LO3 ENERGY

Distributed grid solutions that bring people, technology and energy together
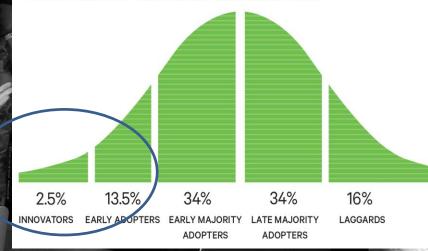
Utility Scale Programs

- Applying tested models for emerging tech adoption and market transformation

- Company background:
  - Energy Program Design
  - Community Engagement
  - Codes and Standards
  - REC Markets
  - Blockchain
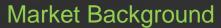 - Advanced Meters
  - System Architecture
  - Computation

Technology Adoption Curve
EVERETT ROGERS - DIFFUSION OF INNOVATIONS 1962

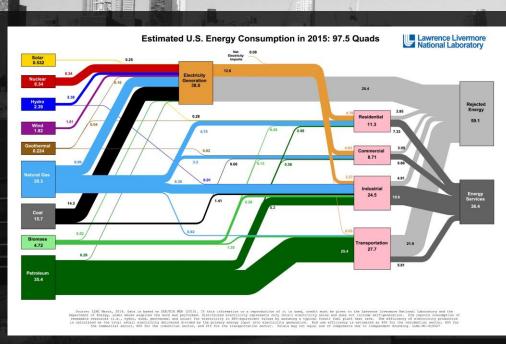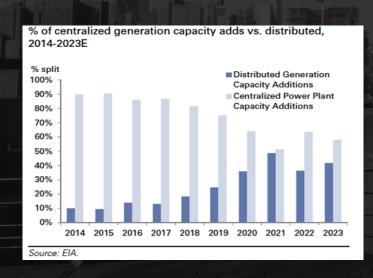| 2.5% | 13.5% | 34% | 34% | 16% |
| INNOVATORS | EARLY ADOPTERS | EARLY MAJORITY ADOPTERS | LATE MAJORITY ADOPTERS | LAGGARDS |

Current Energy Resources – Inefficient and Centralized

Energy
vs
Exergy

Source: Lawrence Livermore National Lab

New Energy Resources - Renewable and Distributed

% of centralized generation capacity adds vs. distributed, 2014-2023E

Distributed Generation Capacity Additions
Centralized Power Plant Capacity Additions

Source: EIA.

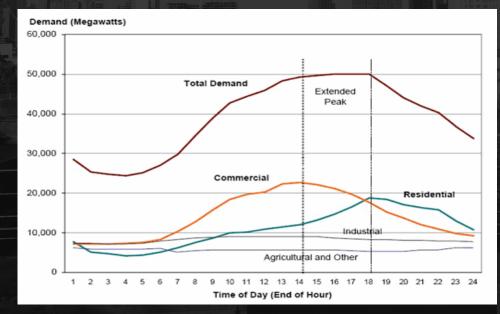Change in US Fuel Mix between Sept 2015 and Sept 2016

Source: EIA, Nov 2016

More than half of the estimated additional solar generation will be distributed, not utility scale

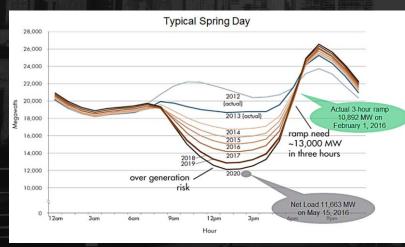# New Energy Resources - Renewable and Distributed

Source: Lawrence Berkeley National Laboratory

New Energy Resources - Predictably Intermittent

Source: CAISO

Source: WattClairity, Jan 2017

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Consumers Demand New Choice and Services

69% of consumers are interested in having **an energy trading marketplace**

33% of consumers who say **reading positive reviews on social media** platforms/ networks would increase their interest in energy-related products or services

47% of consumers plan to sign up for a **community solar program** managed by a third party and one that allows them to benefit from solar power even if they do not have solar panels on their property within the next five years

SHARING ECONOMY

- UNDERUTILIZED ASSETS
- NO BURDEN OF ASSETS
- LESS RESOURCE INTENSIVE MODEL
- CROWD-FUNDING
- SHARING PLATFORMS
- SOCIAL MEDIA
- SENSE OF COMMUNITY

Source: Accenture's New Energy Consumer research program 2016

Utility Grid Faces Structural Issues

- Grid unidirectional and brittle - future calls for fast-acting, resilient, adaptive platform

- Current utility business models do not encourage Distributed Energy Resources

- Regulatory barriers limit consumer participation in energy

- Major market changes underway, unprecedented shifts by utilities and market actors

- "Prosumer" movement creating pressure on existing business models

- Broad, coordinated control of small scale DERs is uneconomic

Blockchains Enable Transactions

Node A	Node B	Node C
Block 1	Block1	Block1
Block 2	Block 2	Block 2
Block….	Block…	Block…
Block n	Block n	Block n

Block Contains:
- Time stamp
- Ownership status
- Reference previous block
- List of transactions

Blockchain Transactions**:**
- Blockchain platform establishes price transparency complies with retail sale regulations
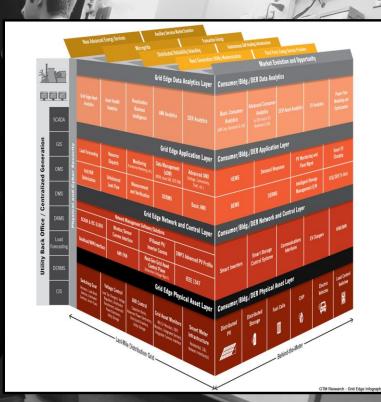- Auditable / Immutable

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Blockchain-based Microgrid Intelligence System

- Transactive, distributed intelligence system to control microgrids

- Based on open-source, cryptographically-secure protocol layer delivering military-grade cybersecurity and real-time data

- Auditable, immutable, secure device control

Community Energy – Sharing Economy

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Tokenization

P2P Markets

Prosumers

Community Microgrids

Tokenization of energy production, storage and consumption creates efficient **local markets**

Efficient Local Markets attract investment, increase impacts and create **local value** for energy, environment and community
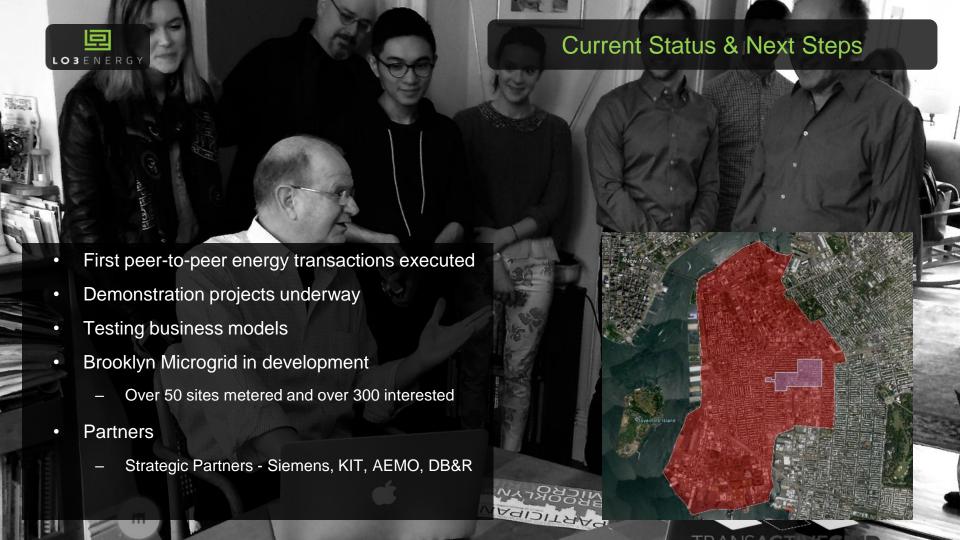
Rise of the **Prosumers** neighbor-to-neighbor, neighbor-to-business community transactions reward **local markets and return community value**

Reward efficiency and resiliency allowing participants to optimize **existing energy spend** according to individual **values, priorities and outcomes**

- First peer-to-peer energy transactions executed
- Demonstration projects underway
- Testing business models
- Brooklyn Microgrid in development
  - Over 50 sites metered and over 300 interested
- Partners
  - Strategic Partners - Siemens, KIT, AEMO, DB&R

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- **Deploy** – Technology
- **Develop** – Business Models
- **Demonstrate** – Market Adoption

New Technology – New Choices – New Deal

They are your electrons, right? Don't forget that.

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