

DOCKETED

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Filer:	Michael Ferreira
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Item 14: Realizing Accelerated Manufacturing and Production for Clean Energy Technologies – GFO-21-304

April 12, 2023 Business Meeting

Michael Ferreira, Energy Commission Specialist
Energy Research & Development Division
Energy Deployment & Market Facilitation Branch



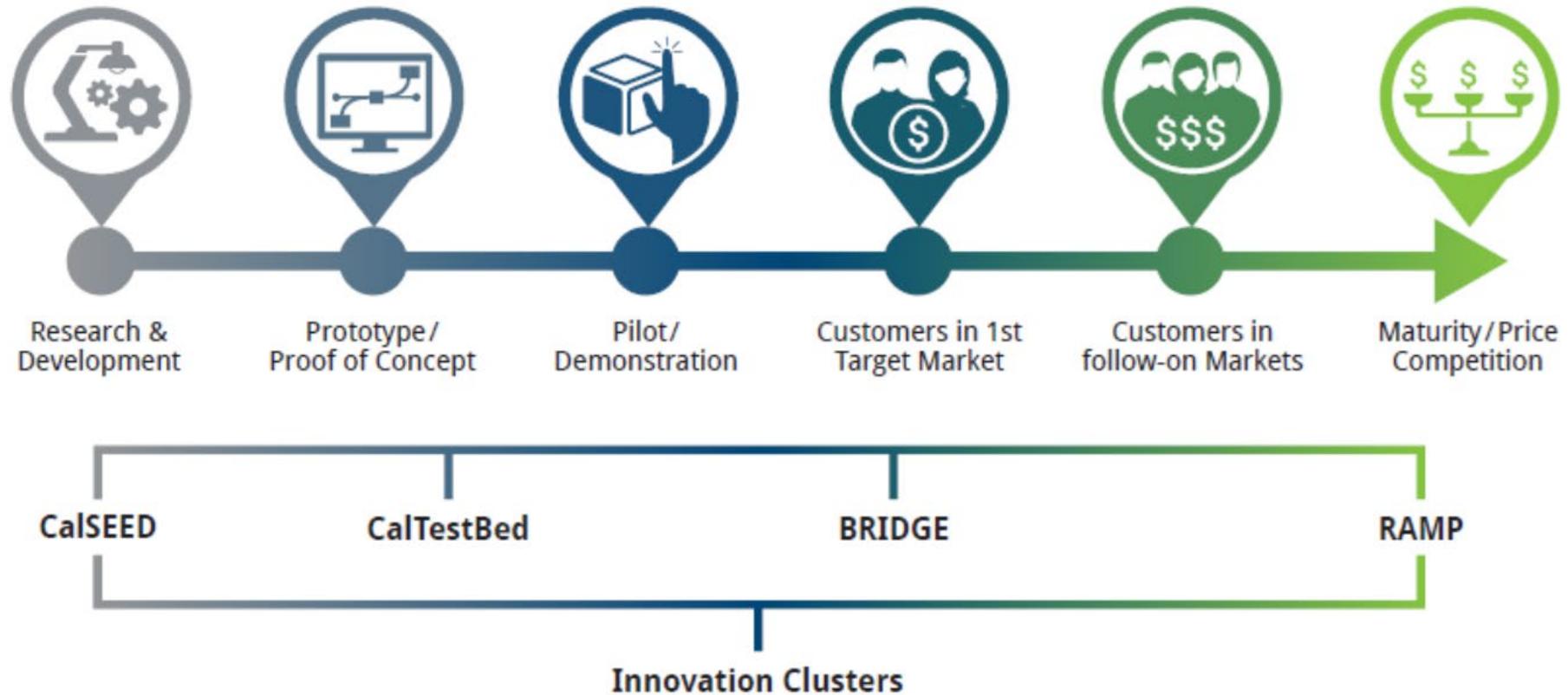
Benefits to Californians

- Support for clean energy entrepreneurs
- Increased safety and electricity service reliability
- Improved affordability
- Job creation





Clean Energy Innovation Ecosystem





RAMP

- Challenges transitioning from prototype to production include:
 - Securing capital
 - Unable to adjust emerging technology to fit established manufacturing processes
 - Lack of manufacturing experience/knowledge
- Low-rate Initial Production (LRIP) - Transition from highly customized hand-built prototypes to final mass-produced end product





Previous RAMP

Through 2 rounds...

14 clean energy start-up companies funded



Employ nearly 600 people



Over \$480 million raised in follow on funding





Previous RAMP Success - Cuberg

EPIC Funding: \$1,566,639 (2019) – San Leandro, CA

- Lithium-metal battery based on a non-flammable electrolyte
- Increases battery energy density by 48% (~70% increase in EV range)
- Successful demonstration led to acquisition by Northvolt in 2021 – \$14 billion order from Volkswagen
- In partnerships with aviation companies for electrified transport applications

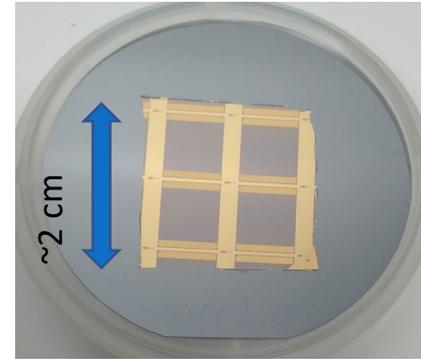




Previous RAMP Success – Antora Energy

EPIC Funding: \$2,999,695 (2019) – Sunnyvale, CA

- Thermal battery driven by an innovative thermophotovoltaic cell (TPV)
- Demonstrated >40% heat-to-electricity conversion efficiency
- LRIP line capable of producing 2 MW of TPV cells annually
- Pilot battery system installed in Fresno, CA





Previous RAMP Success - Ubiquitous

EPIC Funding: \$2,997,343.00 (2021) – Redwood City, CA

- Transparent solar coating
- Turns windows and surfaces into renewable generators
- ~\$50 million in private investment since RAMP award
- Partnering with Andersen Corporation to develop solar generating window and door products





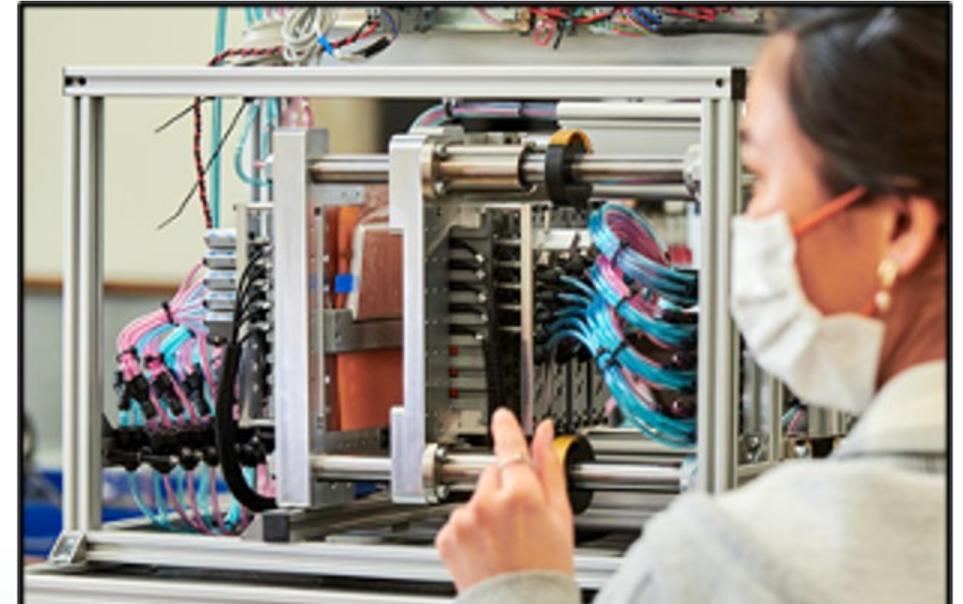
New Projects Proposed for Approval



Liminal Insights Emeryville, CA

Scaling up production of ultrasound-based Battery Inspection System

- Improves speed, accuracy, and scalability of battery manufacturing inspection
- Reduces individual cell cost by 15%, translating to > \$100B in annual value creation potential by 2030
- Lowers battery costs from faster build time, more accurate battery lifetime predictions, faster QC

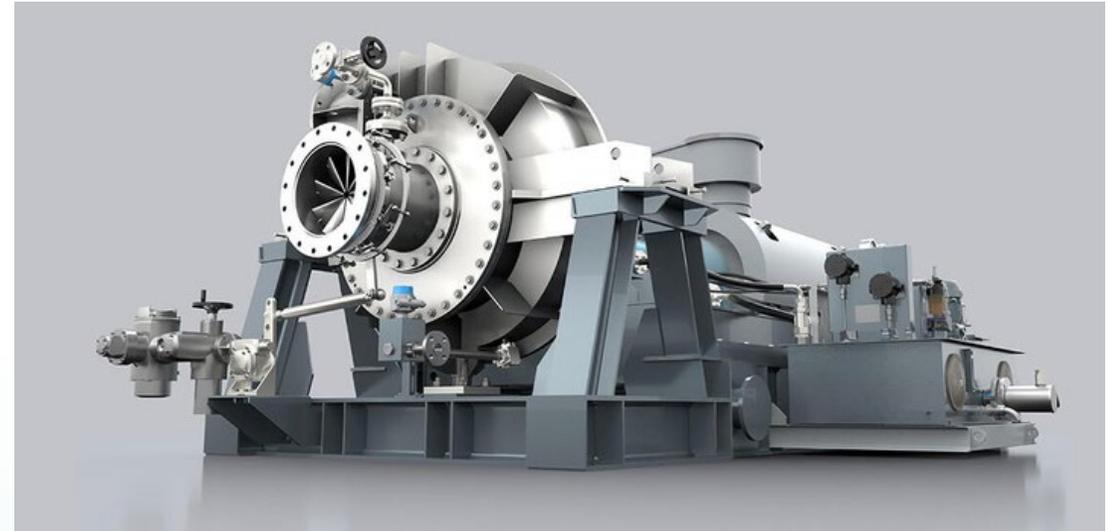




Skyven Technologies Fresno, CA

Electrification of Industrial Heat with High-Temperature Steam-Generating Heat Pumps

- Develop family of pre-engineered, factory-assembled systems, cut capital costs by 50%
- Industrial heat pump as drop-in replacement for natural gas boilers
- 3x more efficient than electric boilers

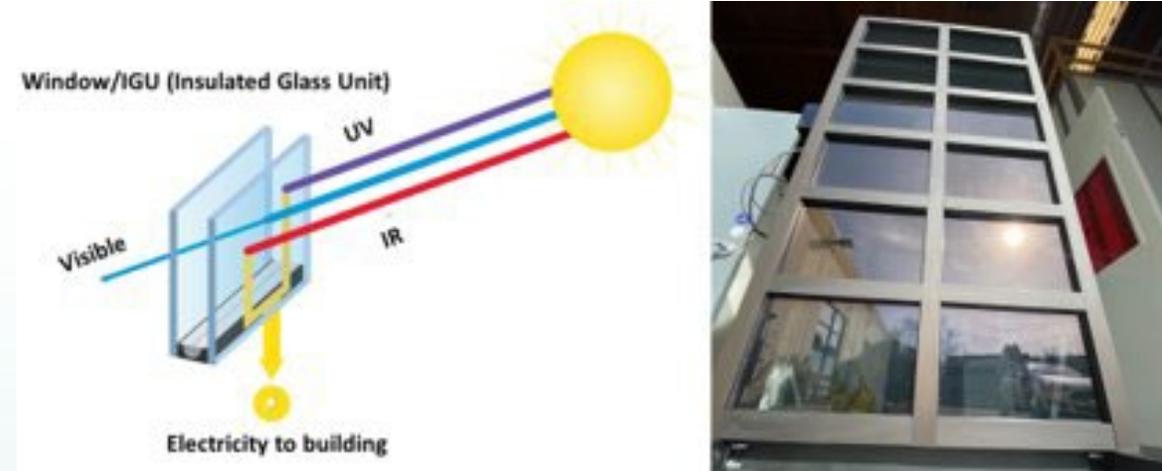




Next Energy Technologies Goleta, CA

Accelerating the Manufacturing of Energy Windows for Zero-Emission Buildings Leveraging Pilot Scale Innovations

- Converts infrared and ultraviolet light to electricity, while visible light passes through
- Integrates into existing window manufacturing process
- Greater electricity reliability, lower energy costs, and PV supply chain diversification





TS Conductor Corp. Huntington Beach, CA

FutureWire Manufacturing Facility

- Lightweight, low-sag, self-monitoring drop-in replacement for power line conductors
- Improves conductor efficiency by 40%
- Increases grid efficiency from reduced line losses, increases safety through real-time data on line conditions and insulated cover





Staff Recommendation

Approve four new RAMP grant agreements and adopt staff's findings that these projects are exempt from CEQA.