# Critical Roles for Fuel Cells in Sustainable & Renewable Power Generation

## Integrated Energy Policy Report - Workshop

National Fuel Cell Research Center

UCIrvine | University of California

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# Fuel Cell Features & Roles

## Fuel cells are critical to sustainable/renewable energy:

- Stationary fuel cells can operate on a variety of renewable fuels with the following features:
  - Ultra-low criteria pollutant emissions
  - High fuel-to-electricity conversion efficiency
  - Distributed (at location of resource)
  - Poly-generation of power, heating, cooling, fuels

- Fuel cells produce "dispatchable" clean power
  - Can be designed to dynamically dispatch in a manner that complements intermittent renewables
  - Regardless of fuel type

- Only distributed technology with competitive (NGCC) efficiency & required emissions
- Fuel cell vehicles offer zero emissions, rapid fueling, and long range (incl. renewable fuels)

- Reversible fuel cells ideal for massive energy storage

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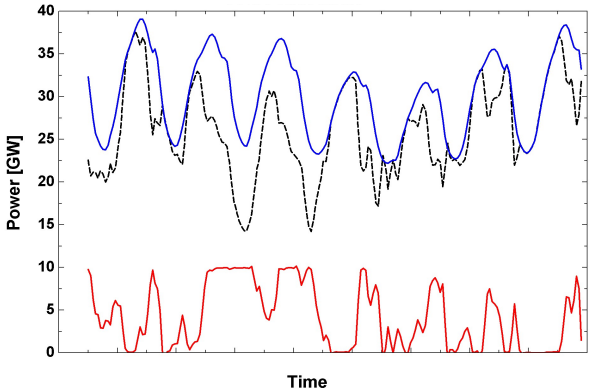
# Demonstrated Success

## Biogas Operation

## BiogasTri-Gen: Power, Heat, $H_2$

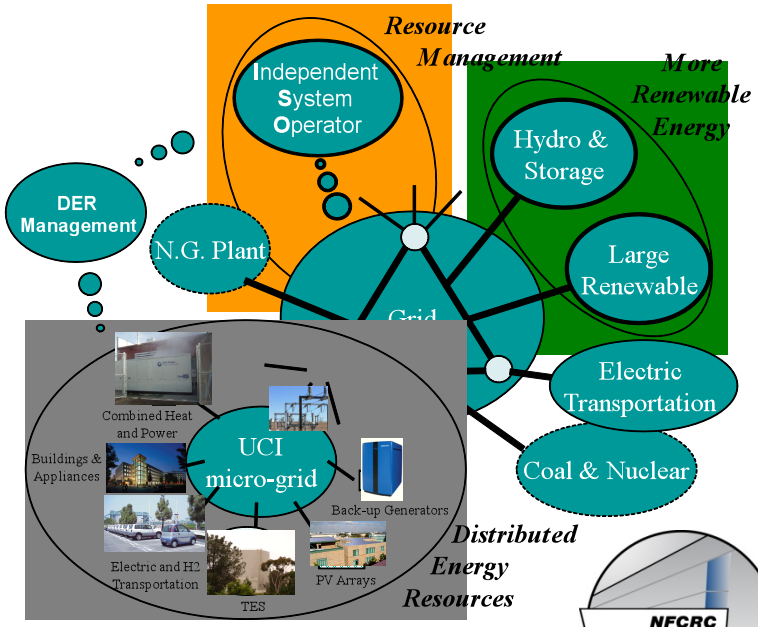
## Combined Cooling/Power

## Complement Intermittency



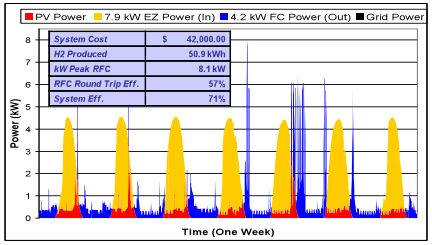

## Dispatchable Green Power

## RESCO Communities




## Transportation

## Energy Storage

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# Thank You
# For Your Attention!

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