12 – 20 stations planned

**HI, OH, SC, NY, CT, MA, CO, UT, TX, MI, and others** with interest



# Energy Resilience as an emerging priority that fuel cells can address

## Examples of stationary fuel cell installations



- **Over 500 MW installed** across more than 40 states
- **Over 8,000 backup power units** deployed or on order
- Users include telecommunications, utilities and railroad sites

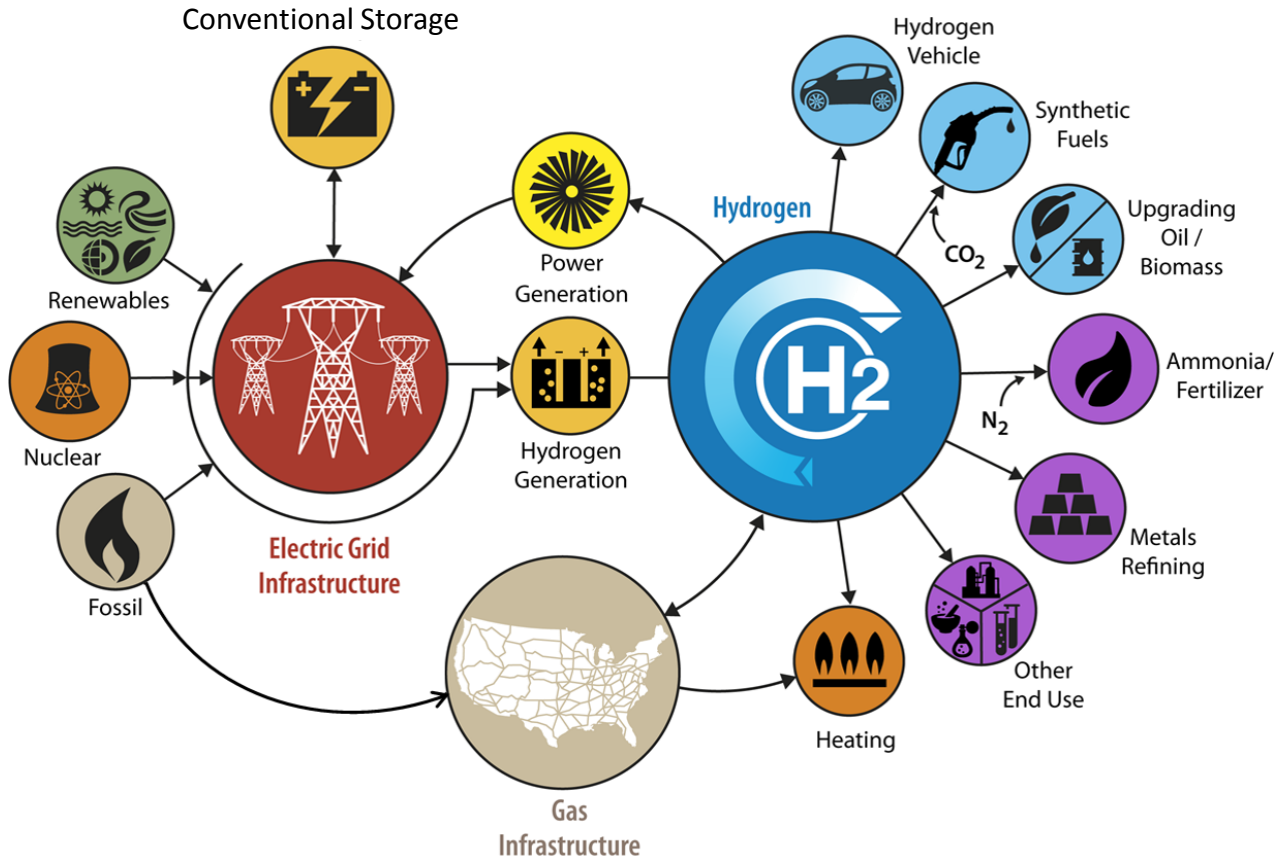
Fuel cells provided backup power during Hurricane Sandy in the U.S. Northeast



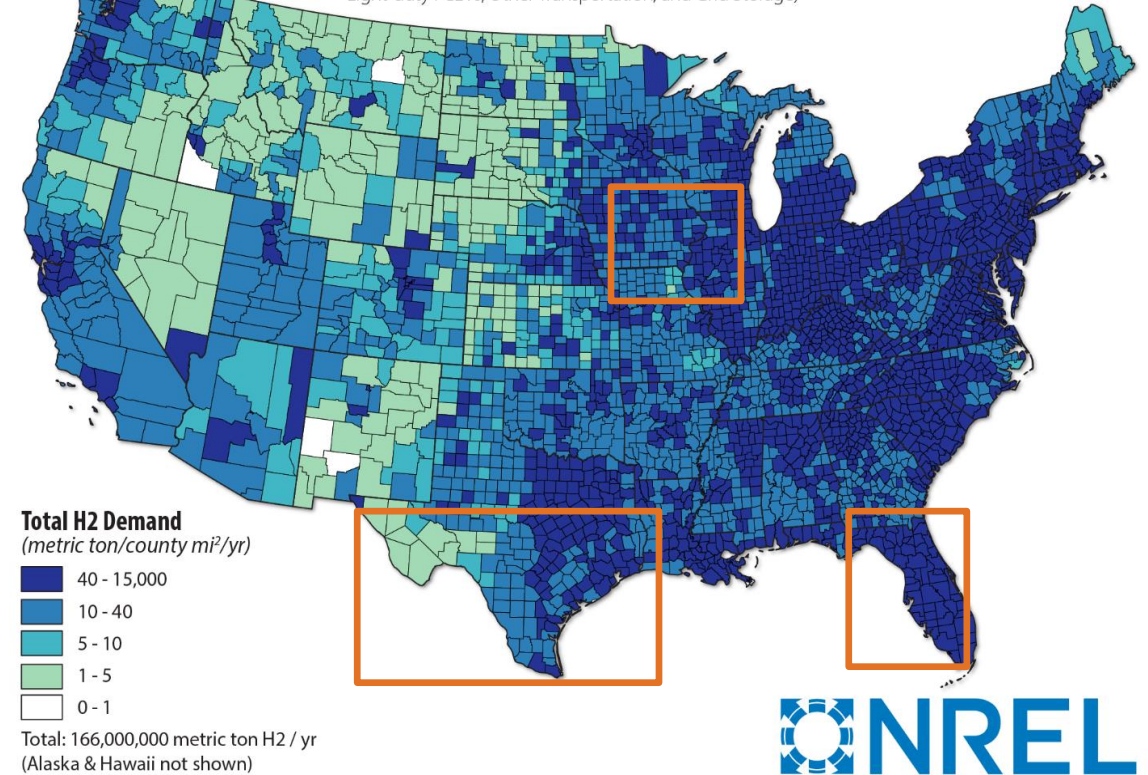
U.S. Dept. of Energy and Defense working together to develop H2Refuel for disaster relief missions



# H<sub>2</sub>@Scale: Enabling affordable, reliable, clean, and secure energy across sectors



**Maximum Market Potential for the Industrial & Transport Sectors, Natural Gas, and Storage**  
 (Oil Refining, Ammonia, Metals, Biofuels, Natural Gas, Synthetic Fuels & Chemicals, Light-duty FCEVs, Other Transportation, and Grid Storage)



**Hydrogen and Fuel Cell Program  
 Budget (FY 2019): \$120M**


**3 H<sub>2</sub>@scale demonstration projects just  
 awarded in Texas, Illinois and Florida**




# H<sub>2</sub>@Rail and H<sub>2</sub>@Ports Initiatives

- U.S. Dept. of Energy in collaboration with:
  - Dept. of Transportation (DOT) – Federal Railroad Administration
  - DOT-Maritime Administration

## Data Centers and Energy Storage Applications



**Assessing large scale applications to increase regional hydrogen demand**



Source: DOT-FRA (top) & SNL (bottom)

# Example of Collaboration: Global Center for H<sub>2</sub> Safety (CHS)

IPHE Steering Committee action: Increase awareness of safety partnership.  
Promotes safe operation, handling and use of hydrogen across all applications.

Hydrogen  
Council

AIChE 

  
Pacific Northwest  
NATIONAL LABORATORY



CENTER FOR  
**Hydrogen**  
SAFETY

*Connecting a Global Community*



 HYDROGEN  
Safety Panel

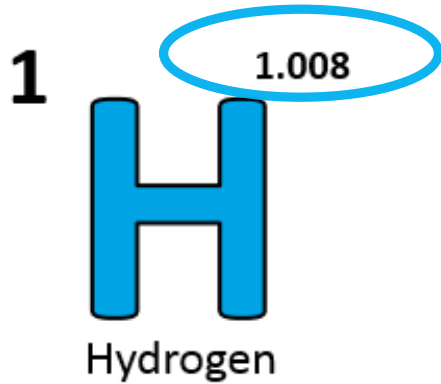
 HYDROGEN  
Emergency Response  
Training Resources

Includes over 20  
partners from industry,  
government and  
academia

[www.aiche.org/CHS](http://www.aiche.org/CHS)

# What can you do? Increase Awareness and Outreach

**Celebrate National Hydrogen  
& Fuel Cell Day**  
October 8 or 10/8



**Use Safety  
Information and  
Training Resources**

H2tools.org



INCREASE YOUR  
**H<sub>2</sub>IQ**

Download for free at:

[energy.gov/eere/fuelcells/downloads/  
increase-your-h2iq-training-resource](https://energy.gov/eere/fuelcells/downloads/increase-your-h2iq-training-resource)

**Save the Date**

**May 19 -21, 2020  
Annual Merit Review  
Washington DC**



**Sign up to receive hydrogen and fuel cell updates**

[www.energy.gov/eere/fuelcells/fuel-cell-technologies-office-newsletter](http://www.energy.gov/eere/fuelcells/fuel-cell-technologies-office-newsletter)

**Learn more at: [energy.gov/eere/fuelcells](http://energy.gov/eere/fuelcells)**



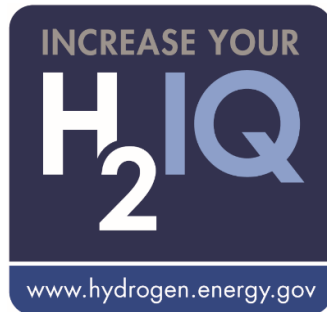
# Thank You

## Fuel Cell Technologies Office

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Director

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*Looking for more info?*

**#H2IQ**

[hydrogen.energy.gov](http://hydrogen.energy.gov)