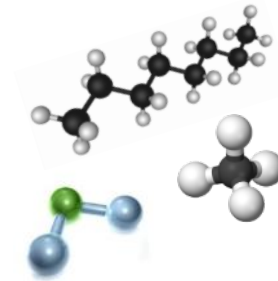


Slow Pace of Fast Change

The Future of Energy Systems



Designed for



Designed by

Garry Golden

Forward Elements Inc

PDF Copy: garrygolden.com/May19

Start

End



Foresight 101



Drivers of Change



Next Steps

The *Slow Pace* of Fast Change



Alternative Futures

Baseline Future

Distributed

?

? Networks

? Design for
Behavior Change

Maintenance,
Preservation
& Renewal

20th Century Dynamics

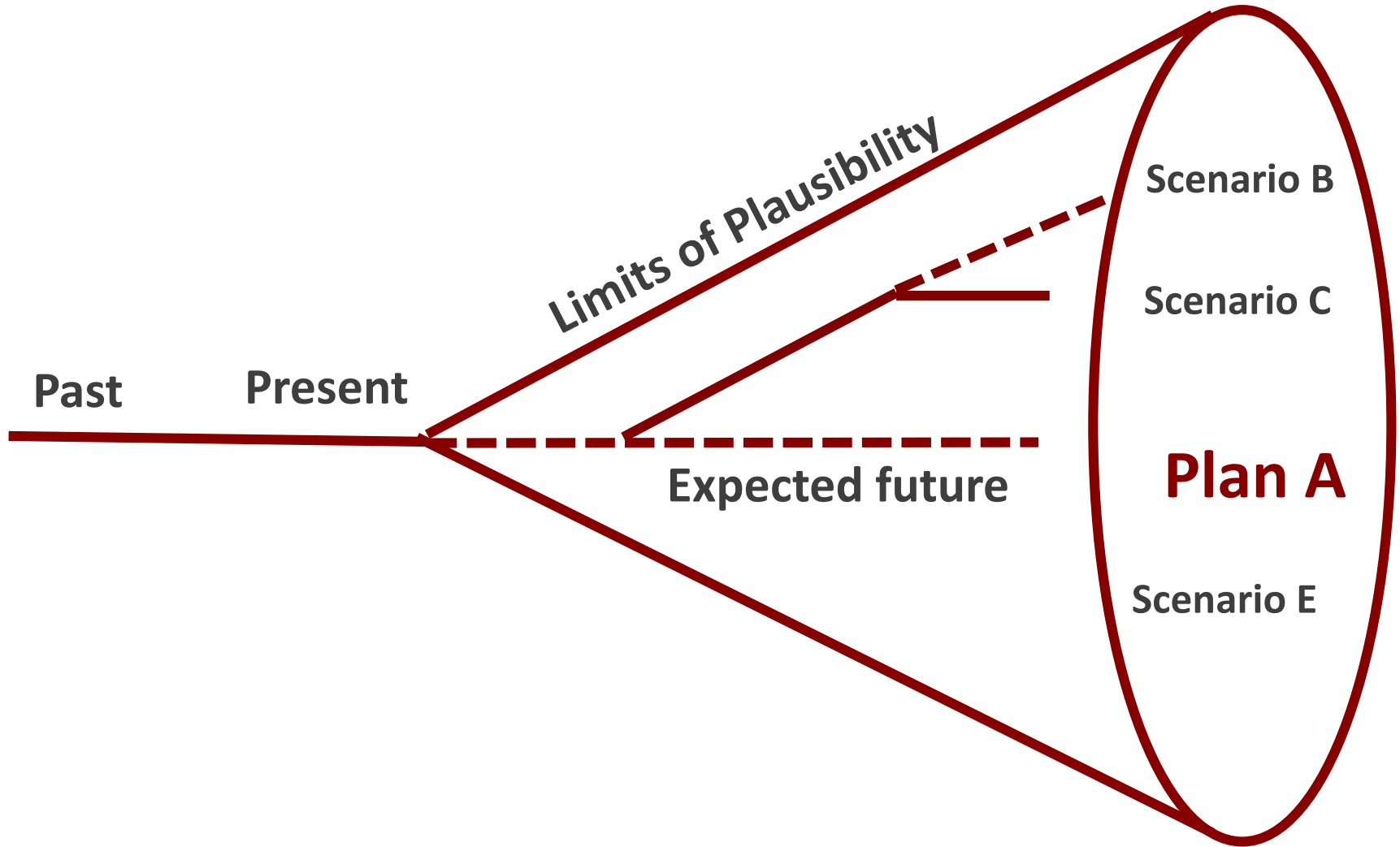
21st Century Dynamics

Thinking Like a *Futurist*?



Foresight 101: Cone of Plausibility

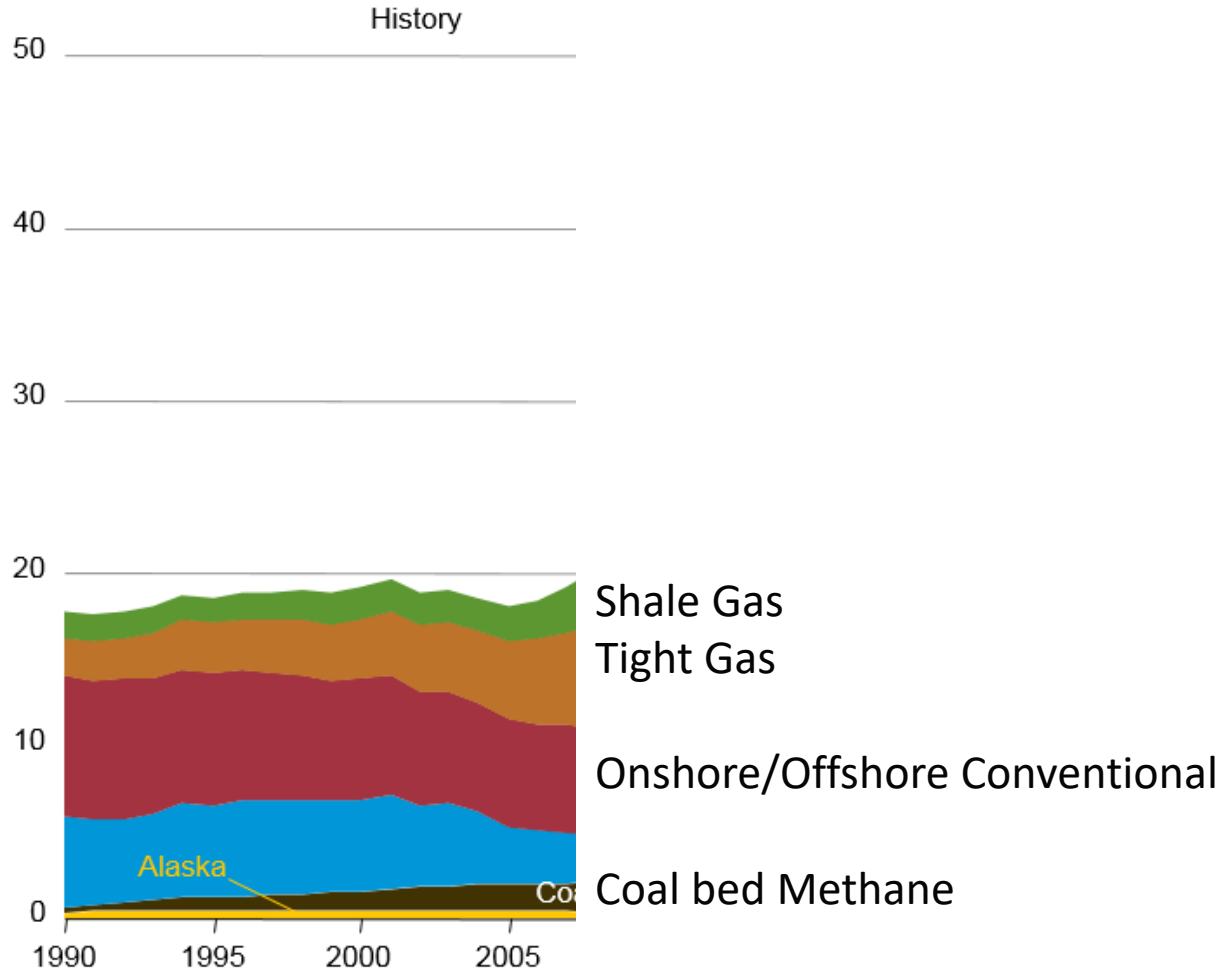
Multiple Outcomes, Multiple Time Horizons



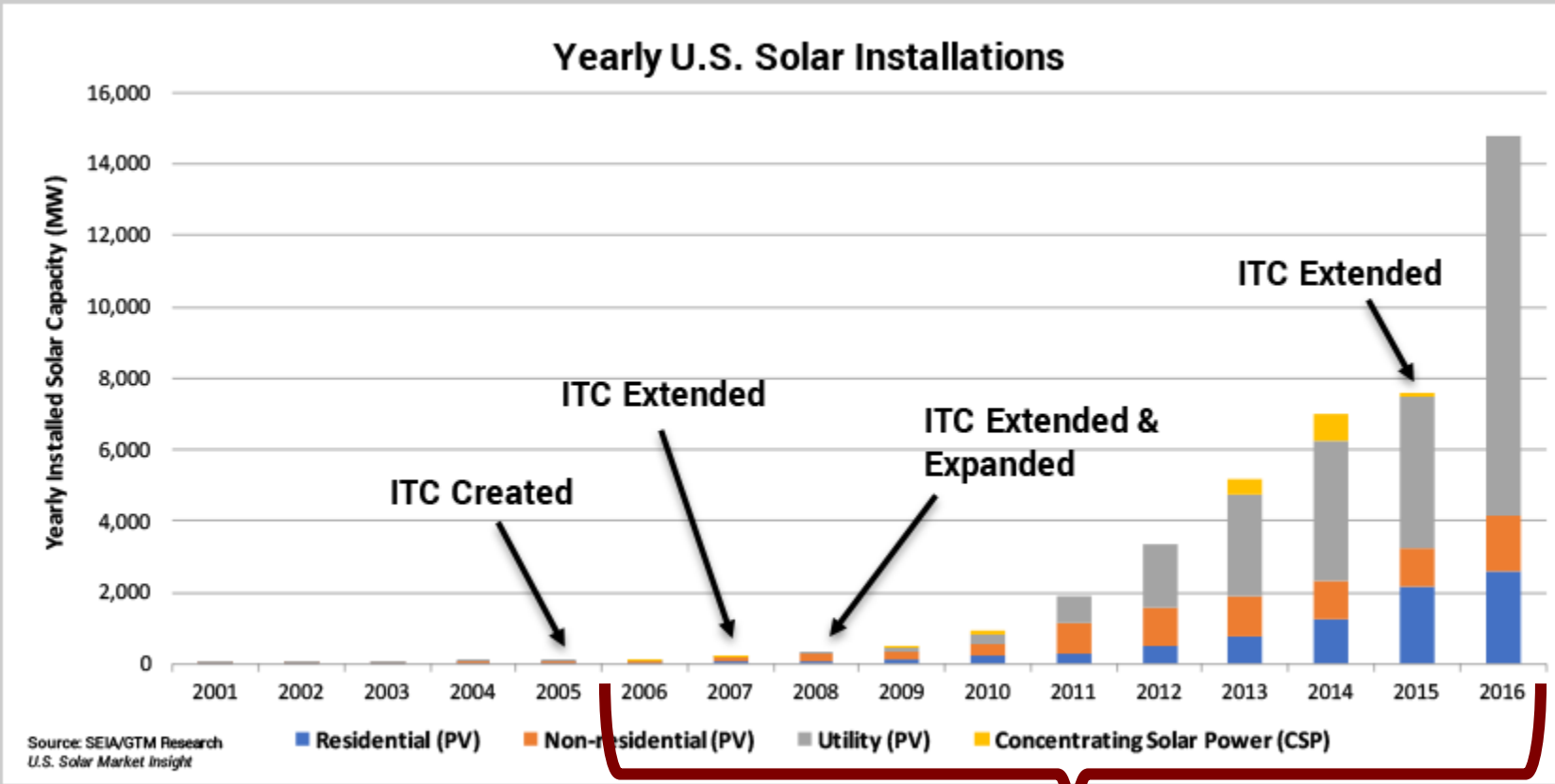
Cone of Plausibility Over Ten Year Horizon


Figure MT-46. U.S. dry natural gas production by source in the Reference case, 1990–2040

trillion cubic feet



Cone of Plausibility Over Ten Year Horizon



A close-up photograph of a person's hand holding a small, rectangular white paper strip. The strip is held between the thumb and index finger, positioned against a solid black background. The paper strip has a slightly irregular, torn edge on the right side. Printed on the strip in a clean, black, sans-serif font is the text: "You will have regulatory certainty for years to come." The text is arranged in two lines, with the first line being "You will have regulatory" and the second line being "certainty for years to come." The lighting is focused on the paper strip, making it stand out sharply from the dark background.

You will have regulatory
certainty for years to come.

IF YOU HIT THIS SIGN
YOU WILL HIT THAT BRIDGE





WAIT FOR IT

.....Wait for it.....

**Every day I make an effort to move toward
what I do not understand.**

- Cellist, Yo-Yo Ma

How does this all play out?



Policy, Policy, Policy

TESLA



Alphabet



New Players

One week battery life on an iPhone 6? It's possible

POSTED 1:49 PM, AUGUST 28, 2015, BY CNN WIRE



An Apple iPhone and a quadcopter, both retrofitted with hydrogen fuel cell batteries, and a hydrogen fuel cell are displayed by Intelligent Energy at ShowStoppers. Photo by Ann Singer.

Radical Disruptions

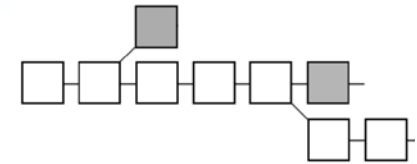
Micro fuel cells + Refueling Devices

Disruptive Trends to Watch:

The Slow Pace of Fast Change



**Solutions for
Shifting Expectations**



**Hype vs Hope
of Blockchain**



In the News

UT Austin students recently won second place for an Alexa chatbot called **Belle** that assists aging populations with phone conversations. **Belle** helps with scheduling appointments, paying bills, preventing scammer abuse and assisting in retail purchases.



True

False

Context of the *Creepy Line*

The Google logo is displayed in its standard multi-colored font, with the letters 'G', 'o', 'o', 'g', and 'l' in blue, red, yellow, green, and red respectively, and the final 'e' in blue.

Inevitability of Dealing with the *Creepy vs Compelling Line* at the..

The logo for 'My Local Utility' is displayed in a multi-colored font. The letters 'M', 'L', 'U', and 't' are in blue, 'y' is in red, 'o' is in green, 'c' is in yellow, 'a' is in red, 'l' is in blue, 'i' is in green, and 't' is in red.

How do we...

- Deliver differentiation and balance privacy***
- Communicate value and benefits of data and AI-driven innovation***
- Maintain the human element for utility member experiences***

Social Norms for the Anonymous-Access Web

1993




"On the Internet, nobody knows you're a dog."

**“On Facebook, 273 people know I’m a dog.
The rest can only see my limited profile.”**

Social Norms & the Social Web

2008





Everyone knows I'm working on some personal growth issues

Assumption:
The web is becoming a platform for managing outcomes & personal behavior change.

Andreas Arden

- *Masterclasses*—including state-of-the-art and creating an effective schedule
- *Personalization*—reading, growing, using work, and more
- *Dog Training 101*—including how to train, all, from the state on a book and more
- *Behavioral Psychology*—including personal learning, behavioral training, and more

BARRON'S

Consumerization Phase implications for Energy sector?

Legacy Phase...

**Build out Access
to Infrastructure**



Consumerization Phase...

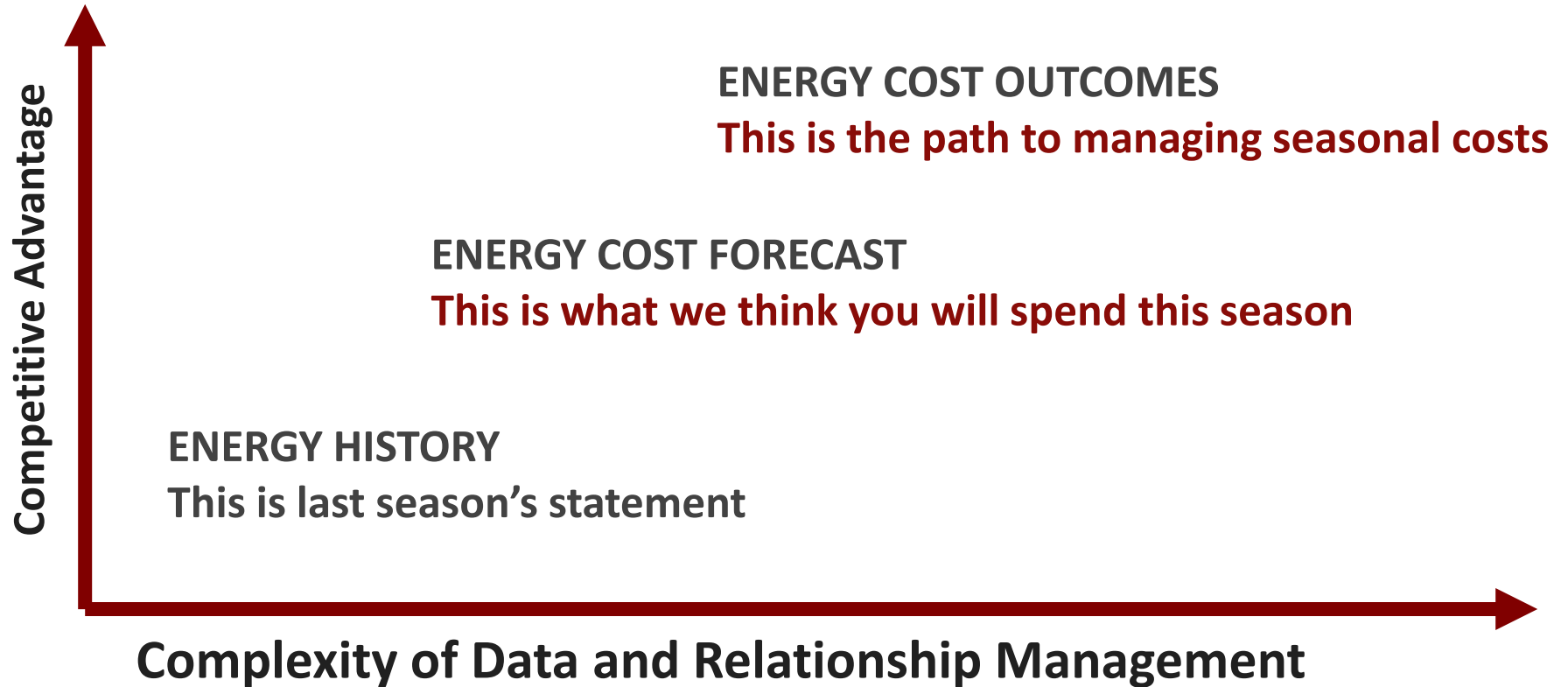
**Managed Services
& Behavior Change Solutions**

Service + Experience Design

How do we think of Behavior Change to Guide Outcomes?



Guided Utilities Experiences



2017 – 2025

Trend: Lower Barriers to Entry for Connected Devices



Focus on Integration Plug + Play Energy Management Solutions



2017 – 2025

Trend: Mainstream Adoption of Home Life Management Systems

Anticipate Need for Strategic Partnerships

Prepared if major players dominate connected home experience and service extensions

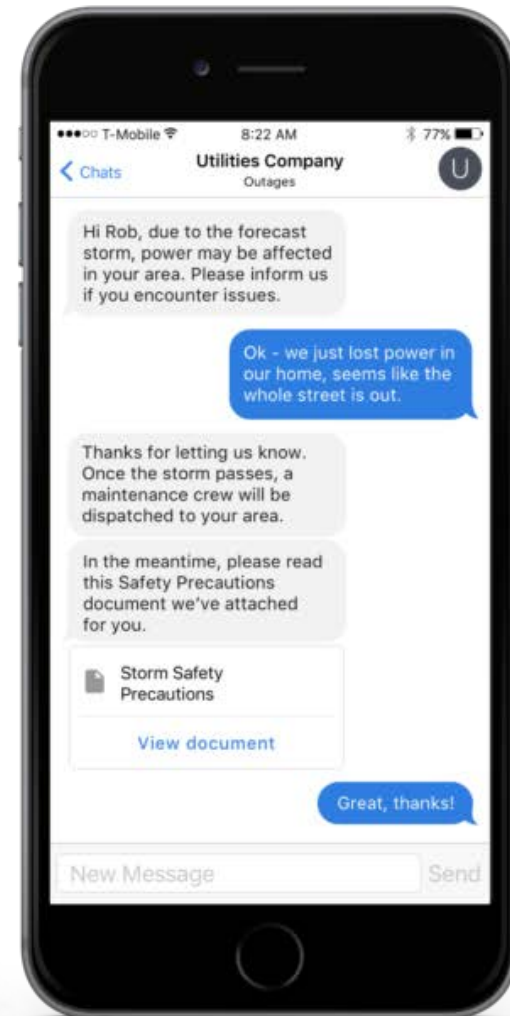
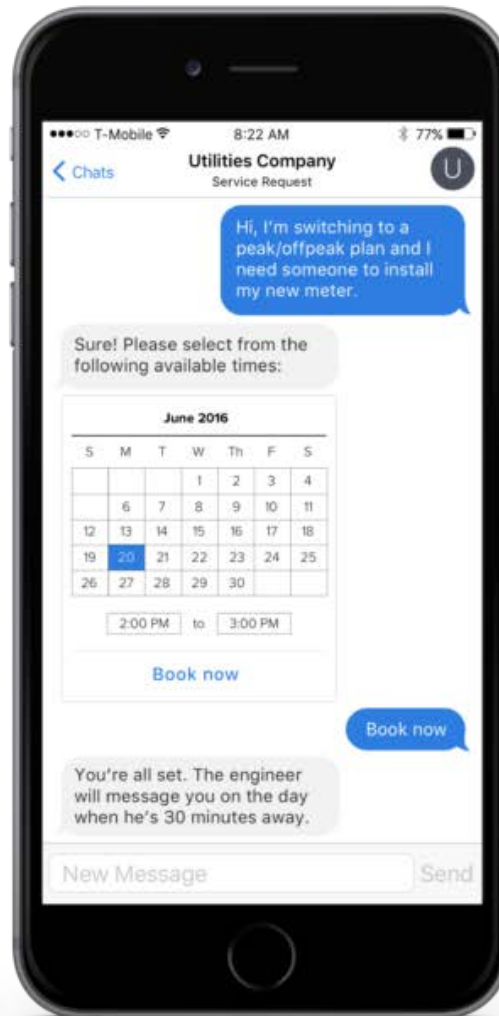
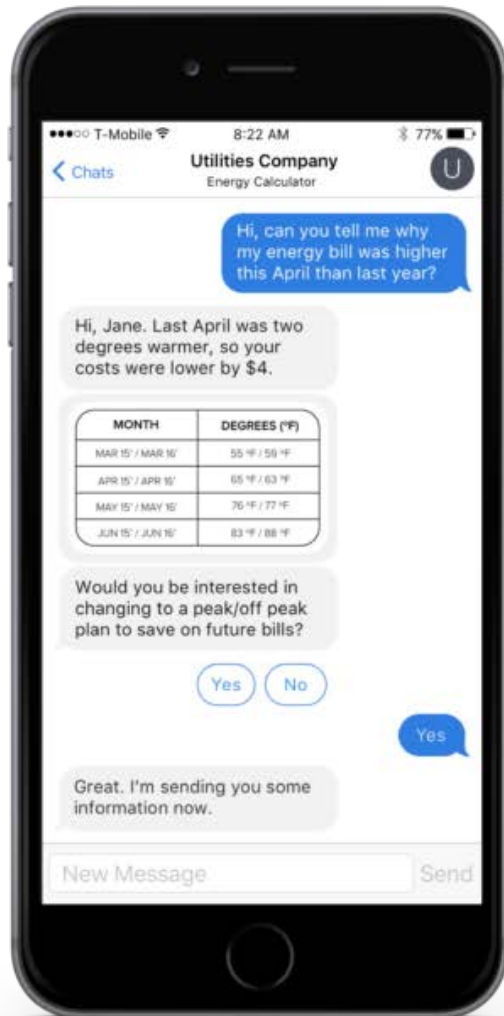
Ecobee3 Thermostat Can Be Controlled By Amazon Echo

By Tyler Lee on 02/12/2016 15:12 PST



2017 – 2025

Shifting Expectations: Text and Bot-based Services



Rolling Eyes at Silly Chatbots vs Taking Messaging Seriously

Preparing for an Era of Connected Devices & Homes

Integration (and Advocacy?) of Networked Solutions:

- How do we interface with energy entrepreneurs and branded solutions?
- How do we guide our communities in making decisions on solutions?
- How do we learn from our community members who are early adopters?
- Might our showroom become a place to explore new Connected Devices?
- Might our members support specific *Kickstarter* projects?

2017 – 2030

Shifting Expectations for Distributed Energy Resources



Embracing Policy Reform + Consumer-driven Dynamics of Solar



Community Storage: Aggregated System level Solutions

"Community Storage" is an emerging term for programs that aggregate distributed energy storage resources that are located throughout a community, such as water heaters, electric vehicles, and interconnected storage batteries, to improve the operational efficiency of electric energy services to consumers.

The Community Storage Initiative

[Join Our Email List](#)

The co-founders of the community storage initiative ask for your support:

- Click on the link above to join the Initiative's email list to receive information about the Initiative and upcoming events
- Promote an "above the baseline" approach to electric water heating, electric vehicle charging, and residential battery use marketed as "Community Storage"
- Share your business model and best practices around "Community Storage"

We ask you to follow the Guiding Principles of The Community Storage Initiative:

1. Voluntary Participation (by the utility, home, business or individual)
2. Education & Training (information resources, program templates, quick-start guides, etc.)
3. Market Acceptance (locally, regionally and nationally)

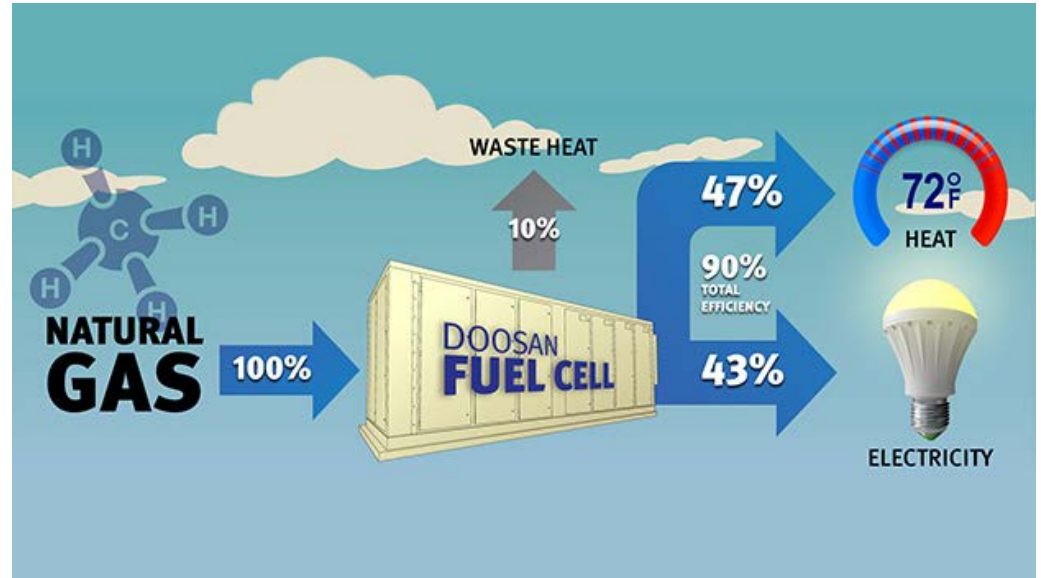


Strengthening Signals but Lingering Scars

NatGas Friendly Vision: Fuel Cells as base of Micro Grids



Bloomenergy



Scenario to Explore

What if our Communities Embrace Distributed Energy Solutions?

Competition or Coopetition?

Walmart 

amazon.com 











*Bringing Value to Our Communities
Ownership or Managed Services Future ?*

- ✓ Design-Build-Manage (Finance to Fuels)
- ✓ Accelerate Regulatory Reforms
- ✓ Fuel contracts & management
- ✓ Restructure Partnerships
- ✓ Align Talent & Culture Change
- ✓ Develop Roadmap Adoption Rollout

Disruptive Trends to Watch:

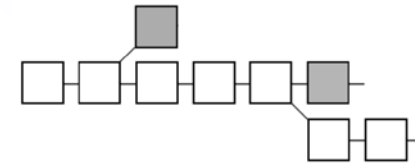
The Slow Pace of Fast Change



Learning Thermostat



Solutions for
Shifting Expectations



**Hype vs Hope
of Blockchain**



World Economic Forum Survey Projects Blockchain 'Tipping Point' by 2023

**“By 2025, 10% of Global GDP will be
orchestrated by blockchain applications.”**

Implications of the blockchain cannot be understood... yet



1994: "Today Show": "What is the Internet, Anyway?"

Evolution of the Web Capabilities



***Access to
Digital Files***



***Access to
Social Networks***



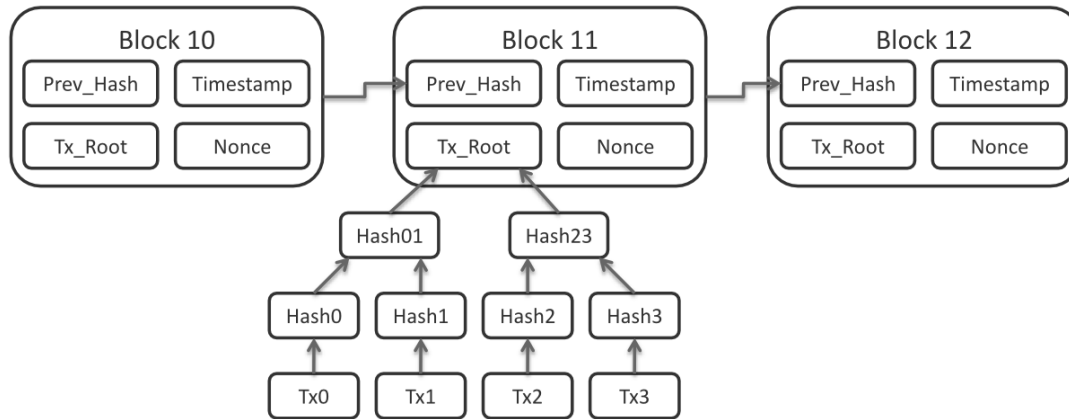
***Access to
Trusted Transactions***

It's just Decentralized Databases + Process Automation!

Assets get entered onto the ledger and generate keys

Network Consensus on who did what...

Smart Contracts execute legal agreements + business processes



A sample of EtherScript

```
note: ""An Ethereum smart contract to sell website for "5000 by March"
note: First, store buyer's ethereum address:
put: 6af267736363736ghgs7726337373737 in storage slot BUYER
note: Then, store seller's ethereum address:
put: 6af267736363736ghgs7726337373737 in storage slot SELLER
note: April 1, 2014 is 13929839948 in "computer time"
put: 16365437465 in storage slot DEADLINE
note: If the agreed amount is received on time...
When transaction value >= 5000 ether
and block timestamp is > storage slot DEADLINE
then
note: ... then designate the buyer as the new website admin and pay the seller
put storage slot BUYER in storage slot WEBSITE_ADMIN
Spend contract balance to storage slot SELLER
```



Assets for Utilities, Governments or Residents=
Energy Usage Data, Bills, Appoints, Crew Field Notes
Identity, Credit Card Information, Equipment Repairs, et al

Authorization for Data use;
Revenue Cycle Management;
Front-end Compliance Walls

Application Development Ecosystems



Public Blockchains

Private Blockchains



CØSMOS



Range of Implications for Energy Sector

Niche

Global System of Record
for Energy Transactions

Global Computer
for Automation + Behavior Change

All Hype

Operational Efficiency Gains

Transformed

- Adoption Stalls
- Oversold Solutions

- Third-Party Integration for Connected Devices
- Secure Billing without Centralized Store
- Data Integrity & Integration
- Reduce Regulatory and Compliance costs

- Utilities Issue Programmable Currencies to Drive behavior and outcomes
- Creation of Peer to Peer Energy Trading Networks
- Cyber Security protection for connected (consumer) devices
- Autonomous Device to Device Energy Trading

Innovative Proof of Concepts... Low Cost EV Infrastructure

Innogy Charges New Electric Car Fleet Using Ethereum Blockchain



Innogy SE, a subsidiary of German energy conglomerate RWE, announced that it has launched hundreds of blockchain-powered charging stations for electric cars across Germany through its e-mobility startup venture **Share&Charge**.



Innovative Proof of Concepts... Payment Solutions



Electricity Crowd Funding
For African Schools



Lorien Gamaroff

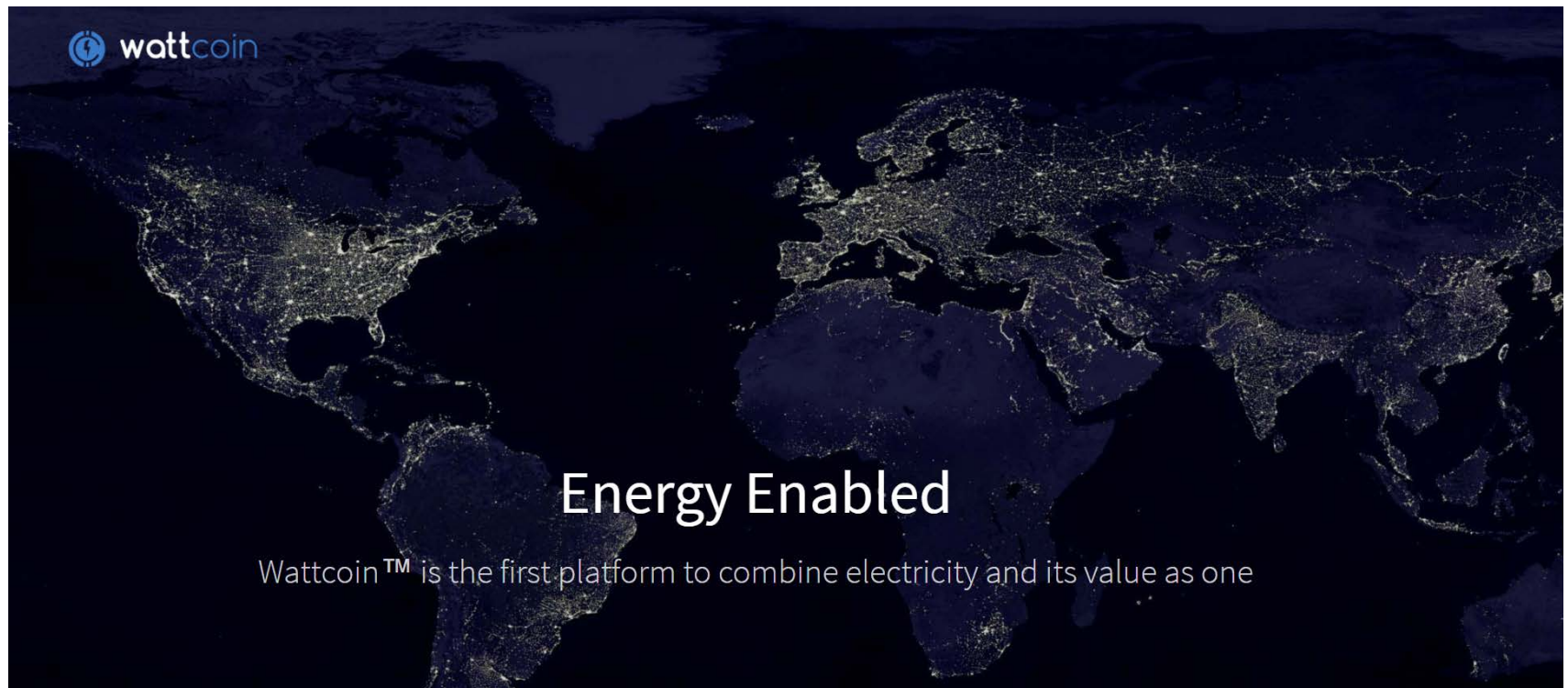
@gamaroff

lorien@bankymoon.com



bankymoon

Innovative Proof of Concepts... Payment + Access



PayGo & Microgrid Service Providers

Use Wattcoin to get paid for delivering solar electricity anywhere that kerosene and diesel is used



Utility & Smart Grid Systems

Use Wattcoin with smart grids to create real-time demand response rewards for energy efficiency



Market & Peer-to-Peer Exchanges

Use Wattcoin on blockchain enabled exchanges between prosumers and consumers of clean energy

Innovative Proof of Concepts... Trading Markets

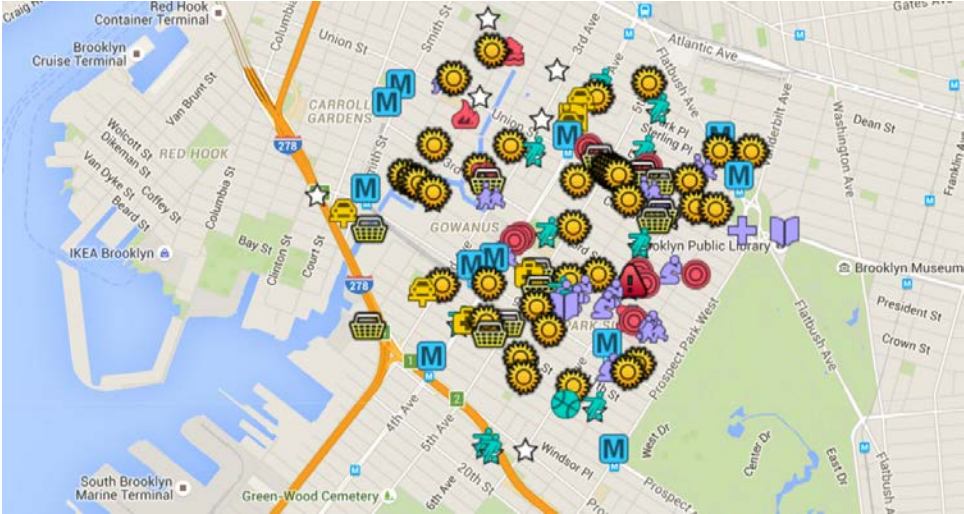
ING, SocGen to test LNG trading with blockchain in months



The logo of the French bank Societe Generale is seen in front of the bank's headquarters building at La Defense business and financial district in Courbevoie near Paris, France, April 21, 2016. REUTERS/Gonzalo Fuentes/File Photo

By Karolin Schaps, Christoph Steitz and Vera Eckert

Micro Grids: Neighbor-to-Nighbor RECs Trading



Radical Idea: Crypto Currencies Tied to Behavior Change

**Crypto Currencies +
Smart Contracts automate
incentives for energy
demand management**



Utilities Issue Negawatts

2018-2030

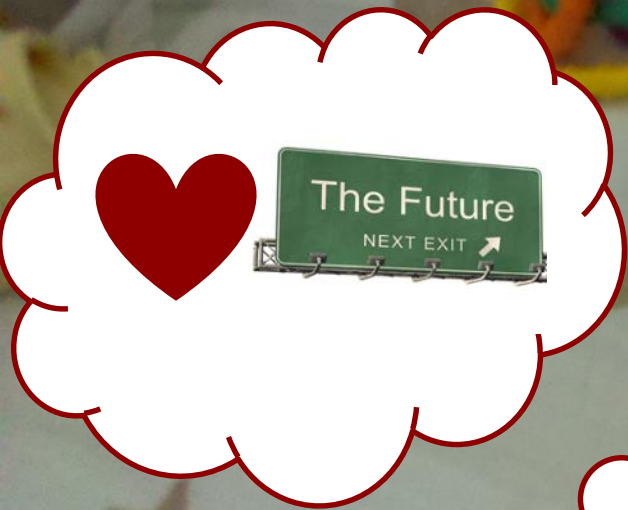
Possible Slogans in Age of Energy Blockchain Services

*“Sell More of
What you Produce”*

*“Our DApp Devices will
Drive Down Energy Costs”*

*“The Network is Your
Energy Company”*

Images Removed



Every day I make an effort to go toward
what I don't understand.

Yo-Yo Ma



Foresight 101



Drivers of Change



Next Steps

Create a Healthy Sense of Urgency

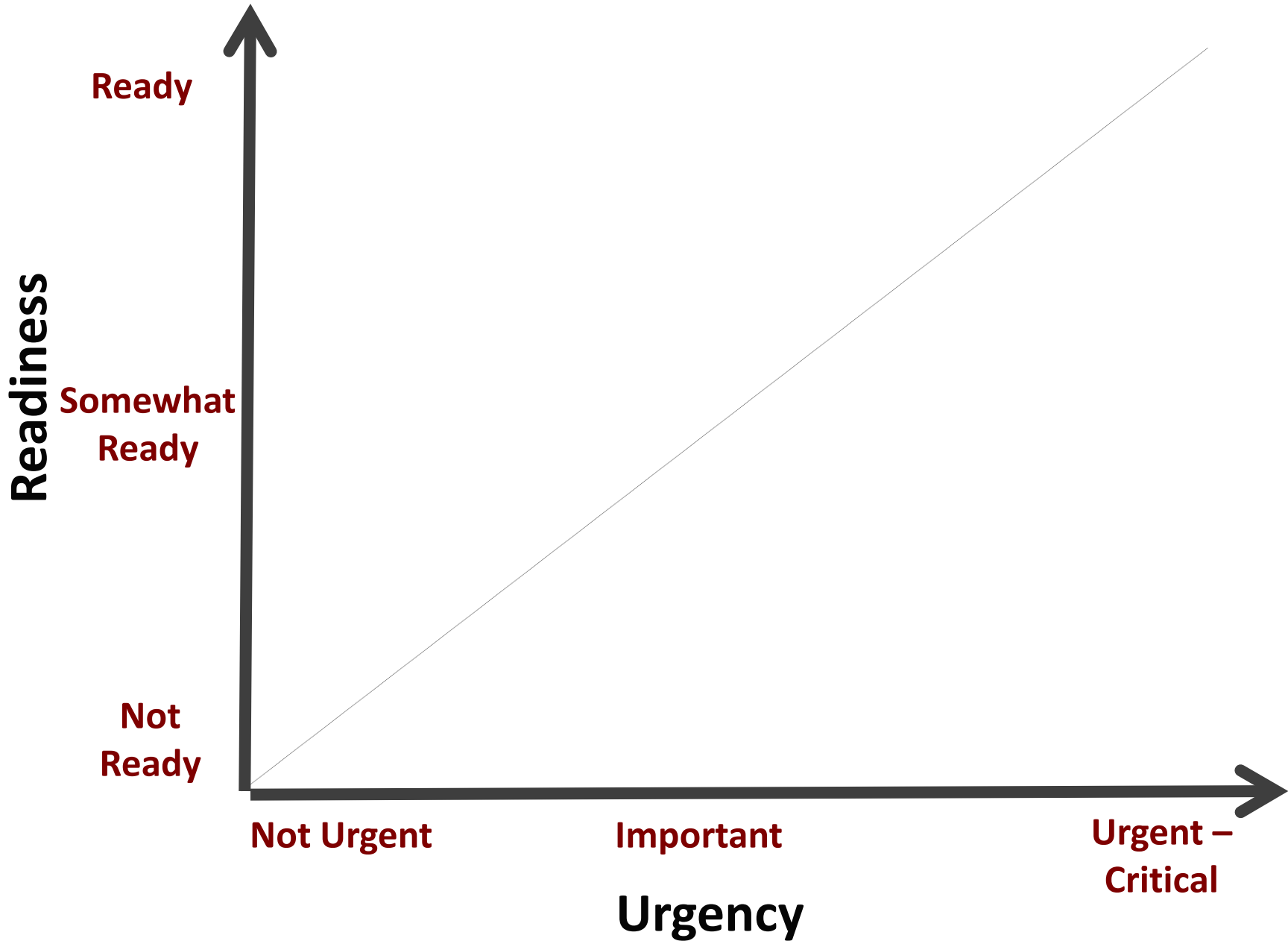
On the Plateau 'Managing the Decline'

- Incumbent mindset
- Incremental Improvement
- Fear, Uncertainty,
Doubt & Denial

Walking up Hill Enabling New Era

- Entrepreneurial mindset
- *Prototyping*
Transformative Change
- *Failing Forward*

Survey Leadership on Emerging Trends



Establish Thought Leadership + Curator Role on Big Ideas

Engage staff, elected officials and community leaders in socializing 'big ideas' on the horizon of the energy sector.

- Energy Entrepreneurship
- Distributed Generation
- Business Model Challenges
- EVs (Battery + Fuel cells)
- Connected Devices + IoT
(Data-Privacy-Security)
- Blockchain + Crypto DApps

Give Structure to Innovative Thinking!

Use 'Killer Questions' to Brainstorm Ideas

What is a need that does not exist today but in five years will be our most requested product/service from our communities?

What skills set will be most in demand in five years that we do not currently address in formal training programs?

What job title does not exist today but in five years will be on our most valued positions within the utility?

Thank You!!

PDF + Resources

garrygolden.com/May19

garrygolden@gmail.com

Two Rs

