From Ivory Tower to Tower of Power

Pacific Northwest

Tales of Curiosity, Zest, and Grit in the Emergence of New Efficiency Resources

Les Tumidaj and Charlie Grist

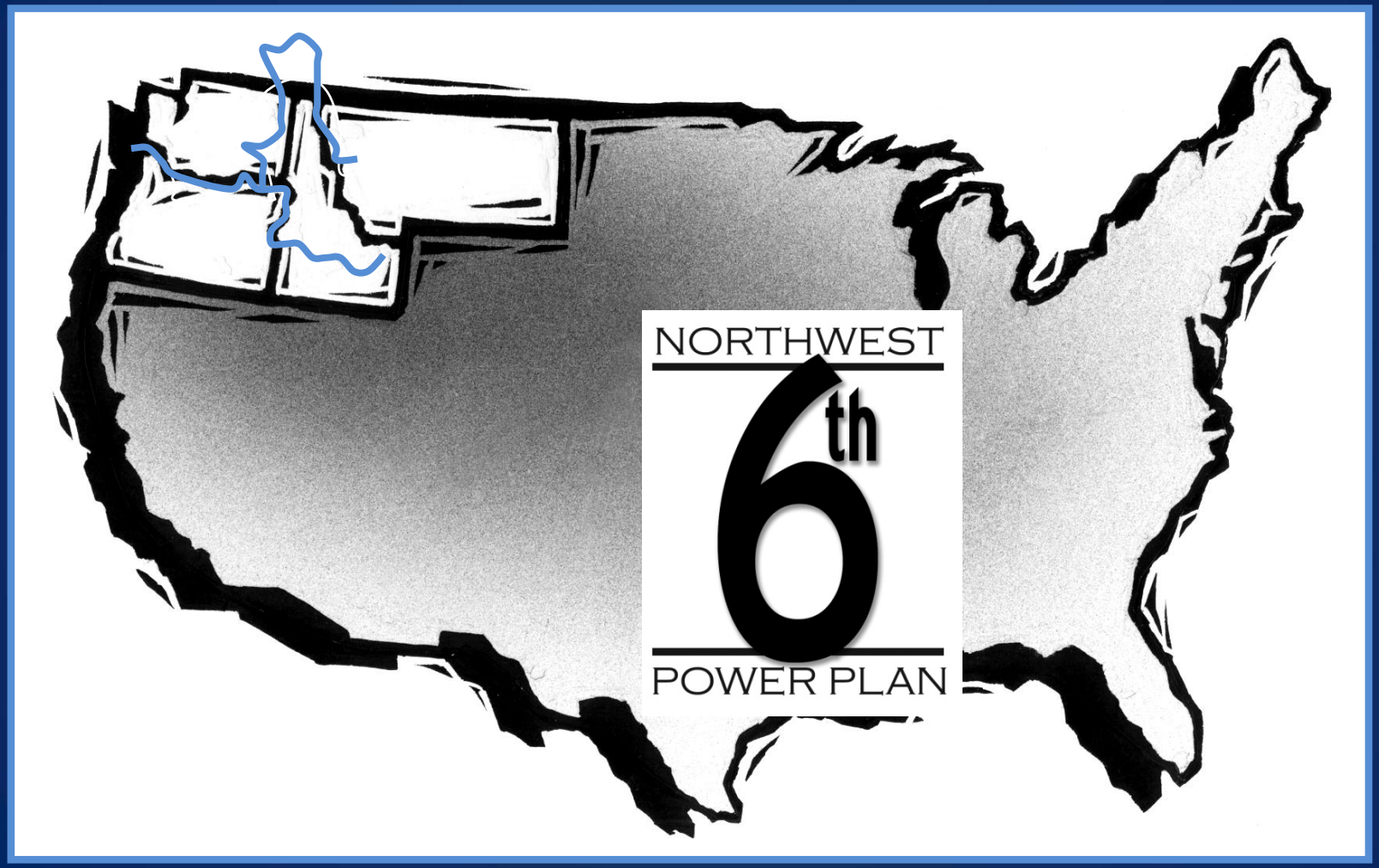
2011 ACEEE National Conference on Energy Efficiency as a Resource

The Challenge of Introducing New Efficiency Resources and Approaches

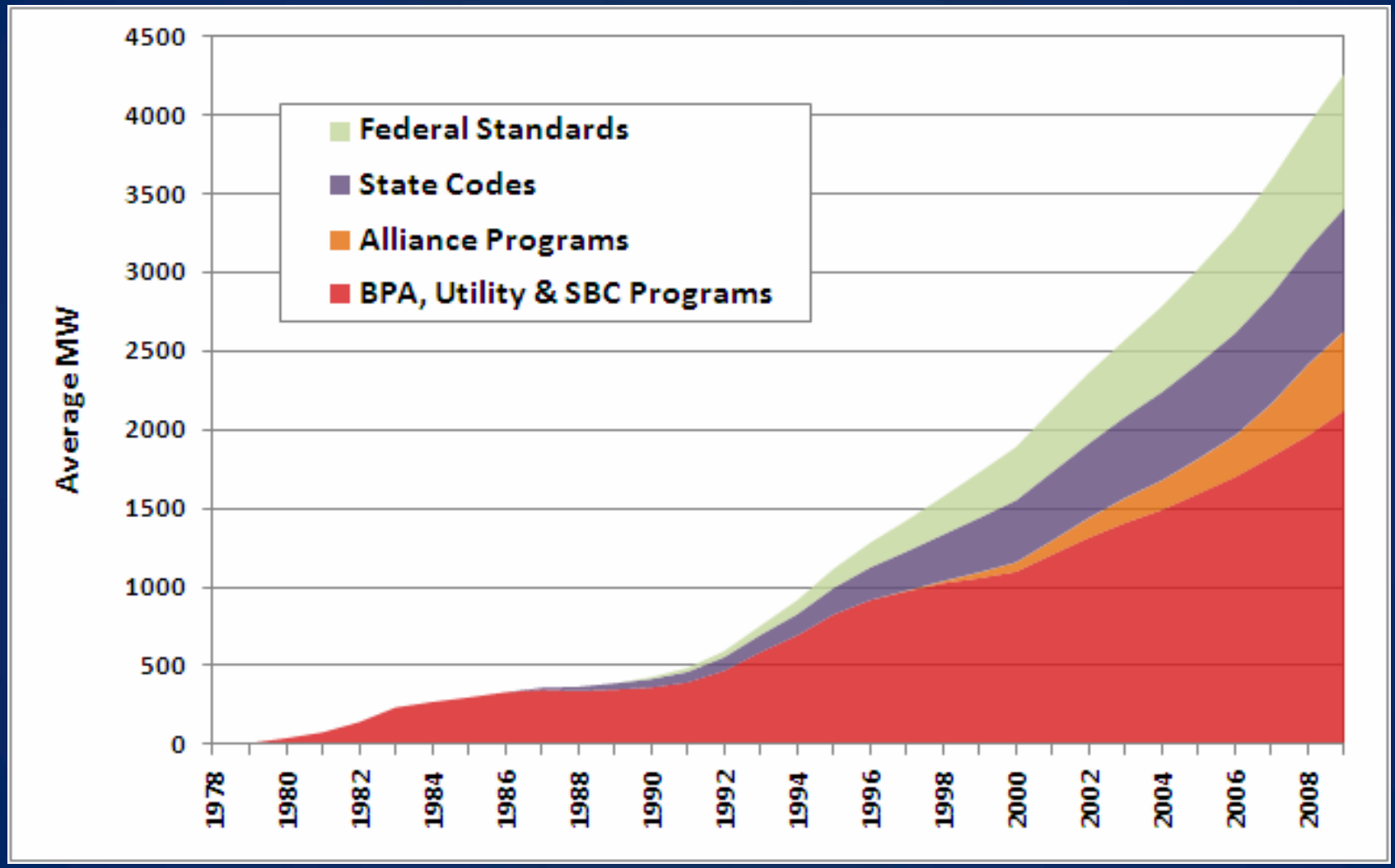
Lessons:

- The Value of Skeptics
- Importance of Public Exposure
- Need for Vision, Leadership & Risk Taking
- The Fruits of Collaboration
- Measurement Matters

Pacific Northwest Region



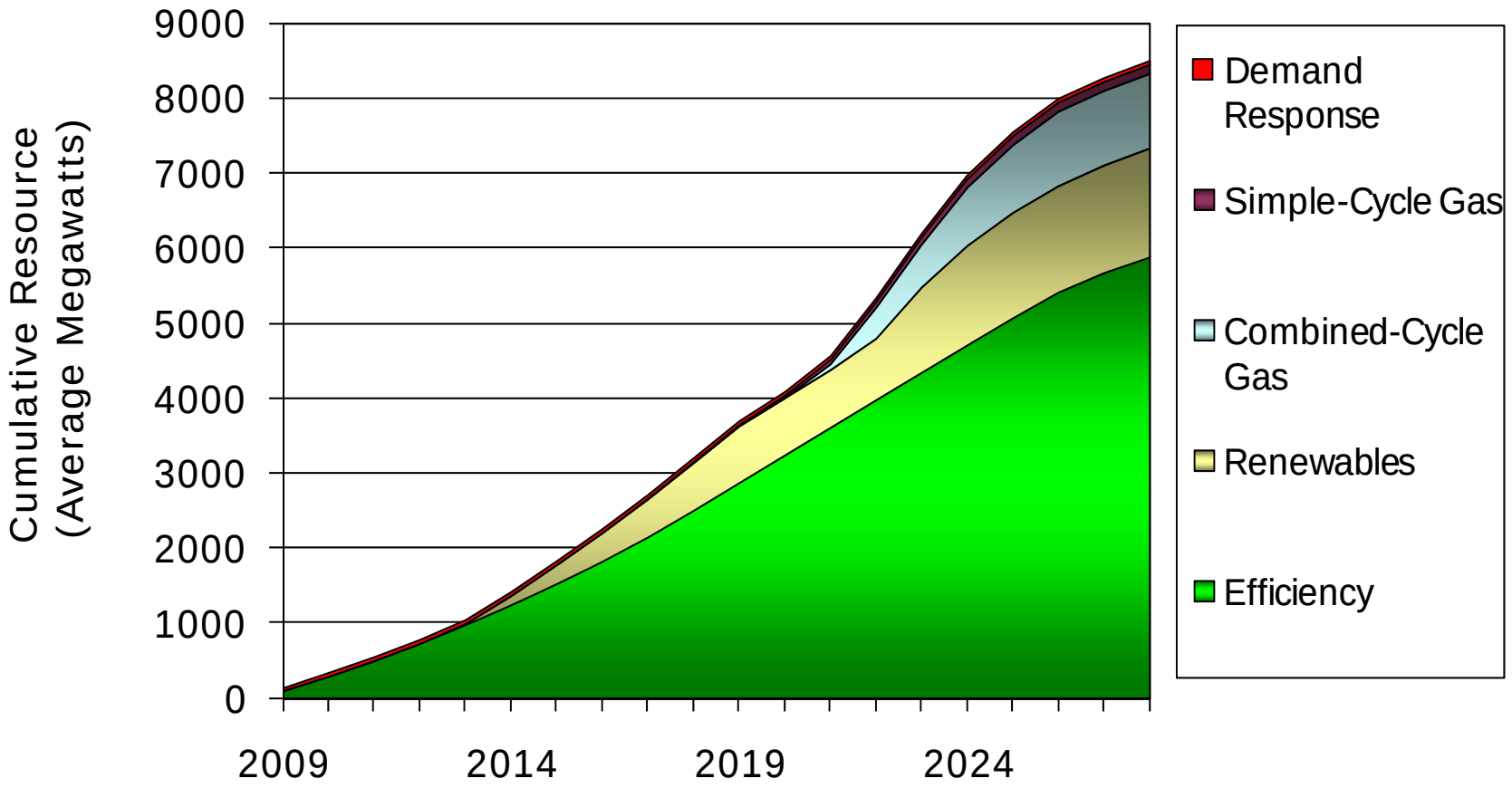
Northwest Energy Efficiency Achievements



Results 6th Power Plan

Tell Dark and Stormy Night
Story Here

6th Plan Resource Portfolio*



*Expected Value Build Out. Actual build out schedule depends on future conditions

Why So Much Efficiency?

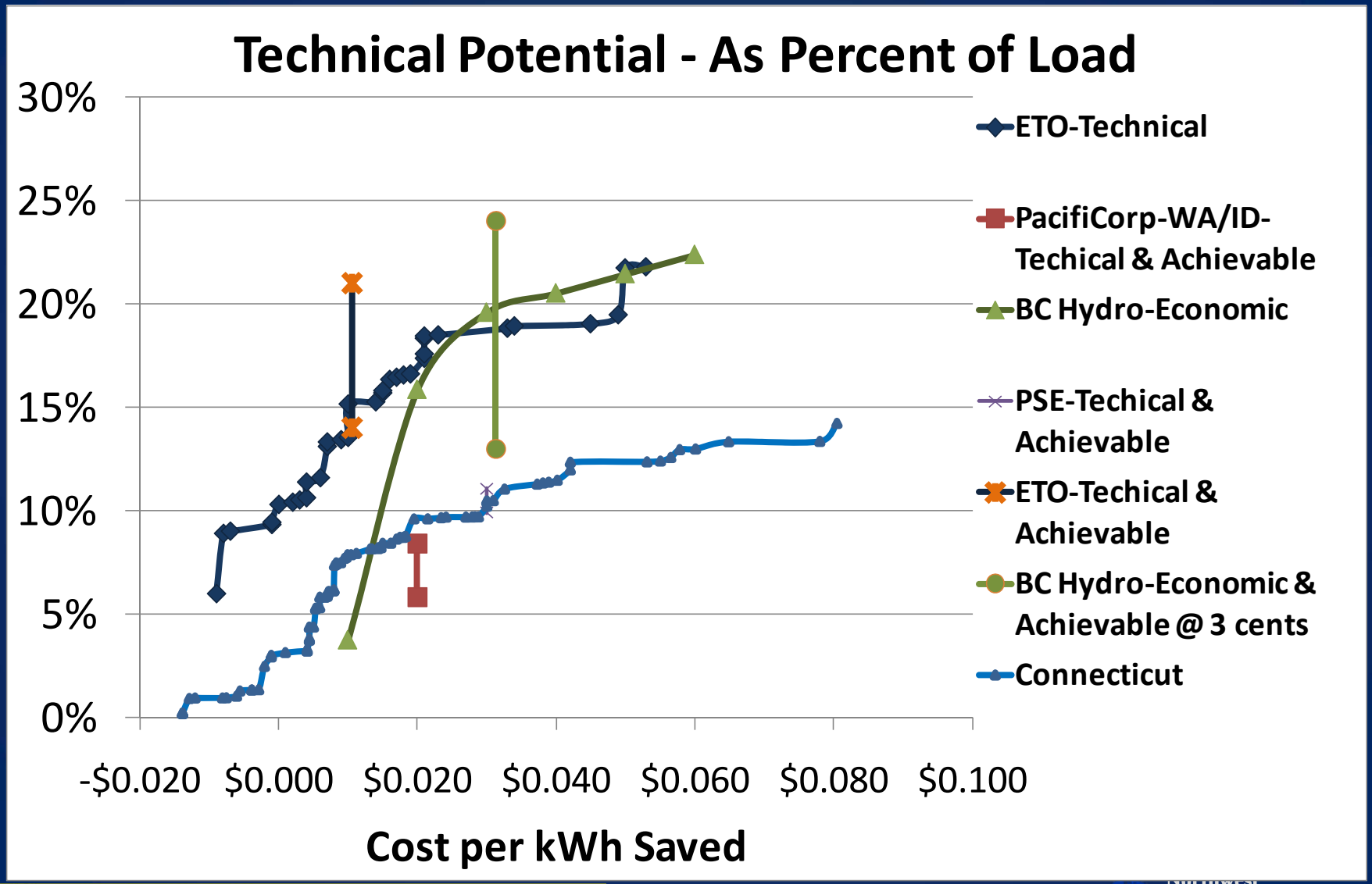
- We found more
  - New technology & applications
  - Over 300 measures evaluated
- It's cheap: $30-$40 per MWh
  - 6000 MWa at less the cost of new generation
  - 4000 MWa at less than wholesale prices
- Mitigates risks of volatile fuel prices & unknown carbon costs

We Found More

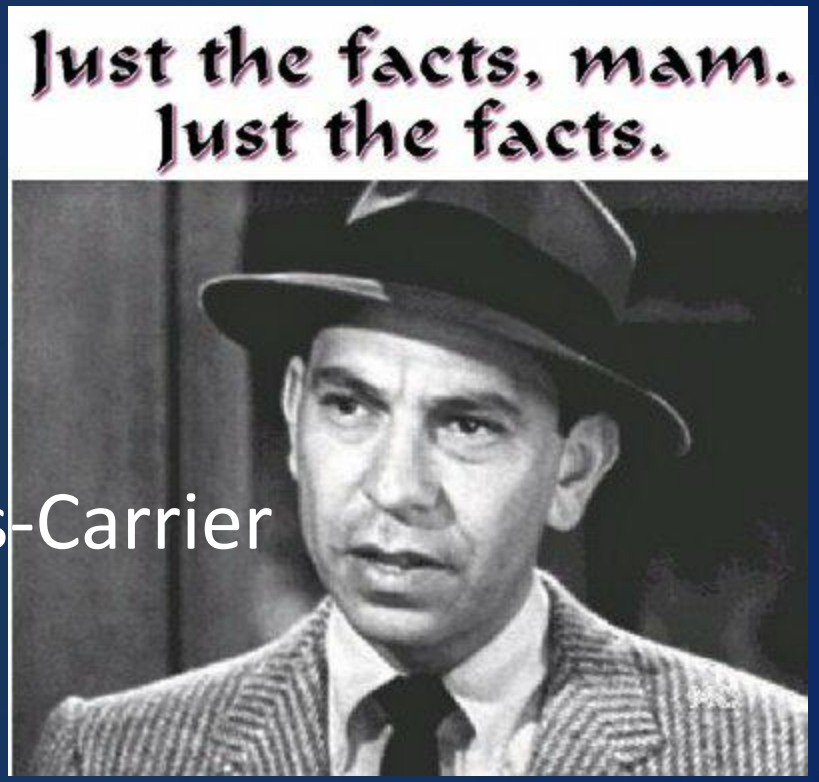
MWa Achievable End of Period and <$120/MWh	5th Plan 2005	6th Plan 2009
Consumer Electronics	155	800
Industrial	350	800
Distribution Efficiency	0	400
Residential	2119	2400
Commercial	1183	1400
Agriculture	93	100
Total	3902	5900

Industrial Efficiency

Dueling Supply Curves

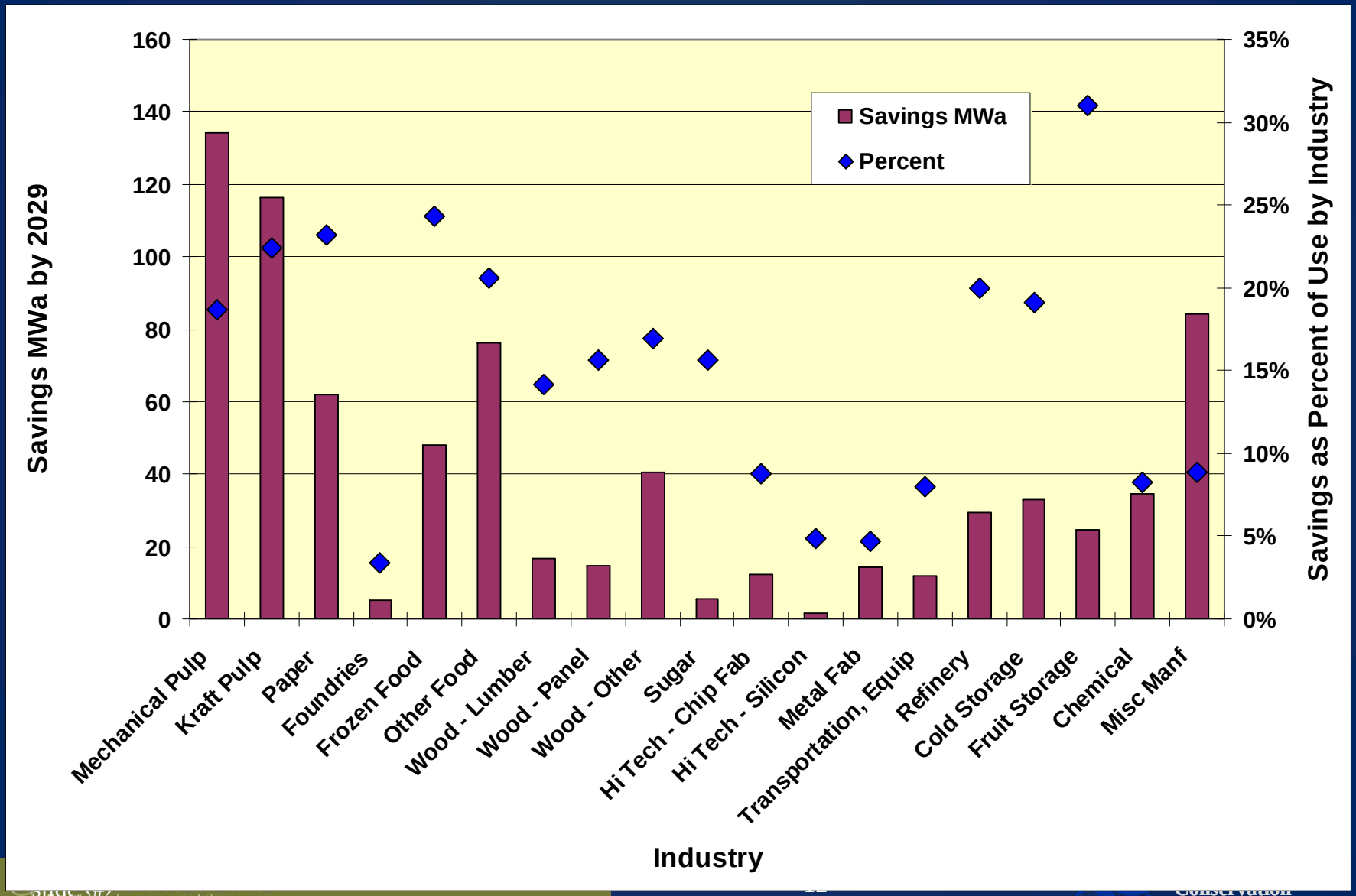


Give Me Some Names & Addresses



- Frito-Lay
- DuPont
- United Technologies-Carrier
- Owens Corning
- Pepsi-Co
- Kimberly-Clark

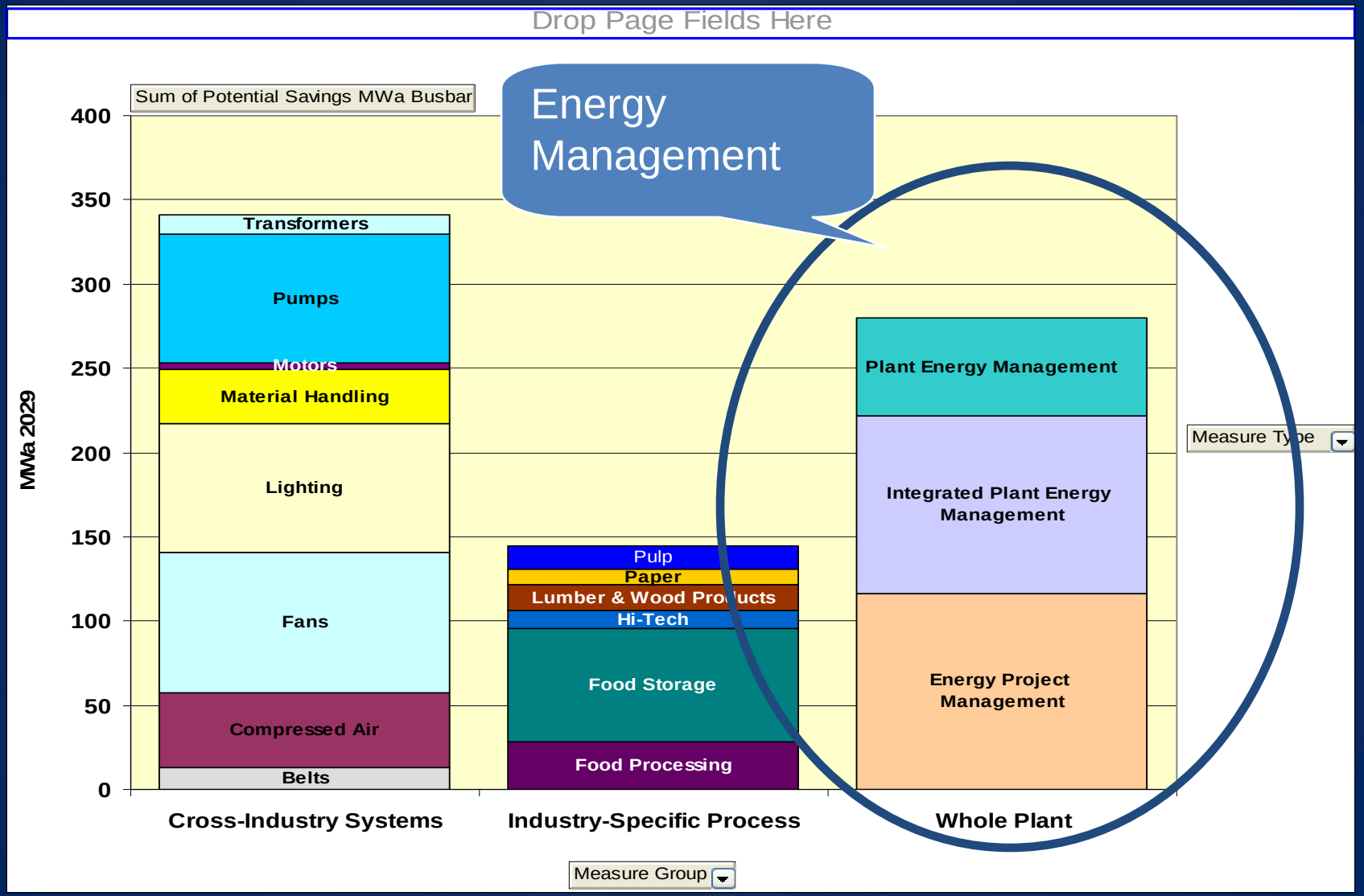
Industrial Conservation Potential



Energy Conservation Measures

- High-Efficiency Equipment (widgets)
  - Cross-industry systems (pumping or lighting)
  - Industry-specific (refiner plates in mech. pulp)
- Systems/Process Approach
  - Demand management, Sizing, Optimization
- People/Management
  - Operational & Business Practices
  - Continuous Energy Improvement / SEM

Industrial Savings Potential by Measure



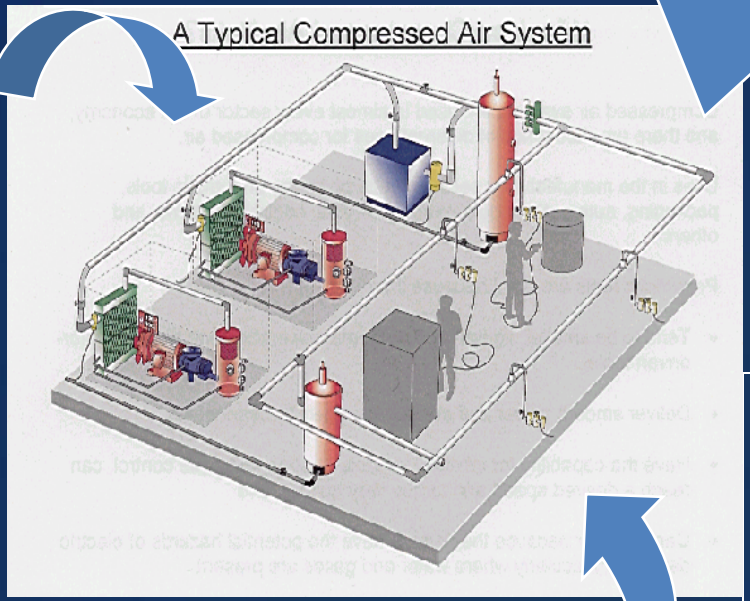
Strategic Energy Management

WHAT IS ***STRATEGIC*** ENERGY MANAGEMENT

A ***system*** of practices that creates reliable and persistent energy savings.

neea

System Optimization
It's More Than the Equipment



Equipment Elements

- Compressors
- Dryers
- Regulators
- Filters
- Nozzles & tools

System Optimization Elements

- Pressure reduction
- Shift pneumatic to mechanical for some uses
- Tool choice & use
- Reduce leakage
- Multi-compressor control strategy
- Reduce system standby time
- Flow control
- Piping & tank configuration

Business Practice Elements

- System Champion
- Key Performance Indicators & Monitoring
- Savings Goals
- System Improvement Plan
- Regular reports on KPI
- Training for operators, maintenance & system champion

Best: Integrated Plant Management

- Adopt Energy Management Plans, corporate goals, department & system level targets, whole-plant approaches, sophisticated tracking, independent verification of savings, corporate business systems engaged

Good: Energy Project Management

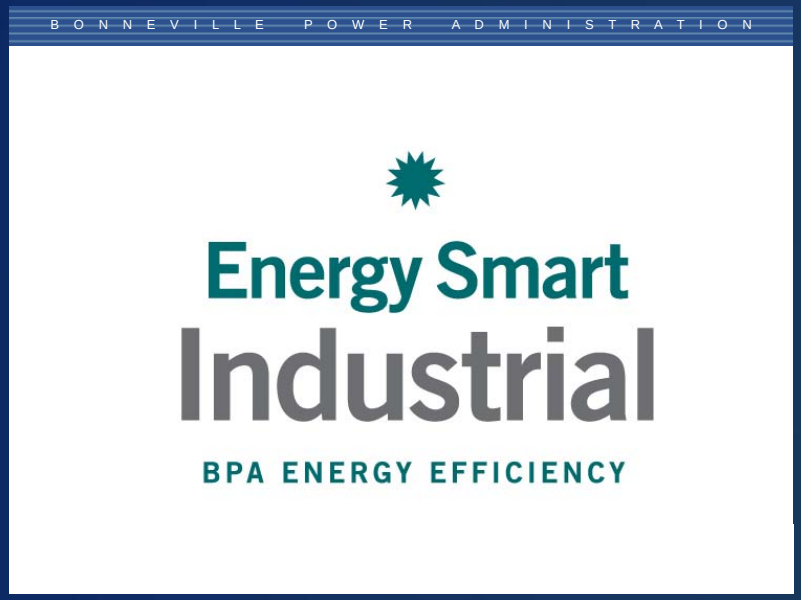
- Assigned Energy Manger, packages of optimized equipment improvements, tracking energy costs, prioritization of capital projects, application of systems optimization tools and practices on the key systems

Better: Plant Energy Management

- Low-cost/No-cost, preventive maintenance, consider energy in O&M, O&M guidelines & training, (Compressed Air Challenge)

Now from the Ivory Tower

6th Plan: Regional Response

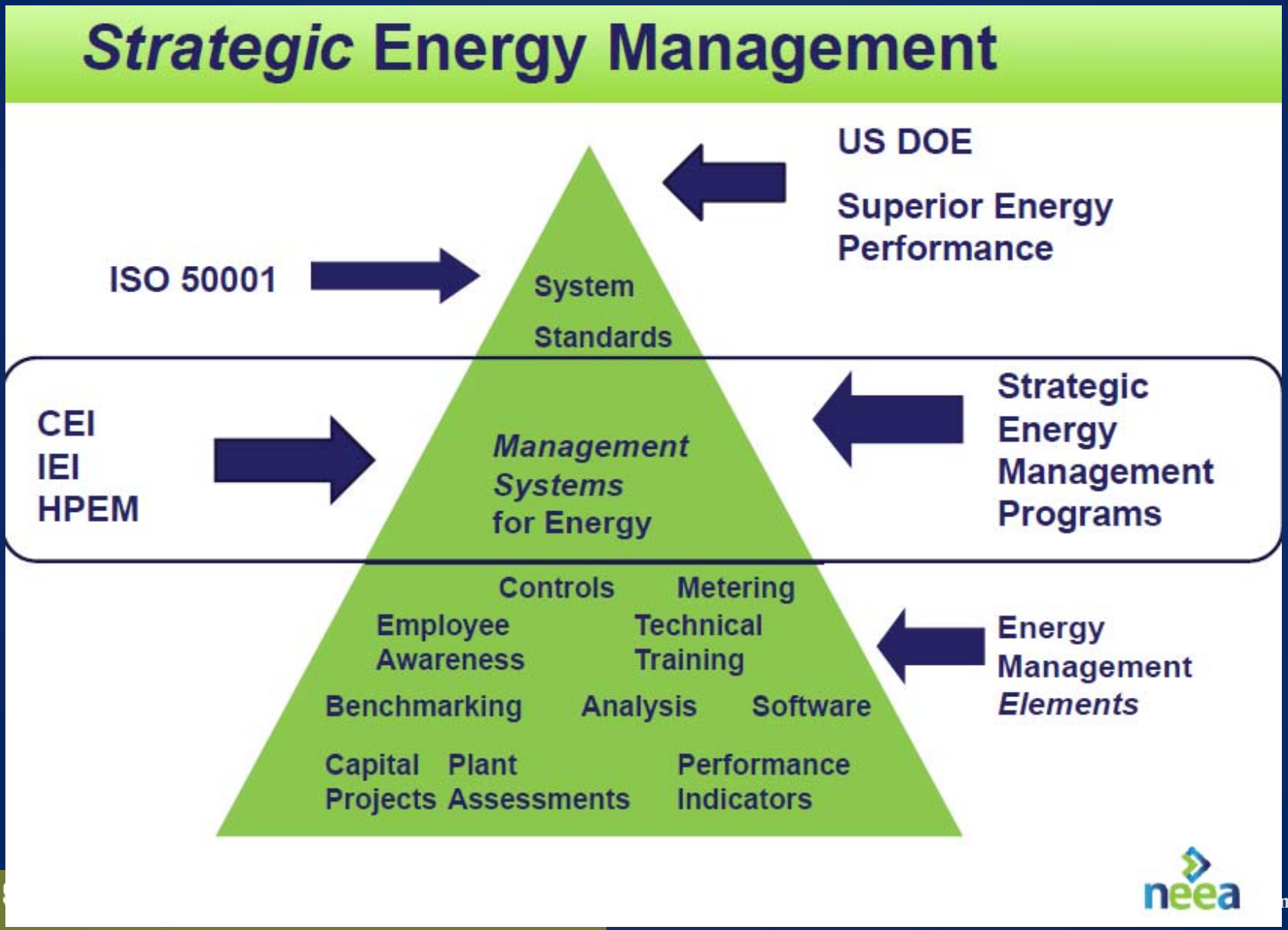


NEEA: Trail Blazer

Tell Hawk Story Here

- Pre-History: EnVinta One-2-Five
- Early R&D: Continuous Energy Improvement
- CEI Pilots and capability development
- Regional collaborations with industry associations & program administrators
- Regional market transformation strategy
- Broke ground on Measurement &Veriification
- Deeply informed Council's work
- In turn, embraced 6th Plan's findings

NEEA – SEM Strategy



NEEA – SEM Results

NEEA SEM aMW savings 2006-2010

Year	Energy Capital Projects	Business Practices O/M	Total
2006	.4890	.3800	.8690
2007	.5120	.7910	1.303
2008	1.923	1.642	3.565
2009	.6180	1.828	2.446
2010	1.450	1.192	2.642
To Date	4.992	5.833	10.825

Energy Trust of Oregon: Early Adopter – CEI Trainings

1	Energy Team
2	Management Assessment
3	Monitoring, Targeting, and Reporting
4	Data Analysis, Opportunity Register, Energy Mapping
5	Develop & Document Energy Opportunities
6	Employee Engagement
7	Energy Management Plan
8	Review and Reward
9	Third Party Involvement

Energy Trust:
Pilot – Continuous Energy Improvement

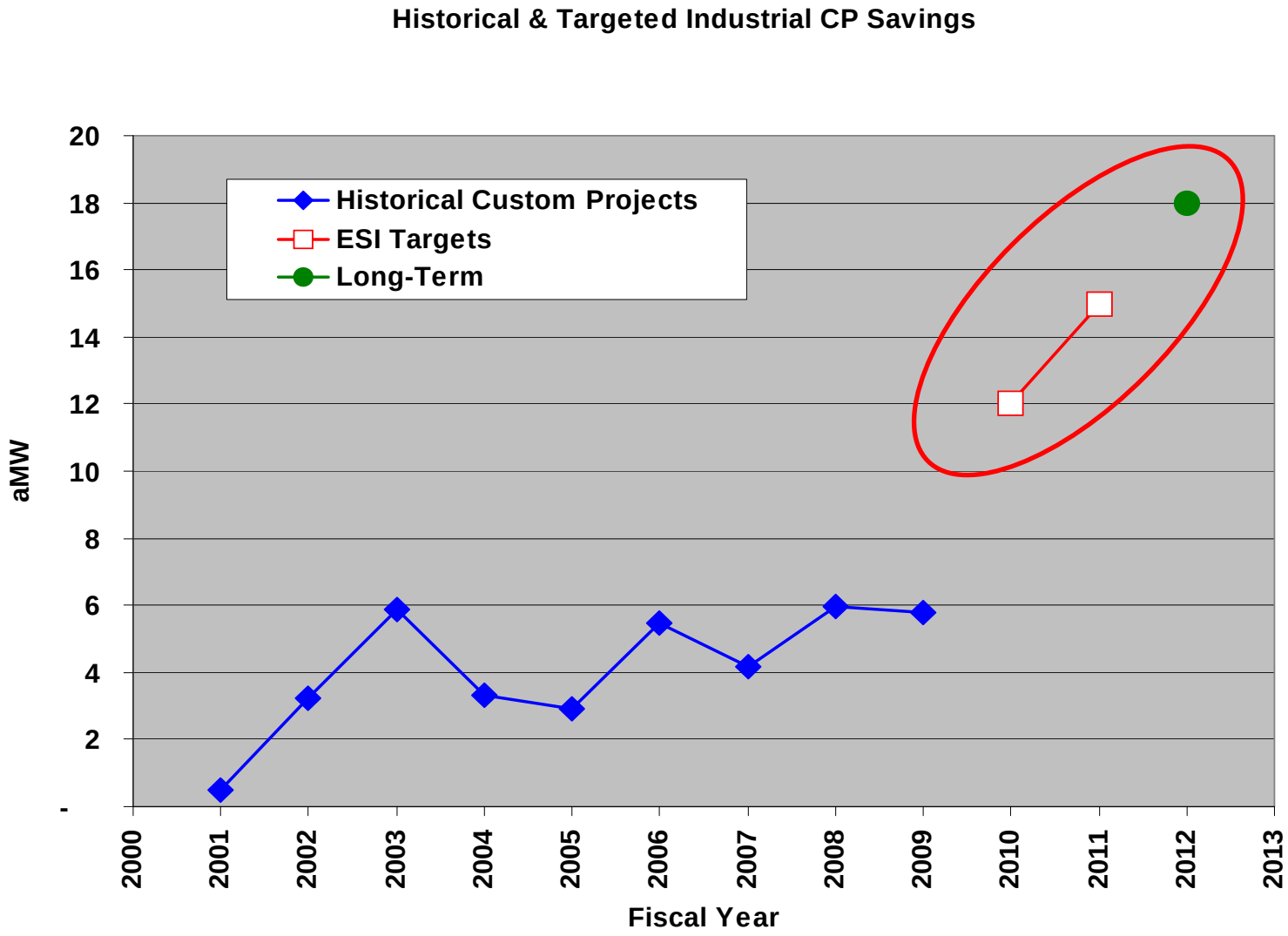
	1-Assess		2-Commit			3-Identify	
	Management Commitment	Energy Management Assessment	Energy Team Meetings	Energy Champion	Team Charter / Energy Policy	Energy & Prod. History	Facility Energy KPI Established
Cement Transfer Terminal	√	√	√	√	√	√	√
Truck Interiors	√		√	√		√	
Steel Drums	√	√	√	√	√	√	√
Precision Plastic Manufacturer	√	√	√	√	√	√	
Regional Water Provider	√	√	√	√	√	√	√
Aluminum Extrusion & Fabrication	√	√	√	√	√	√	√
Hardboard Plant	√	√	√	√	√	√	
Dimensional Sawmill	√	√	√	√	√	√	
Electronic Test Equipment	√	√	√	√			
Medical Electronics	√	√	√	√		√	
Computer Printers	√	√	√	√		√	

Energy Trust: Pilot Results

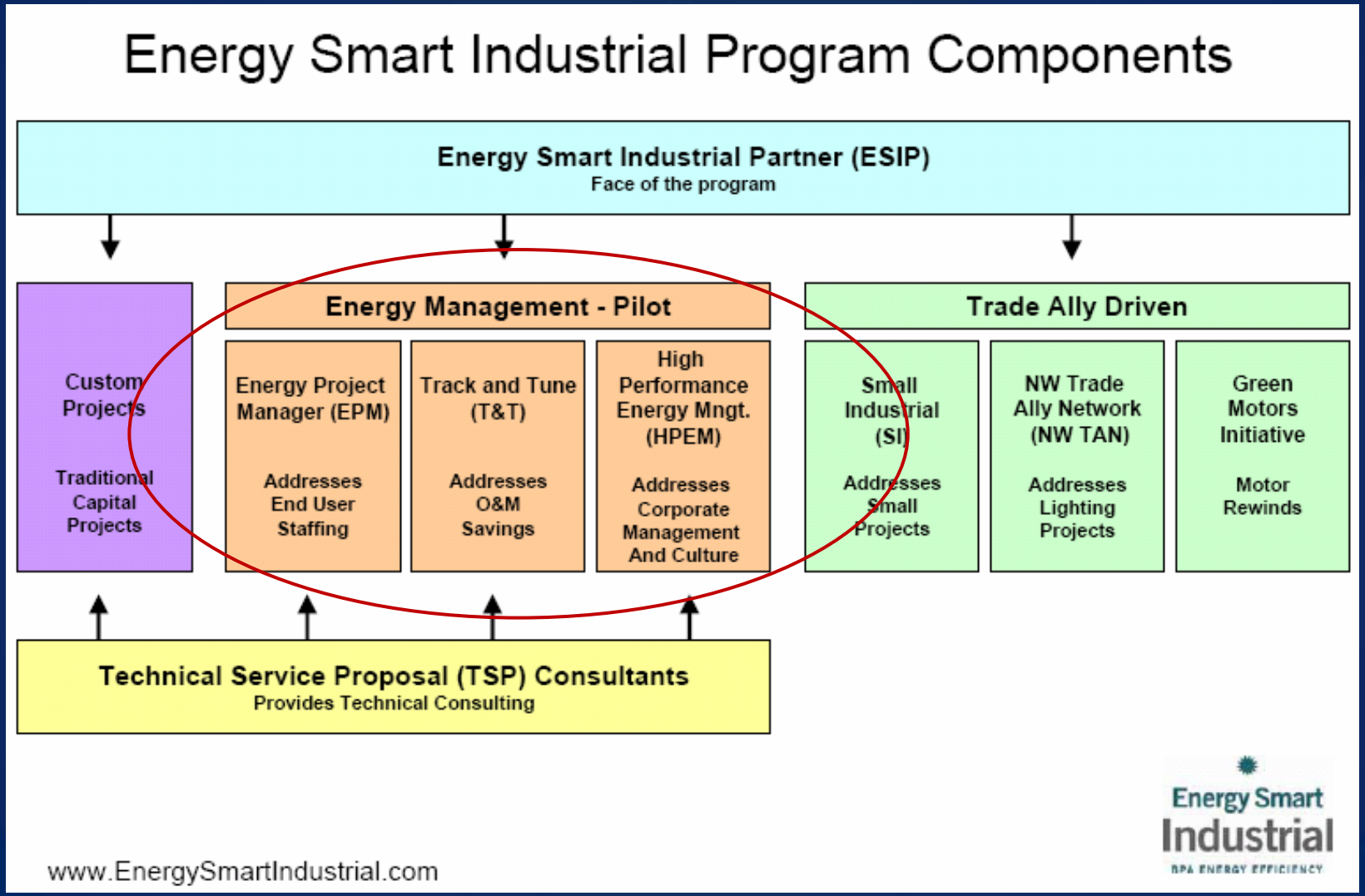
Savings from Monitoring Tracing & Reporting

Site	kWh Savings	Reduction	Incentive
1	503,000	15%	$ 10,060
2	3,385,000	10%	$ 33,850
3	26,000	2%	$ 520
4	1,075,000	10%	$ 21,500
5	855,000	4%	$ 8,550
6	348,000	2%	$ 6,960
7	572,000	2%	$ 11,440
8	690,800	16%	$ 13,816
9	5,573,000	18%	$ 111,460
10	480,800	5%	$ 9,616
Total	13,508,600	8%	$ 227,772

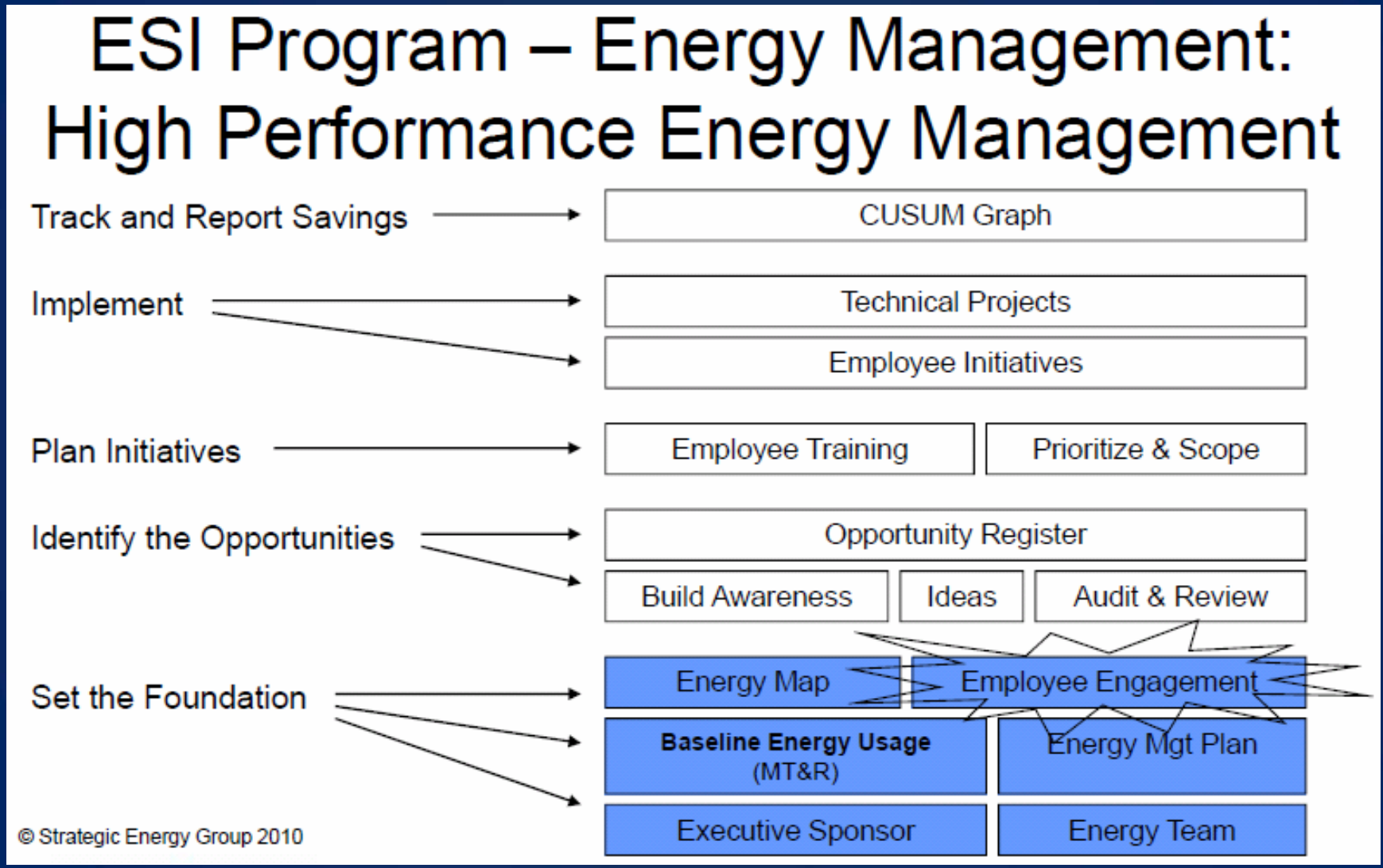
For Bonneville:
Daunting Targets from Council Plan



BPA's Reinvention
Energy Smart Industrial Program



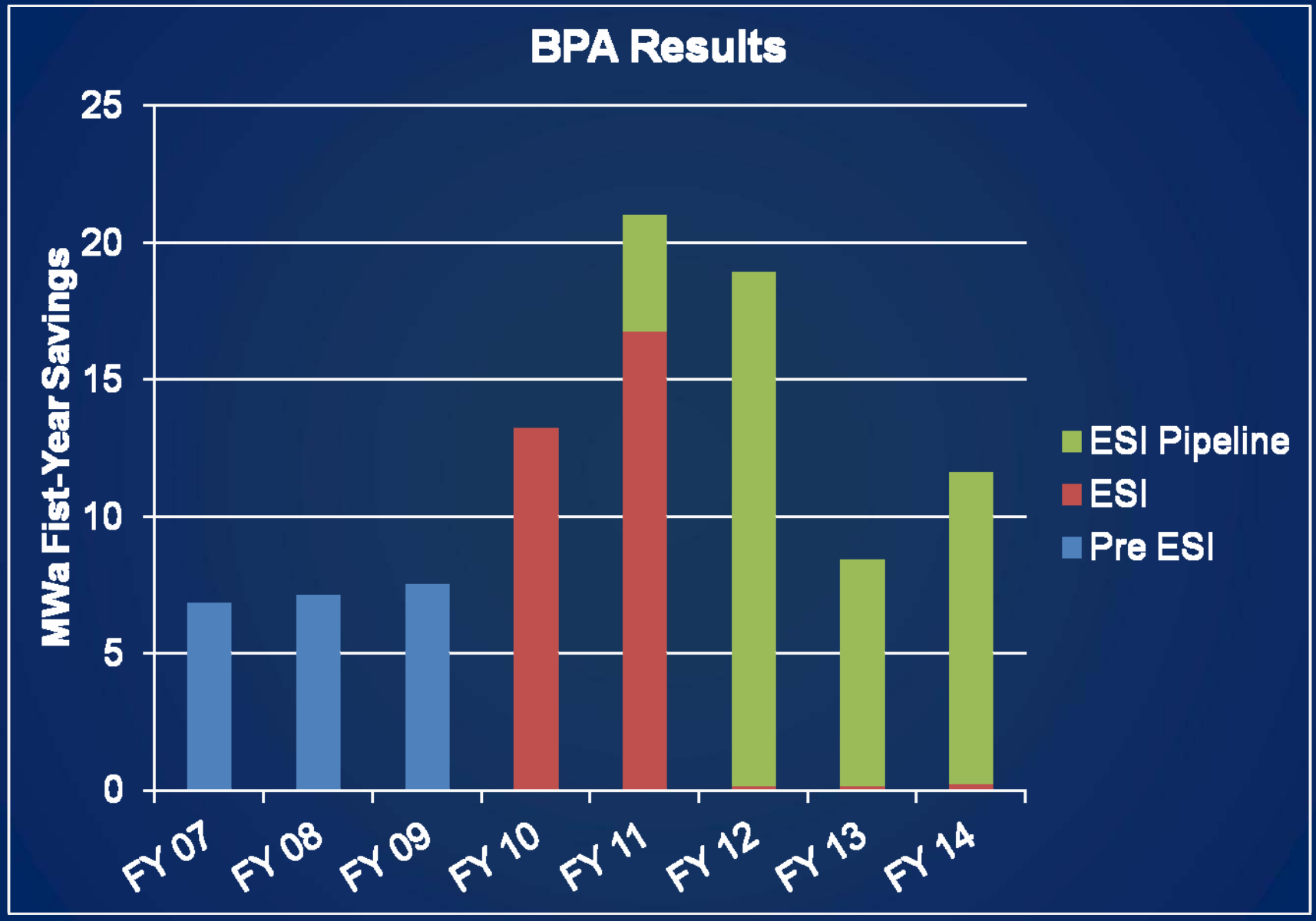
BPA's HPEM (CEI) Process



Verifying the Results

Monitoring, Targeting, and Reporting

CUSUM Charts


BPA Results
MWa Fist-Year Savings
25
20
15
10
5
0
FY 07
FY 08
FY 09
FY 10
FY 11
FY 12
FY 13
FY 14
ESI Pipeline
ESI
Pre ESI

Key Relationships

Tell The Graduate Story Here

Key Learnings

- Senior management commitment is vital
- Organizations that demonstrate an existing "learning culture" fare best
- Industry associations/reference partners accelerate top management commitment and participation
- Successful implementation appears to be tied to internal and external champions
- Business conditions provide critical context for plant readiness

Take Away

- The Value of Skeptics & Curmudgeons
- Importance of Public Exposure & Review
- Need for Vision, Leadership & Risk Taking
- The Fruits of Collaboration
- Measurement Matters

The End

Charlie Grist: Northwest Power & Conservation Council

Les Tumidaj: Strategic Energy Group