



**ARE YOU READY
FOR THE NEXT
INDUSTRIAL
REVOLUTION?**



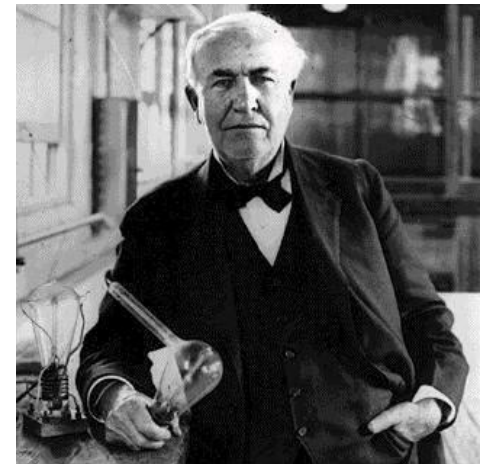
Revolutions Have Transformed: >

Desktop computing

- > Enterprise networking
- > Wireless communications
- > Internet & mass media

What about electricity ?

-- and its 70+ year old grid!



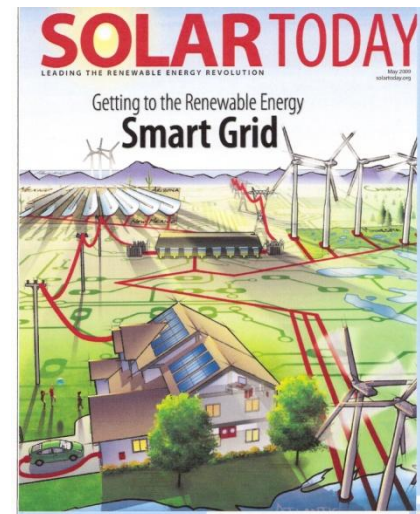
What Makes a Grid “Smart”?

Communications systems that:

1. Gather and store data and then make it available to accomplish something
2. Communicate intelligence to multiple users;
and
3. Allow automated responses to that intelligence

Smart Grids Are Coming

1. Fundamental, game-changer for utilities, renewable energy suppliers and marketers
2. Infrastructure deployments underway in some metro areas
3. Time to become part of the local 'solution' is now
4. Several lessons being learned . . .



Lesson #1:

Separate the fanfare from what's doable

- Talk is cheap; this is a pipeline to supply end-users with solar and wind energy
- Complex systems not easily designed

Lesson #2:

This stuff needs to be sold

- Expect resistance from regulators & consumers
- Without high prices or TOU rates, there's no incentive - yet

Lesson #3:

Smarter grids will appear if ...

- Utilities see value and can recover the costs
- Move faster building the infrastructure
- Distributed generators aren't blocked by lots of red tape
- Smart appliances become widely available
- End-users can 'plug-and-play'

Lesson #4: Utilities Have A Lot To Gain

- Outages cost an average \$100+ billion each year
- Smart technologies can improve reliability by:
 - preventing
 - detecting, and
 - responding to outages

Remember August 2003?



Lesson #4:

Utilities Have A Lot To Gain (cont'd)

- Can be more reactive to solar and wind power sources, thereby reducing greenhouse gas emissions
- Better control their own fate
- More options to meet RPS requirements
- Improved relations with regulators & customers --
Pepco example in MD

Holy Grail: Consumer Behavior

Two prerequisites:

1. Feel the pinch of higher, grid-supplied electricity costs
2. Rules and prices rewarding them for:
 - > using power off-peak, or
 - > on-peak from their own facilities (e.g. solar)

Watch: Austin Energy's *Pecan Street Project*

Integral to its sustainability goals:

1. 700 MW demand reduction
2. 15% energy efficiency
3. 30% of supply from renewables
> 100 MW from solar



Watch: Xcel Energy's *SmartGrid City*

Proving ground for:



1. Increasing reliability
 - averted 4 potentially long-term outages
2. Providing customers with more energy-use info using a web portal
3. Enabling Xcel and its customers to remotely control in-home energy use

SMART GRID **CITY**™

Become part of a smarter solution!

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