



BPA's Utility Energy Efficiency Summit

Securing our Energy Future

Mark Gabriel | March 17, 2009



Mind Powered: Insight with Impact.

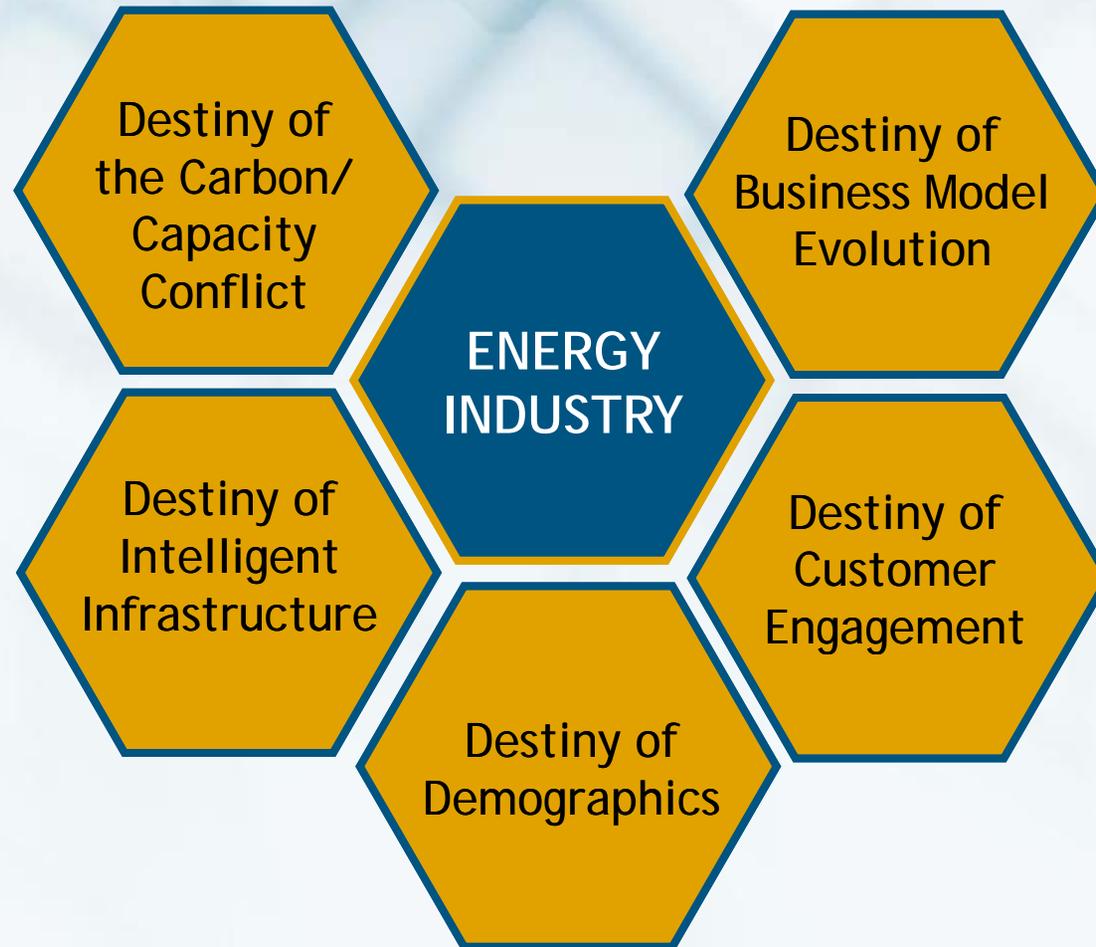
What is a Megatrend?

- A megatrend is occurring regardless of efforts to change its outcome

- No amount of personal, corporate, or governmental “will” or “desire” can prevent it from happening

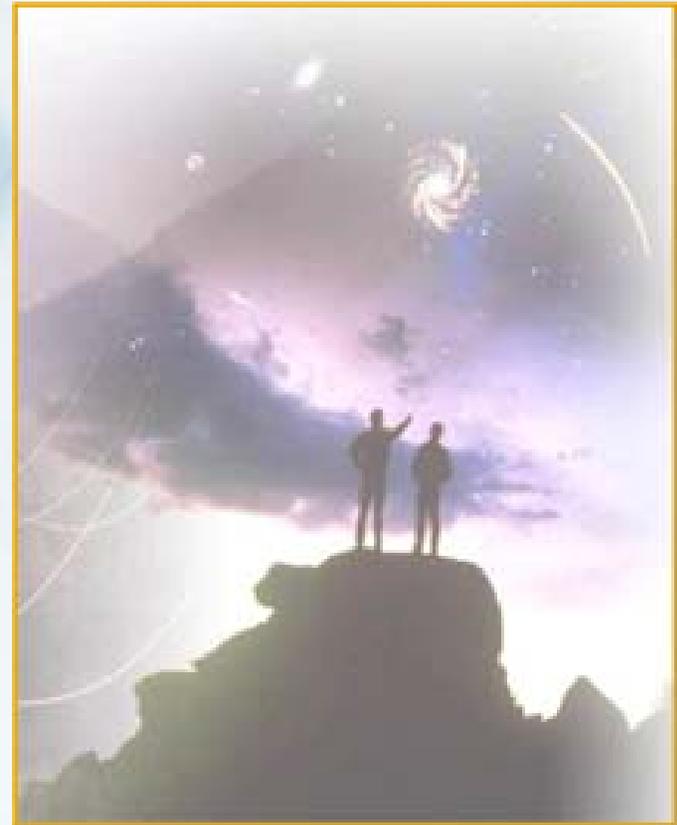
- Megatrends can be nudged in certain directions, but cannot be stopped or altered in any major way

Five Megatrend Destinies Universally Impact the Energy Industry



The Worlds have Suddenly Evolved

- We are seeing galactic alignment of the planets of capacity needs, utility interest, consumer consciousness, technical potential, legislative incentives, and economic conditions



The Destiny of Carbon Constraints/Capacity Conflict



Efficiency, demand response
and load management are
the Only short term answers

- Demand for new power sources will outstrip capacity - the U.S. 50,000 MW challenge
- Demand for clean energy will reach beyond capacity
- Public perception contrasts with the reality of the system
- Renewables are being viewed as a possible answer
- EIA has suggested we could see 44% price increases
- NERC report shows majority of regions will be capacity short within the next five years
- Lieberman-Warner: the \$1,500 per family question—and killing coal until 2020

The Renewable Dilemma

- Three key drivers of renewables:
 - Environmental (carbon) constraints
 - Increased coal, oil, and natural gas prices due to rising demand
 - Inability to build thermal generation or nuclear in time
 - Green guilt



We Have Been Here Before...



- 5,000 turbines in the Altamont Pass
 - 576 MW name plate/125 MW
 - Considered obsolete and not working
 - Built after 1970s energy crisis
- U.S. 2008:
 - 5,329 MW of wind built
 - 920 MW coal
 - Re-examination of Energy Efficiency

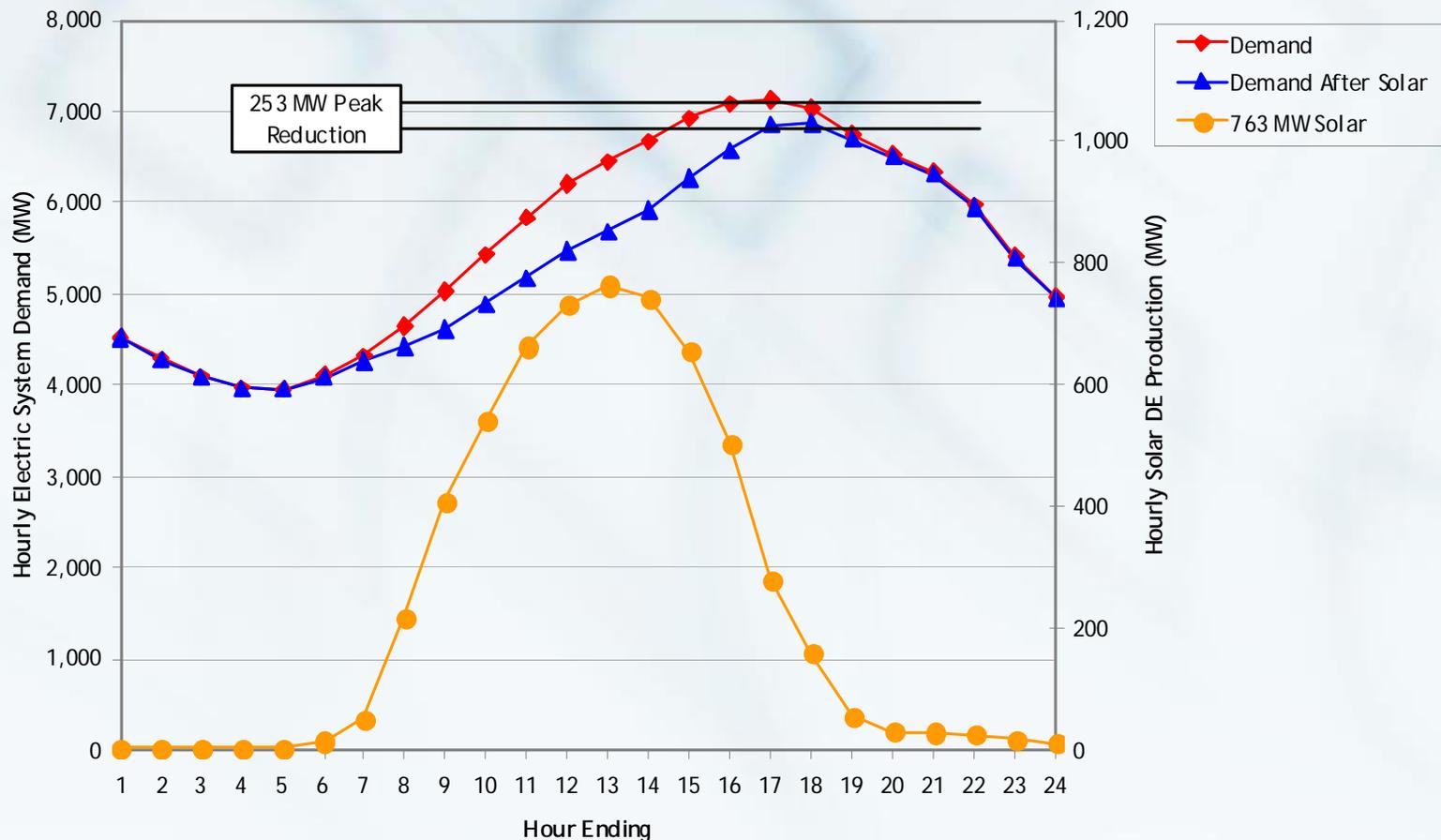
Solar Findings in Arizona

- Potential short-term solar DE savings
 - Energy production and loss reduction
 - Reduced fuel and power purchase costs
 - Lower bills for customers
- Potential long-term solar DE savings
 - Capacity savings for generation
 - Capacity savings for transmission - defer project
 - Minimal capacity savings for distribution unless targeted
- To achieve long term savings
 - Deployment must start now
 - Develop targeted incentive programs and market strategies



The Solar/Peak Conundrum: Even in Arizona...

Summer Day
Comparison of Load to Solar DE Generation
763 MW of Installed Solar Capacity



Energy Efficiency and Demand Response

- Critical pieces in an evolving market
- Beyond traditional programs
- Takes advantage of technology and customer willingness



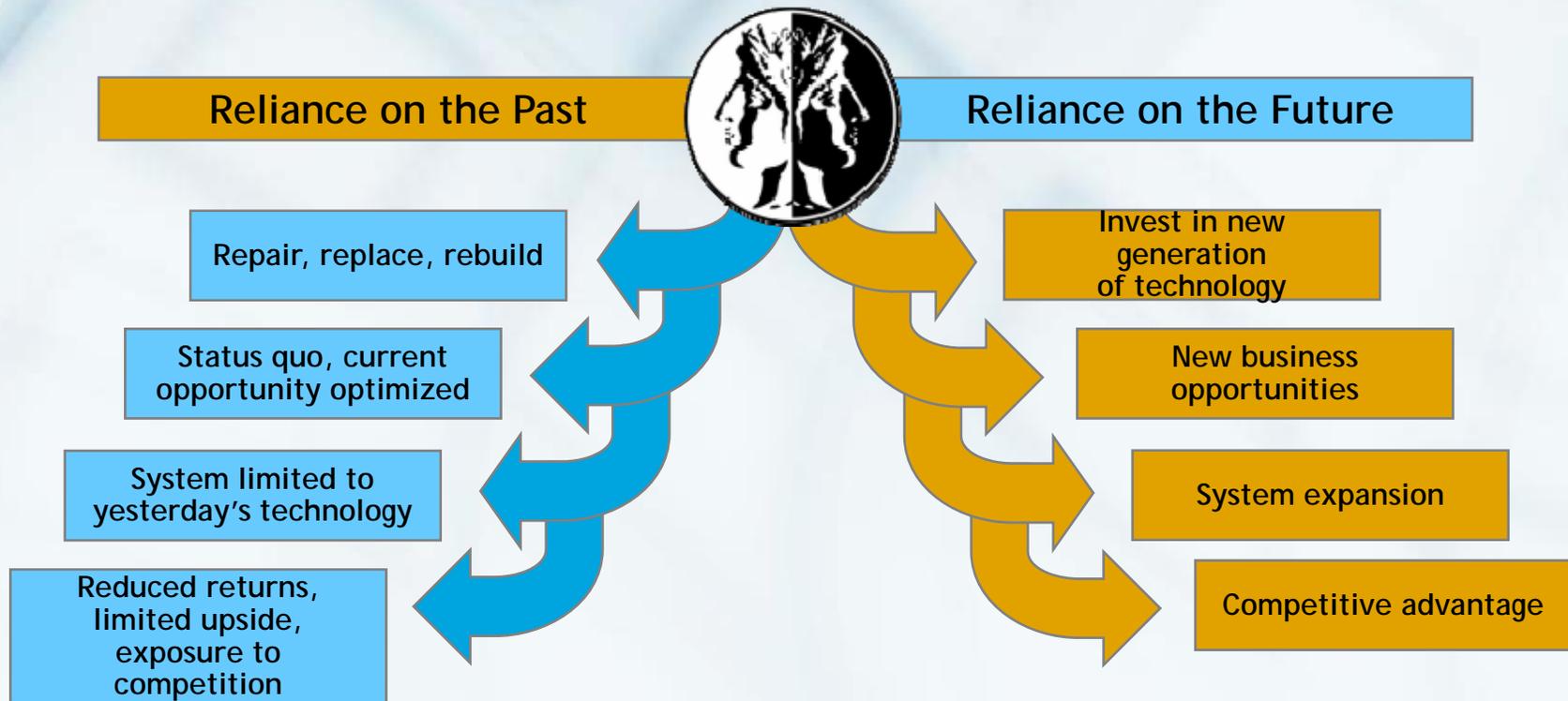
The Destiny of Customer Engagement

- SQRA (security, quality, reliability, and availability) are at the core of this change
- Clients will demand the Burger King model of “have it your way”
- Systems to manage customer interaction will be required in new and challenging ways



The Janus Conundrum: Looking Back or Looking Forward

Choice of Capital Investment



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There is a Major Sea Change in Consumer Thinking

- Global climate change is on everyone's minds
 - It is not about science, it is about belief
- Economic downturn is reflecting a new mood
 - Gasoline prices rise and electricity consumption goes down



Customers Get Creative around Their Energy Supplies and Suppliers



The “Carborexic Movement”

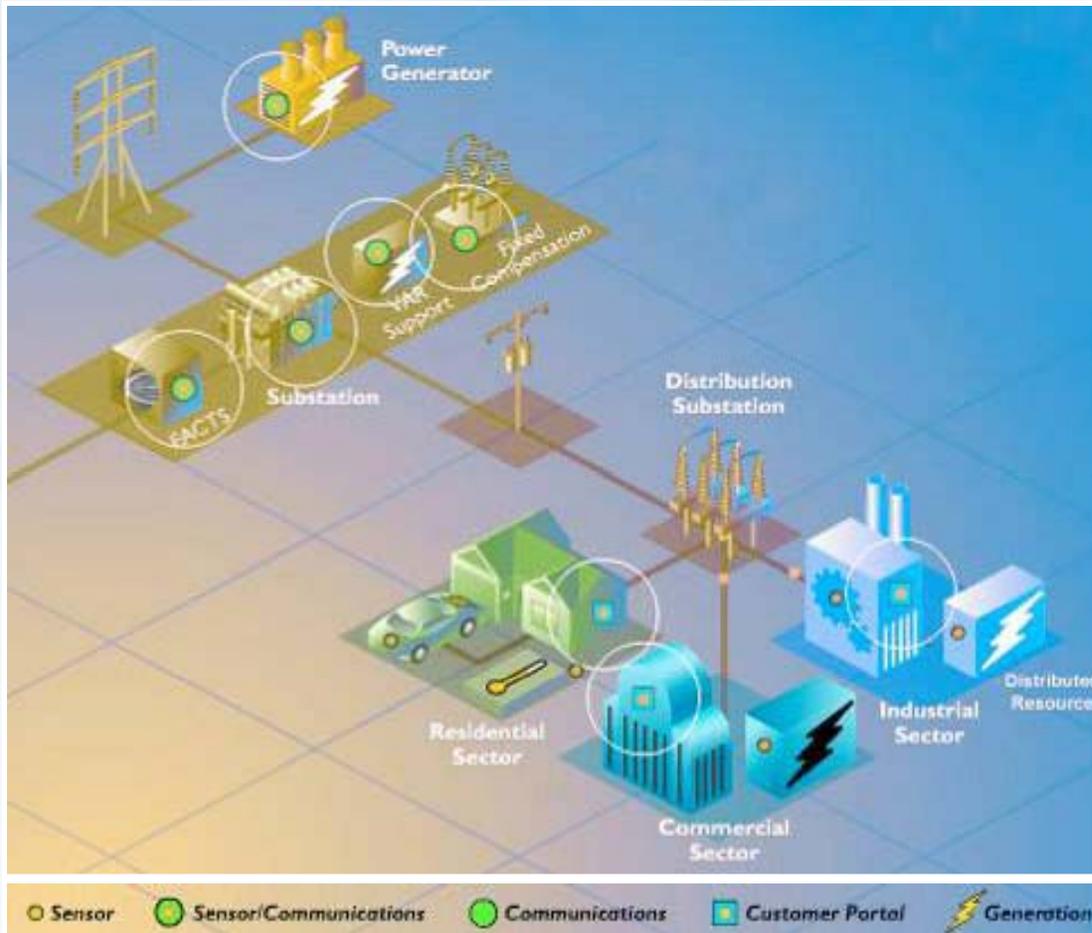
- These are extremes, but not so far fetched...
 - Family of four unplugging refrigerator using it as an “icebox” with frozen water bottles
 - Keeping the house at 52 degrees—in winter!
 - Using a single plastic bag for a year
 - Trying to keep energy use at 10% of national average

Key is Engaging Customers in New and Different Ways

Customer Preferences to CPP & DR Events Back

Peak Pricing Event	Thermostat	Lighting	Audio / Video	Spa / Pool	Water Heater	Power to Grid
<input checked="" type="checkbox"/> HIGH: > 50c/kWh	+6° Cool, -4° Heat	Table lamp	ALL TV's OFF	-6°	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> MEDIUM: > 30c/kWh	+3° Cool, -2° Heat	Walk paths	TV backlight = Low	4°	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> NORMAL 12 c/kWh	Normal Program	Normal Accent	TV backlight = High	Norm	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> OFF PEAK 9 c/kWh	-1° Cool, +1° Heat	Normal Accent	Normal	+1°	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Event						
<input type="checkbox"/> STAGE 1	TSTAT OFF	MOST OFF	TV Activity Timer	OFF	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> STAGE 2	No Over-Ride	ALL OFF	ALL TV's OFF	OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

The Destiny of Intelligent Infrastructure



- \$50 Billion* will be spent in next 5 years in T&D
- The enabler for energy efficiency and demand response
- Critical need to understand dynamic effects of linking communications, computing, and energy
- Not counting stimulus money

The Federal Story on the Smart Grid

- \$4.2 Billion for activities to modernize the Grid
- \$3.25 Billion may be issued by BPA projects
- \$6 Billion in loan guarantees
- ARPA-E program with \$400 Million



The Federal Story on Energy Efficiency

- \$3.2 Billion under the Energy Efficiency Community Block Grant Program
- \$5 Billion for Weatherization
- \$3.1 Billion for Additional State Energy Grants

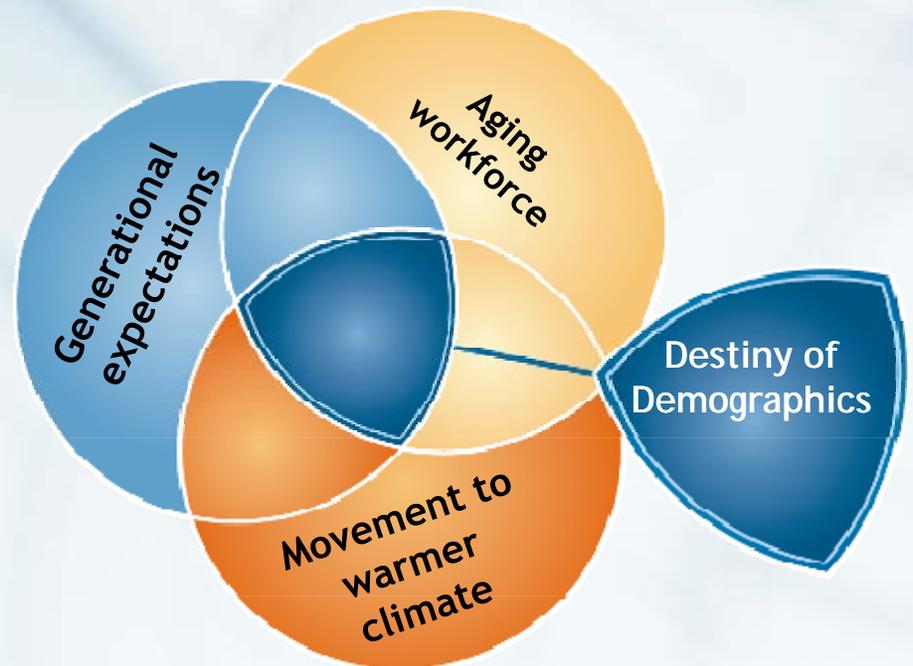


There are Rules...

- Align utility financial incentives with energy efficiency and provide timely cost recovery and timely earnings opportunity for the utilities for “cost-effective, measurable, and verifiable efficiency savings”
- Implement building energy codes for residential buildings that meet or exceed the International Energy Conservation Code
- Implement building energy codes for commercial buildings that meet or exceed ANSI/ASHRAE/IESNA Standard 90.1-2007
- Implement a plan for achieving compliance 2017

The Destiny of Demographics

- 30% of all science and engineering degrees are held by people over 50; average age of a lineman is approaching 48
- Expectations of service and needs for service is expanding
- Movement to warmer climates drives needs



The Destiny of Business Model Evolution



- M&A, asset divestitures, and realignments will continue through the next decade
- Huge increases in the cost of generation and infrastructure will require new partnerships across industry lines
- Customers will demand new engagements with the industry
- Financial community will drive many of the changes

Positioning to Provide Solutions

- Education and community involvement
 - The energy “story” is closer to your customer’s hearts and minds than ever before
- Learn from the past
 - Promote energy efficiency programs we know work—avoid those that do not
- Sustainability is here to stay
 - Critical to balance real needs with perceived problems
- Invest in and deploy technology
 - The key in keeping the lights on has been and will always be technology

Technology Answer 1: Demand Response and Energy Efficiency

- Deploy systems that allow for active Demand Response
- Use energy efficiency to the maximum extent possible
- Not all demand response is created equally
- Long term value of Demand Response is dependent on being controllable, measurable, verifiable, and predictable
- Tools and technology are the critical factors in the permanent recognition of Demand Response on par with supply side resources

Technology Answer 2: AMI and Intelligent Infrastructure

- Critical investments in infrastructure and energy efficiency will allow the greening of the Grid and improvements in system reliability
- Getting customers engaged requires new technologies
- The implications of AMI go far beyond simply reading meters
- Intelligent infrastructure is the answer to bringing renewables and other generation options onto the system

Technology Answer 3: Generation Options

- We cannot let today's market fear deter the industry from doing the right thing
- Renewables and energy efficiency cannot do it alone—it will require coal, nuclear, and natural gas to keep the lights on
- Carbon sequestration is a 15-20 year solution, not a five year answer
- R&D support is critical for the future of our customers and the nation

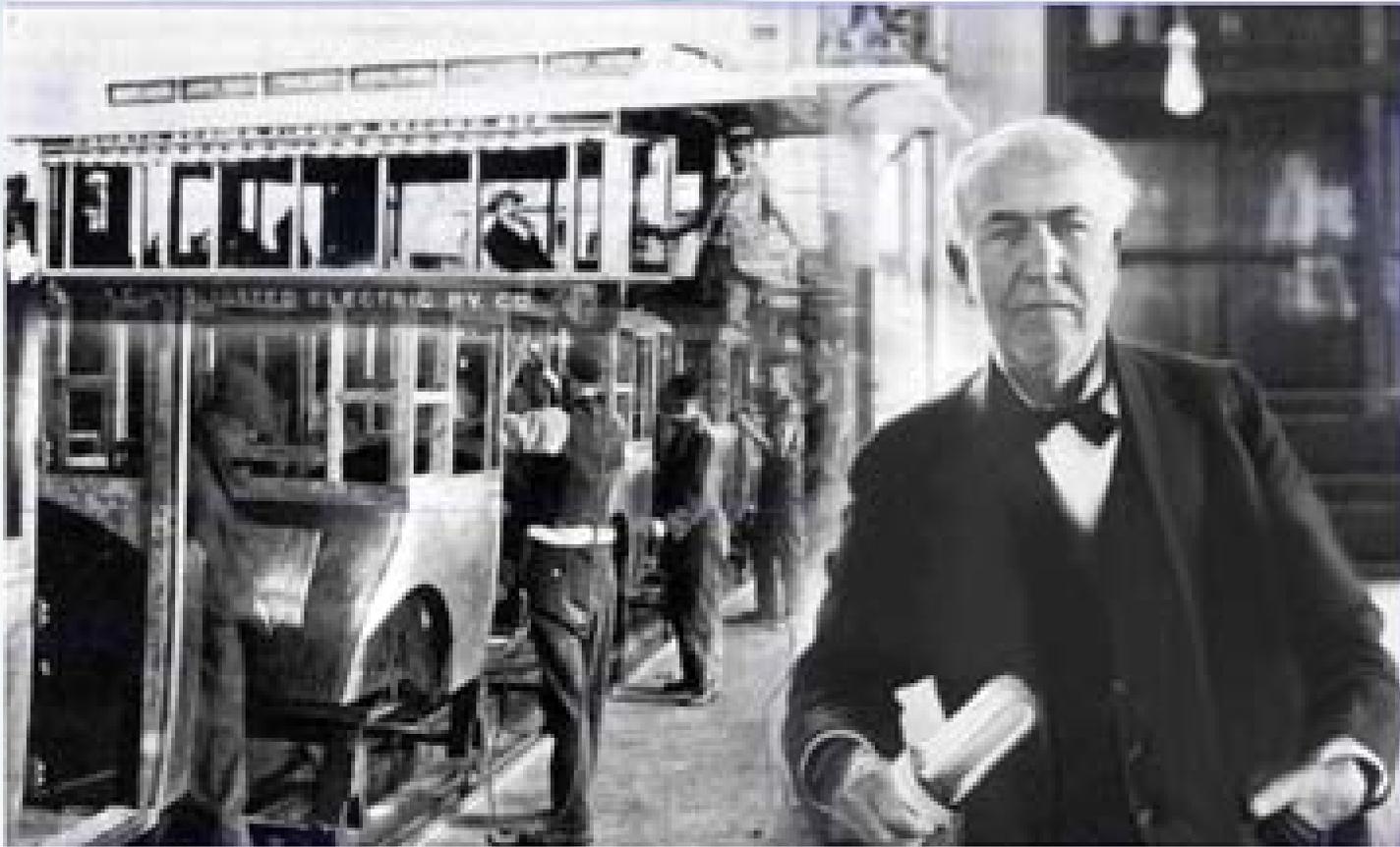
10 Ideas About the Future

1. We must stop waiting for the perfect solution and perfect technology
2. Customers want to be engaged regardless of utility economic logic
3. We must invest in infrastructure with no regrets: it may be costly in the short run, but will pay off in the long run
4. Renewables are best backed by active Demand Response and load control
5. We need to speak about our business in ways our mothers can understand

10 Ideas About the Future (cont.)

6. Demand Response and load management must be known, controllable, and measureable
7. Place accountability for energy efficiency on the supply side
8. Recognize the drivers of energy efficiency and Demand Response go beyond energy savings (SQRA)
9. Seek unusual opportunities
10. We have been waiting 20 years for this opportunity—let's take advantage of it!

“The Best Way to Predict the Future is to Invent It”



Questions?

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