

Nathan Phelps



Program Manager, DG Regulatory Policy

Evaluating the Benefits and Costs of Solar PV



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Vote Solar Info



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- > We work for all types of solar power
- > We work at the state level
- > We work with policymakers
- > We work with local advocates
- > We work with people (that's you!)

Founded in 2002, Vote Solar is a non-profit organization working to make solar a mainstream energy resource across the U.S.

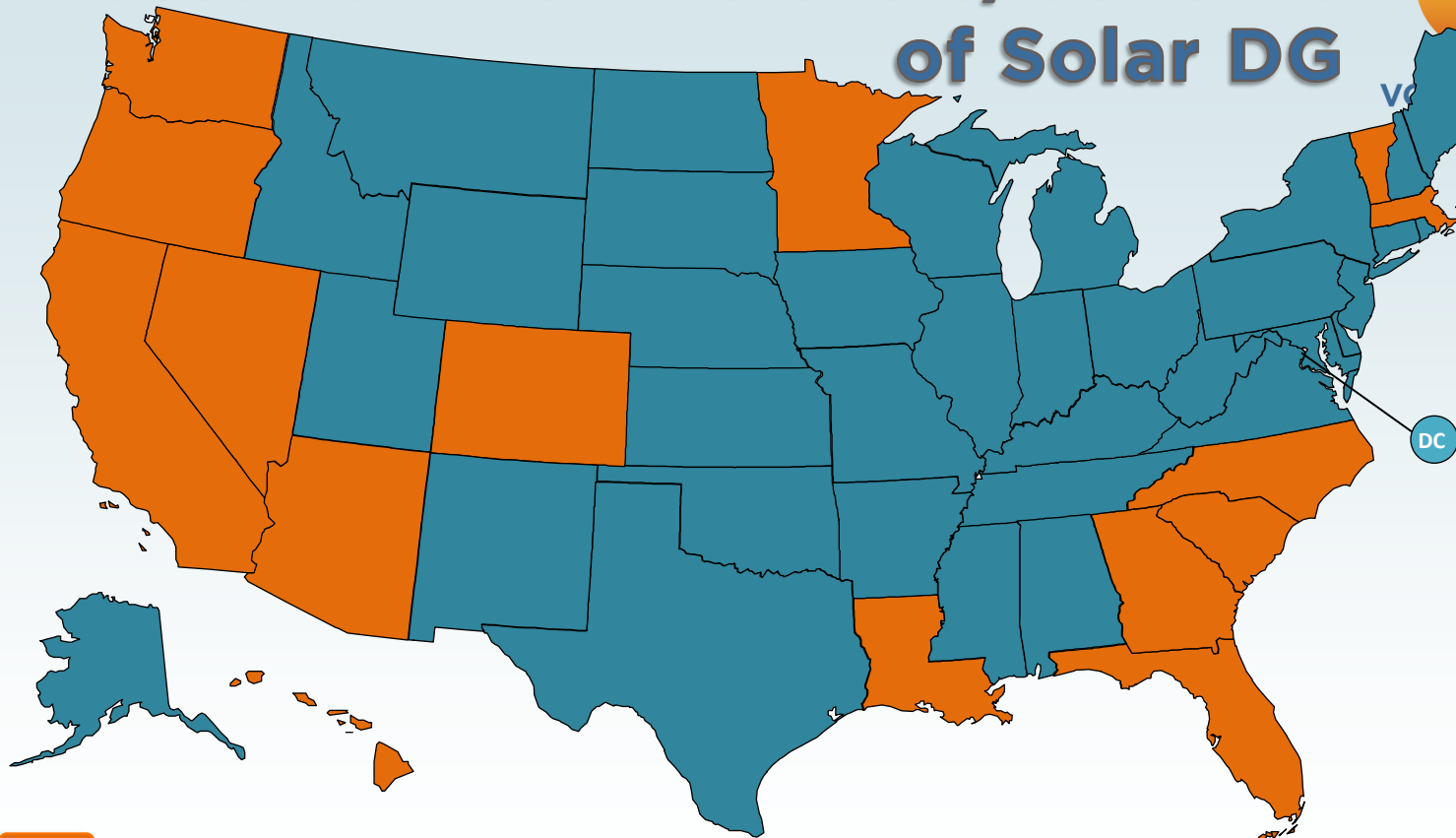
Outline

- Intro
- Costs & Benefits
- Case Study
- Conclusion

Assessments of the costs/benefits of Solar DG



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 C/B, or solar valuation assessment underway or expected to start in 2014

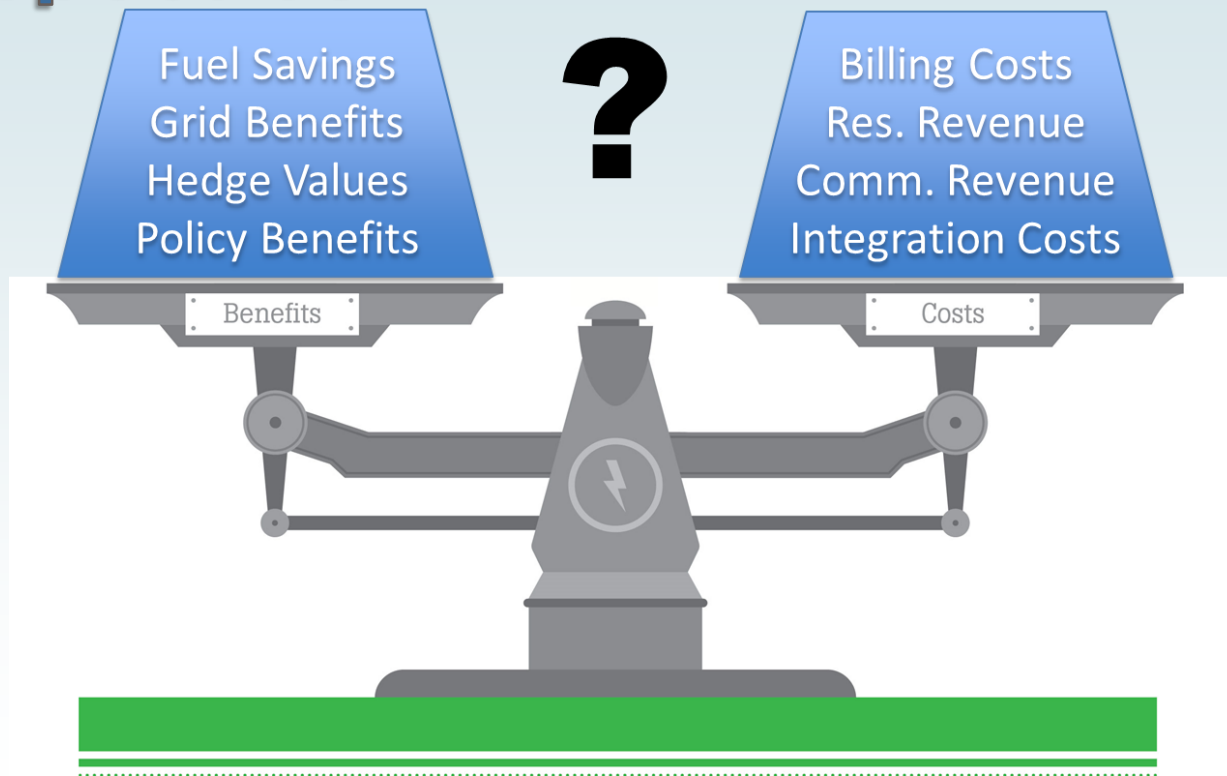
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C/B from the *Ratepayer's* Perspective



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Outline

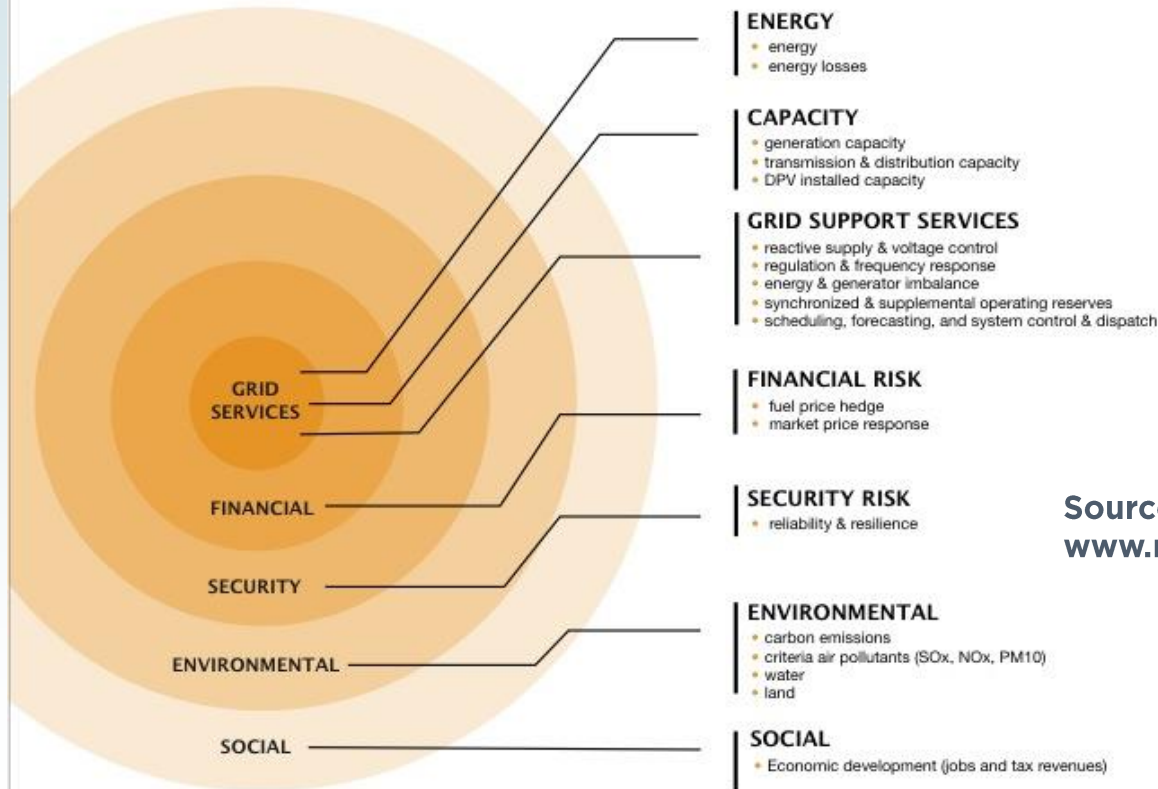
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BENEFIT & COST CATEGORIES

For the purposes of this report, **value is defined as net value, i.e. benefits minus costs**. Depending upon the size of the benefit and the size of the cost, value can be positive or negative. A variety of categories of benefits or costs of DPV have been considered or acknowledged in evaluating the value of DPV. Broadly, these categories are:



Source:
www.rmi.org/elab



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EE Correlation

» States use C/B analyses for EE

- > Great *starting* point for PV

» Avoided Energy Supply Costs Report

- > Used by the New England States
- > Updated every two years
- > Already evaluates many of the benefits associated with PV

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Avoided Energy Supply Costs in New England: 2013 Report

Prepared for the Avoided-Energy-Supply-Component
(AESC) Study Group

July 12, 2013

AUTHORS

Rick Hornby
Paul Chernick
David White, PhD
John Rosenkranz
Ron Denhardt
Elizabeth A. Stanton, PhD
Jason Gifford
Bob Grace
Max Chang
Patrick Luckow
Thomas Vitolo, PhD
Patrick Knight
Ben Griffiths
Bruce Biewald



Synapse
Energy Economics, Inc.

485 Massachusetts Avenue, Suite 2
Cambridge, Massachusetts 02139

617.661.3248 | www.synapse-energy.com

CO Case Study

Xcel Reviews Rooftop Solar Costs & Benefits



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Table 1 Categorization of Levelized Net Avoided Costs

	Low Gas		Base Gas		High Gas	
	\$/MWh	%	\$/MWh	%	\$/MWh	%
Avoided Energy Costs	\$ 35.80	55%	\$ 52.10	63%	\$ 76.10	69%
Fuel Hedge Value	6.60	10%	6.60	8%	6.60	6%
Avoided Emissions Costs	5.10	8%	5.10	6%	5.10	5%
Avoided Capacity & FOM Costs	11.50	18%	11.50	14%	11.50	11%
Avoided Distribution Upgrades	0.50	1%	0.50	1%	0.50	0%
Avoided Transmission Upgrades	0.20	0%	0.20	0%	0.20	0%
Avoided Line Losses	4.70	7%	6.20	8%	8.30	8%
Solar Integration Costs	(0.50)		(1.80)		(4.40)	
Net Avoided Cost	\$ 63.90	100%	\$ 80.40	100%	\$ 103.90	100%
Generation	\$ 58.50	92%	\$ 73.40	92%	\$ 94.90	91%
Transmission	2.50	4%	3.20	4%	4.30	4%
Distribution	2.90	5%	3.60	4%	4.60	4%
Net Avoided Cost	\$ 63.90	100%	\$ 80.20	100%	\$ 103.80	100%

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CO Case Study

We took a closer look at the math in Xcel's study...

Table 1: *Summary of Benefits Assessed in PSCo's DSG Study*

Benefits to PSCo Ratepayers	Fully Valued	Undervalued	Not Included
Energy			
Avoided energy (including fuel)	✓		
Avoided T&D line losses	✓		
Capacity			
Avoided generation capacity		✓	
Avoided T&D capacity and fixed O&M		✓	
Grid support services			✓
Financial			
Fuel Hedging	✓		
Avoided RPS or renewables costs			✓
Grid security and resiliency			✓
Environmental			
Air pollutants (NO _x , SO _x , PM, & CO ₂)		✓	
Reduced water usage in power production			✓
Avoided land costs for generation or T&D			✓
Societal benefits (not direct ratepayer benefits)			
Job creation benefits			✓
Economic development, including local taxes			✓
Avoided health impacts			✓

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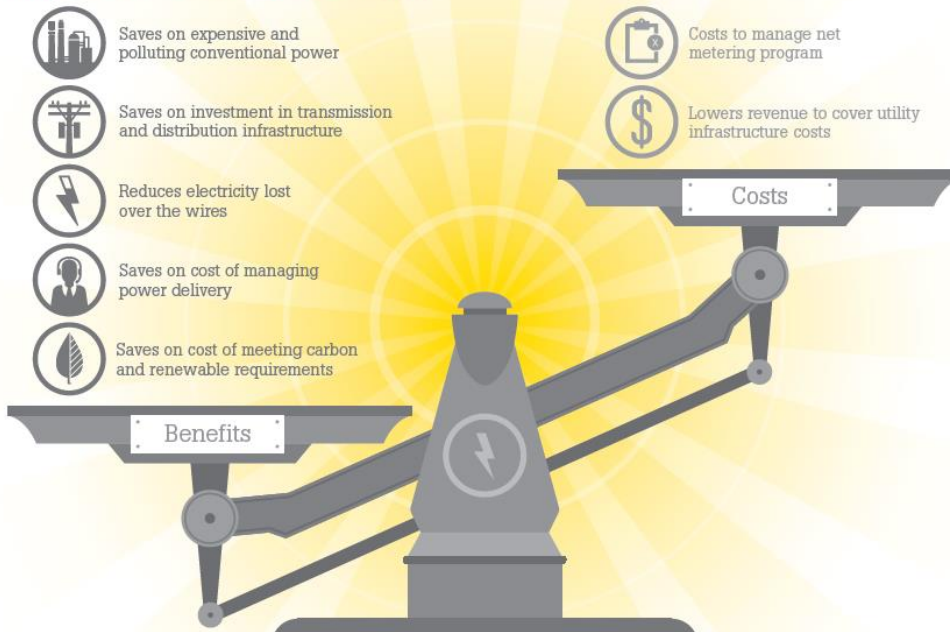
CO Case Study

Our conclusion: net metering is a net benefit



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Private investment in local clean energy benefits solar and non-solar Coloradans alike.



Totalling up to **\$11 Million** in annual net benefits.

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CO Case Study Result



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- » **Vote Solar helped bring attention to this issue**
- » **Xcel's study is thrown out**
- » **A new evaluation is started with regulatory oversight**





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Additional Thoughts

» Rate structures

- > Closely tie cost recovery with cost incurrence

» Self-consumption v. exports

- > kWh generated and used on-site is no different than any other load-reducing activity or technology

» Allow for innovative technologies

- > DR, CHP, storage, microgrids etc.

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Big Picture

» Take comprehensive view

- > Beyond residential customers
- > Beyond IOU available information

» EE evaluations are a template

- > No need to start from scratch
- > Adapt existing EE analyses (where available)

» Costs and benefits to the ratepayers!

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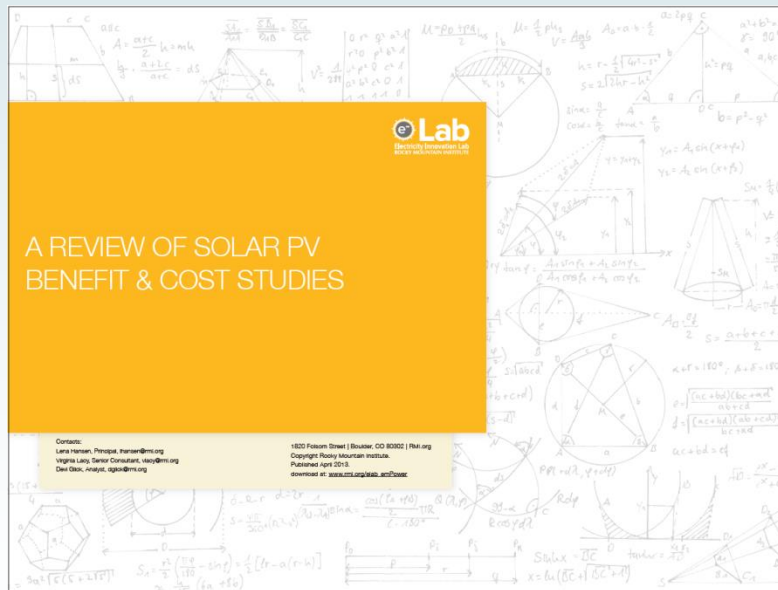
Resources



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A REGULATOR'S GUIDEBOOK: Calculating the Benefits and Costs of Distributed Solar Generation

Interstate Renewable Energy Council, Inc.



Thank you



Nathan Phelps

**Program Manager
DG Regulatory Policy**

Boston Office

(860) 478-2119

nathan@votesolar.org



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