



**UCDAVIS**  
**INDUSTRIAL ENERGY EFFICIENCY**

Symposium July 31, 2019

Advancing Solutions in  
Electrical Generation,  
Storage, and Optimization



COMBINED HEAT & POWER PLANT  
EMISSION REGULATIONS

# Context



## Transformative Environment

1. Procedural (contractual)
2. Financial
3. Political
4. Technical

## Integrated Impacts

1. Conservation
2. **Energy Efficiency**
3. Generation
4. Storage

Come together and jointly identify meaningful RD&D opportunities for technology and process improvement that can ultimately reduce greenhouse gas emissions and improve economic competitiveness for California industries.

# Solar & Battery Trajectories

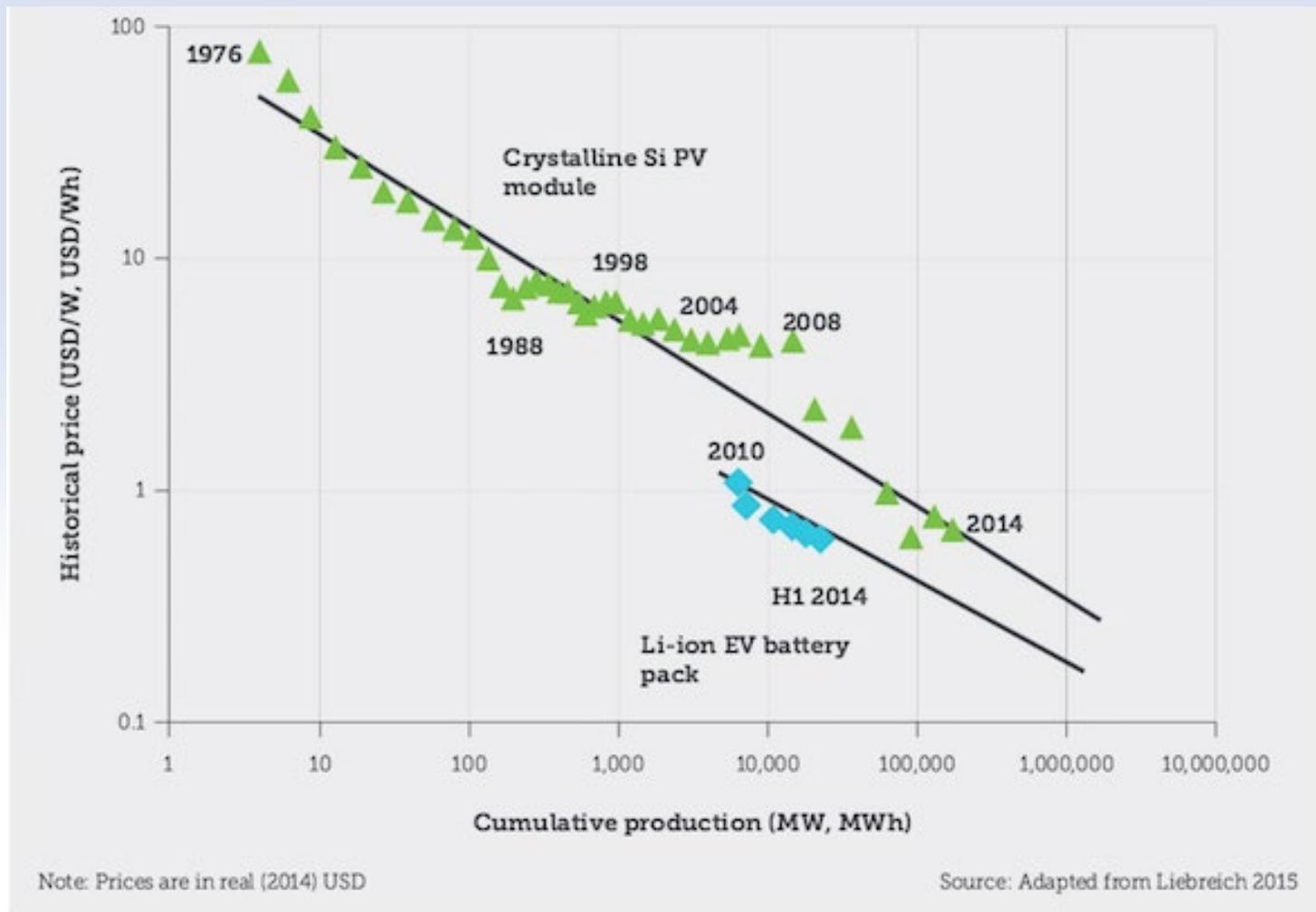


Figure 3: Lithium-ion batteries and solar PV modules are on very similar learning curves for cost reductions.

# Examples of RD&D



TECHNOLOGY	EXAMPLE OF RD&D OPPORTUNITIES
Intelligent Power Mgmt	Anything AI/ML
Microgrids	Anything 5G & IIoT
Energy Storage	Networking / Aggregation
Solar	Efficiencies w/ Bifacial PV
Cogeneration	Dual Fuel with the Sun
Heating	Decarbonization

# RD&D Direction



## Obstacles

- Resistance to Change
- Financial Hurdle Rates
- Medium term Political
- Complexity

## Opportunities

- Energy as a Service (EaaS)
- Virtual PPAs
- Dynamic DR
- Cooperative Networks