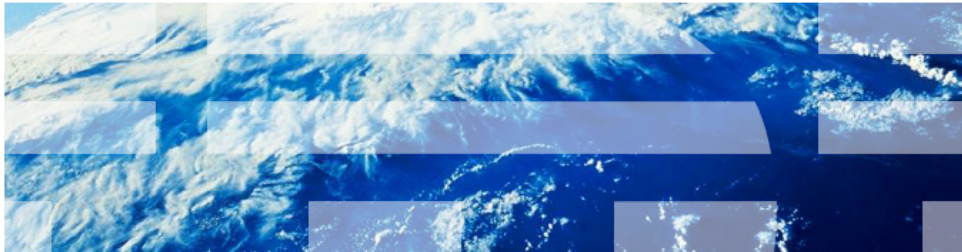


## Driving Innovation in Utilities – The IBM Experience



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IBM does a lot of innovation, working across industries

E&U industry at a juncture – fascinating time. Would you rather be in, say, pulp & paper?

I myself is a business consultant

But have been working with clients for many years helping to manage innovation or assessing potential of innovation

## IBM Research: Global

- 3,000 engineers, scientists and technical professionals
- 5 Nobel Laureates, 13 National Medals, 6 Turing Awards



6,000 patents per year, 2x Microsoft, 3x Intel

## Innovation defined

Creative Idea + Recognition of Value + Implementation



*A process that transforms ideas into business value*

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Innovation:

- = creative idea + recognition of value + implementation
- = the process that transforms ideas into business value

## Incremental Innovation



## Radical Innovation



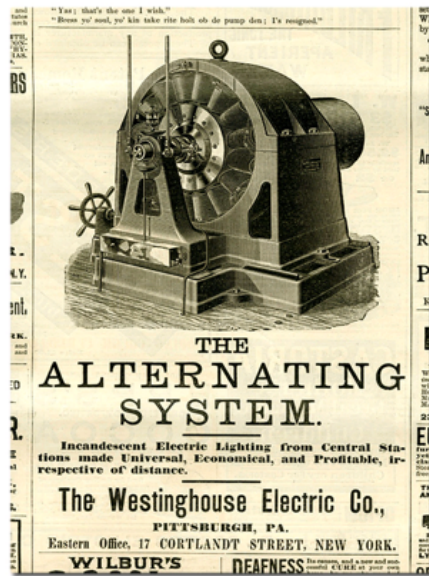
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Two basic types:

- Incremental / continuous / sustaining / improvements
  - Improving price/performance
- Radical / discontinuous / breakthrough / disruptive
  - Initially a lower price/performance, but has a desirable new feature

(Be careful with the “Radical” word and emphasis on the other words as well)

## The Smarter Grid Is Radical



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In the 1880s, Nikola Tesla invented the 3-phase 60 Hz technology still used in the North American electrical grid, which was then commercialized by George Westinghouse, who was competing with Thomas Edison.

One hundred and twenty five years later, the Smarter Grid aims to solve this 19th century problem using 21st century systems. And the 21st century itself brought a new set of challenges to be met: energy efficiency, integration of distributed and renewable energy, charging of electrical vehicles, pressure on costs, environmental concerns, and consumer expectations.

The Smarter Grid is a radical overhaul of Tesla's grid.

Driving Innovation in Energy and Utilities

IBM

The Smarter Grid Is Different



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With the Smarter Grid, utilities are engaging into some radical innovations – not all radical, some are incremental.

Smarter Grid innovations are not limited to implementation of new technologies.

- Because some of the technologies are immature, the innovation process must include managing uncertainty at a much higher level than utilities are accustomed to.
- The Smarter Grid supposes the re-thinking of internal process and organization lines.
- Customers are participants in the Smarter Grid, not just passive ratepayers.

For organizations focused on delivering an essential public service, radical innovation is a difficult art to master. The level of disruption may be underestimated, resulting in difficult implementations. Or, the radical nature of the innovation may be watered down to make it easier to swallow, reducing or eliminating many benefits. At other times, organizations may over-analyze a breakthrough innovation, building up cost up-front to address hypothetical issues rather than learning what is worthwhile as the innovation is developed toward implementation.



## Smarter Grid Innovation Is Different



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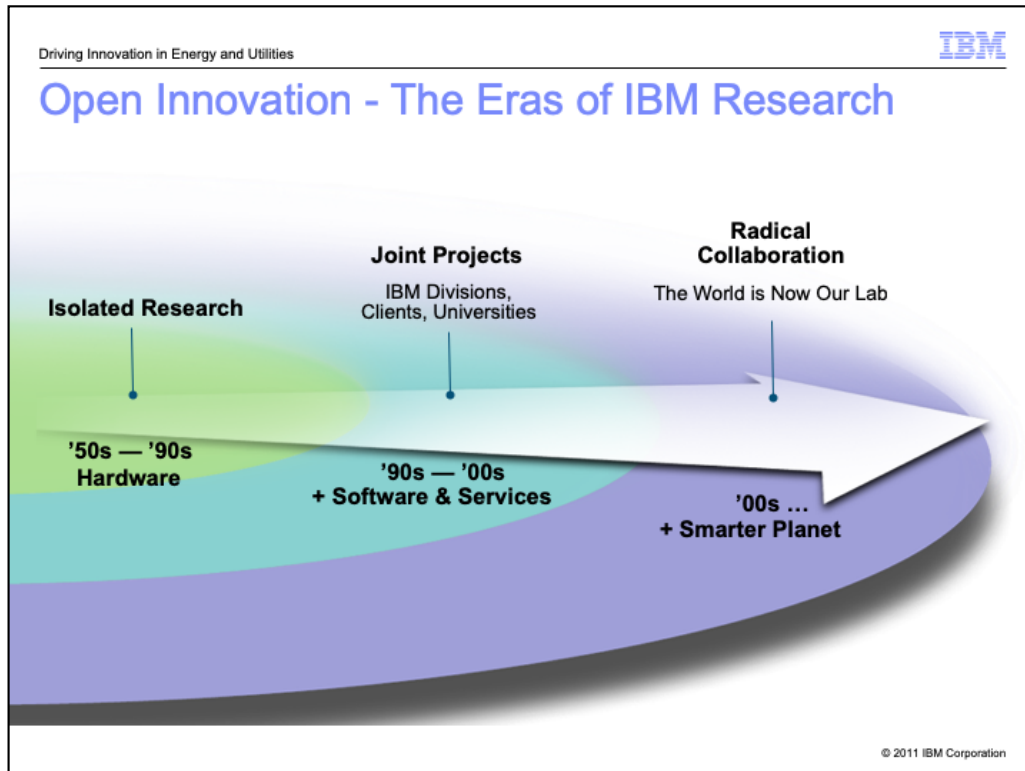
The disruptive nature of Smarter Grid innovations calls for a different management framework. Utilities cannot entirely rely on the approach used to manage information technology projects (i.e. sequential design process in a waterfall model), nor on the approach traditionally used in power systems (ECP - engineering, procurement, construction, testing and training).



Successful utilities implement an innovation framework based on industry leading practices:

- Reinforcing senior management's involvement in the innovation process.
- Focusing on maximizing the value for the utility, its customers, its shareholders and other stakeholders.
- Centering innovation around a few major strategic areas.
- Embracing open collaboration with vendors and other utilities.
- Implementing an integrated innovation management process from the concept stage, to pilots, and to general roll-out.





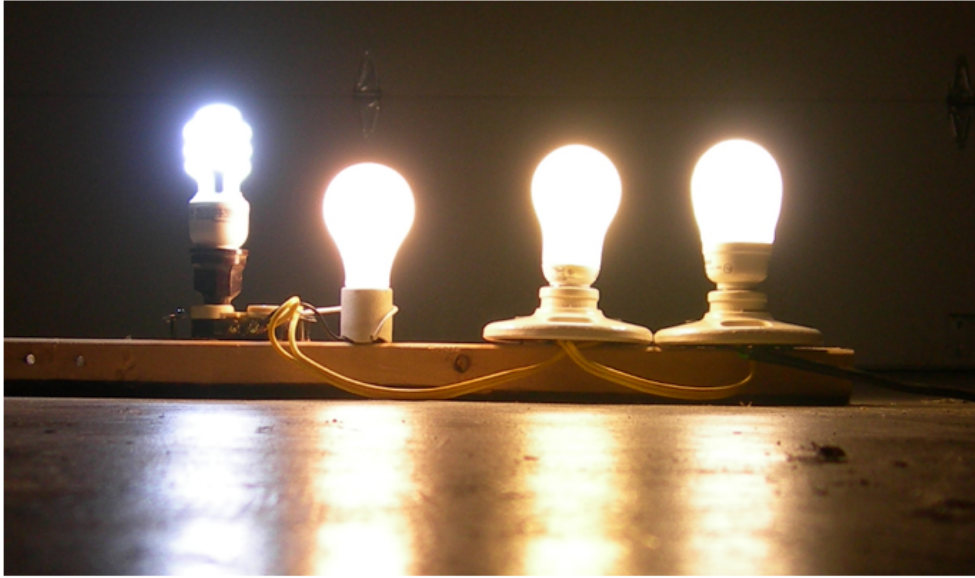
### EXAMPLE – IBM Research

IBM Research's agenda has evolved over the years:

- From the 50s through the mid-90s, IBM's research was isolated. We worked in small teams or individually with very little contact with others. Our focus was almost exclusively on hardware.
- From the mid-90s through the mid-2000s, we worked on joint projects with IBM's units and with clients and universities. In a sense, it was the first time we opened the doors to IBM Research. We added software and services to our research focus.
- From the mid-2000 until now and for the foreseeable future, our researchers have moved out of our labs to do research in cities, deserts, rivers, electrical grids, hospitals, etc. This is an era of radical collaboration. And we've added

“smarter planet” to our research agenda.

## There Is Nothing Radical about Managing Radical Innovation In Utilities

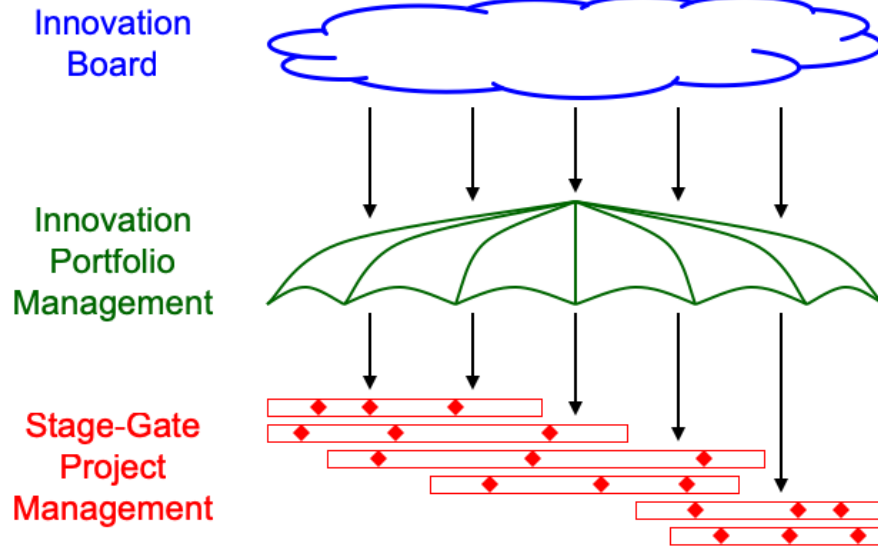


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Making innovation a senior management topic, managing innovation as a portfolio of initiatives and using stage-gate to develop ideas is nothing new – you just have to tie things together.

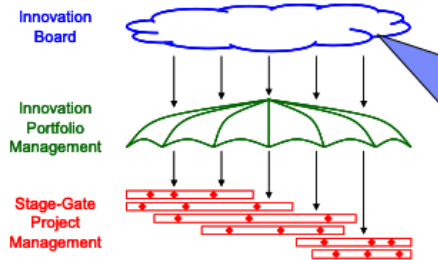
It is being used across a range of industries where innovation is essential, such as biotech, pharmaceutical, aeronautics, and including at IBM.

## Managing Innovation



Address strategic issues  
With the right projects  
That are well managed

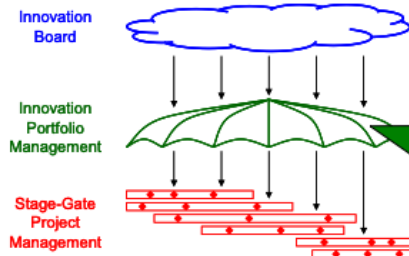
## Innovation Board



Senior management oversight  
Strategic alignment  
Focus on value

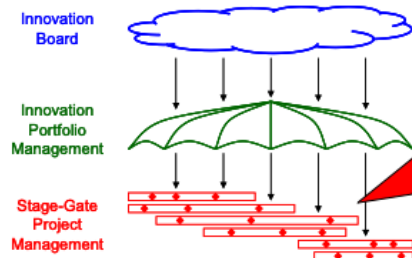


## Innovation Portfolio Management



Opening up collaboration  
Road mapping  
Collecting ideas  
Launching projects

## Stage-Gate Project Management



Institutionalize learning  
Deliberate decision making

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# Energy Grand Challenges @ IBM Research

## Li-Air Batteries with 500 miles range

## Zero-Emissions DC

## Supercomputing & Grid Simulation

## Smart Grids

## Earth-Abundant Soln-Processed PV

## Concentrator PV

## Smart Buildings

## Smarter Energy Platform

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EXAMPLES of innovation buckets at IBM in E&U

15



## We've only just begun to uncover what is possible on a smarter planet.

- The world will continue to become smaller, flatter and smarter. We are moving into the age of the globally integrated and intelligent economy, society and planet.
- There's no better time to start building smarter energy and utilities organizations—focused on providing energy responsibly to empowered consumers. And there's no better time to invest in creating the kind of society we all desire.

Let's work together to drive real progress in our world.

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## We've only just begun to uncover what is possible on a smarter planet.

The reality is that the Internet has been instrumental in creating a globally integrated world and it is up to us to take advantage of it. We are moving into the age of the globally integrated and intelligent economy, society and planet.

IBM scientists and industry experts are working on smart energy solutions like these around the world. We're helping build seven of the world's ten largest automated meter management projects. And we're partnering with utility companies representing nearly 50 million consumers in the Global Intelligent Utility Network Coalition to accelerate the adoption of smart grid technologies and business solutions.

We won't have this opportunity forever. I think one thing is clear: we agreed earlier that the world will continue to become smaller, flatter and smarter. We are moving into the age of the globally integrated and intelligent economy, society and planet. IBM invites you to work with us to drive real progress for our endearing planet. We welcome your ideas and look forward to the opportunity to co-create solutions for smart utilities and a smarter planet. Thank you for your attention and your input!

## Benoit Marcoux

Benoit Marcoux is a energy and utility consultant with IBM Global Business Services, focusing on strategy and helping clients in transforming their operations and migrating to a smarter grid. A professional engineer with master degrees in applied sciences and business administration, he is a member of IBM's Energy and Utilities global community, where he actively contributes to knowledge sharing, particularly through writing in various industry journals and newspapers.

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