SoCalGas A Sempra Energy utility®

Hydrogen Storage and Use
Electrolytic H_2 – Direct Injection vs Methanation

"BIG" Energy Storage: Priorities and Pathways to Long-Duration Energy Storage Workshop
Hosted by Sandia National Laboratories, Pacific Northwest National Laboratory and Oak Ridge National Laboratory

March 9-10, 2021

SoCalGas

- Largest natural gas distribution utility in the US
- An active part of the community for more than 140 years
- Serve 12 counties and 22 million people
- Employ more than 8,000 Californians
- 130 Bcf of geological storage, 18 TWh (if converted to electricity at 44% efficiency)

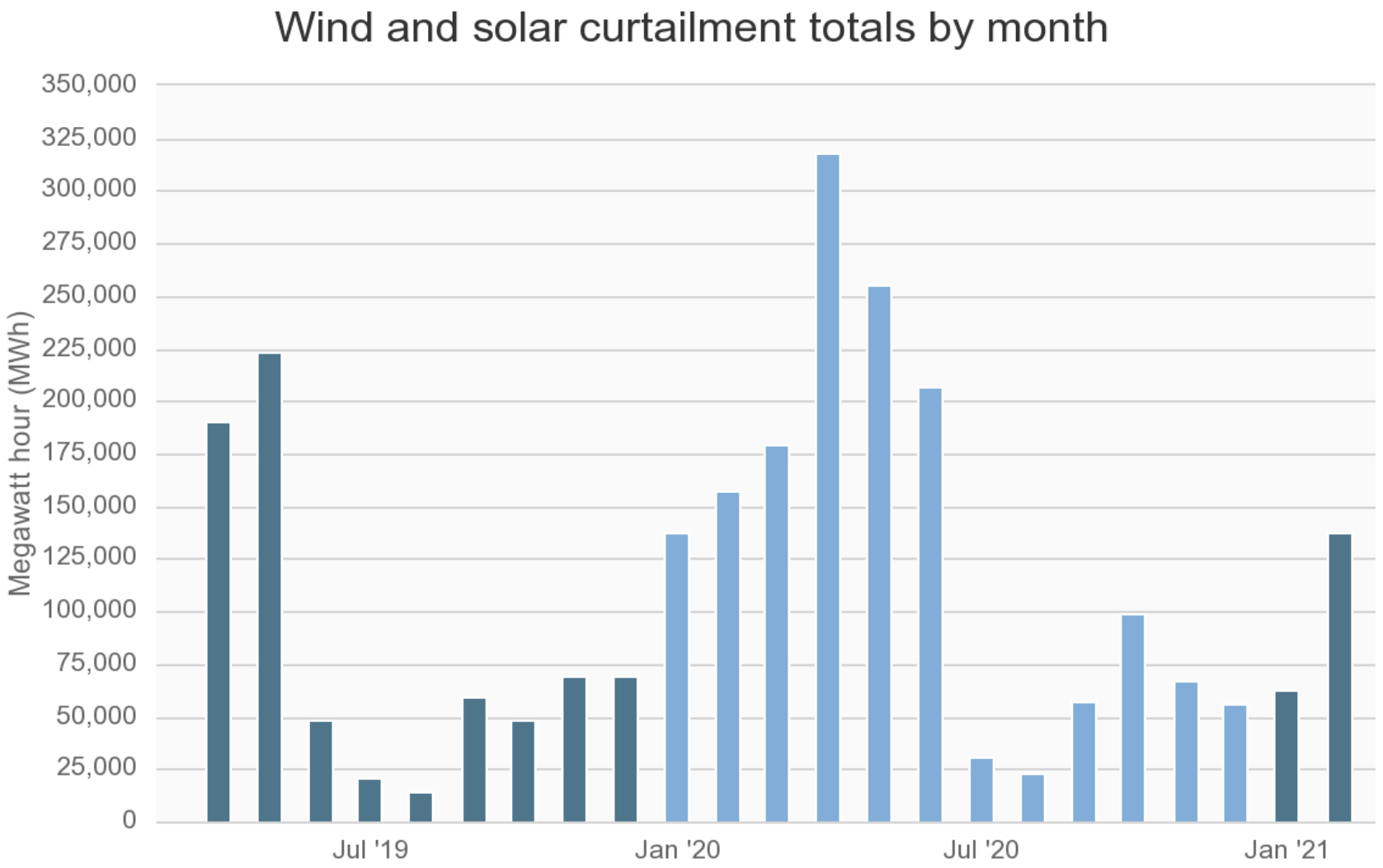
Natural Gas Storage Capacity

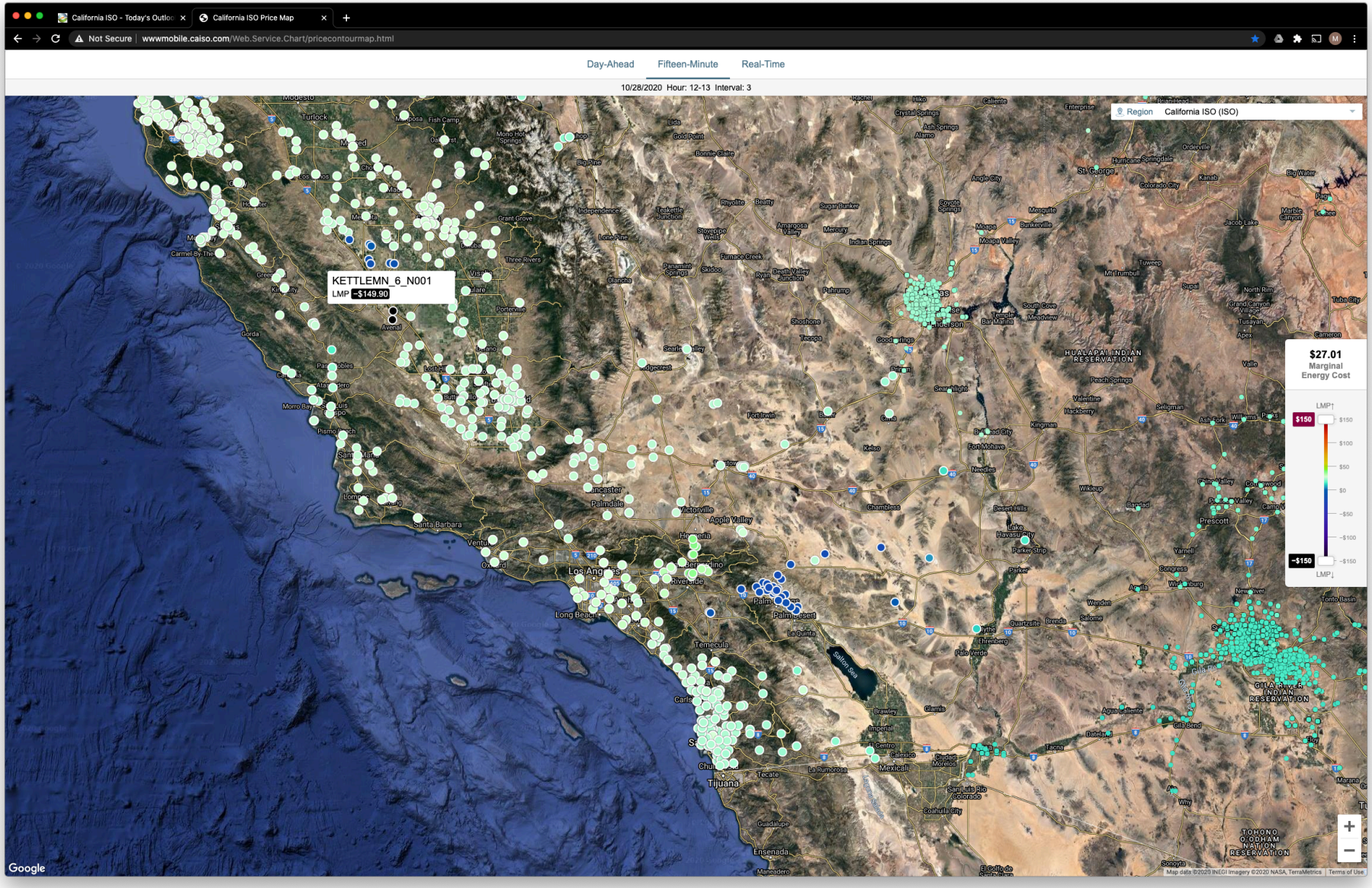
Region	NG Storage (BCF)	NG Storage (TWh)	NG Storage % Annual Power Consumption California	NG Storage % Annual Power Consumption Lower-48
Lower 48 States	4261	571		15
California	476	64	25	
SoCalGas	135	18	7	

3

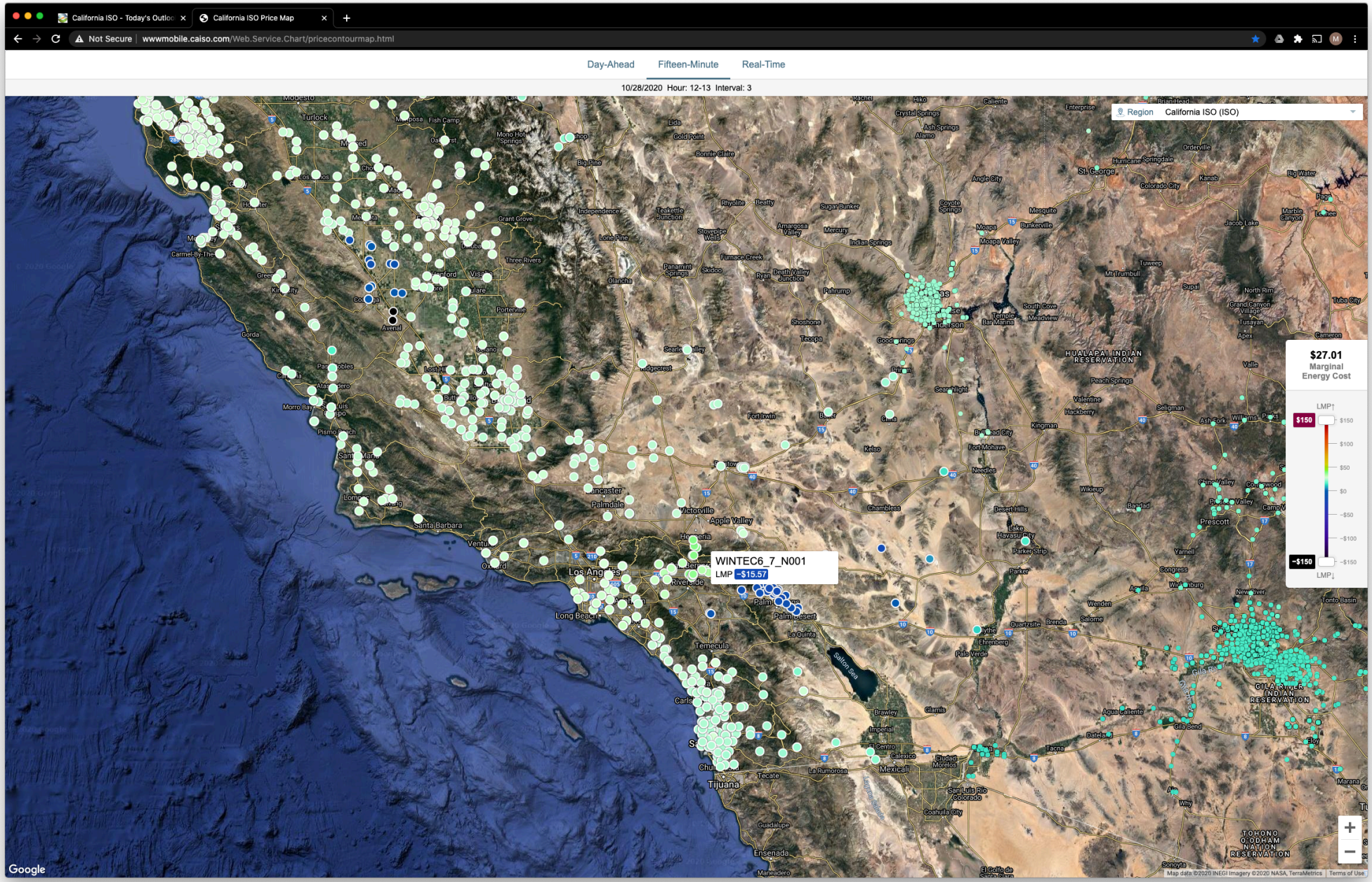
CAISO Curtailments

2020 Jan-Sept Curtailments: 1.6 TWh



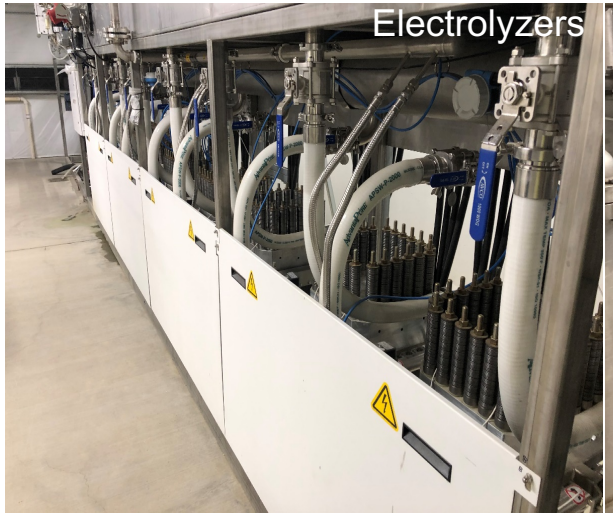

California ISO - Today's Outlook
California ISO Price Map
Not Secure
wwwmobile.caiso.com/Web.Service.Chart/pricecontourmap.html
Day-Ahead
Fifteen-Minute
Real-Time
10/28/2020 Hour: 12-13 Interval: 3
Region California ISO (ISO)
KETTLEMN_6_N001
LMP -$149.90
$27.01
Marginal
Energy Cost
LMP↑
$150
$100
$50
$0
-$50
-$100
-$150
LMP↓
Google

California ISO



SunLine Electrolyzer Facilities

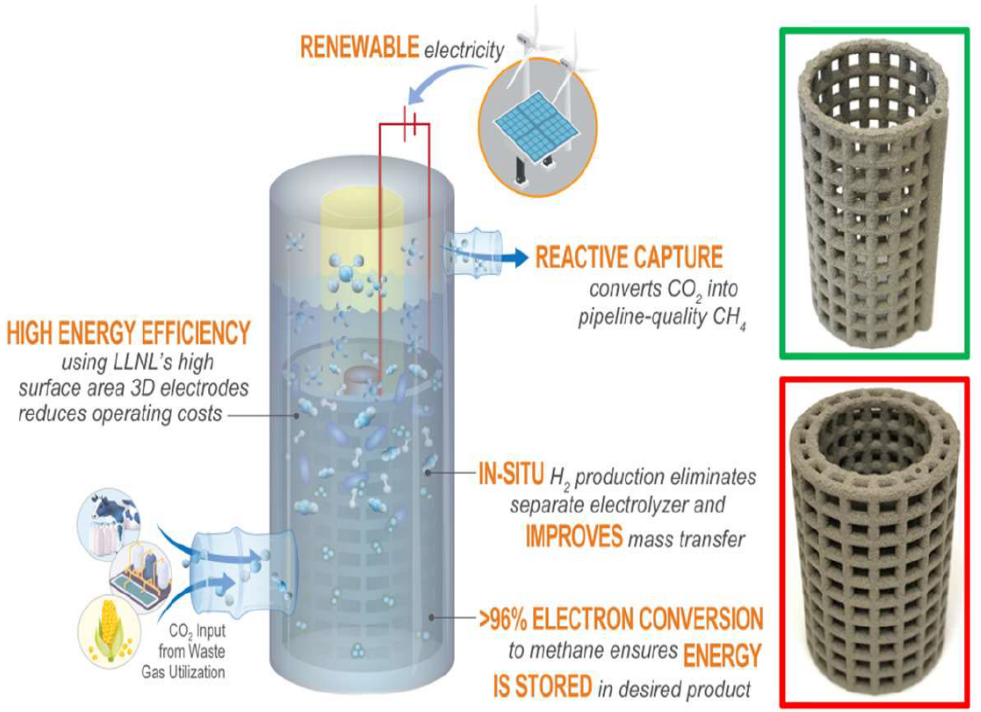
- 2.4 MW
- ~900 kg H_2/day
- Still under commissioning by NEL
- Currently generating ~300 kg/day to meet daily fleet demand

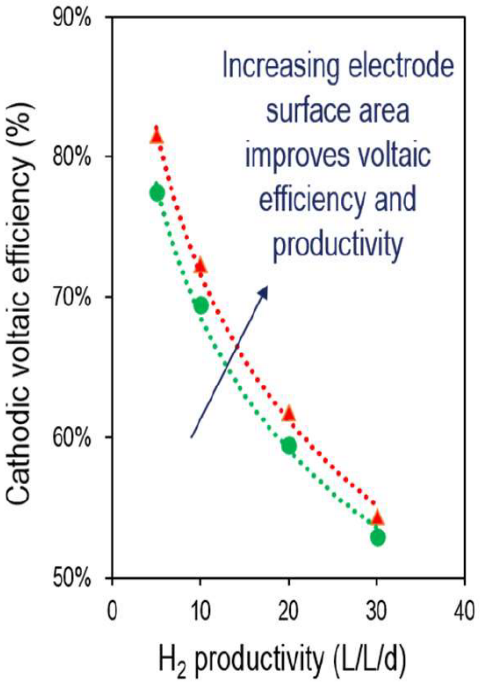


High Efficiency Power-to-Gas in a Modular Hybrid Electrobioreactor

Advanced Manufactured Electrobioreactors Enable Long-term Energy Storage through High Selectivity CO2 Conversion to CH4

- Advanced manufacturing of optimal reactor topology improves energy efficiency
- Reactive capture (selective CO2 utilization) couples electrolysis with bioconversion
- Produces pipeline-quality CH4, readily integrated into existing national infrastructure





STARS Compact Electric Induction Heated SMR