



NZE and the SOB: Service not Process, Policy not Control

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Smart grids will deliver more energy
but the supply will be more volatile



Buildings and other end nodes must adapt to changing energy availability



Winter



Spring

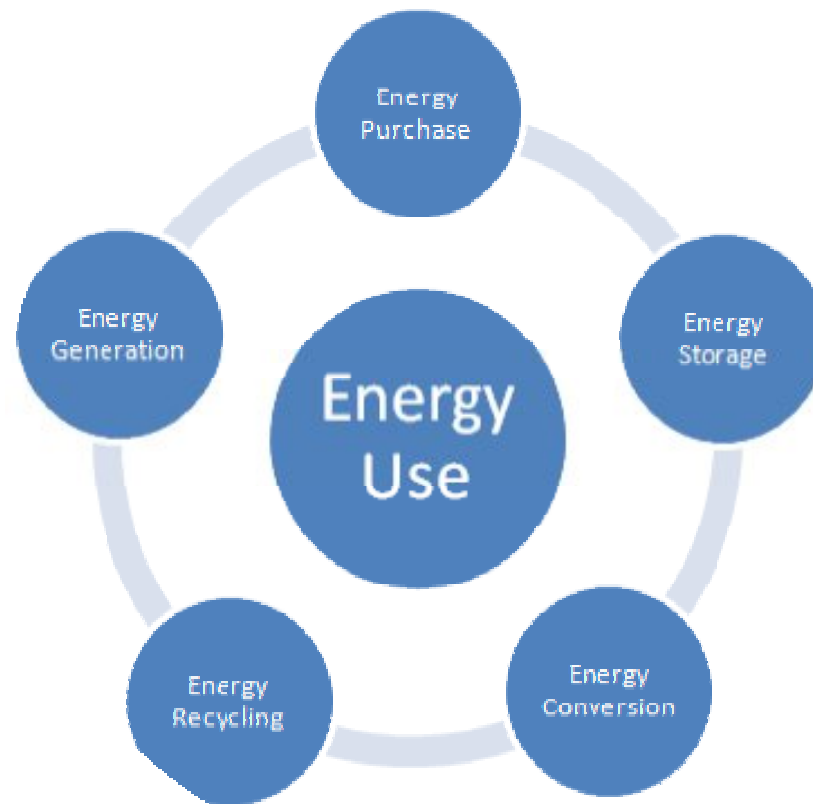


Mid-Summer



Early Fall

Treat each end-node as a microgrid,
driven by its own business processes



Share the problem, not the solution

Smart energy will unbundle price
and availability arbitrage



Benefits of “Blended” power products have proved illusory

- Low Utility of wind sources
- High cost of central compensation for volatility of supply

Selling back to the grid when everyone else does is just bad economics



Business needs including social drivers
will determine ability to respond



We need to consider what architectures support early adopters



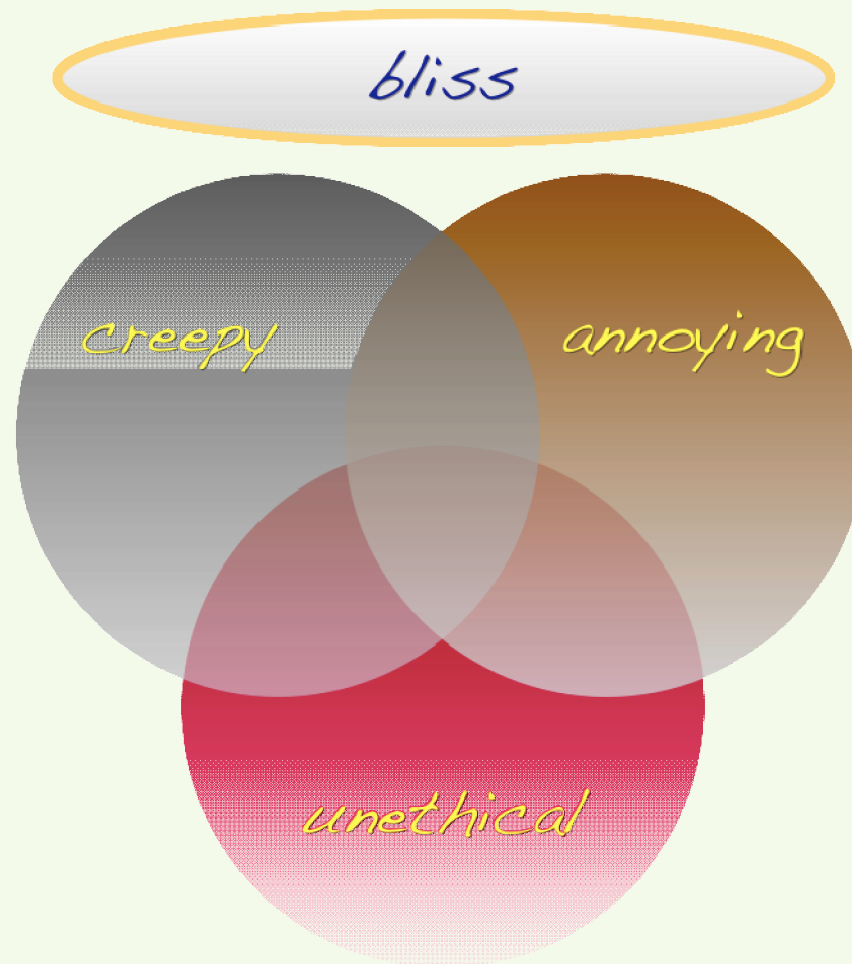
Early adopters have done so to defend themselves from the grid

- Manufacturing
- Data Centers
- Home Entertainment Centers

NZE Military Base defines an aggressive approach



Privacy will be a growing motivator for early adopters



Microgrids manage their own energy use and enter markets only to make up the deficit

- The only solution that manages the Knowledge Problem



Hide complexity of systems and processes from external market

- Time and Schedule
 - WS-Calendar
- Product descriptions and Price
 - Energy Market Information Exchange (EMIX)
- Market and Reliability Communications
 - Energy Interoperation
 - & its profile, OpenADR 2.0

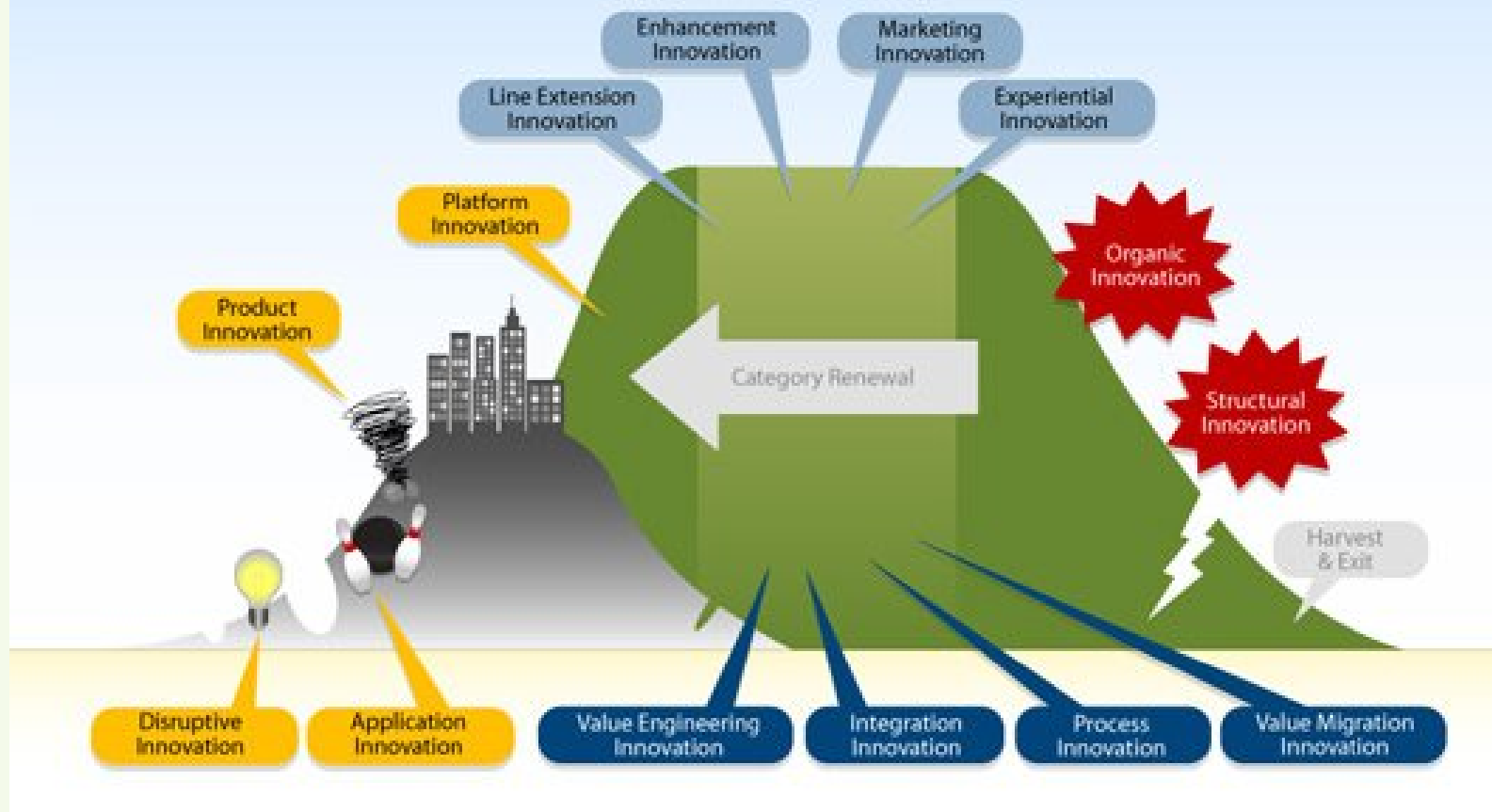
Early deployment of consumer-based storage and energy management is the key

- So how do we get it?
- So how do we create incentives?
 - or is it “How do we remove disincentives?”

Venture (& Innovation) will more readily follow consumer-driven

Broad Universe of Innovation Types

Different Types Get Traction at Different Points



Trust the Customer

Trust Markets

Don't own the Complexity

End Nodes as microgrids – Freeing
up the participants to innovate



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Questions



Standards References

- These standards are in or approaching final status:
 - WS-Calendar allows synchronization and common communication of schedules in a high level business manner
 - Energy Market Information Exchange [EMIX] defines cross-cutting price and product definition communication for the Smart Grid
 - Energy Interoperation defines DR, DER, and usage/demand projection and measurements and price+product distribution
- All three are defined to, from, within, and outside of microgrids
- All drafts publicly visible



Other Useful References

- Reference Architecture for Service Oriented Architecture defines language and approaches for service interactions.
- Galvin Electricity Initiative Perfect Power describe the systemic benefits of a micro-grid approach to grid design.
- OASIS Privacy Management Reference Model (PMRM)
- Transactive Energy White Paper approved by the EMIX TC describing transactive energy as the basis for building to grid interactions.

