New Energy Cities Workshop
Financing Clean Energy

January 27, 2011

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

A Smart Investment

- Over **1.63 million US jobs** are supported by energy efficiency (ACEEE)
- **$7 trillion** in cost-effective energy investment through 2030
- Can reduce national energy consumption by as much as **30%** without a reduction in quality of life
- Energy efficiency and clean energy generate immediate benefits, significant economic returns over time and mitigate the costs of climate change

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Rapid Change in Energy Finance

- Capital available to invest directly, not just incentives
- Push to build and support markets for financing clean and efficient energy
- Public and private dimensions
  - Institutional reform to align interests and incentives
  - Risk mitigation and management
  - Energy education and consumer engagement
  - Public investment as catalyst for private capital

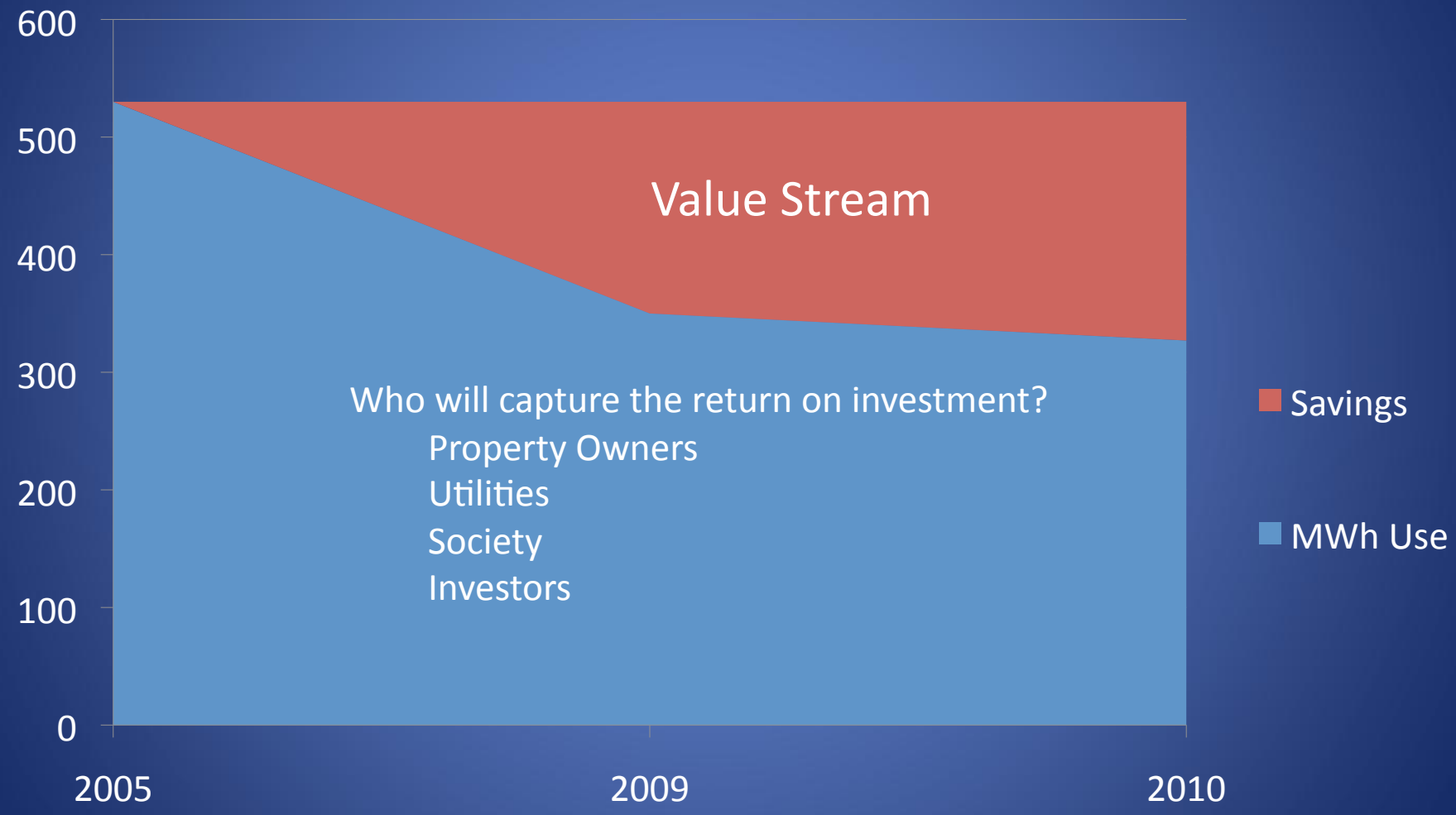
New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Framing the Choices

- Determine sources of capital
- Address needs for capital assistance
- Define risks
- Map cash flows and payments to financing
- Create implementation plan
- Manage performance and quality

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Edmonds Library Retrofit



New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Property Owner

Energy cost savings, home comfort, asset value increase

Consumer debt

- Traditional model of financing clean energy and retrofits
- As simple as a loan from a bank
- Well established pathway for financing
- Lots of barriers to uptake including credit, debt constraints, transaction costs, and more

Utilities

Energy conservation

Avoided cost of new generation

I-937 obligations

Rate base energy efficiency

- Already exists – public purchase charges, utility rebates, feed-in tariffs, etc.
- Acknowledges that efficiency is generally the lowest-cost resource
- Treats generation and efficiency similarly
- Complex – would need both state and federal changes to regulation to equate efficiency and generation

Society

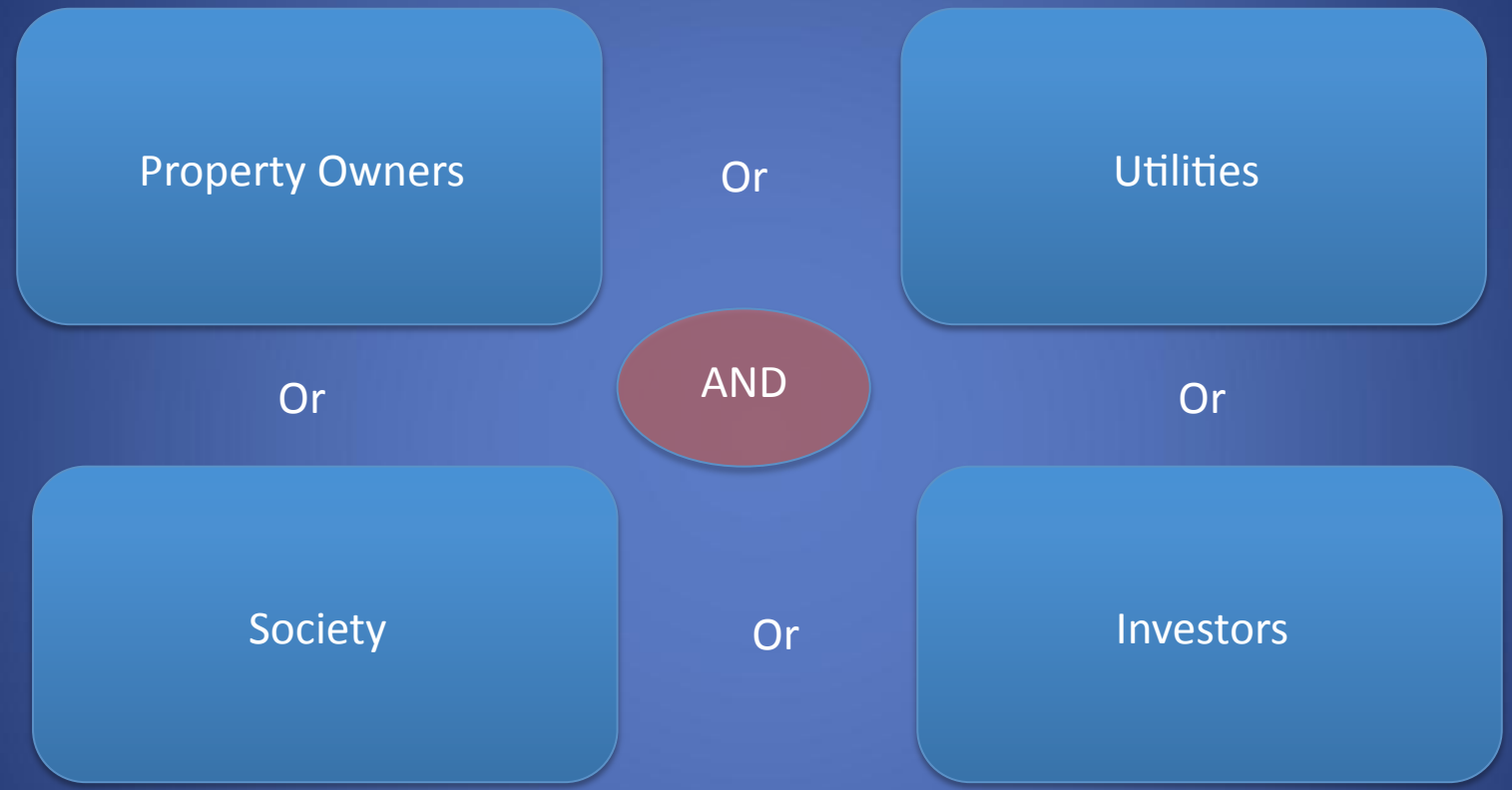
Reduction of carbon emissions and job creation

- Tax incentives and grants based on local, state or federal general funds
  - EECBG and SEP
- Everyone likes “free” money
- Could drive fast uptake
- Very expensive to the public and doesn’t acknowledge benefits to property owner

Investors

Seeking value stream available in building retrofits

- Private companies upgrade and manage homes and buildings
- Generally high cost of capital
- Similar to traditional ESCO models
- Private investors generally want larger investments
  - Large buildings, not homes
  - Multiple buildings

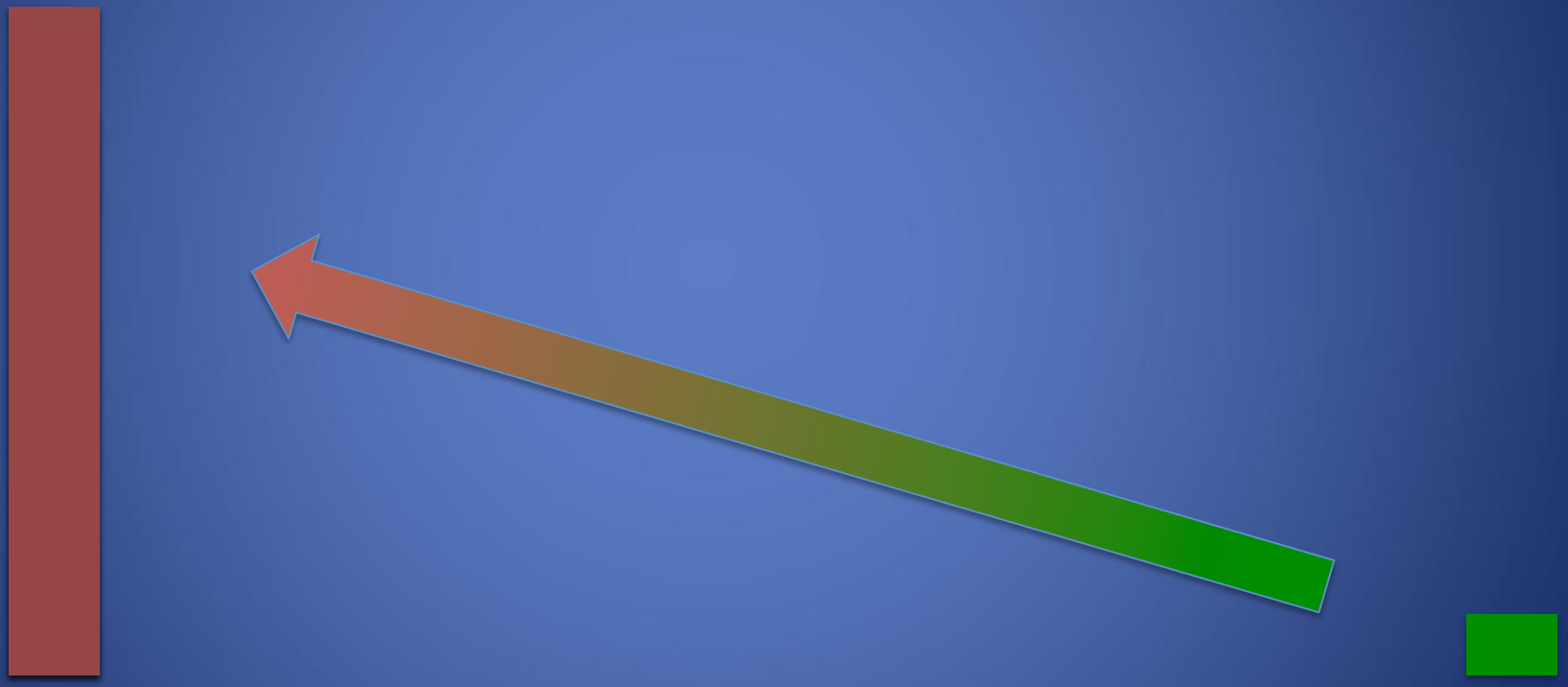


New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Best Strategy: A Combination

- Allow property owners to access low-cost loans
- Provide tax incentives and rebates, as appropriate
- Package structures for private and utility investment

The Art of Energy Efficiency Financing



New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

The Art of Energy Efficiency Financing

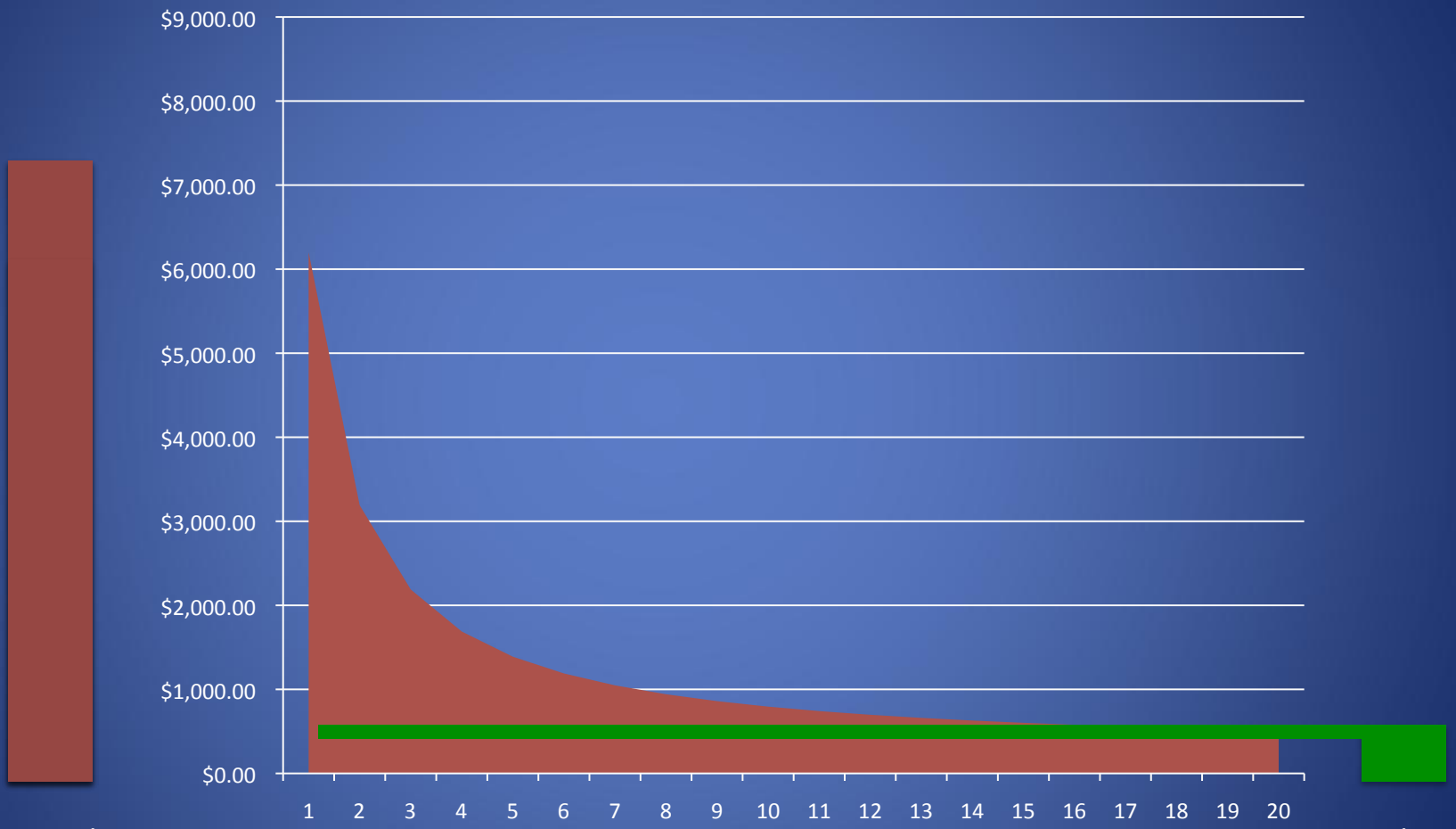
Capital Cost

- Reduce Capital Costs
  - Utility Incentives
  - Public Resources
    - Grants, Tax Policies
- Reduce Financing Cost
  - Mitigate Capital Risk
- Extend Financing Term
  - Attract Patient Capital

Value Stream

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

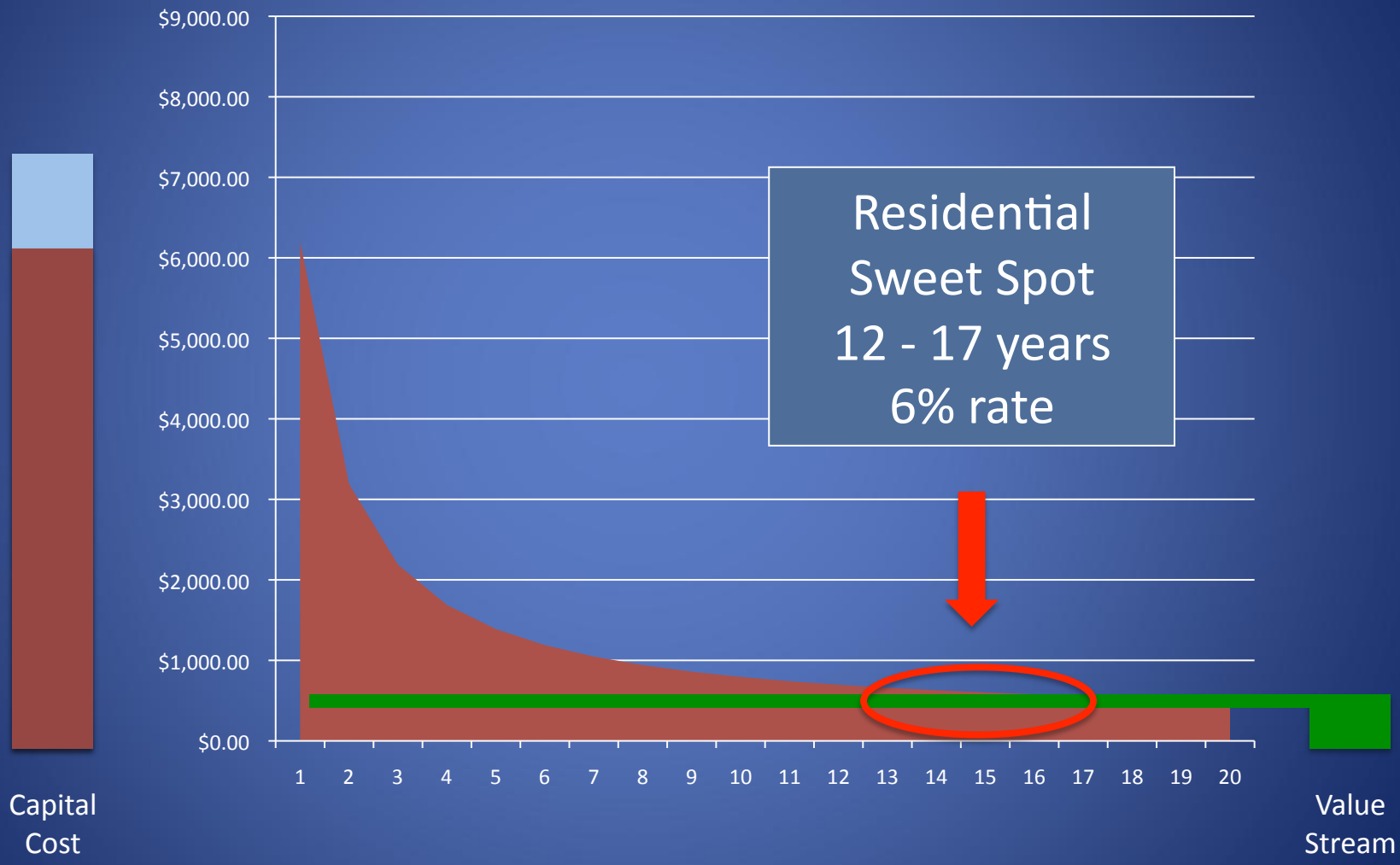
The Art of Energy Efficiency Financing



New Energy Cities

Pioneering the Clean Energy Economy in the Northwest

The Art of Energy Efficiency Financing



New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Capital Assistance

- Uncertainty about savings drive capital costs up
- One-time dollars accelerate implementation
- Capital assistance can be a loan loss reserve (LLR), a cash grant or rebate, a utility backstop, or other source of funds
- One-time dollars can lessen risk to other capital

Challenges for Energy Efficiency Finance

- Residential sweet spot is 12-17 years at 6%
- Many property owners stay fewer than 10 years after a retrofit
- Commercial business tenants change more frequently
- Consumer debt needs to follow the meter
- Other methods rely less on a single debt payer
- Aggregation helps mitigate turnover vacancies

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Mitigating Risk

- Some entity will bear or share the risk of non-performance and non-payment
- Home owners unsuited to that risk
- Risk mitigation is a good role for investors, the public and utilities
- But first: reduce risk – data streams, quality assurance and efficient payment collection

Models of Energy Efficiency Financing

- PACE
- On-bill
- ESCO models
- Utility portfolios
- Consumer loans

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

What is PACE?

- Property Assessed Clean Energy
- Based on Berkeley First solar model
- Provides a method of collection and a method of security
- Property tax assessment for loan repayment provides additional security and easy repayment

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Current Status of PACE

- Fannie Mae and Freddie Mac concerns with "priority liens"
- U.S. DOE and local jurisdictions have paused PACE-only programs
- Congress not likely to move "PACE fix"
- Local action still possible?
  - —EWEB and Lane County moving ahead

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

PACE Considerations

Advantages

- Low cost of capital due to security of property tax mechanism
- Low overhead costs
- Local governments could finance retrofits directly, without utilities
- Ease of loan transfer
- KISS – very simple

Disadvantages

- Risk for poor energy performance and savings on property owner
- Does not split incentives
- Requires local government leadership and voter acceptance
- Separates finance cost and utility savings, with possible impact on energy use behavior

What is On-Bill Financing?

- Direct financing of capital cost by third party
- Usually a blend of public and private capital
- Utility participates by using energy bill to capture loan repayments

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

On-Bill Considerations

Advantages

- Multiple types of capital from public and private sources
- Consumers see benefits and costs of retrofit simultaneously
- Aligns incentives for non-owner-occupied structures
- Can work with low-income properties
- Efficient way to use one-time dollars
- Allows low-risk utility involvement and the ability to capture energy use data

Disadvantages

- Short-term uncertainty about performance
- Potential for higher interest rates or lack of underwriting
- A patchwork of utilities and regulatory environments
- Structures may have more than one utility, could lead to fuel switching
- More complex with blended capital
- Consumer to opt-in and places most risk on the consumer (including shut-off)

What are Energy Service Companies?

- Private companies install and manage energy performance improvements (ESCOs)
- Performance contract; firms paid through energy savings
- Generally apply to large commercial or institutional buildings or campuses

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

ESCO Considerations

Advantages

- Private sector driven and financed, with all risk on the ESCO
- Investments limited only by cost of capital
- Incentives to maximize energy performance and productivity
- Capacity to finance retrofits of large structures

Disadvantages

- Requires detailed contracts, and monitoring of savings and performance
- Currently infeasible for smaller buildings and residences, given cost of capital
- Long-term contracts limit applicability in many commercial structures

Energy Portfolio Strategies

- Allow for more than just retrofits:
  - Demand side management
  - Transportation integration
  - Utility efficiency
- Removes burden from property owner
- Operates best at scale
- BUT: requires utility with incentive and ability to manage

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Other Models

- Unsecured loans (including “on-bill”)
- Reserve backed consumer loans (including PowerSaver)

Opportunity for State "Green Banks"

- Federal movement on "Energy Independence Trust"
- Opportunity to access patient capital and pensions
  - —Could apply to all types (e.g., PACE, On-Bill, ESC0)
- Low cost capital that can be purchased by the Feds to get to AAA bonds

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Other Key Considerations

- Community workforce agreements
- Quality assurance
- The Risk "Hot Potato"
- Marketing and Implementation
  - The DC Project

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Examples of Other Programs

- Clean Energy Works Portland
  - On-bill mode
- Cambridge Energy Efficiency Alliance
  - Loan loss reserve model
- Boulder, CO
  - Paid for by carbon tax
- Babylon, NY
  - Capitalized out of solid waste reserve fund
- Delaware Sustainable Energy Utility

Getting to Scale

- Select scalable financing strategy
  - Link to early, catalytic projects
- Identify sources of capital
  - Any ability to use public bonding for private benefit?
- Create capital assembly platform for blending
- Use implementation and outreach models, driven by data

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Aggregation Creates Security and Depth

- Identify the resource
- Aggregate the resource
- Deliver the resource to investors

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Case Study: Building a Finance Program

- Clean Energy Works
  - Portland, then Oregon
- Skunkworks
- Data analysis to support financing vision

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Residential Retrofits - Portland

ELECTRIC											
MEASUREDESC	Utility	Average Cost	Cost over Measure Life	Levelized Cost ($/kWh)	Average Savings	Utility Savings Y1	Utility Savings Y28	Total Utility Savings for 28 years	LevelizedA Annual Utility Savings	Simple Payback	
SF Air Sealing, Ele Heat	ELE	$ 453.43	$ 10.08	$ 0.01	1,018	94.987	134.72	3300.70	117.88	3.85	
SF Duct Sealing, Ele Heat	ELE	$ 812.57	$ 18.06	$ 0.02	733	68.417	97.037	2377.43	84.908	9.57	
SF Ceiling/Attic Insulation, Ele Heat	ELE	$ 854.78	$ 19.00	$ 0.03	727	67.805	96.168	2356.15	84.148	10.16	
SF Wall Insulation, Ele Heat	ELE	$ 1,134.40	$ 25.21	$ 0.03	908	84.699	120.13	2943.20	105.11	10.79	
SF Floor Insulation, Ele Heat	ELE	$ 1,413.47	$ 31.41	$ 0.03	1,021	95.286	135.14	3311.07	118.25	11.95	
SF Duct Insulation, Ele Heat	ELE	$ 605.92	$ 13.46	$ 0.06	216	20.149	28.577	700.15	25.005	24.23	
SF Heat Pump, Ele Furnace Replacement HSPF 8.1	ELE	$ 8,044.03	$ 446.89	$ 0.18	2,520	235.07	333.41	8168.58	291.73	27.57	
Clothes Washer, MEF 2+, Ele DHW, Ele Dry	ELE	$ 892.60	$ 63.76	$ 0.41	154	14.398	20.421	500.33	17.869	49.95	
Windows SF Ele	ELE	$ 5,112.17	$ 113.60	$ 0.24	479	44.677	63.365	1552.47	55.445	92.20	
Clothes Washer, MEF 2+, Gas DHW, Ele Dry	ELE/GAS	$ 894.24	$ 63.87	$ 0.38	167	15.592	22.114	541.81	19.35	46.21	
Clothes Washer, MEF 2+, Ele DHW, Gas Dry	ELE/GAS	$ 900.90	$ 64.35	$ 0.39	166	15.513	22.002	539.04	19.252	46.80	
		$ 6,167.17							553.18	11.149	

$6,200

11

Commercial Retrofits - Portland

MEASUREDESC	Category	Utility	Average Cost	Total Cost	Average Incentive	Average Savings	Utility Savings Y1	Utility Savings Y28	Total Utility Savings for 28 years	LevelizedA Annual Utility Savings	LevelizedA Annual Utility Savings per Measure	Simple Payback	
Occupancy Sensor, ceiling mount, 180+ watts connected load	Controls	ELE	$ 103.20	$ 309.60	$ 47.36	356	$ 26.71	$ 36.67	$ 899.22	$ 32.12	$ 96.35	3.21	
T5HO4-lamp fixture	Lighting-HO	ELE	$ 307.83	$ 615.66	$ 69.74	909	$ 68.14	$ 93.55	$ 2,294.27	$ 81.94	$163.88	3.76	
New Exit Sign, LED	Exit Sign	ELE	$ 101.85	$ 203.71	$ 15.34	294	$ 22.05	$ 30.27	$ 742.44	$ 26.52	$ 53.03	3.84	
Direct-Fired Convection Oven	Oven	GAS	$ 2,991.56	$ 598.31	$ 842.67	595	$ 682.82	$ 673.66	$ 17,683.25	$ 631.54	$126.31	4.74	
High-pressure sodium or metal halide, more than 175 watts	Lighting-Halide	ELE	$ 314.15	$ 62.83	$ 26.48	656	$ 49.23	$ 67.59	$ 1,657.63	$ 59.20	$ 11.84	5.31	
10 HP Motor	Motor	ELE	$ 611.43	$ 611.43	$ 100.00	1,157	$ 86.80	$ 119.18	$ 2,922.65	$ 104.38	$104.38	5.86	
Ice Machine up to 500 lb	Ice Machine	ELE	$ 2,123.03	$ 424.61	$ 300.00	2,397	$ 179.78	$ 246.83	$ 6,053.18	$ 216.18	$ 43.24	9.82	
2-lamp 4-ft T12 to 2-lamp 4-ft Prem.T8 & Eff. Elec. Ball.	Lighting	ELE	$ 53.92	$ 539.18	$ 14.54	159	$ 11.95	$ 16.41	$ 402.43	$ 14.37	$143.73	3.75	
Freezer (48 ft^3)	Freezer	ELE	$ 3,040.89	$ 608.18	$ 150.00	1,319	$ 98.93	$ 135.82	$ 3,330.82	$ 118.96	$ 23.79	25.56	
Refrigerator (48 ft^3)	Refrigerator	ELE	$ 2,562.23	$ 512.45	$ 150.00	885	$ 66.40	$ 91.17	$ 2,235.84	$ 79.85	$ 15.97	32.09	
			$ 12,210.10	$ 4,485.95		8,728					$782.51	5.733	

$12,200

5.7

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Bundled Retrofits - Portland

Building Type	*Buildings in Project*	*Total Measure Cost*	*Scale Discount*	*Incentives*	*Net Cost*	*Total Annual Savings*	*Project Simple Payback*	*IRR*
Commercial	500	$ 2,242,976				$ 391,254		
SF Residential - Elecric	2500	$ 15,417,917				$ 1,382,950		
SF Residential - Gas	7500	$ 45,250,174				$ 1,701,182		
	10,500	$ 62,911,067		0%	$ 62,911,067	$ 3,475,385	18.1	4%

10,500

18

Activity	Annual Investment (20-year program)	Net Multiplier	Net Regional Economic Impact	Job Factor (per $1M)	Total Job Creation	Tax benefits
Energy Efficiency	$ 63,000,000	1.6	$ 100,800,000	6	378	
Solar	$ 52,000,000	1.9	$ 98,800,000	8	416	
District heating/cooling	$ 15,000,000	1.6	$ 24,000,000	6	90	
	$ 130,000,000		$ 223,600,000		884	$ -

$130,000,000

$223,600,000

884

Why Finance Clean Energy Systems?

- Jobs can't be outsourced
- Increases productivity of energy
- Cost-savings for the community and businesses
- Puts Edmonds in a position to attract private investment

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

The Best Strategies Leverage a Portfolio of Investments

- Blend residential, commercial and public building retrofits for broadest job creation benefits
- Leverage renewable energy investments with energy efficiency investments to shorten pay-back
- Bring in additional dollars by blending public financing options with private investment

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Rapidly Changing Landscape

California

- $3.1B energy efficiency program (September 2009)
- 130,000 homes, 20% reduction, by 2012

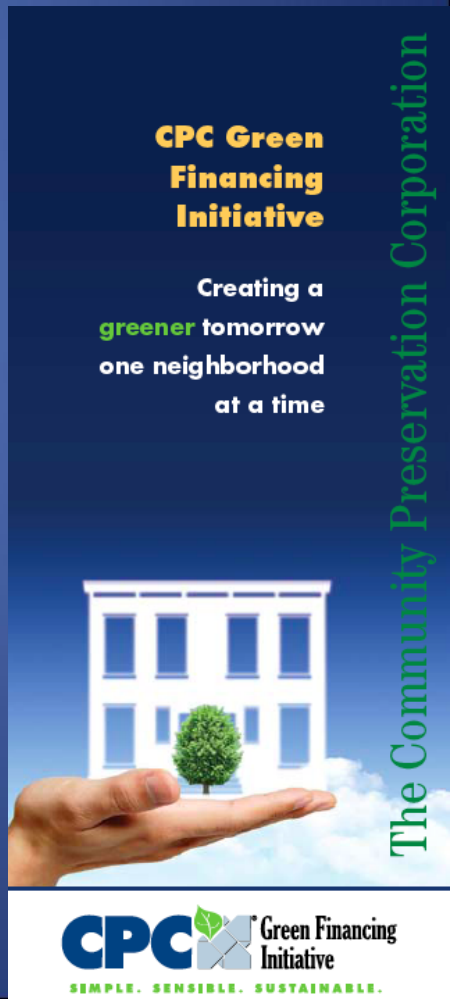
New York initiatives

- CPC ~ $1B, 15,000 housing units, 3 years
- Green New York ~ $5B, 1M homes, 5 years, 16,000 jobs

Oregon initiatives

- EEAST legislation
  - Streamlines building retrofit strategies
  - Pathway for multiple forms of capital, private and public
- Clean Energy Works Portland

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest



Finance

Looking at Edmonds

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Sustainable Works - Edmonds

- Program components in place
  - Neighborhood aggregation efforts - voluntary
  - Audit incentive
  - Loan process & market – 10-15 year terms
  - Credit enhancement
    - Loan rate reduction for moderate incomes
- ARRA seed funding to development program

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Sustainable Works Energy Saving Retrofits Program

- Connects residences and businesses to implementation actors, contractors, and incentives & financing
- Catalyzes community demand
- Creates a stream of data for future innovation

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Sustainable Works – Additional Points

- Facilitation as important as financing
  - Often overlooked by jurisdictions
- Size of loan matters in consumer loan model
  - Portland CEW has shown larger than expected loans at ~ $10K
- Administration/planning can eat into savings "delta"
  - Economies of scale possible with community scale ESIPs
- Underwriting critical – LRFs linked to mortgages piggyback on collateral

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Building to Scale

- Sustainable Works uses public dollars for leverage; scaling requires stream of low cost capital
  - Snohomish County EECBG Partnership
- Data stream and work with SnoPUD/PSE opens door to scaling opportunities
- Scaling requires:
  - Unified, facilitated flow of low cost capital
  - QA linked to capital requirements
  - Capital linked to appropriate returns in aggregation

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

New Energy Cities

Pioneering the Clean Energy Economy in the Northwest