Creating Connected & Resilient Communities Through Applied Stakeholder Innovation

Utility Energy Forum Keynote

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George Karayannis, CityNOW Executive Director
George.Karayannis@us.Panasonic.com
The Accelerating Rate of Technological Change

Rate of adaptation defines survival

"We won't experience 100 years of progress in the 21st century — it will be more like 20,000 years of progress (at today's rate)"

Ray Kurzweil
Inventor, author, Futurist

Impact on...
- City Planning
- Utility Systems
- Business Models
What Should You Be Thinking About Differently?

- Multi-Stakeholder Planning
- Comms Infrastructure
- LEDs, 5G & RoW
- Social Equity
- Workforce Housing
- Community Resiliency
- Mobility & Transit
- Econ Dev
- Carbon Reduction
An Unforeseen & Unpredictable Climate Future

Hurricane Ophelia

2017
Major Storm Trends Over 40 Years

Billion-dollar Disaster Events by Year, 1980-2017

2017: $306B

NOAA expects these costs will increase as weather becomes more volatile.

Trend suggests ever-increasing challenges to electric system resilience in the future.
How Resilient Are Your Communities?

Mexico Beach FL After Hurricane Michael 2018
Utilities Face A Shifting Competitive Landscape

In November 2018 Shell launched “Shell Energy Inside” as part of Shell New Energies, the division tasked with the provision of low carbon solutions.

The service bundles behind the meter optimization of electricity consumption via the intelligent orchestration of e.g. lighting, HVAC, back-up generation, battery energy storage, electric vehicles coupling the offering with the identification of demand response opportunities.
CA CCAs expected to serve 16% of electrical load by 2020, but could be over 50% in 2020.

CCAs could lead to achieving 2030 RPS 10 years sooner.

Every CA CCA has chosen to provide customers with more renewable energy than the competing utility and has done so at lower rates.
A CENTURY OF APPLIED INNOVATION
A Holistic Perspective – CityNOW Value Proposition

Right of Way
- Value Asset Appropriately
- Leverage Asset Strategically
- Comprehensively Plan & Manage

Mobility
- Efficient & Equitable
- Safe & Reliable
- Accessible

Energy
- Renewable
- Resilient
- Distributed
Human-Centric & Resilient: Fujisawa Sustainable Smart Town

Fujisawa Stakeholders

-70%

-30%

+30%

+25%
**Applied Stakeholder Innovation: Pena Station NEXT (400-Acre, P3 TOD)**

- **$95M in P3 Projects**
  - 1st Statewide V2X Deployment in US, $72M P3
  - 1st Commercial Microgrid in CO, $11M P3
  - 1st Carbon Neutral Planning Tool in US, $250K P3
  - 1st AEV for First Mile/Last Mile in US, $250K P3
  - 1st Safe & Smart Streetlights in CO, $100K P3
Living Lab for Innovation – Pena Station NEXT Phase I

Phase I = 154 Acres

Deployed Solutions
- Portfolio Microgrid
- Community Wi-Fi
- Connected Mobility
- Autonomous Shuttle
- Networked Streetlights
- Public Safety
- Environmental Sensing
- Smart Parking
Business Model

1. Airport Invested in Canopy Steel
2. Xcel Invested in PV & BESS
3. Panasonic Invested in Rooftop PV
4. 17 Months Concept - Completion
5. 15 Separate Contracts Required

Microgrid Use Cases

1. Grid integration of solar
2. Peak demand reduction
3. Energy arbitrage
4. Frequency regulation
5. Backup service (Panasonic)
Applied Mobility Innovation: Connected Vehicle Program

Building the Internet of Roads

**Colorado’s V2X deployment program:**

- U.S.’s first full-scale V2X transportation network
- Foundational platform for infrastructure
- Open & interoperable
- Available to all infrastructure owners & operators in Colorado

100M+ Connected Cars by 2022
20 Terabytes Per Hour
150 Petabytes Per Year

V2X System

- On-Board Equipment (OBE) Subsystem
- Roadside Equipment (RSE) Subsystem
- V2X Data Ecosystem (VDE) Subsystem

Enabling Applied Innovation
Confidential Customer

- DC Fast Charging stations to serve EV customers
- Solar PV for renewable energy
- Stationary BESS for demand charge reduction & resiliency
Working together to define the new "right way" to accelerate outcomes that collectively create a better life, a better world.
A Non-Linear Process To Achieve Transformational Outcomes

Non-linear approach

Linear approach

Applied Innovation  Master Planning  Engineering  Build  Operate  Continuous Improvements

Aligning Stakeholders  Working with stakeholders
A Lightweight Process That Empowers Decision Makers

Value Creation | Articulation | Assessment | Proof-of-Concept

Enabling Applied Innovation
Enabling Long-Term, Multi-Stakeholder Value Creation

Combined Value Creation

- Ideas continuously enter a continuously evolving process
- Process supports ambitions ranging from business-as-usual to disruptive
- The combined value creation process truly drives long-term transformation
CityNOW Utility Innovation & Advisory Services accelerate the development and deployment of innovative smart city strategies and solutions that will be successful today and support an evolving regulatory structure.

CityNOW Utility Innovation Platforms

- Business Model Innovation
- Smart City Technical Support
- Multi-Stakeholder Alignment
- Utility Innovation Platforms

Utility Challenges

- Community Choice Aggregation
- Increasing Customer Demands
- Climate Change & Resiliency
- Regulatory Transformation

Panasonic Value Added

- Strategy, Market Research, Competitive Landscape, Multiparty Financial & Value Stream Analyses, Smart City & Resiliency Solutions & Service Models, Senior Leadership Coaching
- Direct On-Call Technical Support (e.g., Microgrid Design, Battery Sizing, 5G Planning, etc.), RFP Support, Technology Identification & Vetting, Smart City Solution Implementation
- Ensure utility priorities represented with developers, cities, transportation and econ. development agencies, while building capacity of utility staff to realize shared vision of future
- Jointly identify high-value new smart city products and services co-developed & incubated with strategic utility partners and Panasonic, leveraging Panasonic R&D and partner capabilities

Outcomes

- Future-Ready Business Models
- Successful Smart City Deployment
- Organizational Transformation & Thought Leadership
- New Rate-Based Products & Services

Solution Offering

- Full-Time CityNOW Program Manager Onsite with Utility
- Direct Access to Subject Matter Experts for In-Scope Projects
- Extensive Expertise Bringing Innovation to Market

Panasonic Off-Grid Wireless Resiliency (POWR) Products

Future Solutions (e.g., Resiliency-as-a-Service)
Applied Utility Innovation – PGE Smart City Strategy

Broadway Corridor Redevelopment Energy and Mobility Strategy for PGE
Submitted by CityNOW
March 19, 2018

Smart Streetlight Roadmap for PGE
Submitted by CityNOW
April 25, 2018

Enabling Applied Innovation
**Applied City Innovation – Underground Storage in RoW**

Use LED upgrades to strategically manage the Right of Way & harden community infrastructure

- Smart streetlights vs ‘safe & smart streets’
- The value of a ‘dig once’ policy
- Open trench = lay more conduit & fiber
- Strategy for
  - attracting & siting 5G small cells
  - attracting & siting IoT vendors
  - community resiliency (e.g., traffic signals, LEDs, 5G)
  - leveraging all city assets (e.g., electrification of mobility)
  - driving economic development / innovation clusters
  - leveraging public-private financing
POWR Pavilion

- Utility-focused business model (utility grid services, rate-based, & a PR win)
- 50kWh battery + 12kW solar PV canopy + durable seating + A/C & USB device charging
- Provides social equity & multi-day resiliency when needed (1K to 10K+ ‘charge-hours’ per day)
- Designed to blend aesthetically into typical park & common area settings
Our stakeholder alignment process enables the development of innovative smart city strategies that enhance the profitability, attractiveness, and resiliency of real estate assets.
Applied Stakeholder Innovation - Immersive Smart City Showcase

- Commercial Business District
- City Hall
- Sports & Entertainment District
- 320 sq. ft. Micro-Unit
- Mobility District
- Smart Streets
- City & Utility Right of Way
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Smart City Training Results by Impact

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<th>Topic</th>
<th>Pre-Course Score</th>
<th>Post-Course Score</th>
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Legend
- 3.9 Pre-Course
- 6.5 Post-Course
Thank You