

Smarter Energy & Utilities IBM Point of View

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Topics

- **Energy & Utilities Landscape in 10 years**
- **IBM Point of View & How to get there**



The Energy and Utilities industry will change significantly by 2024...



Smart appliances become ubiquitous



Consumers can easily sell surplus energy to the grid or contract with a third party



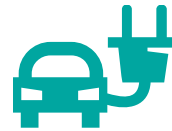
Regulatory environment allows new business opportunities for energy providers



Battery technology will become increasingly available



Automated Demand Response will be used to control peak demand



Electric vehicles are affordable, and utility-sponsored purchasing programs are available



Home energy management systems are inexpensive and prevalent



Consumer-owned generation is affordable for the average household



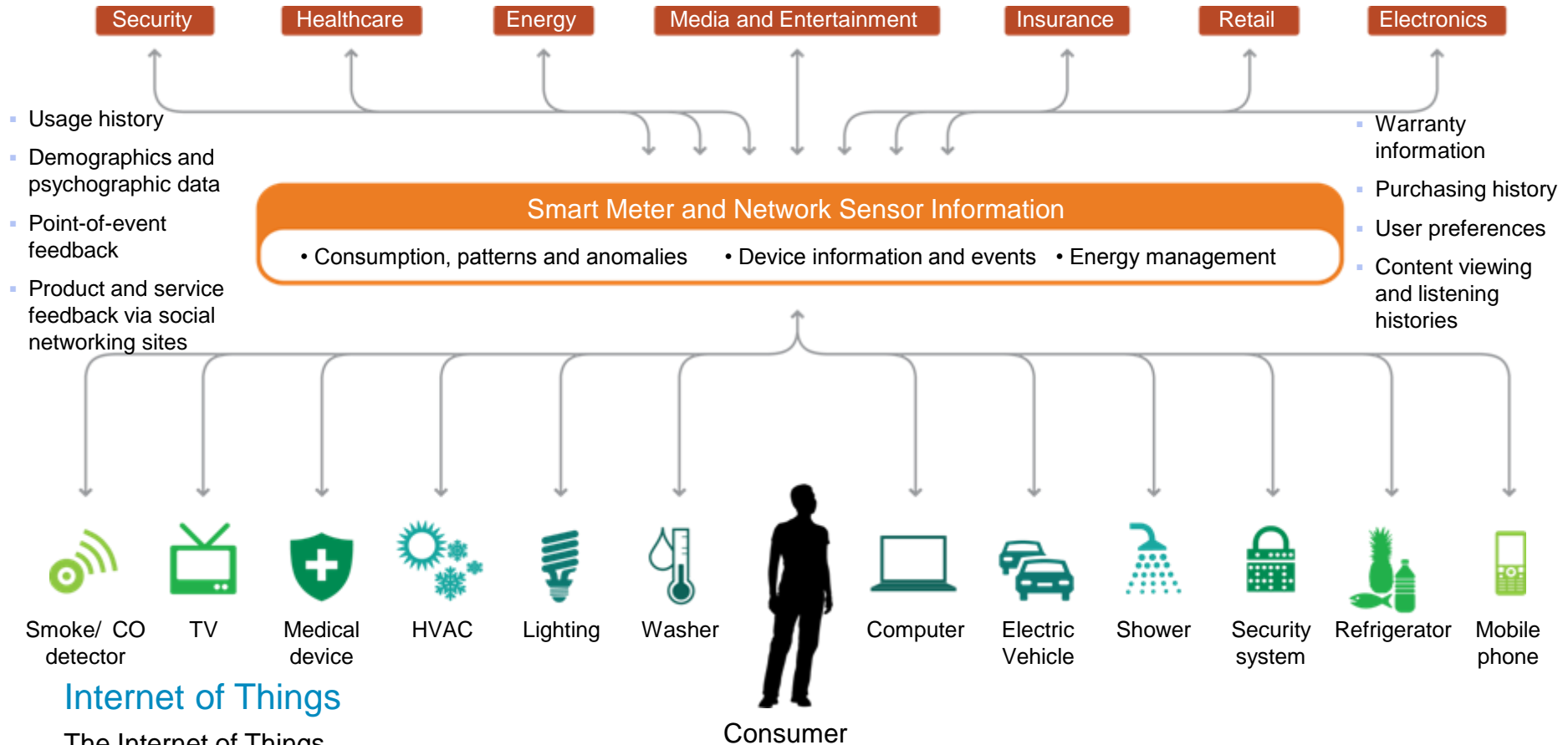
Microgrids are established where existing infrastructure is insufficient



There is an app for that.. consumers will connect to their utility via their smart phone

Enabling Technology Happening #1 shaping the Industry: The Internet of Things

Instrumented, Interconnected and Intelligent – Utilities are founding members of the Internet of Things. They will be significant contributors to it in the future



Internet of Things

The Internet of Things will reach 1 trillion.

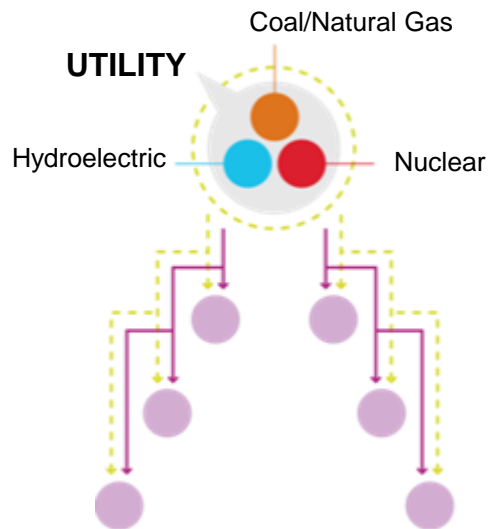
Internet of People

2 billion people are on the internet.

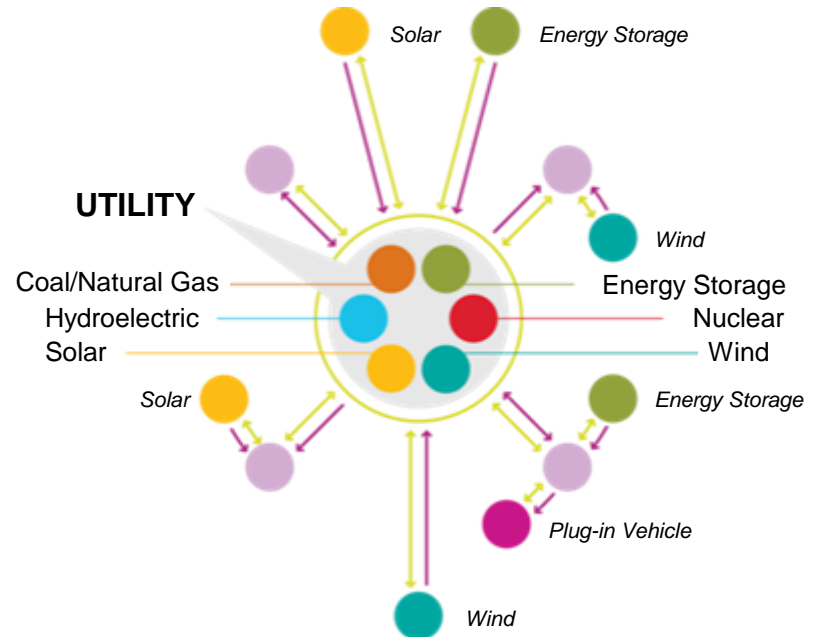


Enabling Technology Happening #2 : Information Technology and Operations Technology Convergence :

Both the IT and OT networks are undergoing the same structural transformation – from hierarchal with well defined interactions to flat and multi variable interactions



TRADITIONAL



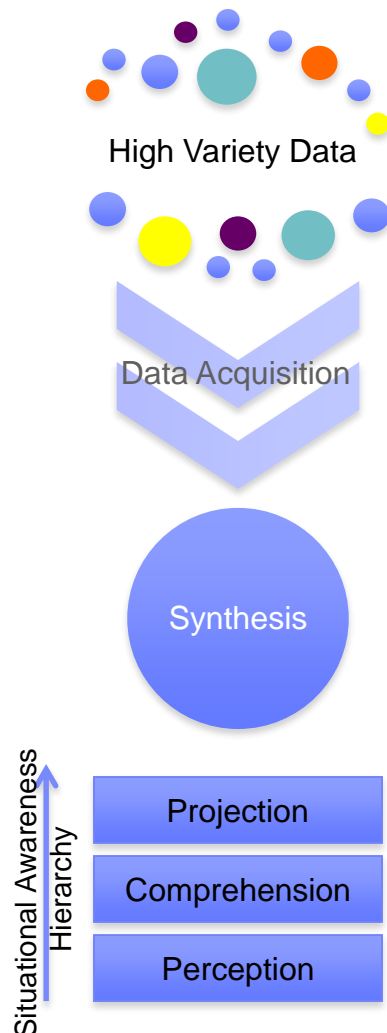
TRANSFORMED

- Consumer
- Power Flow
- - - Periodic Information Flow
- Continuous Information Flow

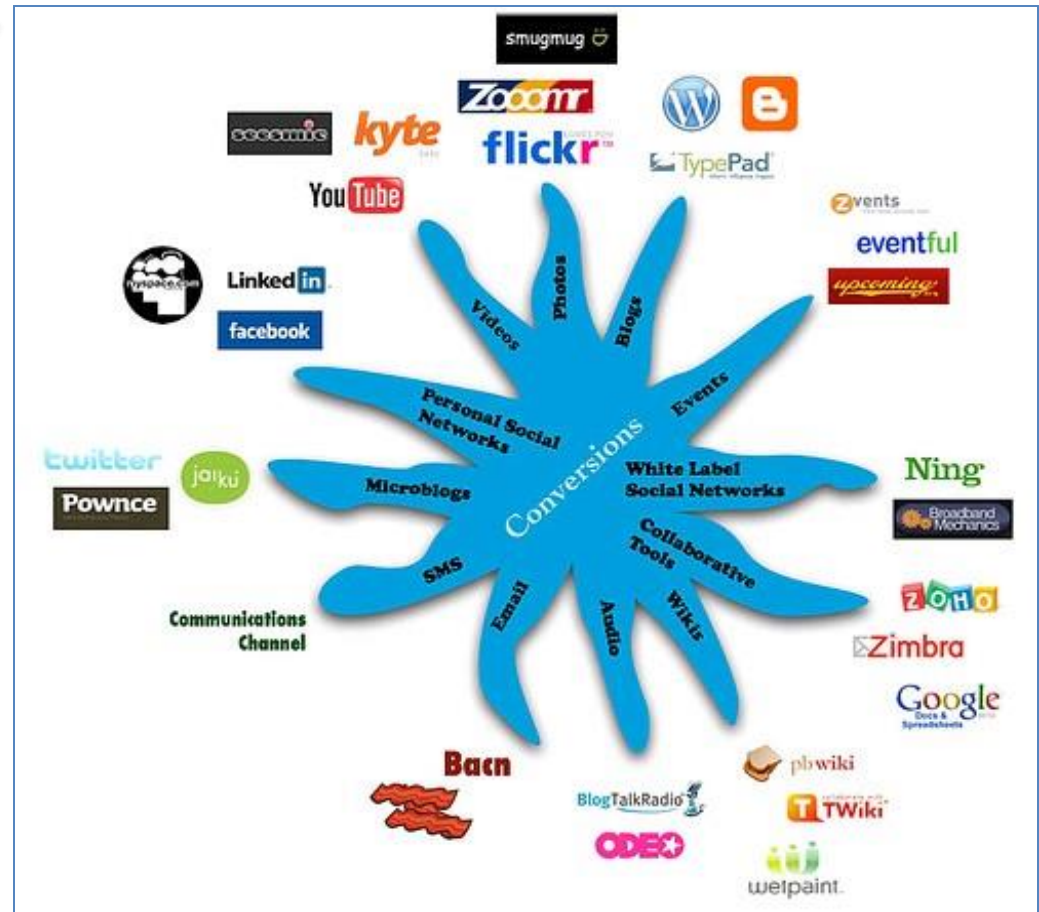
Enabling Technology Happening #3 shaping the Industry: Situational Awareness

Situational Awareness crosses the chasm expanding from a specialized internal management process to a critical social customer interaction

Classic Model



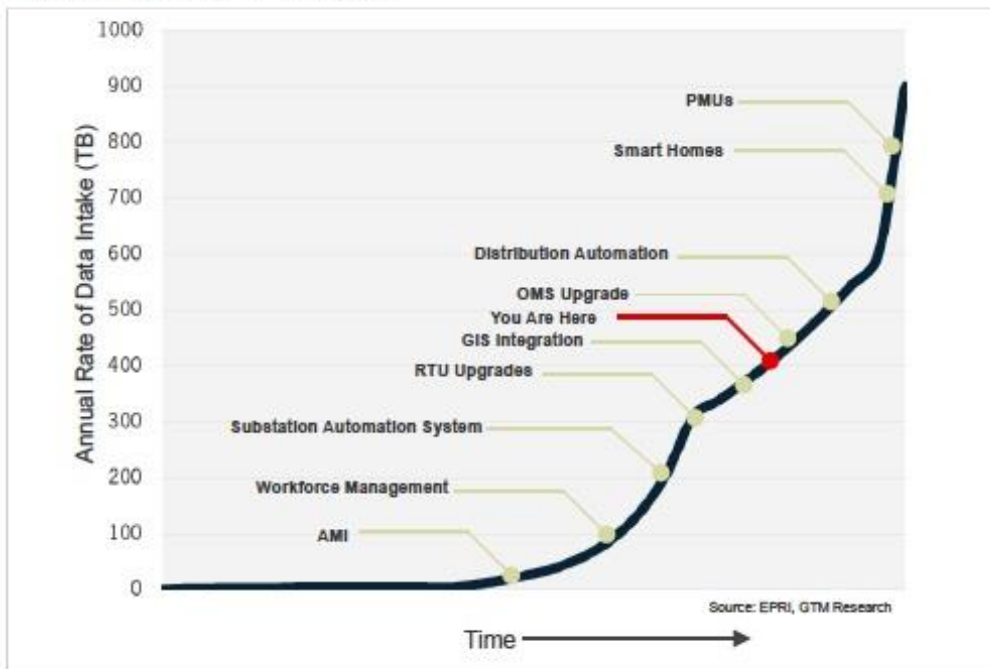
Modern Model



Enabling Technology Happening #4 shaping the Industry: Big Data

The explosion in new data sources and their accuracy transforms the potential breath and depth of applications - it's not a problem... It is an opportunity

FIGURE 1-9: DATA GENERATION AND UTILIZATION



SOURCE: GTM RESEARCH

Data Source Information
Accuracy expansion

$+10^6$

Customer
Usage Points

$+10^x$

Social Media
Clicks

$+10^3$

Waveform
Samples

$+10^7$

Avg Utility
Potential
Smart points

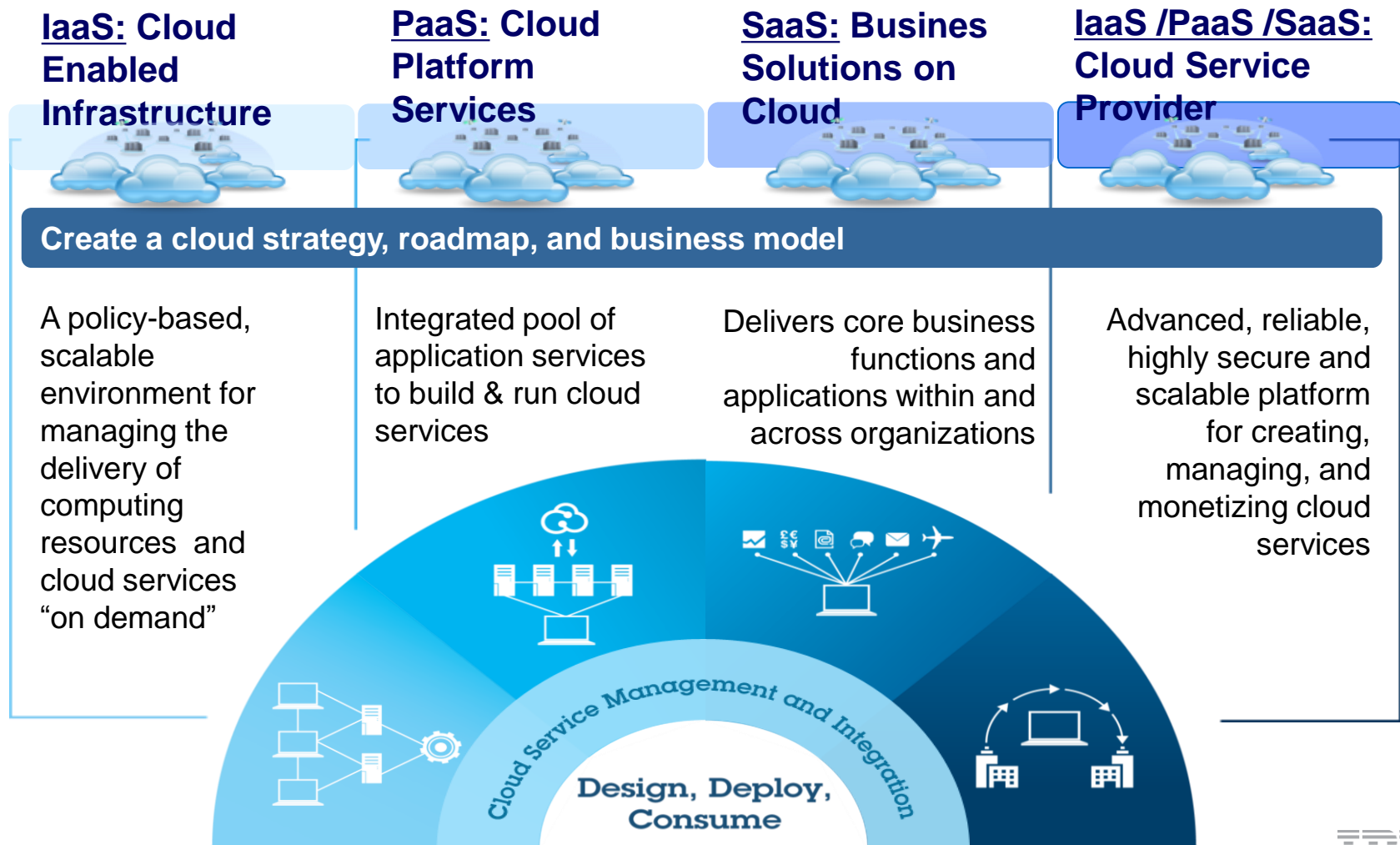
data—the new economic asset that has become the basis of significant opportunity for transformation

80% of all data is unstructured and growing 15 times the rate of structured data



Enabling Technology Happening #5 shaping the Industry: Cloud

The era of cloud makes it cheap and easy to deploy, test, and grow new business models with scale and agility



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1. Viable Substitutes Rise

Introducing the business and technical challenges of intermittency, dispatchability and disintermediation

2. Customer Engagement Deepens

Through rich and instant interaction delivered via social and mobile apps

3. Core Expectations Persist

Requiring the continued delivery of safe, reliable and low cost energy with sustainability embedded

1. Viable Substitutes Rise

Introducing the business and technical challenges of intermittency, dispatchability and disintermediation

WHAT WE SEE SHIFTING

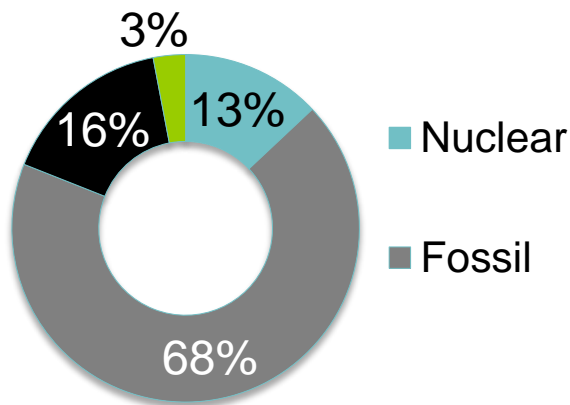
Alternatives reach grid parity while renewables and storage mainstream and demand response increasingly balances supply.

STRATEGIC IMPERATIVE

Assume the role of energy integrator.

Power Generation: Renewable Energy is Maturing

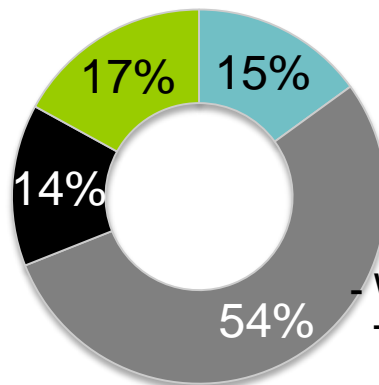
2012 Energy Mix



540 quadrillion BTU

+14% Increase in Energy Use

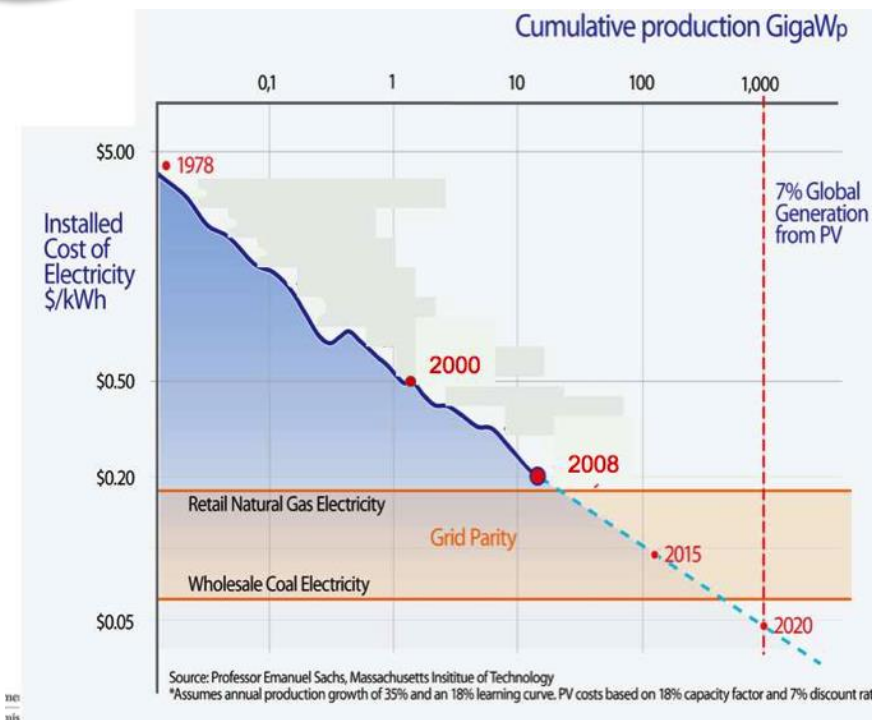
2030 Energy Mix



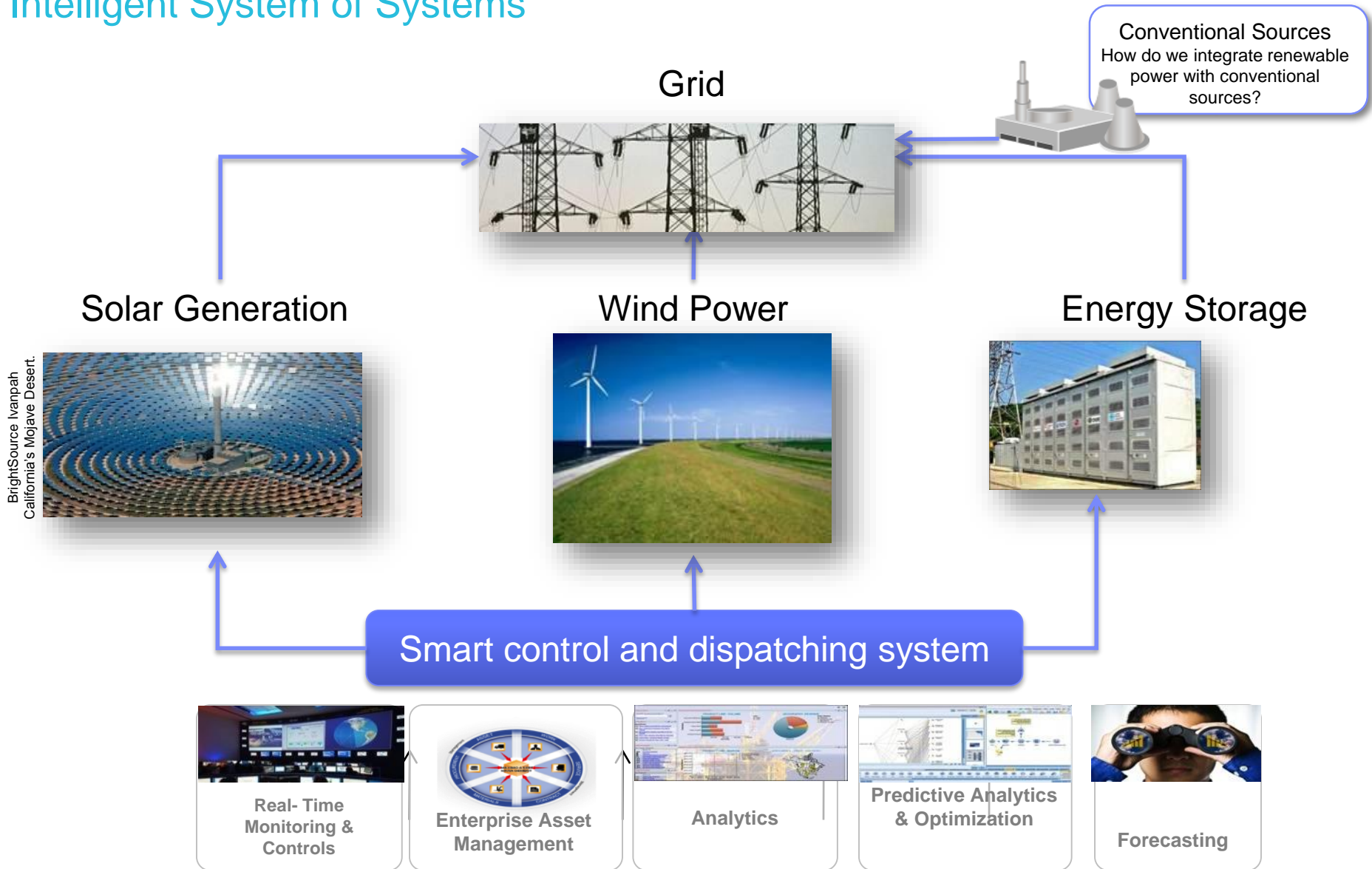
720 quadrillion BTU

- Wind and Solar reaching Grid parity:
Transition to incentive free markets

70 percent of new power generation capacity added between 2012 and 2030 will be from renewable technologies (including large hydro)



Integrating Renewable (Centralized or Distributed) energy requires an Intelligent System of Systems



Cloud based Renewables Platform

Bharat Light & Power

CLEAN ENERGY. BHARAT KE LIYE.

BLP India in the Press

Managed Assets by 2018:

1GW

Baseline Growth: 200MW/ 5 Farms
to 1GW/ 25 Farms in 4 years

Signed 10 years strategic
outsourcing Engagement with
IBM

Business Problem:

Grow wind and solar portfolio from 200MW to 1GW in four years. Required a platform to quickly add new assets, business applications In a cost effective manner.

Solution: Implement a comprehensive renewa

1. Remote Operations Center (ROC)
2. Rule Engine
3. BI and Reporting
4. Service Request Management
5. Enterprise Asset Management
6. Mobile
7. Forecasting
8. Analytics

"By partnering with IBM and implementing latest technology trends like Cloud, Smarter Planet, Big Data and Mobility, BLP will be able to raise the bar in the Wind Energy Business"

Balki G. Iyer, chief development officer, BLP.



2. Customer Engagement Deepens

Through rich and instant interaction delivered via social and mobile apps

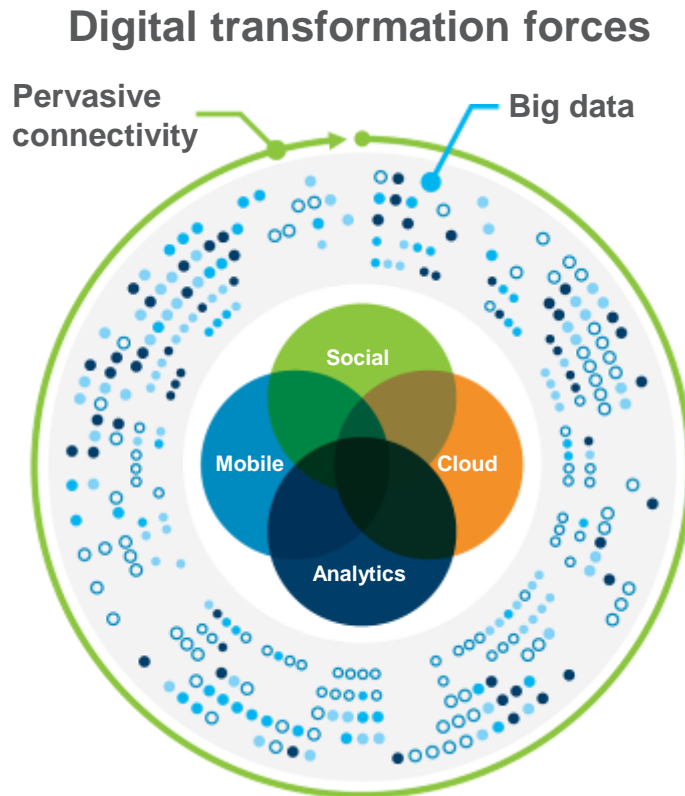
WHAT WE SEE SHIFTING

Per capita demand is rising but energy intensity is sinking and prosumer supply is expanding driving a more sophisticated and economically challenging customer interaction

STRATEGIC IMPERATIVE

Deliver a 360 degree customer of one experience

The emergence of **big data**, **social**, **mobile**, **cloud** and **analytics** are fundamentally changing how we live, work and interact



67% of global consumers

want to use mobile devices to check out

1 out of every 7

minutes spent online is spent on Facebook

80% of new apps

will be distributed or deployed via the cloud

18% of Africa's GDP

is expected to be handled through mobile money transfers by 2015

40% of people

socialize more online than they do face-to-face

1/3 of consumer data

will be stored in the cloud by 2016

...and is creating a profound impact at all levels of society

Digital transformation enablers



**Mobile
revolution**



**Social
media
growth**



**Big Data &
Analytics**



**Cloud
Computing**

Societal impacts

Individuals

- Connected consumer
- Networked workforce
- Empowered citizens

Companies

- Evolved business models
- Optimized digital operations
- Connected enterprise

Industries

- Value migration
- Industry redefinition
- Fragmentation

Energy Providers will need a Digital Front Office to engage customers effectively..

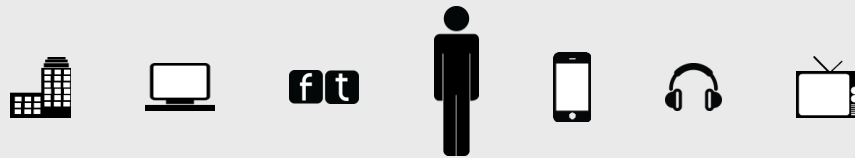
Personalize engagement to extend brand reach beyond the meter

Create a core competency in data management and analytics

Evaluate threats to core revenue; plan defensive and growth-oriented business model innovation strategies

The convergence of all of this change is transforming the front office—the systems, processes and people that touch the customer

Empowered
consumer



Channels



Physical



Web



Social



Mobile



Call Center



Broadcast

Digital Front Office

Capabilities

Innovate business models,
products and services

Define a unified cross-
channel vision for customer
engagement

Create best- in-class
marketing capabilities

Engage based on deeper,
more actionable customer
insights

Optimize supply and demand
to changing consumer needs

Increase business partner
and supplier visibility

Back office

Enterprise resource planning
(ERP) systems

Legacy applications

Data warehouses

“A new era of computing is upon us ... it is defined by computing moving to the front office.”

- Ginni Rometty, Chairman and chief executive officer of IBM; Investor Day, May 9, 2012



Realizing this importance, utilities are taking action to meet the needs of increasingly diverse customers

How well do you know **WHO** they are, not just their customer number, or tariff/rate program.

Electric Vehicle Owner



Green Activist



Solar Power User



Fixed income consumer



Student



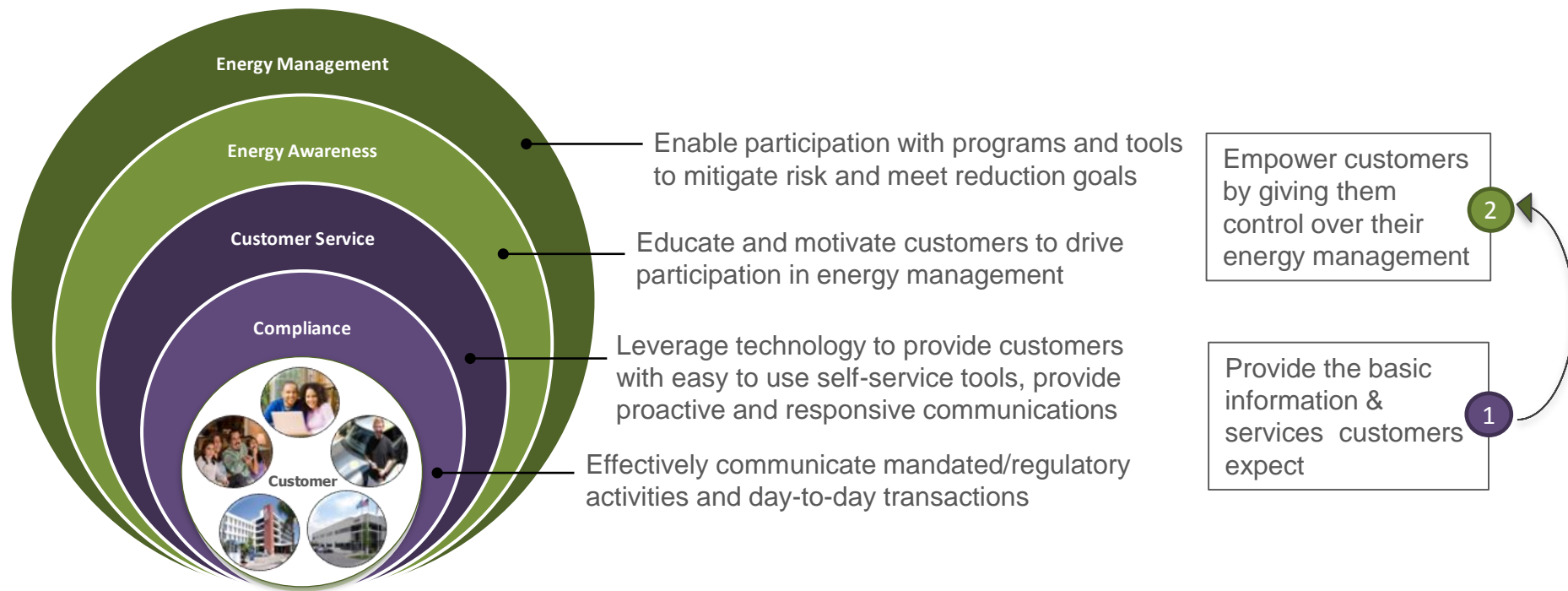
High consumption user



And **HOW**—and **WHERE**—do you reach them, and with **WHAT** message?

Southern California Edison (SCE) has adopted a successful approach to transforming the customer experience

Everything we do is targeted at achieving the highest level of customer satisfaction, driving increased engagement and making the customer experience easy and convenient



SCE - A Digital Customer Experience Vision

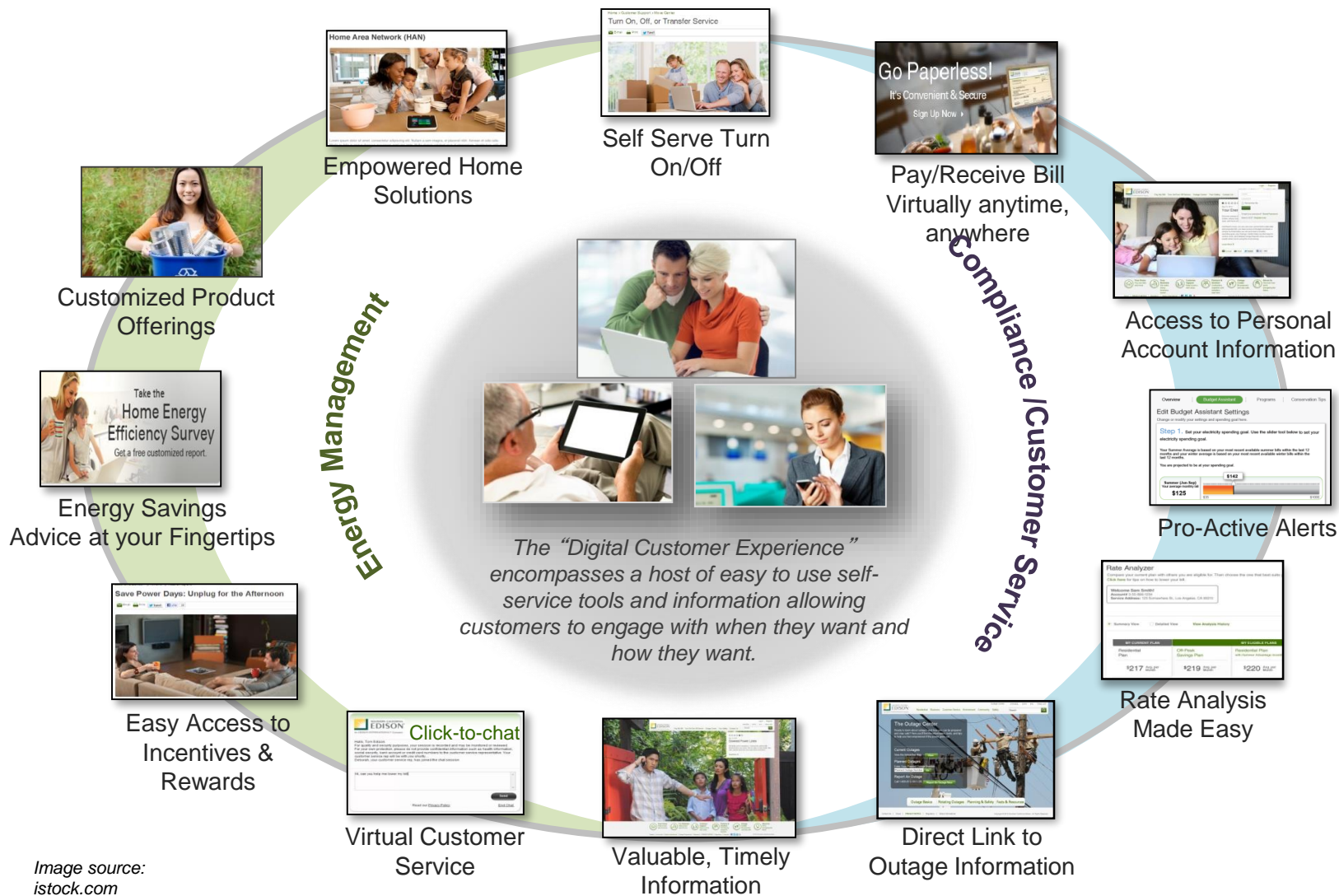
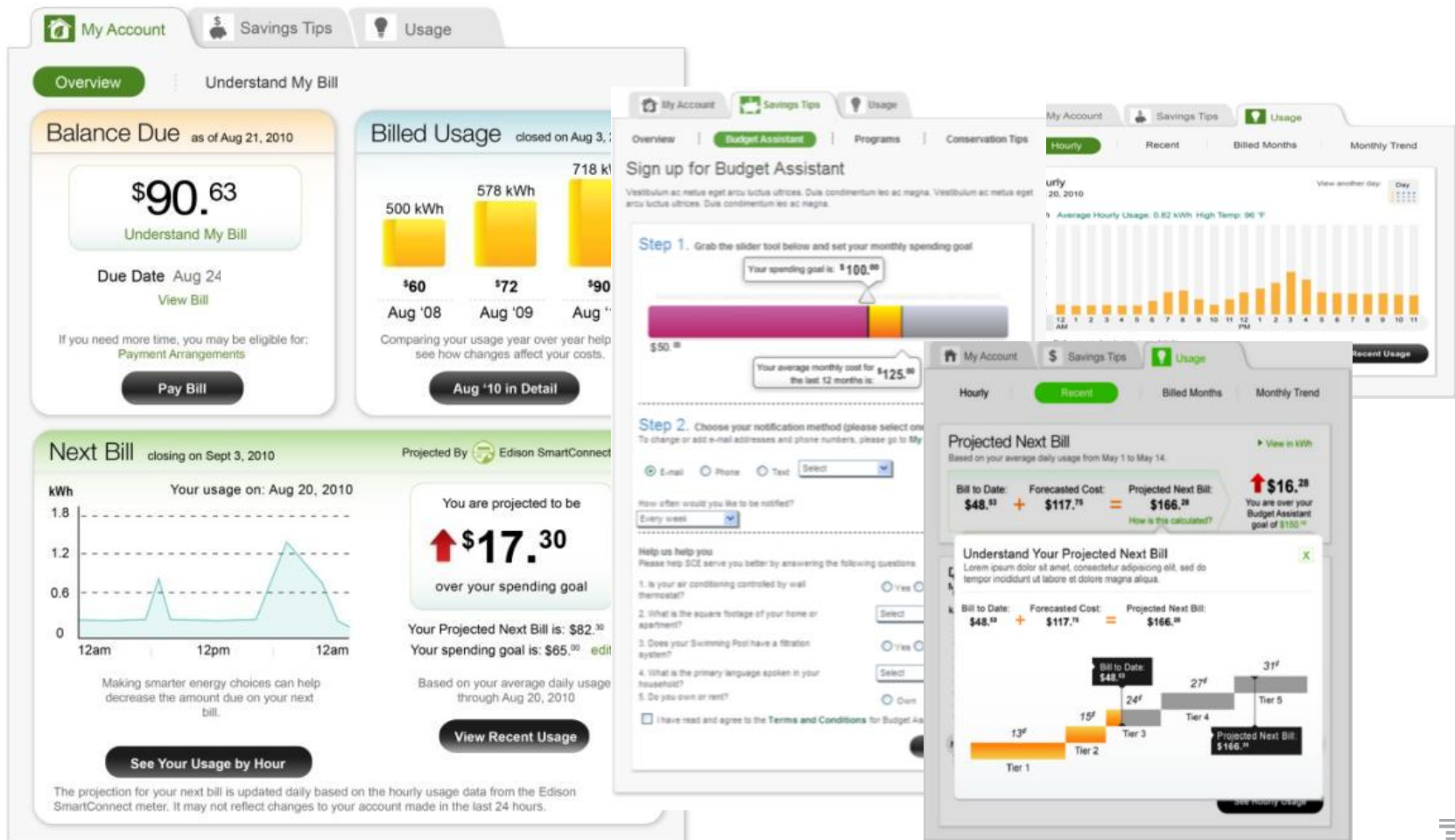


Image source:
istock.com

Unlocking the value of data

Empowering customers with next day access to energy data, new price options, proactive alerts & offerings by strategic partners



3. Core Expectations Persist

Requiring the continued delivery of safe, reliable and low cost energy with sustainability embedded

WHAT WE SEE SHIFTING

In some markets, Grid essentiality is challenged with OPEX agile new entrants emerging and growth stunted by #1 Rise of Valuable Substitutes & and #2 Deepening of Customer engagement. In other markets, meeting demand growth is must be accompanied with an economic & environmental sustainable approach

STRATEGIC IMPERATIVE

Disrupt business processes through analytics driven operational excellence.

Utilities are being driven to invest in grid operations transformation by a combination of these 4 drivers

Operational Excellence

- Improve system reliability and efficiency
- Reduce outages and durations
- Take into account Distributed Energy Resources
- Increased participation of Customer
- More stringent Regulatory environment
- Ageing grid management systems

Financial Performance

- Better utilization of ageing assets & workforce
- Improved Capital Planning and cash flow
- Cost take out - Reduce operational expenditures
- Minimize technical grid losses

Customer Satisfaction

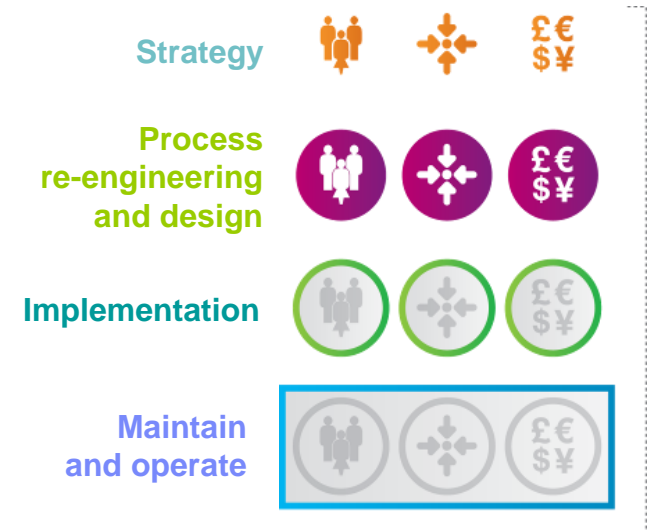
- Improve customer satisfaction and retention
- Leverage information and conduct analytics to increase customer insight

Regulatory Goodwill

- Establish a trusted relationship with regulators ensuring operations regulatory compliance and reporting

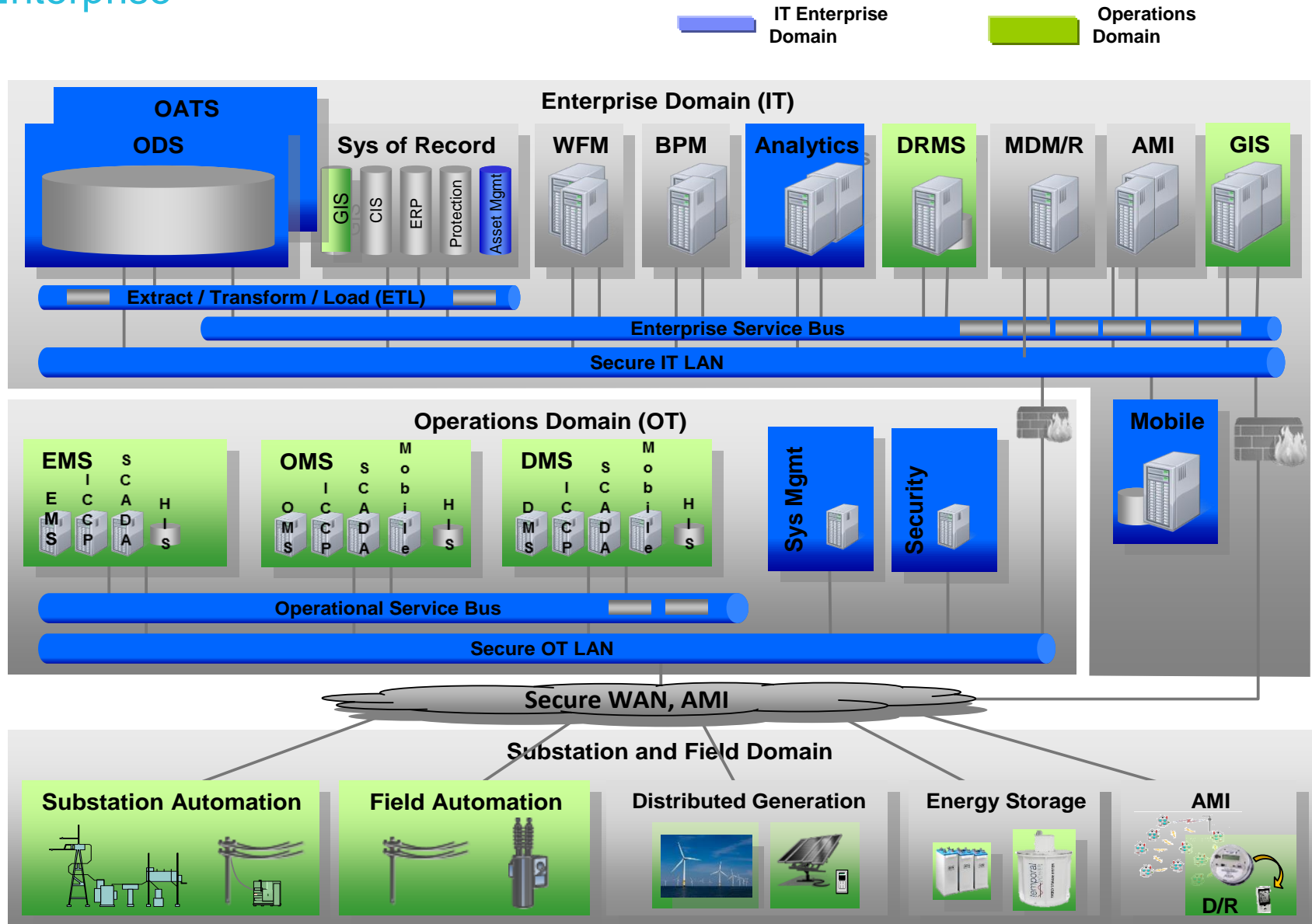
This requires a smarter, Integrated Grid Management Systems that is transformational

- It consists of the implementation, design and support of the foundational applications and processes that form an integrated network operations platform, including business process automation, analytics, security software and hardware capabilities, and their integration with other utility operations surrounding customer, workforce and asset management.
- These can include such systems as distribution management systems (DMS), outage management systems (OMS), geographic information systems (GIS), and other mission-critical systems



This requires complex systems integration!!

An Integrated Grid Management System spans from the Field to the Enterprise



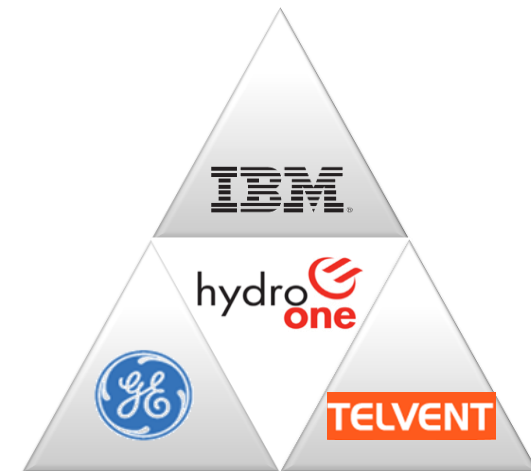
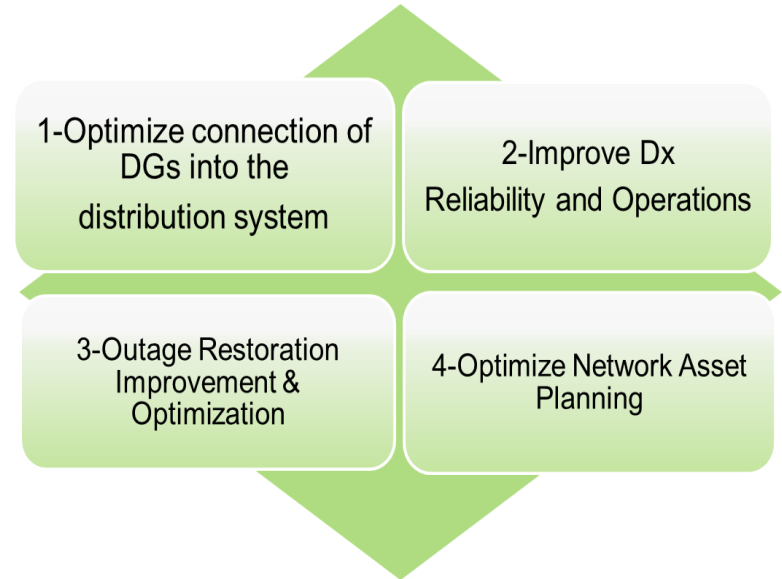
Hydro One Case Study

Advanced Distribution System Project – ADS

The need

In 2009, Hydro One initiated its Advanced Distribution System (ADS) project aimed at designing, building and operating a more modern and intelligent distribution system in a trial area to test intelligent system design and equipment in advance of possible broader scale deployment.

By improving business processes and integrating operating communications and IT systems technologies, Hydro One is focused on improving monitoring, control and protection of distributed energy resources, system reliability and operations. This will allow the company to optimize outage restoration and to better plan and manage its distribution and asset network.



Being the energy integrator requires system(s) of engagement that optimally balance all supply and demand points delivering safe, secure, reliable and efficient electricity service

