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and Trade Show for Federal Agencies

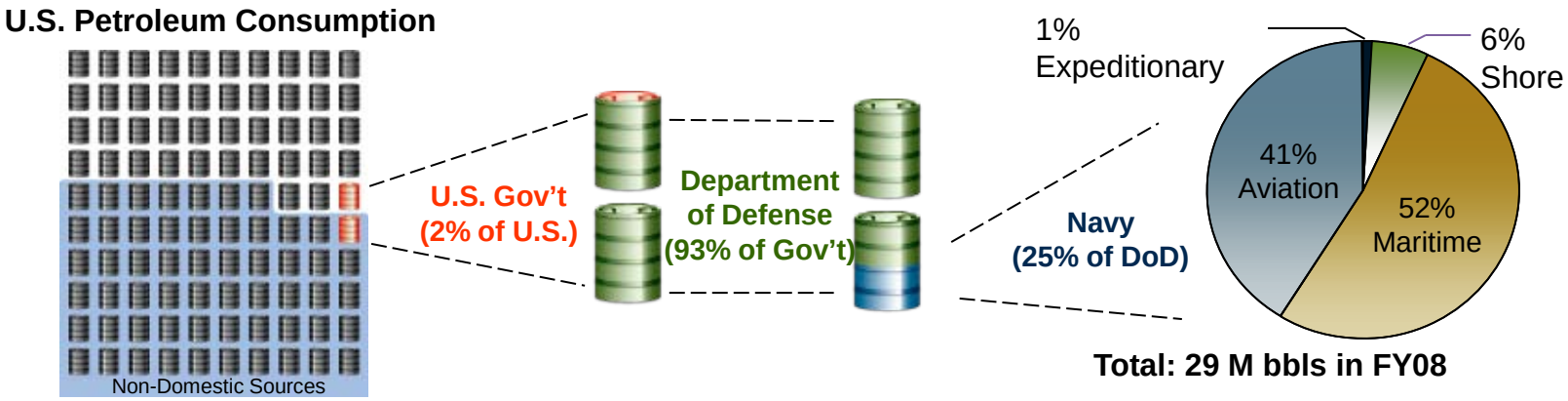
A River of Energy Solutions

A Strategy for Energy

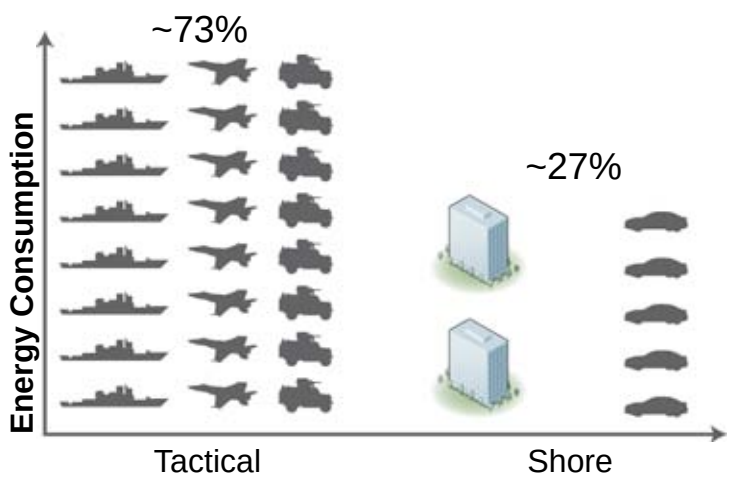
How the US Navy created a plan reduce Shore energy use

Navy Energy Profile

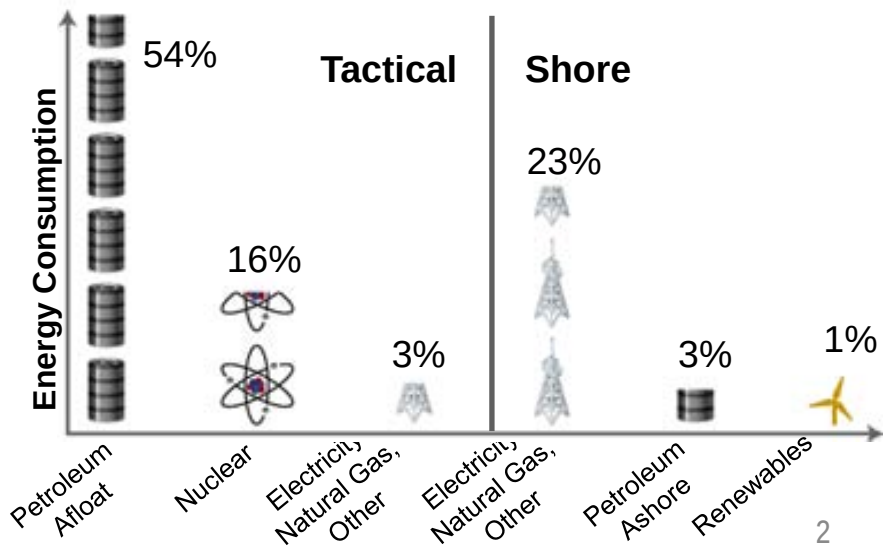
Navy Petroleum Consumption in Perspective



Overall Energy Consumption



Overall Energy Sources



In 2007, US Navy Shore Energy faced internal challenges

Scope

11 Regions

77 Bases

2.1 Million Acres

141 Runways

197 Piers

332,000 Active Duty

204,000 Civilians

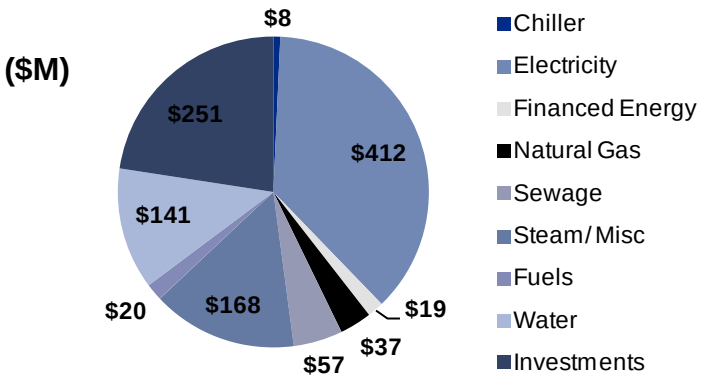
436,000 Family Members

35,000+ Major Facilities

150+ Possible Efficiency or Renewable Energy upgrades for each

Installation Management Budget = $8.3 B/YR
Plant Replacement Value = $124 B

$1.2 Billion Annual Utility Bill



Leadership and Culture 2007

- **Energy is for the "Green"**
- **Fighting Two Wars - Not a priority for Leadership**
- **Little money allocated**
- **Few people assigned**

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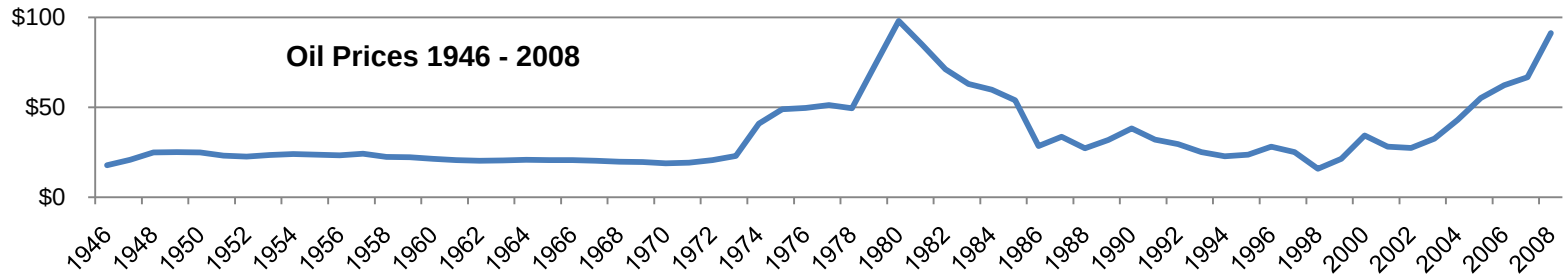
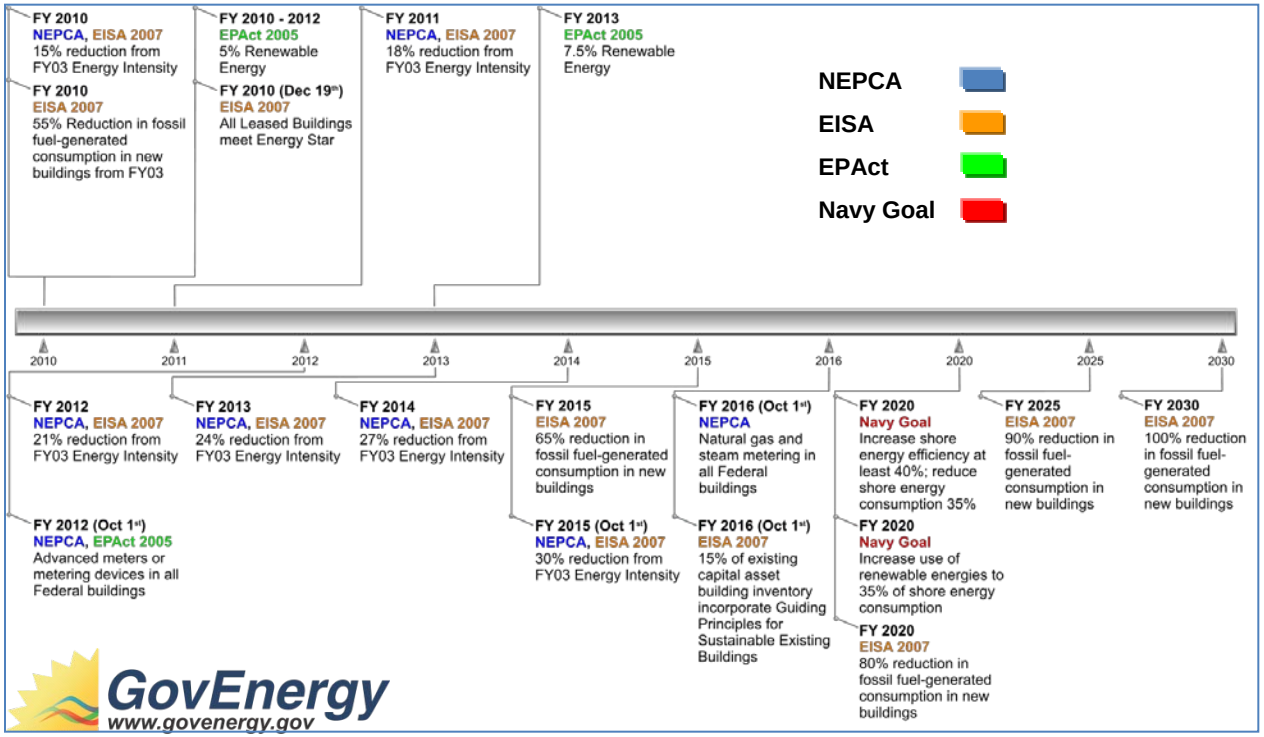
These challenges were compounded by external factors

Price Uncertainty



Federal Mandates, DoD/DoN Policy



- Energy Reduction Goals
- Sustainable Facilities
- Renewables
- Metering
- Vehicles
- GHG

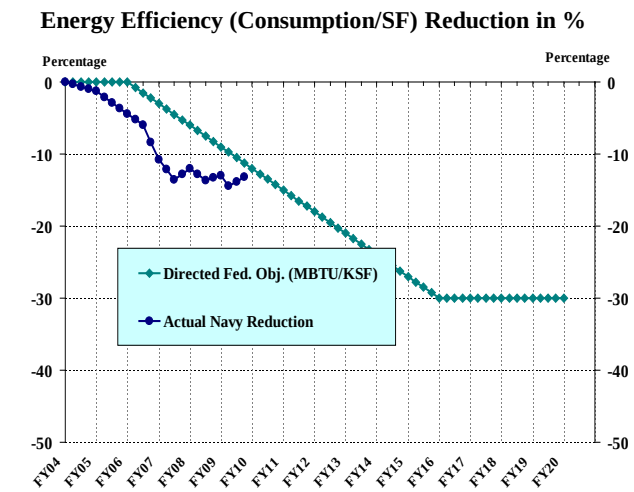
Most Effective Strategy?

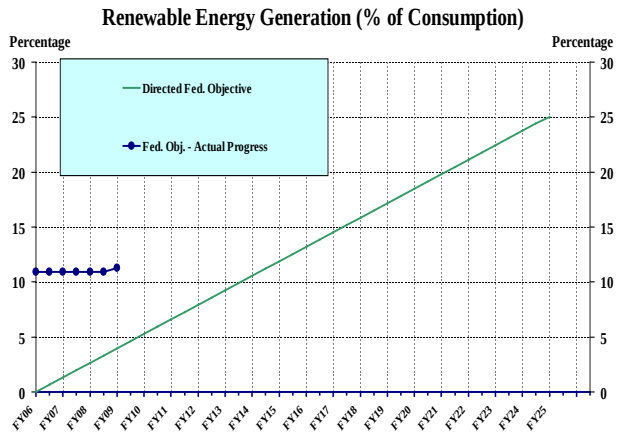
Total Cost to Navy?

To begin to address the problem, the Navy needed to establish the facts, get leadership support and make a plan

2007 | **2008** | **2009**

Facts





Baseline Analysis

Strategy and Implementation Plan

CNO Support

Task Force Energy

Increase Shore Energy Security through:

- Energy Efficiency - "First fuel of choice"
- Renewable Energy - Reaching tomorrow, today
- Cultural Transformation - New face for a new tomorrow

Guiding Principles kept strategy development on track

1. Bottom Line - A business analysis… must make economic sense

2. Tailored to the Navy's actual inventory and make-up
   - "Right Technologies"
   - Consistent approach but allowing for local differences

3. Includes all Shore Readiness and Energy Programs (impact and funding)
   - Maintenance/ Recapitalization
   - New Footprint
   - Demolition

4. Rigor of analysis = Confidence in the result
   - Considers Enabling Systems (FM, EM, AM, UM)
   - Governance
   - Metrics and Measures

Tackling energy challenges requires a structured, strategic approach

BE STRATEGIC
with energy and resource management

Broadly
Evaluate your enterprise.

See potential
Threats and opportunities.
Recommend and prioritize
Actions.
Talk about
Expectations and
Goals.
Implement and
Communicate with stakeholders.

1. **Broadly evaluate your enterprise.**
2. **See potential threats and opportunities.**
3. **Recommend and prioritize actions.**
4. **Talk about expectations and goals.**
5. **Implement and communicate with stakeholders.**

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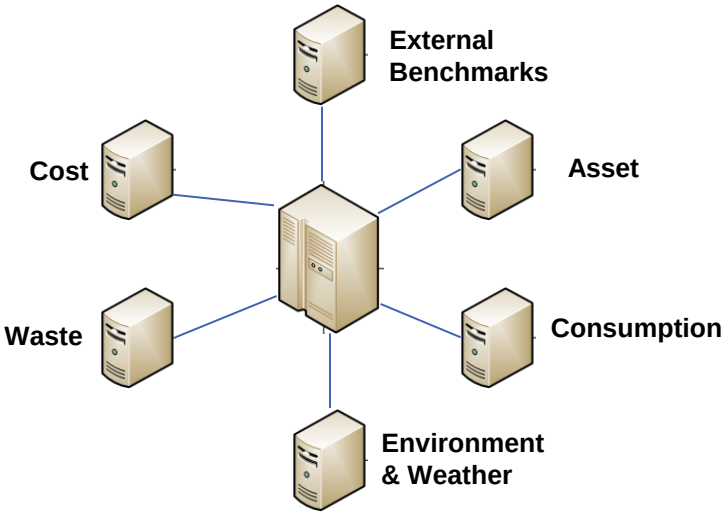
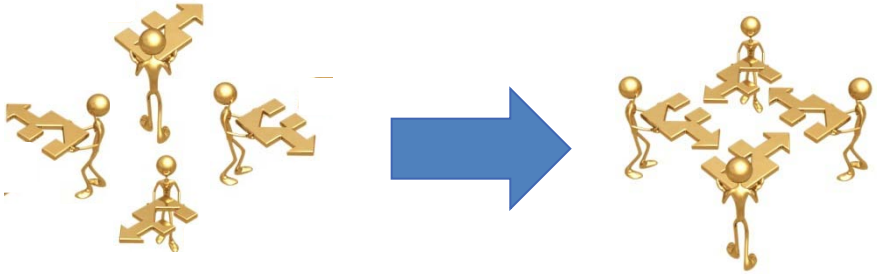
This approach will transform an organization's business fundamentals

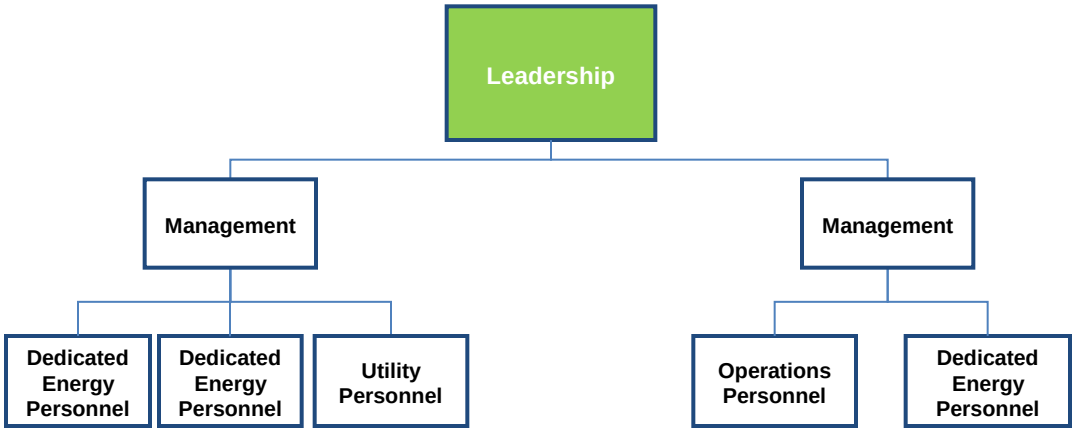
Understanding and Organizing Data



Aligning Behavior to Sustain Transformation



Creating an Organization to Deliver the Transformation



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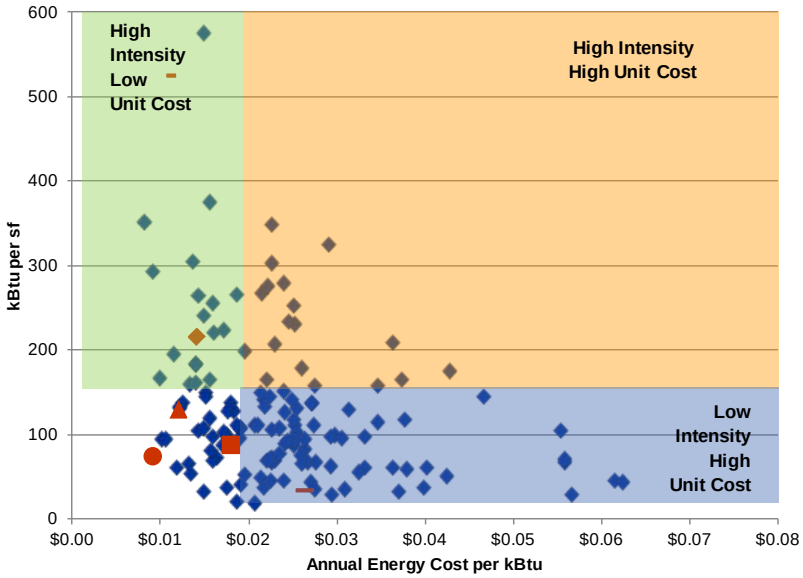
It takes internal and external factors into account

Energy in your enterprise

- An enterprise can use average unit cost and energy intensity to identify assets with higher than average costs per kBtu and energy intensities
- Assets with high intensity or high unit cost facilities have a higher potential for energy savings

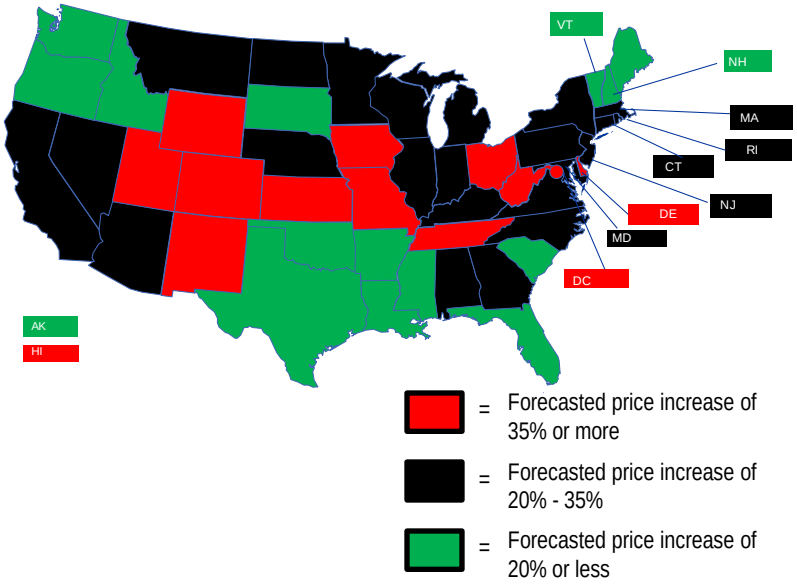
Energy Cost vs. Energy Intensity of Assets



External Drivers

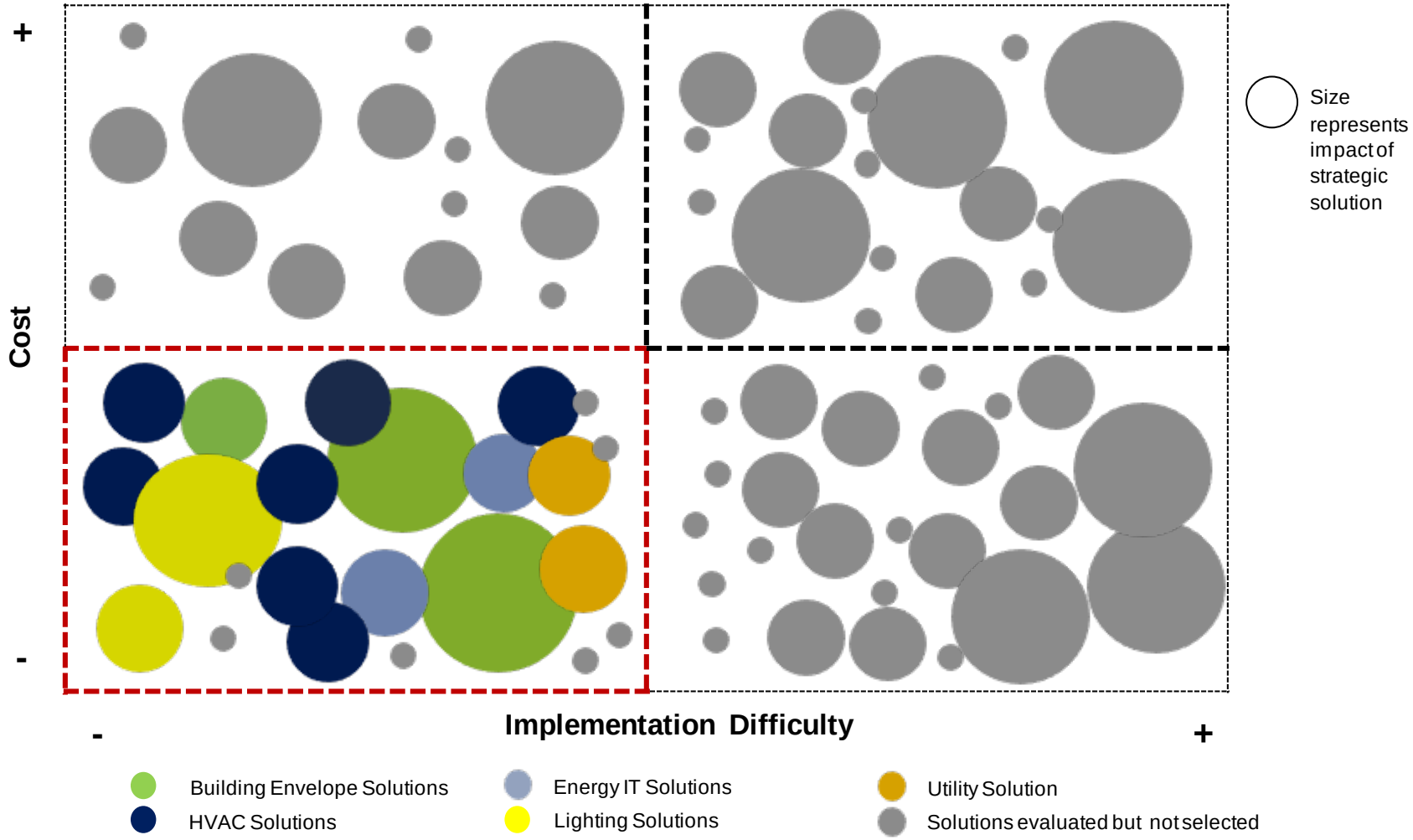
- Technology
- Security of Supply
- Price and Cost Volatility
- Reliability

Deloitte's Electricity Price Volatility Model



It evaluates strategic solutions

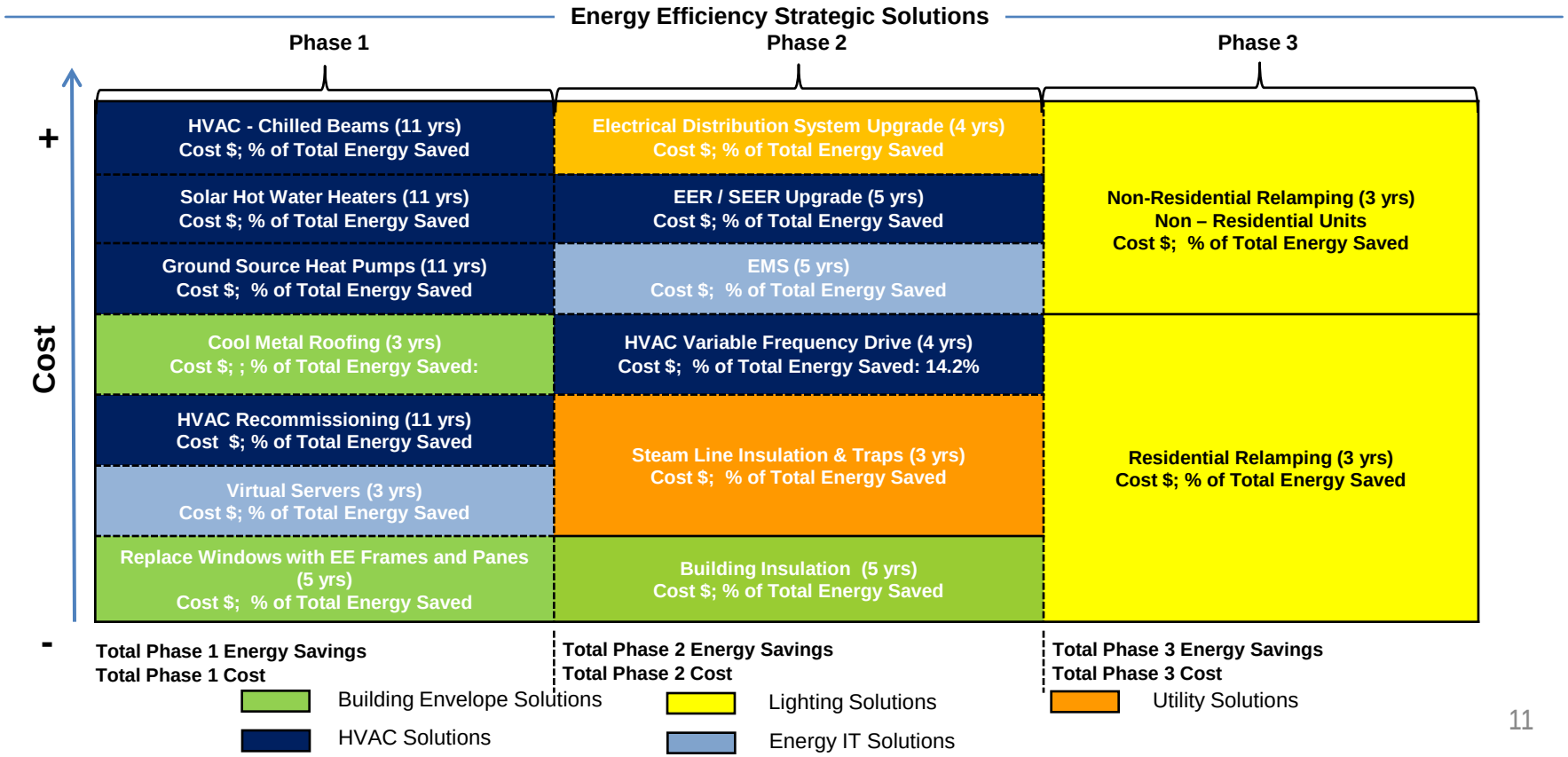
Based on cost and ease of implementation a set of high-impact strategic solutions is selected to assist an organization in the realization of it's energy efficiency goals



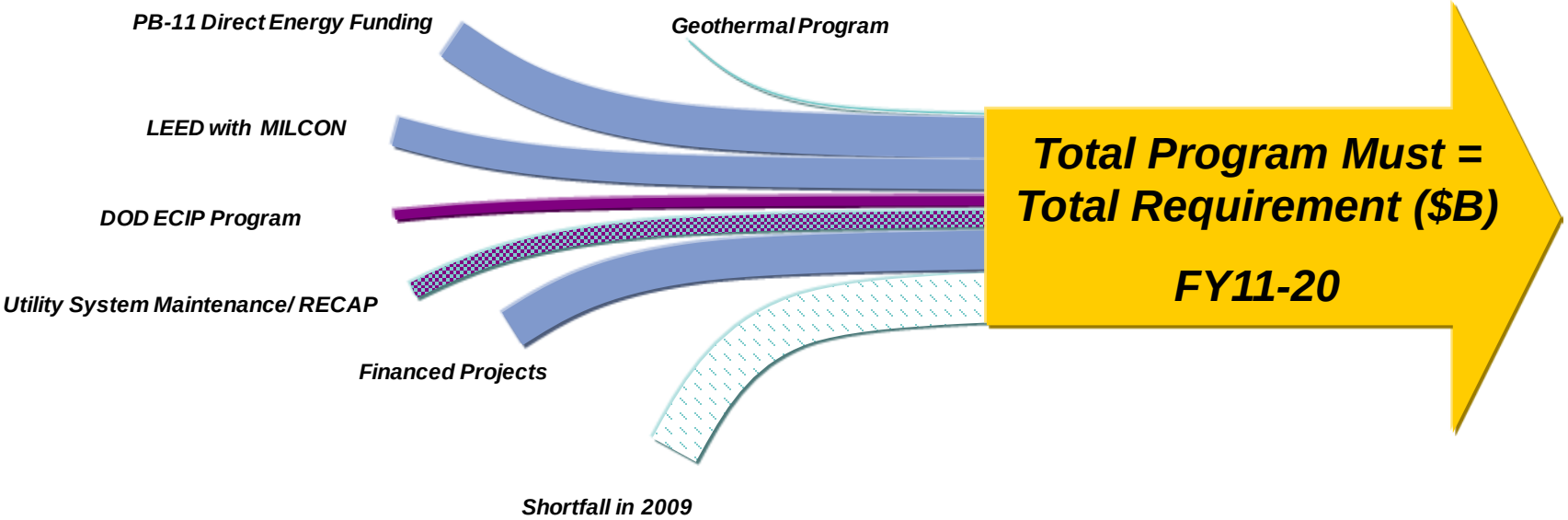
It creates a business case that meets budget and performance expectations

Phasing strategic options allows an organization to make informed decisions balancing budget considerations and program goals. The primary strategic options are characterized as follows

- **Low Cost/High Impact**
- **Optimized**
- **"Big Bang"**



The Strategic Plan had to account for many Shore programs



Technology Plan

"Watch" - Technology not unique to Navy infrastructure, execute where/when viable

- Solar, Bio-fuels, Wind, Storage

"Partner" - Technology advancing Navy Energy Security and/or good ROI

- Secure Smart Grid Technologies

"Lead" - Invest/ incentivize energy R&D as lead when uniquely advantageous to Navy

- Ocean Energy Technologies
- Geothermal exploration

Infrastructure Plan

- Informed Facility Energy investments and retro-commissionings
- "*Navy Energy Building Code*" - Mandatory efficiency and viable renewable upgrades with future new footprint/ major upgrades
- Utility distribution system efficiency investments
- Critical Asset energy assessments – from asset back to source, including vulnerabilities and mitigation COAs
- Demand mgmt/ critical load prioritization

Culture and Management Systems

Utilize Mandated Enabling Systems

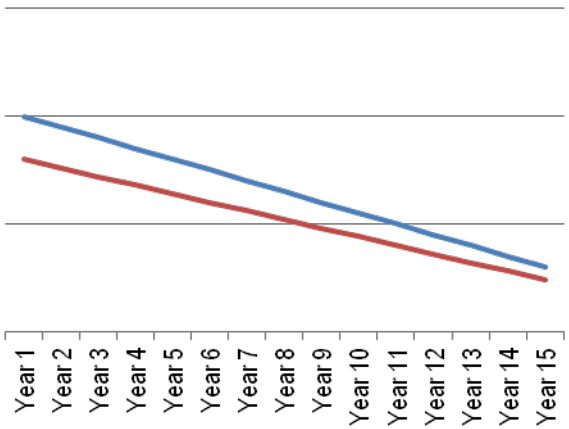
- Building-Level Energy Audits
- Advanced Metering
- Energy Management Staff

Provide Transparency to Leaders via Integrated facility, utility, and real property management systems

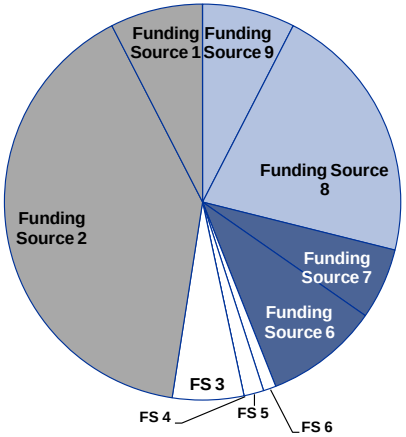
- Behavior and Operational Opps
- Infrastructure Opps

A strategic approach must be translated to an implementation plan

Strategic Target Set



Budget Determined

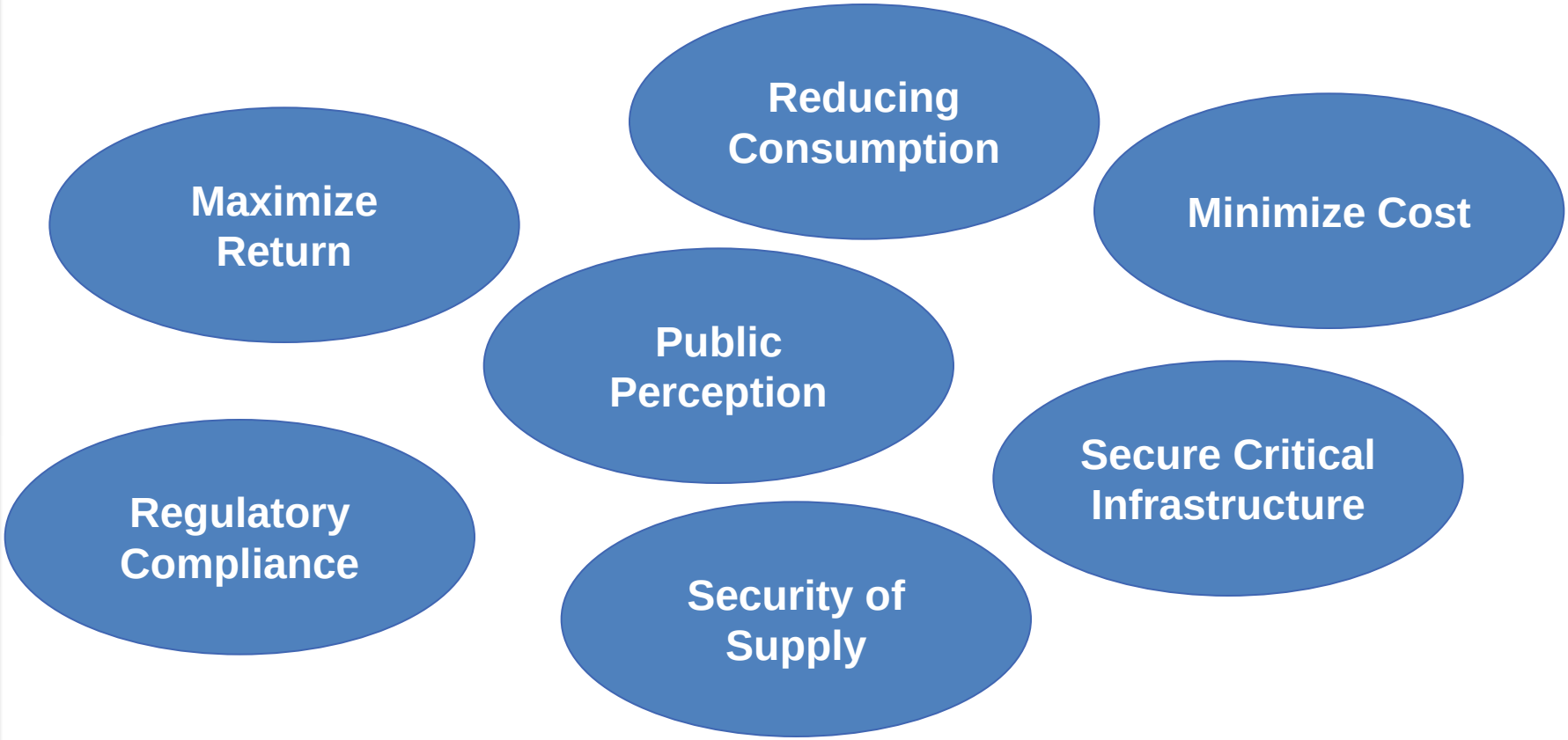


Timeframe Established and Strategic Option Selected

Phase I 2011 - 2013	Phase 2 2014 - 2017	Phase 3 2018 – 2020
Energy Savings: 65% of Total Savings Cost: $1,500 M	Energy Savings: 20% of Total Savings Cost: $765 M	Energy Savings: 15% of Total Savings Cost: $590 M

But – how does an organization selected a good portfolio of projects to implement?

Project criteria are established to meet goals and align with the mission



But – how does an organization weight the value of these criteria?

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Tools like eROI help to select and prioritize energy projects

Investment Criteria

Investment/ Project Decision

Maximize Financial Benefits
- Construction Cost
- Overhead Cost (%)
- Design Cost (%)
- Salvage Value
- % Construction Cost per year
- Time to Accrue 50% Project Benefit
- Cost Impact per Fuel Type
- Demand Impact per Fuel Type
- Non-Energy Savings / Costs

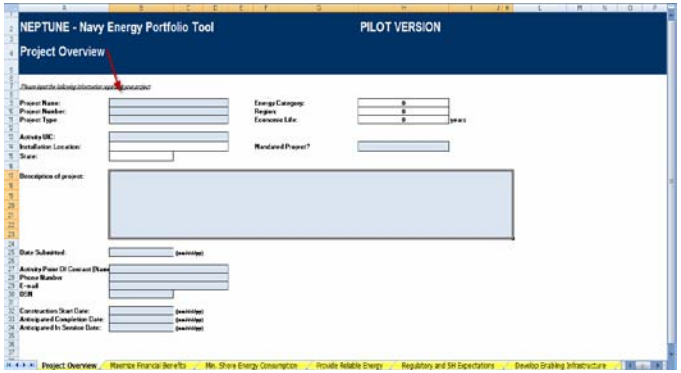
Minimize Energy Consumption
- Fuel Use by Fuel Type
- Distillate Oil
- Residual Oil
- Natural Gas
- Coal
- LPG
- Other

Provide Reliable Energy to Critical Infrastructure
- # of Critical Facilities or Equipment Impacted
- # of Outages /Shortages per Year
- Duration of Outage/ Shortage
- Susceptibility
- Current Backup Power / Fuel Availability
- % of Functions Enabled to Continue During Outage/ Shortage
- $ Damage per Outage/ Shortage

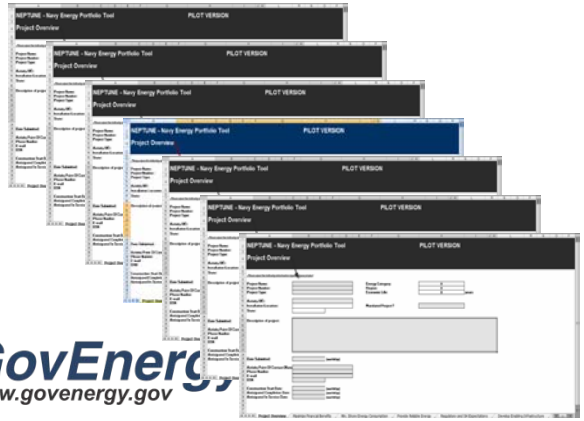
Regulatory Compl. and Stakeholder Expectations
- # of Regulatory Mandates Addressed
- Impact on Public Perception
- Timing of Impact
- Impact on Quality of Service
- Timing of Impact
- # Affected by Impact

Develop Enabling Infrastructure
- Impact on Energy Supply and Demand Information
- Impact on Flexibility of Infrastructure
- Impact on Ability to Demonstrate Energy Tech Adoption
- # of Installations Tech is Applicable

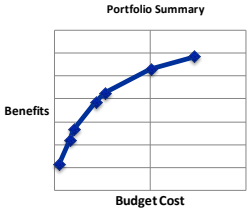
Project Submission

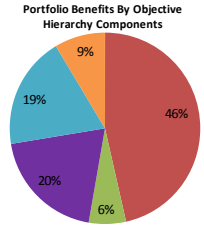


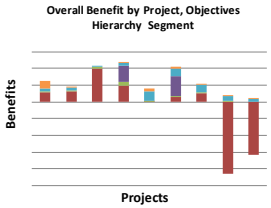
Portfolio Aggregation



Portfolio Optimization







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With a comprehensive, enterprise-wide view, project impact is maximized

- Each box on the right represents a unique building, while the size and color of each box represents the illustrative energy usage per square foot
- Virtual Metering takes disparate databases and combines the data into compelling information in the form of Heat Maps
- Virtual Metering allows for insightful comparisons against industry benchmarks in areas such as building energy intensity, energy cost, energy consumption, and overall performance
- It further enables an organization to prioritize specific energy, cost and sustainability objectives, and track progress towards these goals over time

Deloitte's Virtual Meters

Real Building Consumption (Illustrative Example)

= Service Area [sq ft]

Building Consumption

Low Consumption — Average Consumption — High Consumption

Against ASHRAE Building Benchmark (Illustrative Example)

ASHRAE Building type regional benchmark

Below Benchmark — At Benchmark — > 200% Benchmark

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Q & A

The Way Forward

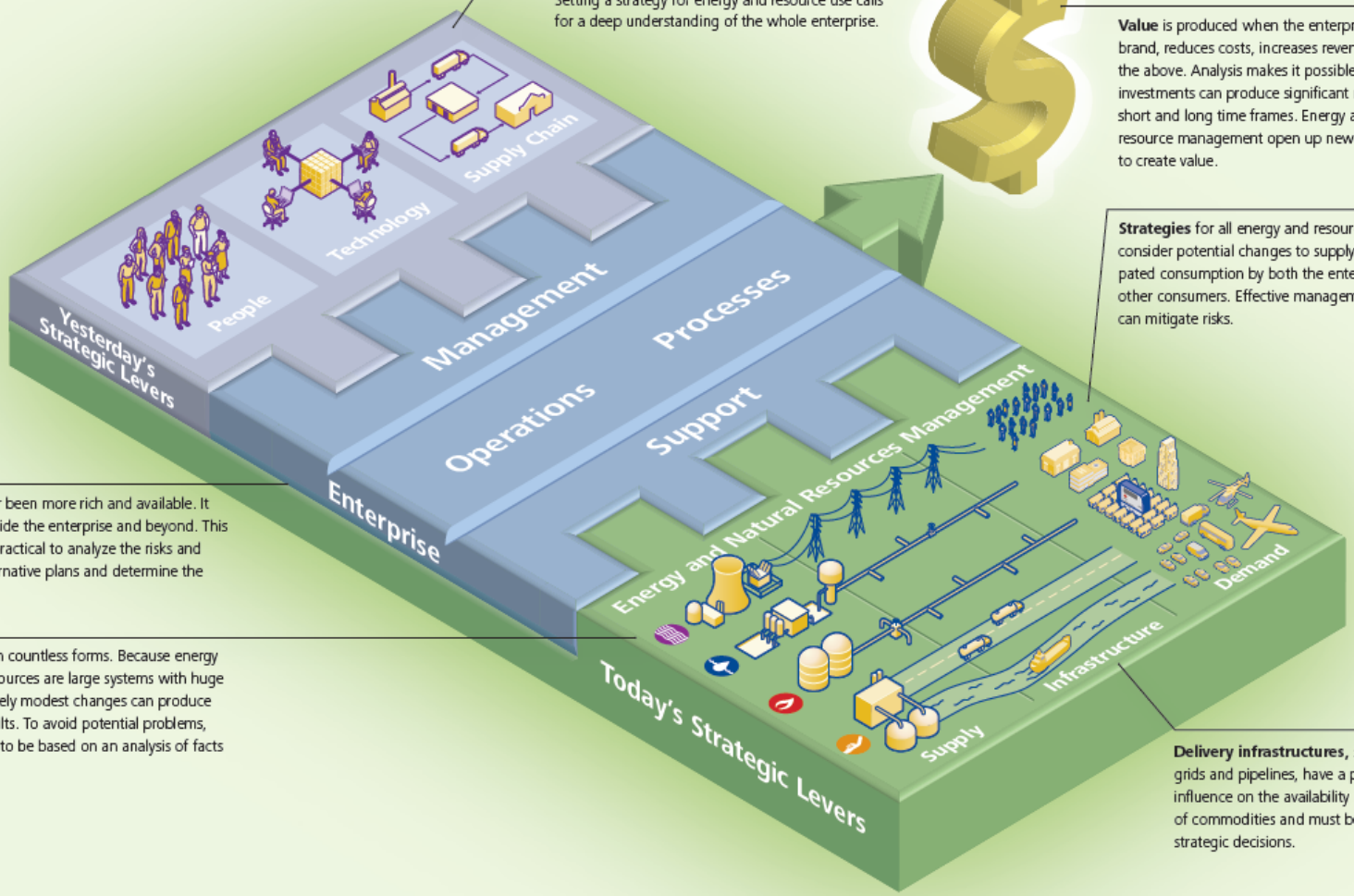
Today's Strategies

Now, an enterprise can create even greater value, reduce risk, and address sustainability initiatives through active management of energy and resources.

Management, operations, processes, support functions, people, technology, and the supply chain affect energy use. They, in turn, can also be transformed by changes in energy supply or use. Setting a strategy for energy and resource use calls for a deep understanding of the whole enterprise.

Value is produced when the enterprise enhances brand, reduces costs, increases revenues, or all of the above. Analysis makes it possible to see which investments can produce significant returns within short and long time frames. Energy and natural resource management open up new opportunities to create value.

Strategies for all energy and resource uses must consider potential changes to supply and anticipated consumption by both the enterprise and other consumers. Effective management strategies can mitigate risks.



Data has never been more rich and available. It comes from inside the enterprise and beyond. This data makes it practical to analyze the risks and rewards of alternative plans and determine the most valuable.

Risks appear in countless forms. Because energy and natural resources are large systems with huge markets, relatively modest changes can produce substantial results. To avoid potential problems, decisions need to be based on an analysis of facts and trends.

Delivery infrastructures, such as power grids and pipelines, have a powerful influence on the availability and reliability of commodities and must be a part of all strategic decisions.