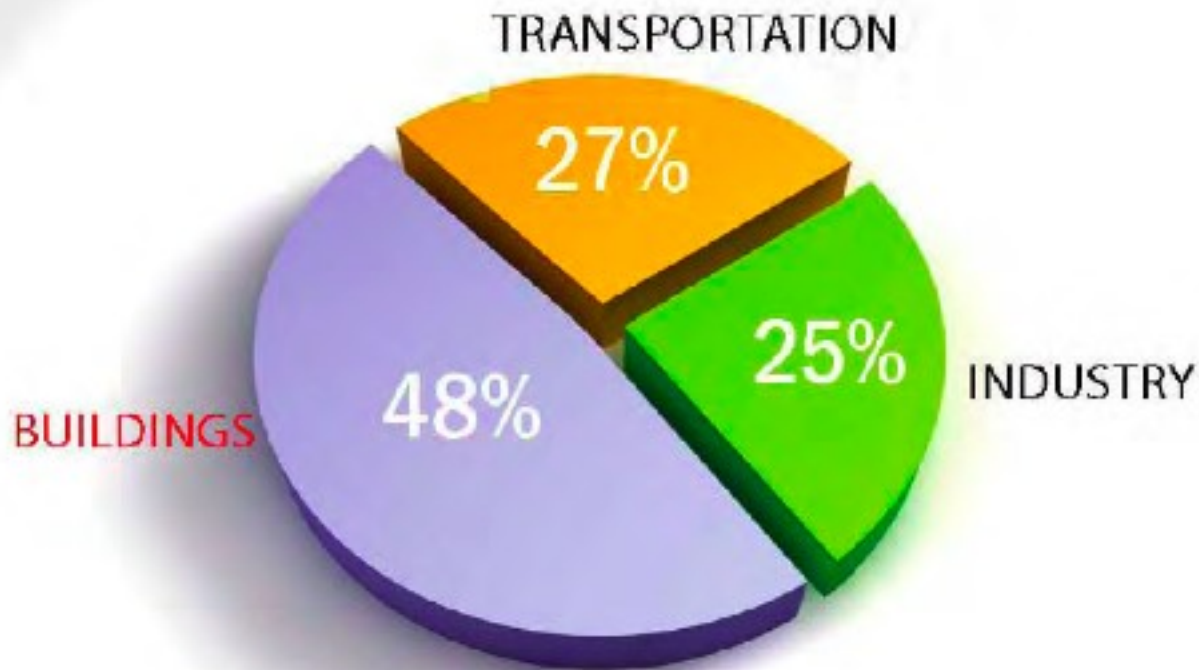


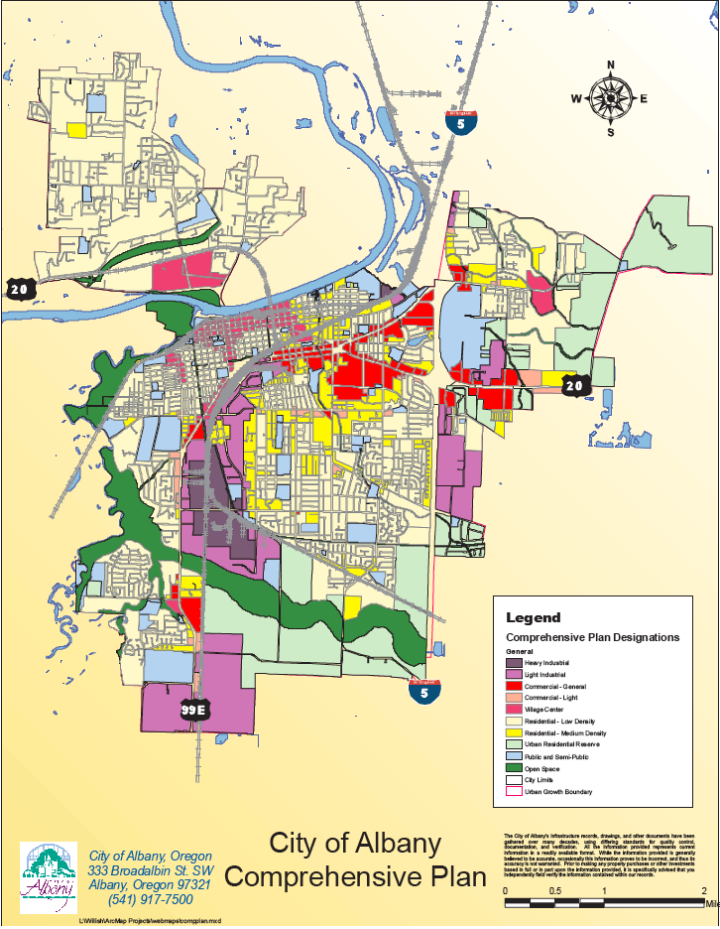


Albany

Pioneer Cities: Buildings & Efficiency

US ENERGY USE





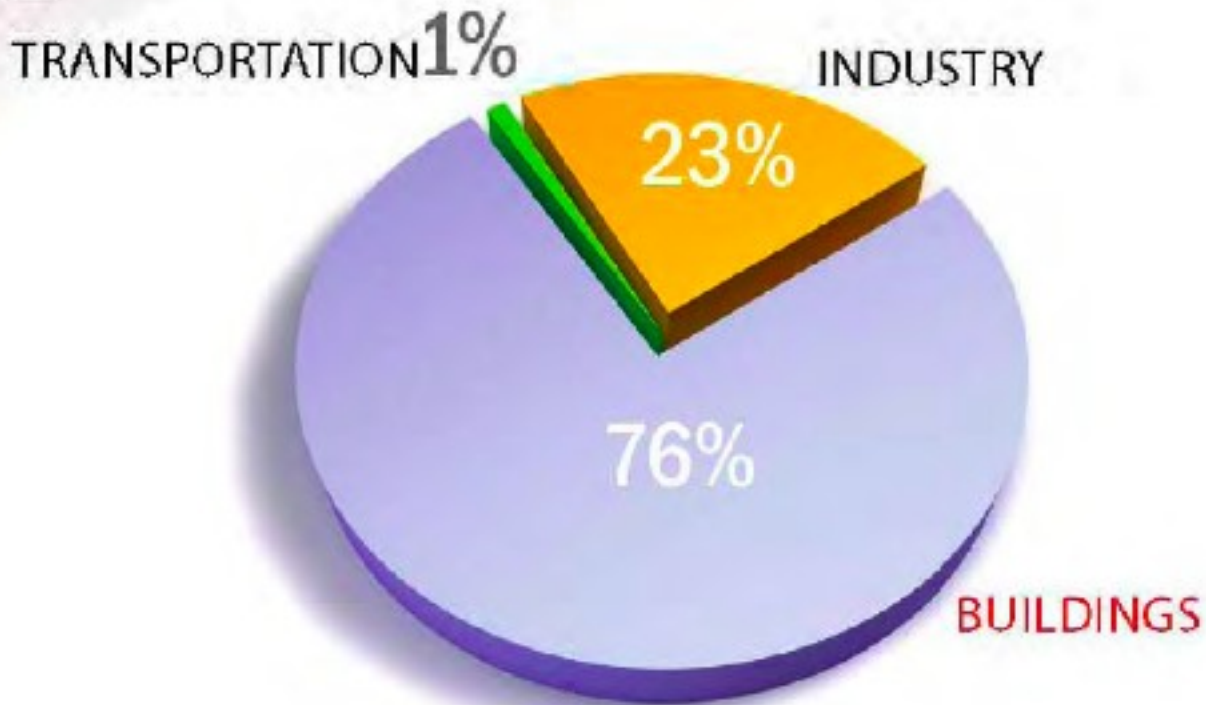
Albany



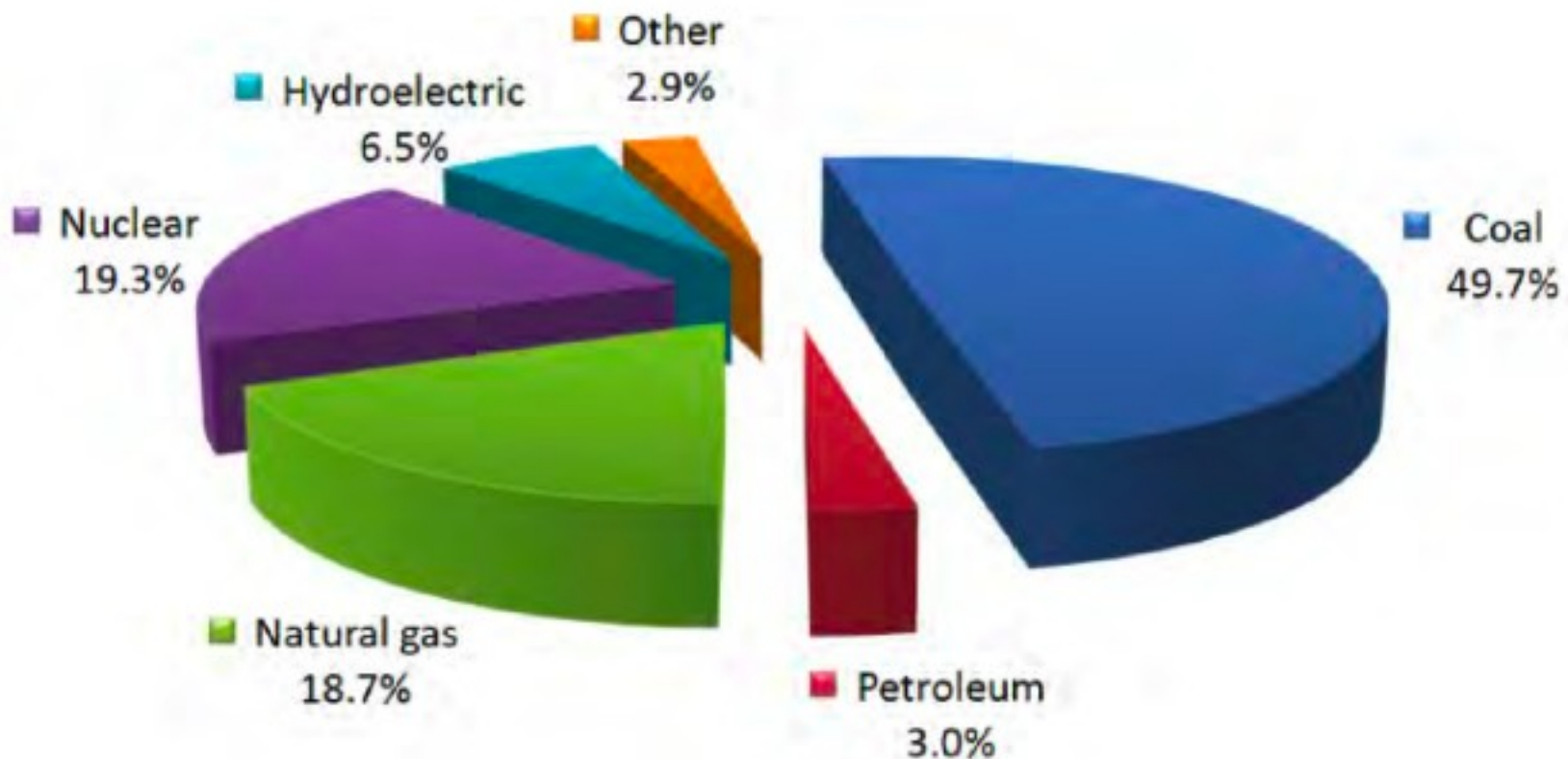
New Energy Solutions



US ELECTRICITY USE



National Electrical Grid



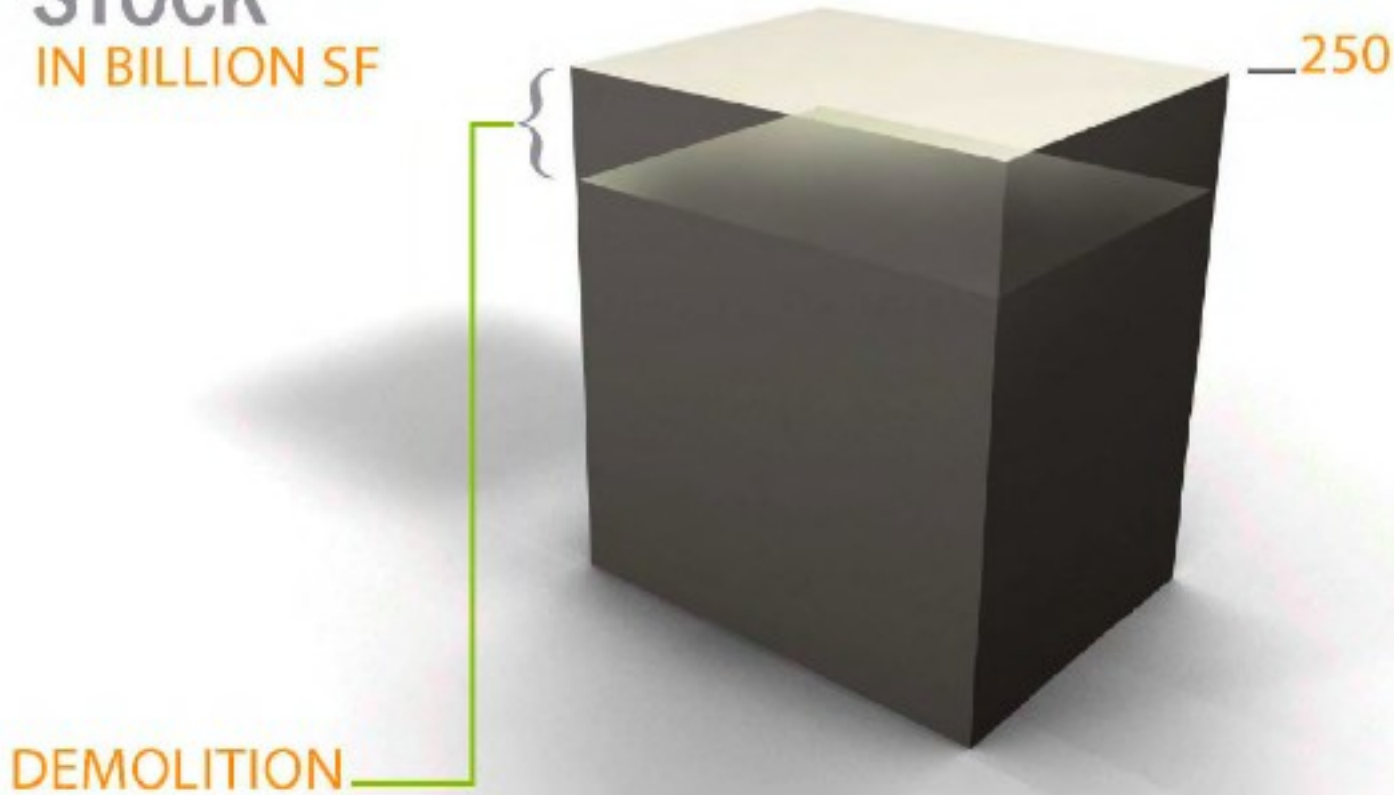
US BUILDING STOCK

IN BILLION SF



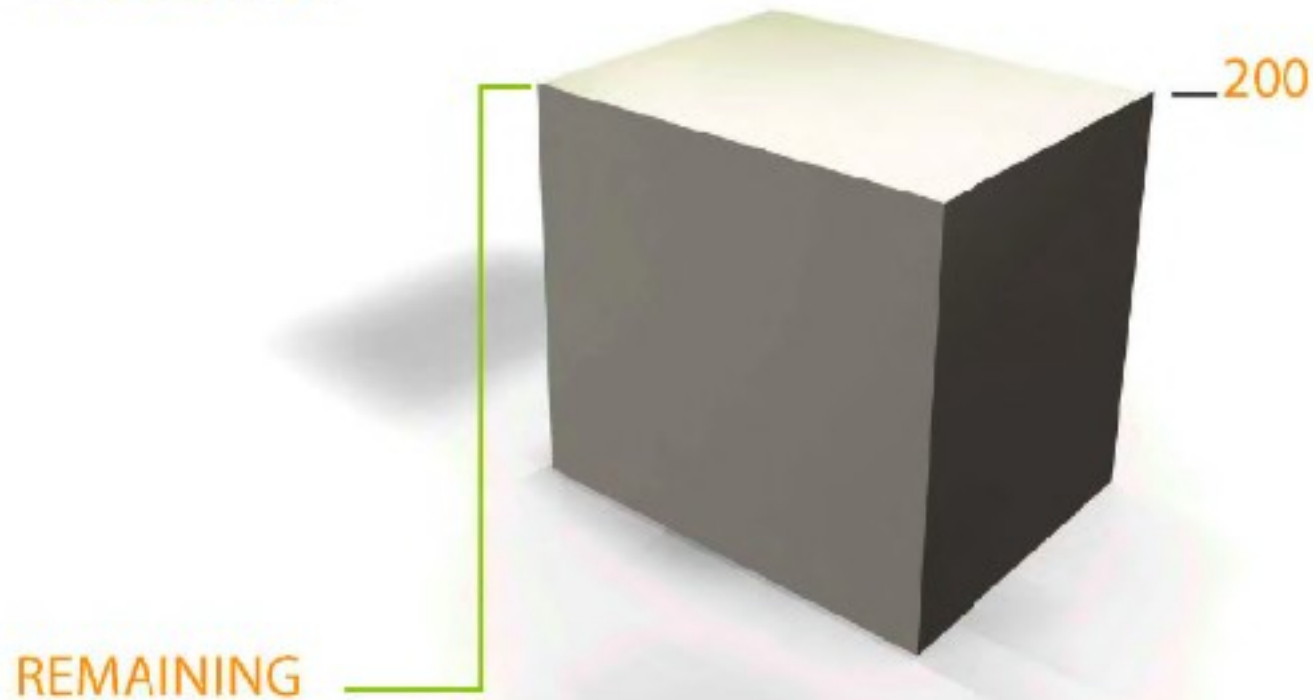
CURRENT BUILDINGS

US BUILDING STOCK IN BILLION SF

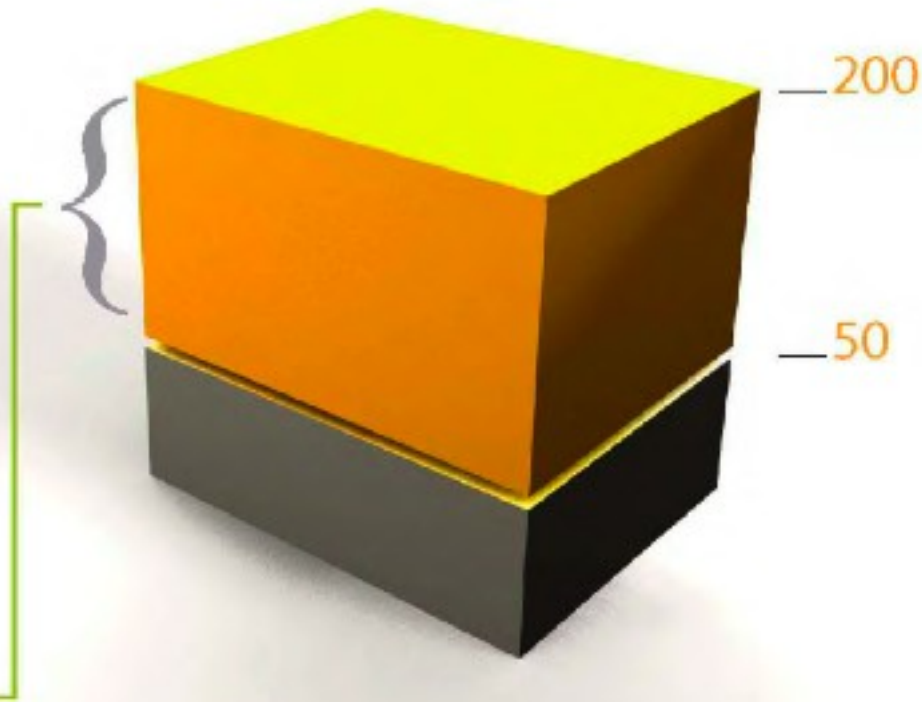


US BUILDING STOCK

IN BILLION SF



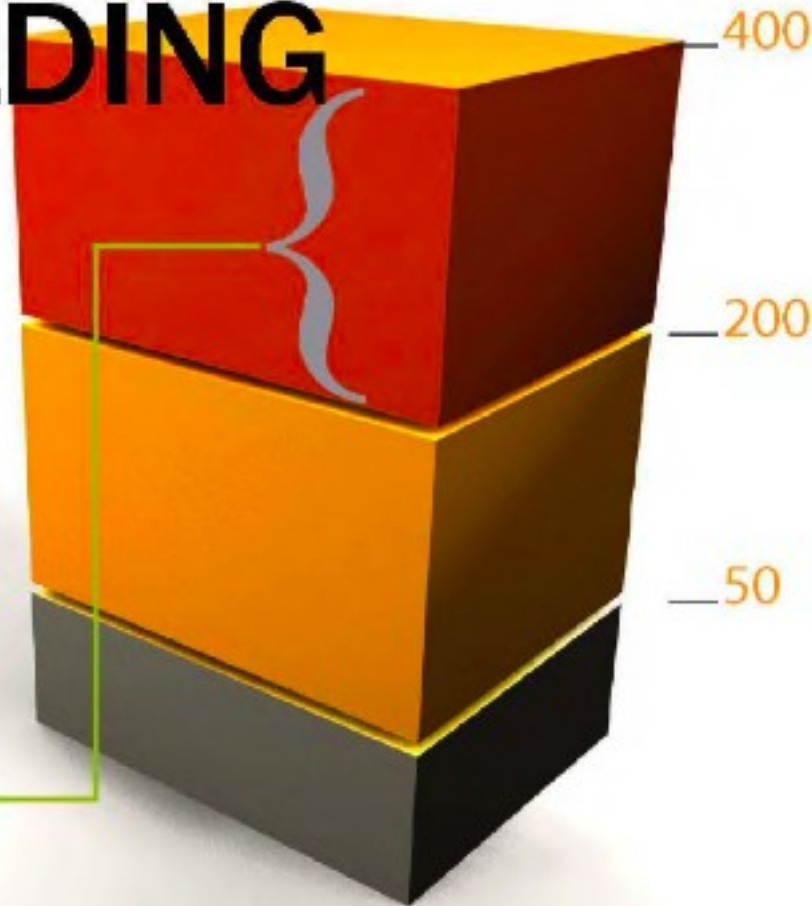
US BUILDING STOCK IN BILLION SF



RENOVATION

US BUILDING STOCK

IN BILLION SF



NEW

BUILDINGS IN 2030



CALIFORNIA

**Title 24 (State Energy Code) to
require NET ZERO Buildings;**

**Residential by 2020
Commercial by 2030**

WASHINGTON/OREGON

- 25%-30% Code Increase
with *reach code*
- Performance Based Incentives
 - Tax Credits
 - Financing Options

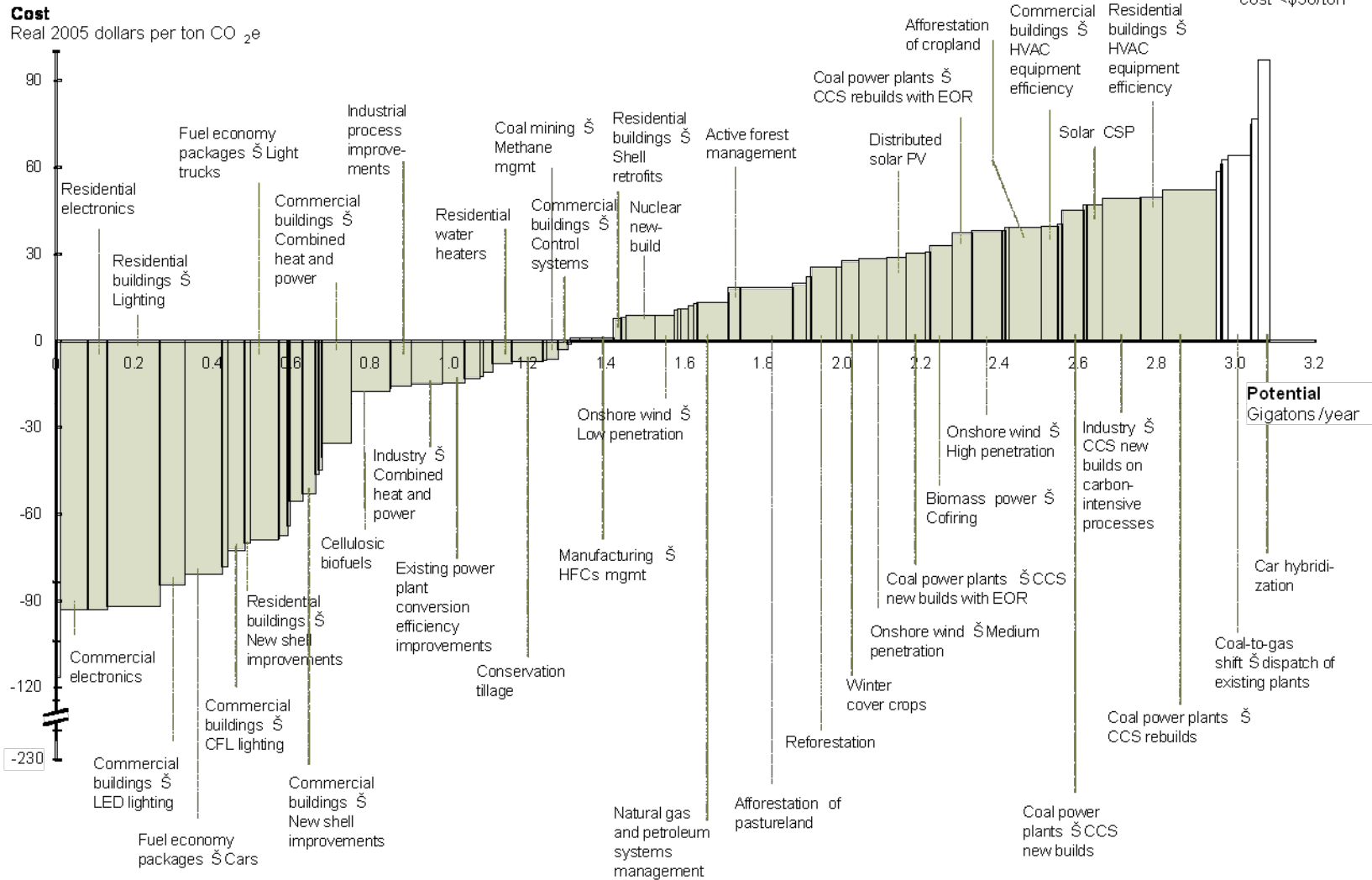
Buildings & Efficiency

- Using less energy is the easiest & most economical step
- Critical to large-scale deployment of new, clean technologies
- Policies are starting to move rapidly
 - Financing
 - Aggregation
- Not an option for buildings; question is whether or not to be strategic
- Pioneer communities ~ stay ahead of policies



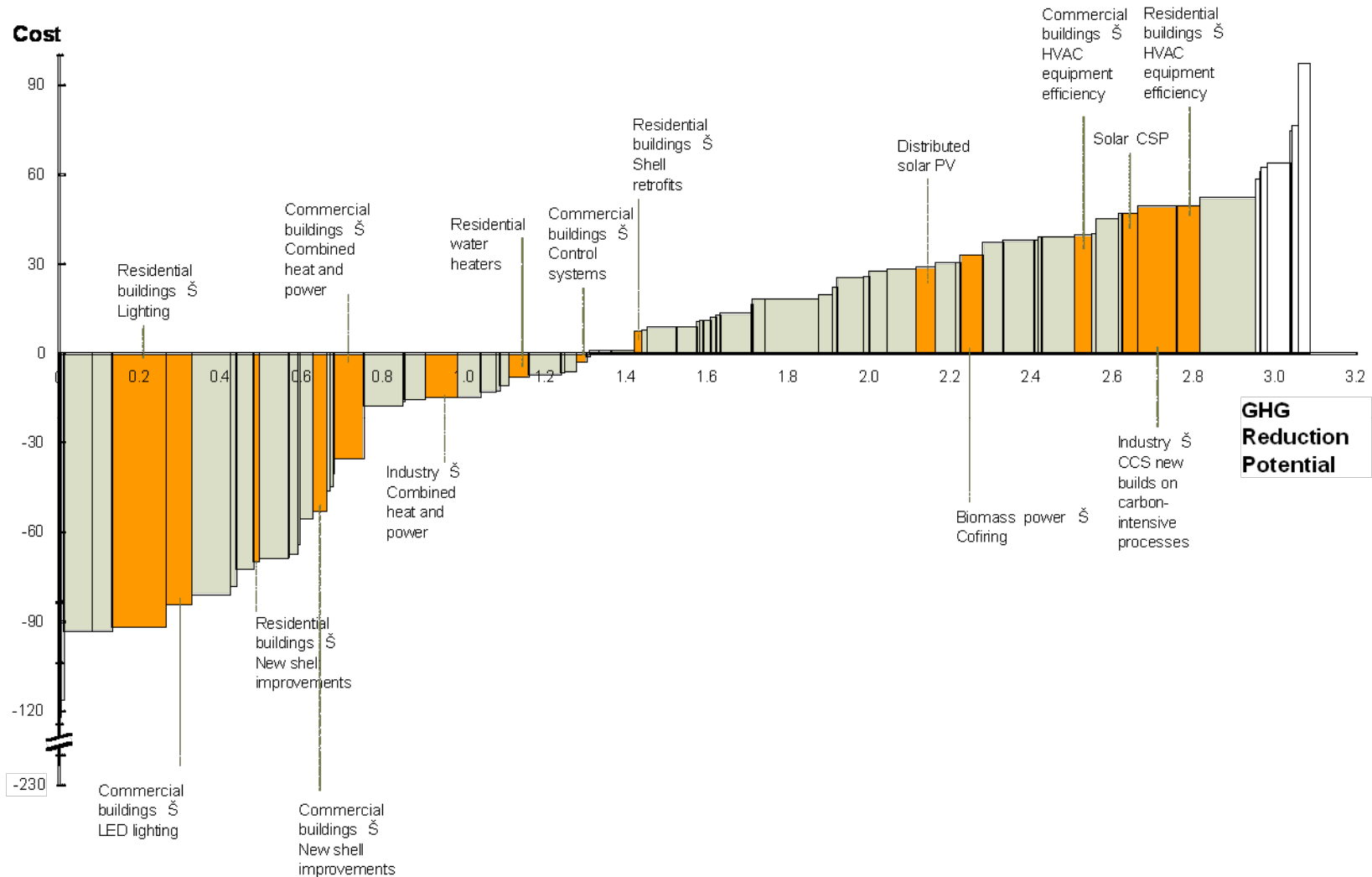
New Energy Solutions

U.S. mid-range abatement curve \$ 2030

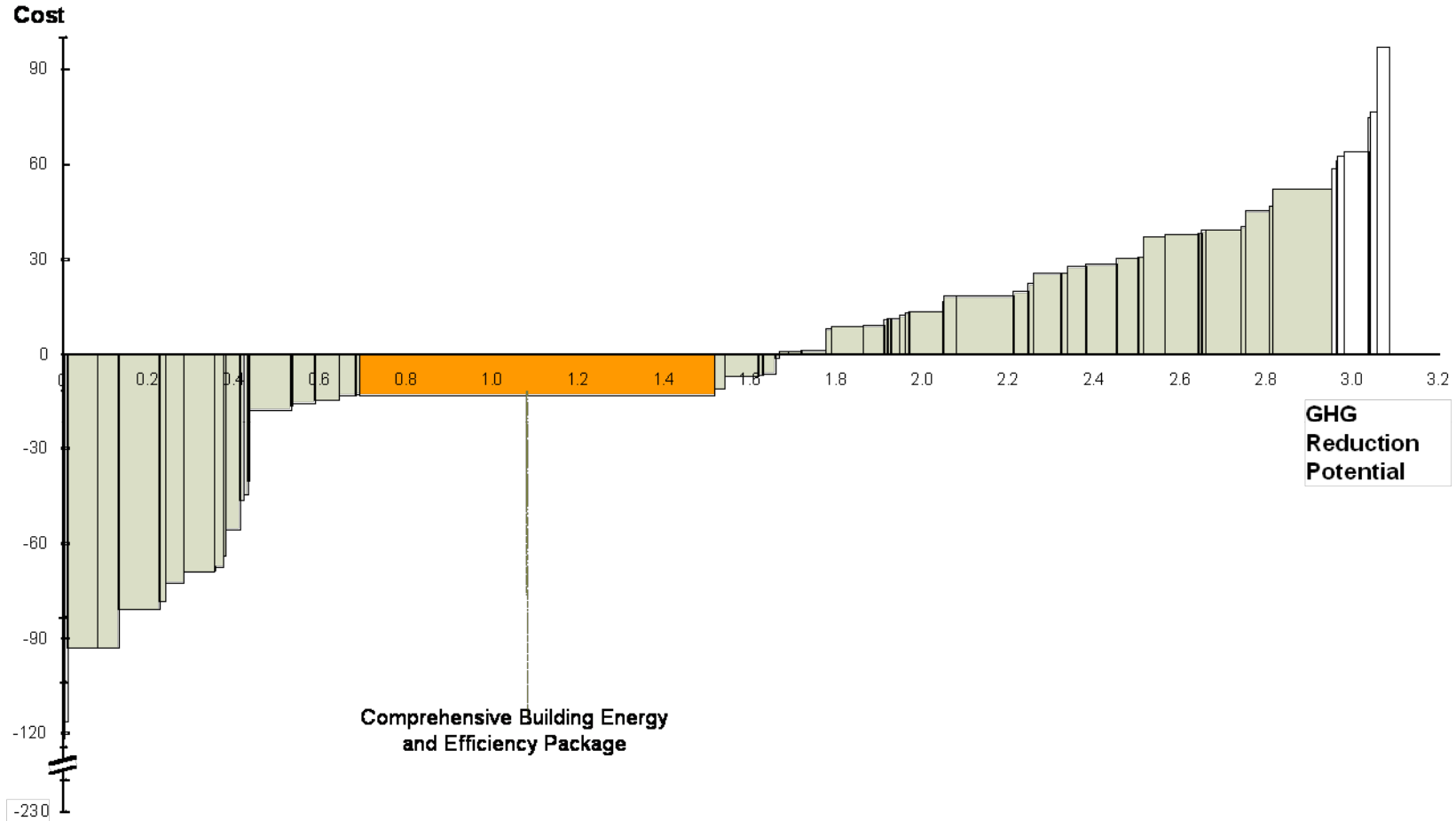


New Energy Solutions

U.S. mid-range abatement curve \$ 2030



U.S. mid-range abatement curve \$ 2030



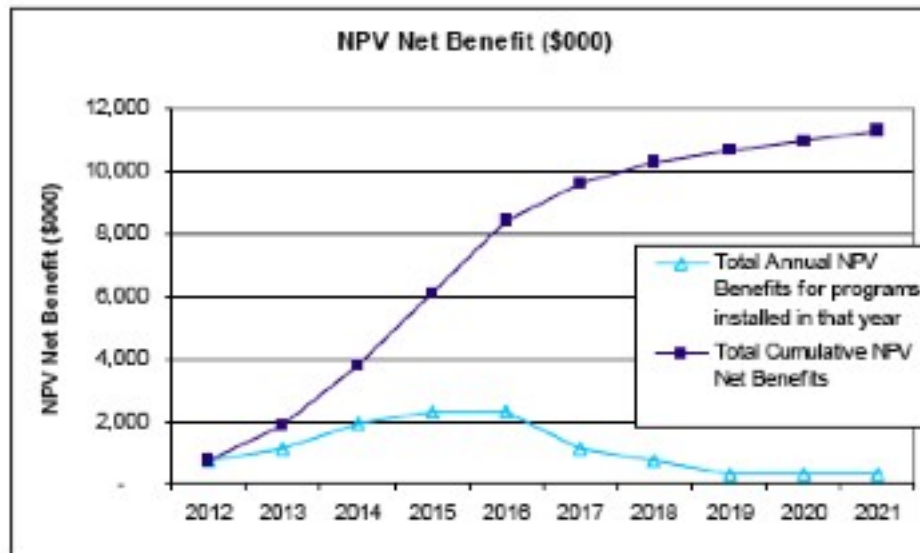
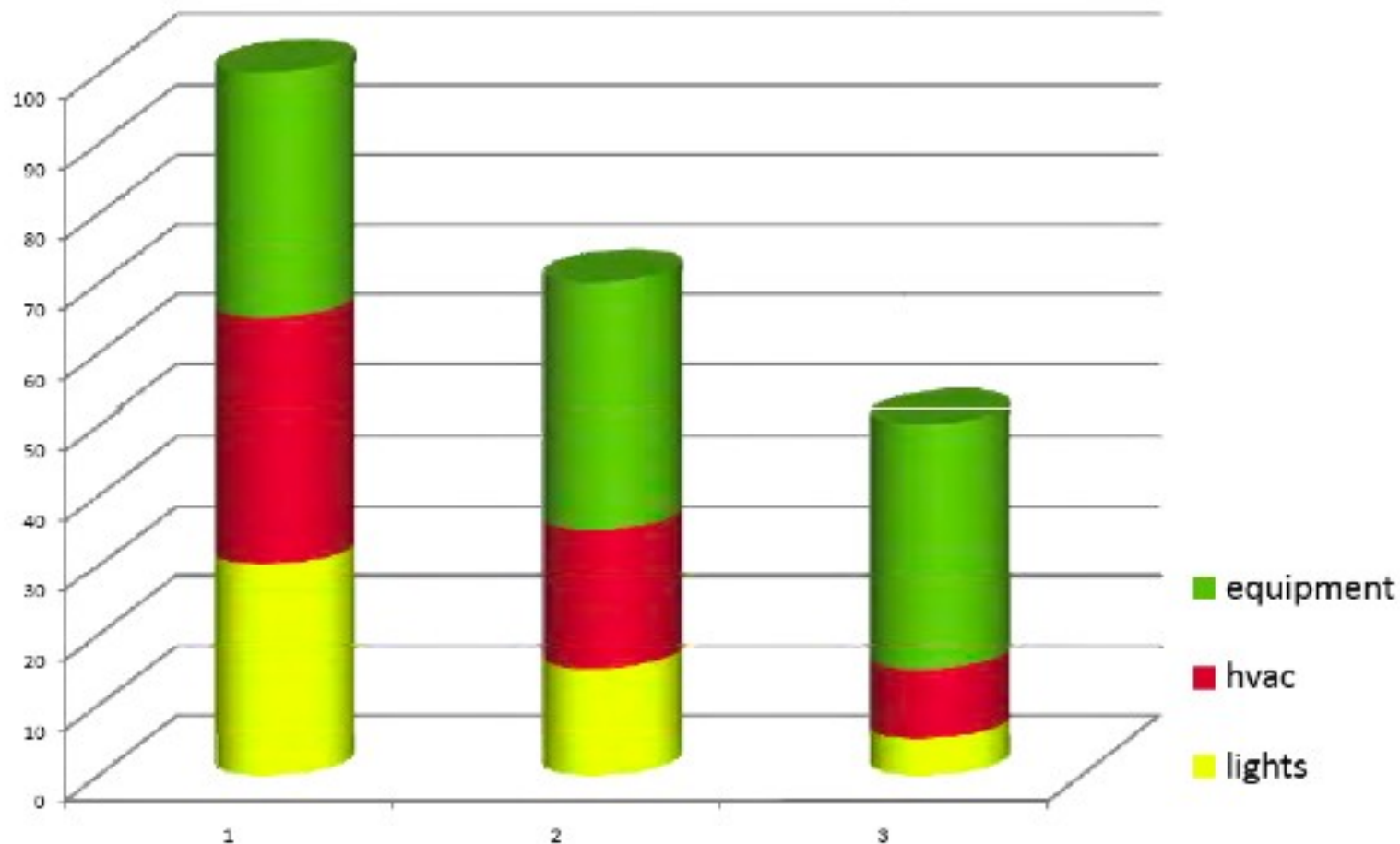


Figure 25: Annual and Cumulative Benefits of DSM under BPA Tiered Rates, Medium Price Forecast Scenario

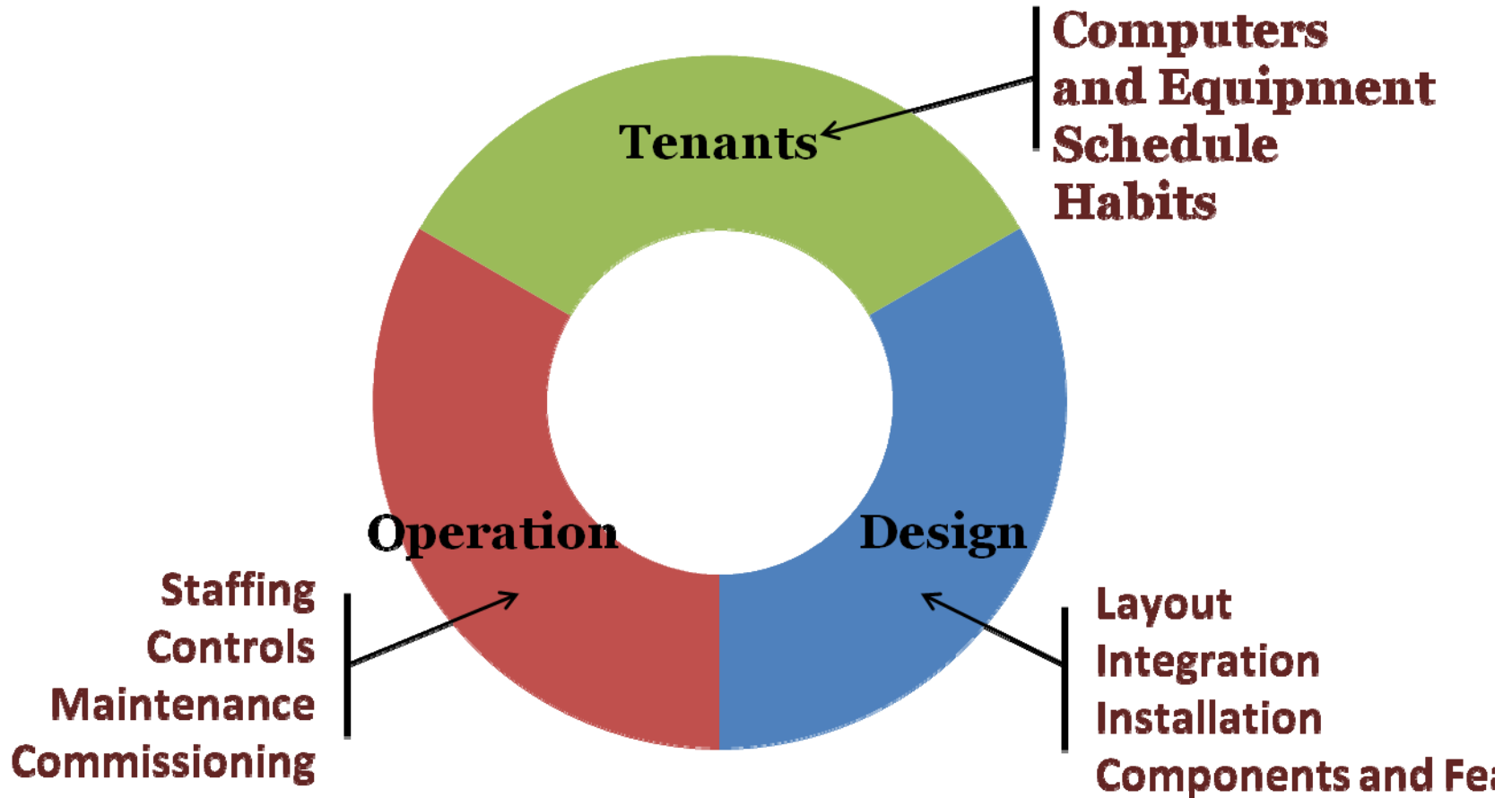
Table 6: Cost-effective DSM Measures under BPA Tiered Rates, Medium Price Forecast Scenario

Measure	Customer Class	Overnight Impacts		
		kW Reductions	MWh reductions	Net Benefit (\$000s)
Envelope	Com	381	2,280	2,826
Appliances, Laundry	Com	60	2,718	673
Exit Signs	Com	27	346	122
Vending Machines	Com	66	340	138
Traffic Signals	Other	5	58	11
Lighting, Early Replacement	Res	230	2,688	828
Appliances, Dishwasher, Early Replacement	Res	10	76	27
Appliances, Clothes washer, Early Replacement	Res	13	685	382
Appliances, Refrigerator, Early Replacement	Res	11	211	132
Lighting, Failure	Res	230	2,688	828
Appliances, Dishwasher, Failure	Res	10	76	27
Appliances, Clothes washer, Failure	Res	13	685	382
Appliances, Clothes dryer, Failure	Res	8	330	61
Appliances, Refrigerator, Failure	Res	11	211	132
Heat Pump O&M and weatherization	Res	1,218	4,760	2,873
Commercial lighting, Early Replacement	Com	117	1,220	671
Commercial lighting, Failure	Com	117	1,220	671
Total		2,528	20,600	10,784

Progress toward net zero will require design, operation, and occupant participation



What Drives Building Performance?



FEEDBACK TO BUILDING OCCUPANTS



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Solutions




REAL-TIME PERFORMANCE INFORMATION



New Energy
Solutions



Energy Certificate

Building Energy Performance >		As built:	In use:		
Certificate type	FULL	Asset Rating	Operational Rating		
Building Type	Office				
Whole or part of building	Whole building				
Very energy efficient		B	D		
A					
B					
C					
D					
E					
F					
G					
Not energy efficient		Calculated	Actual		
Asset rating method:	UK National Standard 2004				
Operational rating method:	UK Office Tailored Benchmarks 2002				
Units used:	kg CO ₂ per sq m of net area per annum >			48	83
Occupancy level	Square metres net lettable area per person			14	12
Equipment heat gain level	Watts per square metre net			12	12
Weekly occupancy hours	Hours per week			55	58
Heating performance ratings				ABCDEF G	ABCDEF G
HVAC performance ratings (cooling, fans and pumps)				ABCDEF G	ABCDEF G
Lighting performance ratings				ABCDEF G	ABCDEF G
Management rating (for in-use performance only)			ABCDEF G		
Internal Environmental Quality			Not assessed		
Risk level			Not assessed		
Further information can be found in the Energy Log Book					
GB 2004		 Directive 2002/91/EC			

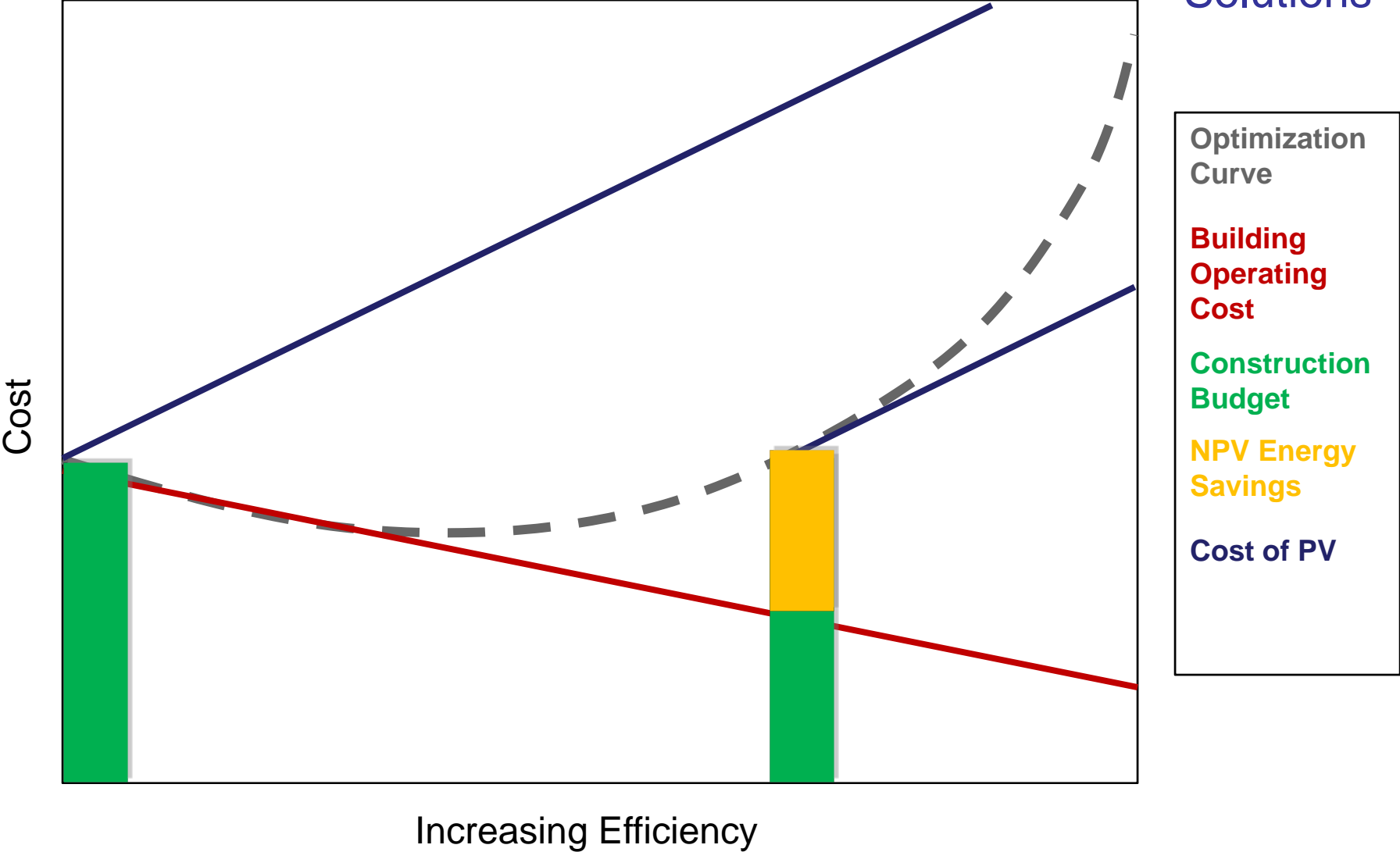


Building Labeling

OPTIMIZING costs



New Energy Solutions



Optimization Curve

Building Operating Cost

Construction Budget

NPV Energy Savings

Cost of PV