



Tumalow
Energy Ingenuity

**Battery Energy Storage
for
Smart Grid Development**

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A Smarter Grid in Vietnam



Stated Development Objective

More stable and reliable power system

Better productivity

Lower losses

Better serve peak loads

Better information for management

More satisfied customers



Transform any commercial building into a profitable *and* clean power plant

Control Software



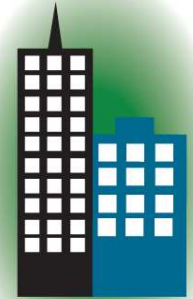
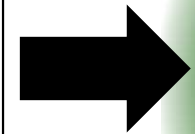
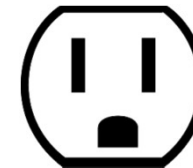
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Battery Energy Storage



Controllable Load



Automatic dispatch for grid services.

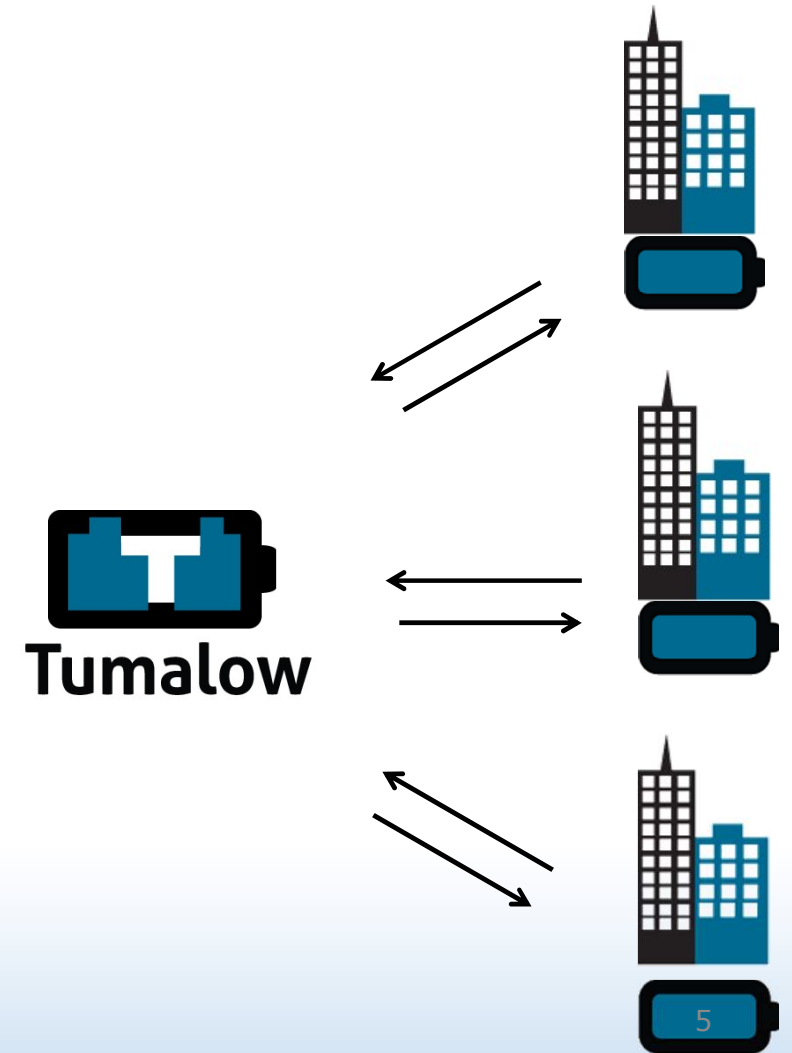
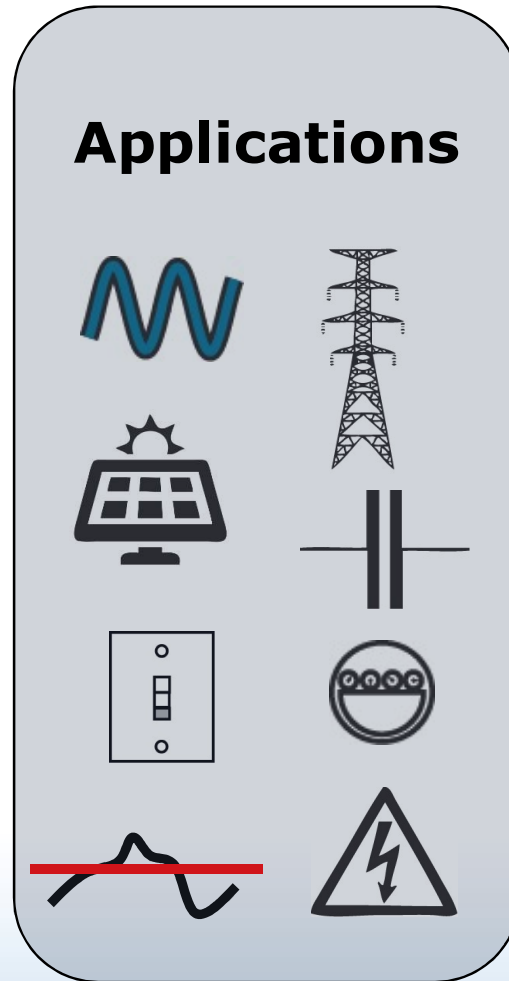
Back-up power at customer facility.

Create a network of smart buildings.

Scalability: Network Operation

Devices in each building are connected over the internet to a cloud server.

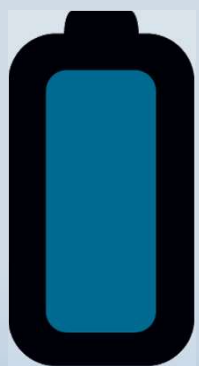
Tumlow uses the storage for the highest value applications in real time.



Energy Assets

Creating a smarter grid,
one **controllable** device at a time

**Initial
application**



**Battery Energy
Storage**

In Development



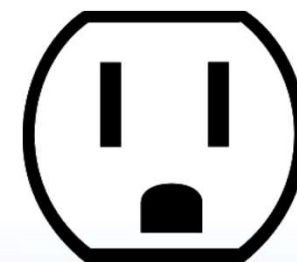
HVAC



Water Heaters



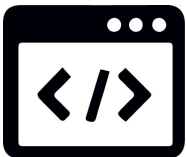
Lighting



Plug Loads

| Smart Grid Development Objective | Benefit of Tumulow Energy Storage |
|---------------------------------------|---|
| More stable and reliable power system | <p>Routine use to stabilize electric grid.</p> <p>Back-up power at customer facility to mitigate outages.</p> |
| Better productivity | Increase utilization of the power plants you already have. |
| Lower losses | Decrease electric congestion to reduce losses |
| Better serve peak loads | Cost-effective infrastructure to meet peak loads |
| Better information for management | Real-time usage information |
| More satisfied customers | Customers experience fewer outages and higher power quality. |

Development



Today

- Prototype completed



- Pilot planning
- Collaborator:



Next Qtr.

- Pilot install
- Early customer site planning
- Collaborator:



2016

- Commercial operation
- Multi-MW pipeline both in and out of US.
- Collaborator: Channel partners



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Appendix

Partnerships



Pilot Site



Virginia Tech
National Capital Region



Sales Pipeline



Team



Bill Lecos

Lecos & Assoc. Founder
Business Development



John Gathright

CTO
Real-time controls



Tarun Kapoor

MBA
Operations



Mike Lewis

Liberty Capitol Founder
Finance



Will Gathright, PhD

CEO
Optimization



Chuck Brody

Thrupoint CTO
Business Development

Mentors



Randy Stewart
Prism Solar
CEO



Jennifer Rohleder
J. Rohleder Law, PLLC
CleanTech Open SE Director



John Cerveney
NY Battery Consortium
Director



Dave McCarthy
Potential Energy DC
Founder



Robert Horan
Schodack School District
Superintendent

Competition



Differentiate: Smart building integration is more customer friendly.
Cater to channel partners.

Avoid: Enter unserved markets.

Storage software



Commercial storage



Residential storage



Commercial Solar + Storage



Demo Movie

See a demonstration at

www.Tumalow.com/demo.mp4