Northwest Solar Communities

Making solar simpler, faster, more cost-effective

March, 11 2015

Energy Trust of Oregon
RAC Meeting

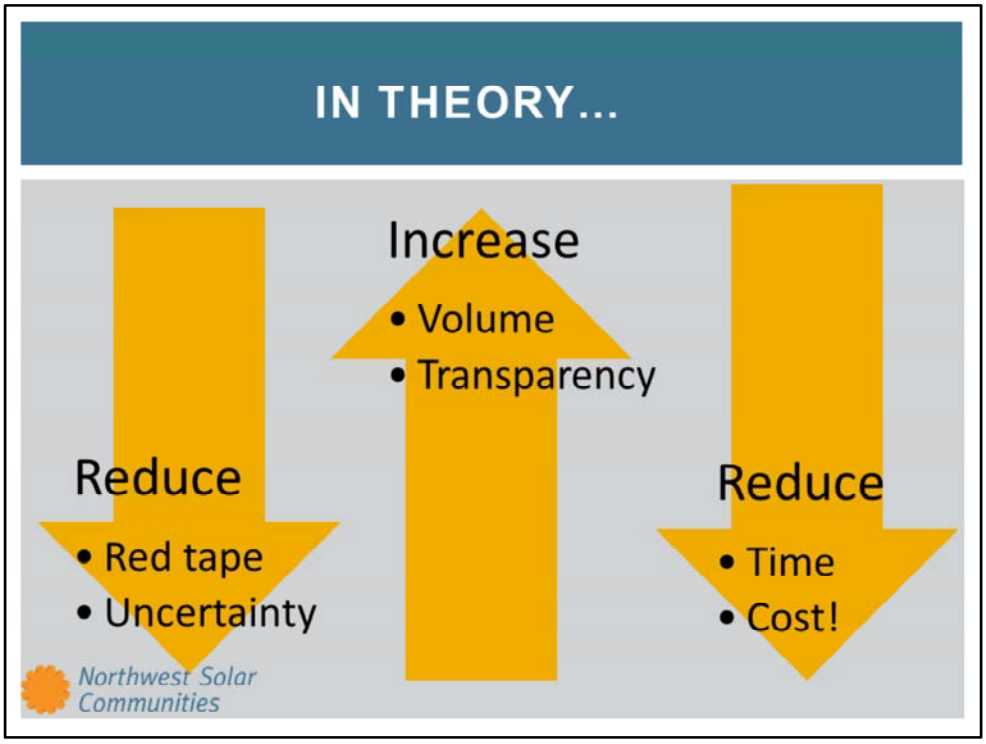
Rob Del Mar
ODOE

Matt Hale
ODOE

Linda Irvine
Northwest SEED

Powered by SunShot
U.S. Department of Energy


CHALLENGE: CUT SOFT COSTS
Permitting
Inter-
connection
Financing
Planning &
Zoning
National Best Practices - Local Implementation


IN THEORY…
Increase
• Volume
• Transparency
Reduce
• Red tape
• Uncertainty
Reduce
• Time
• Cost!
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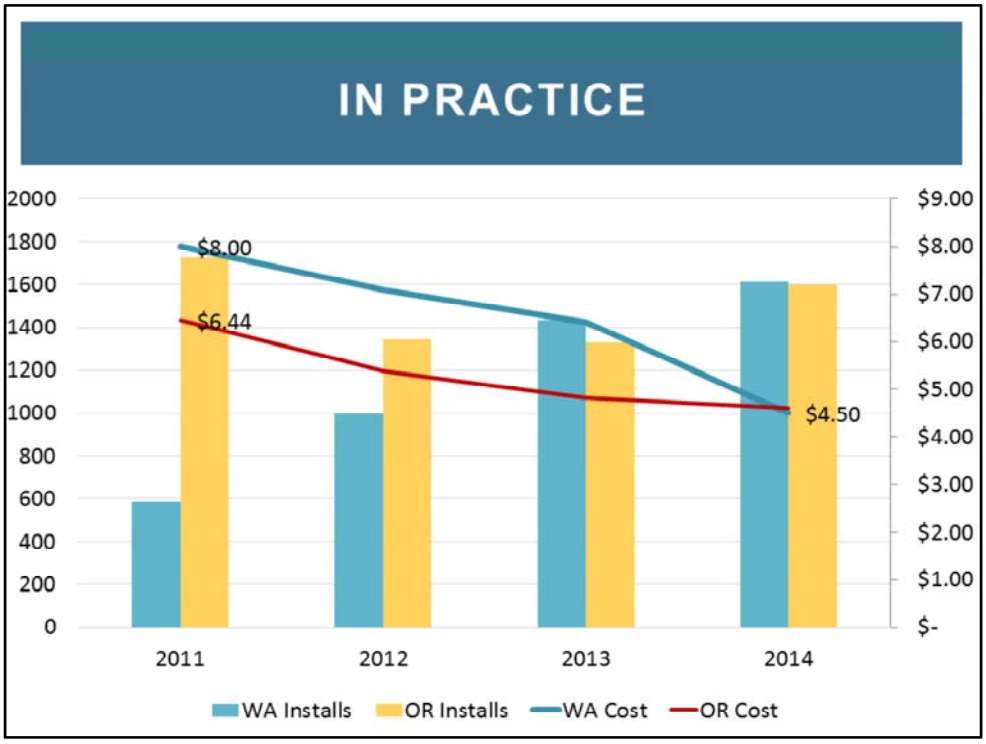
IN PRACTICE
2000
1800
1600
1400
1200
1000
800
600
400
200
0
$9.00
$8.00
$7.00
$6.00
$5.00
$4.00
$3.00
$2.00
$1.00
$-
$8.00
$6.44
$4.50
2011
2012
2013
2014
WA Installs
OR Installs
WA Cost
OR Cost

OUR APPROACH

- Convene Work Groups
- Share Best Practices
- Create Tools & Templates: "Toolkit"
- Support Adoption
- Recognize Progress

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TOOLS & TEMPLATES

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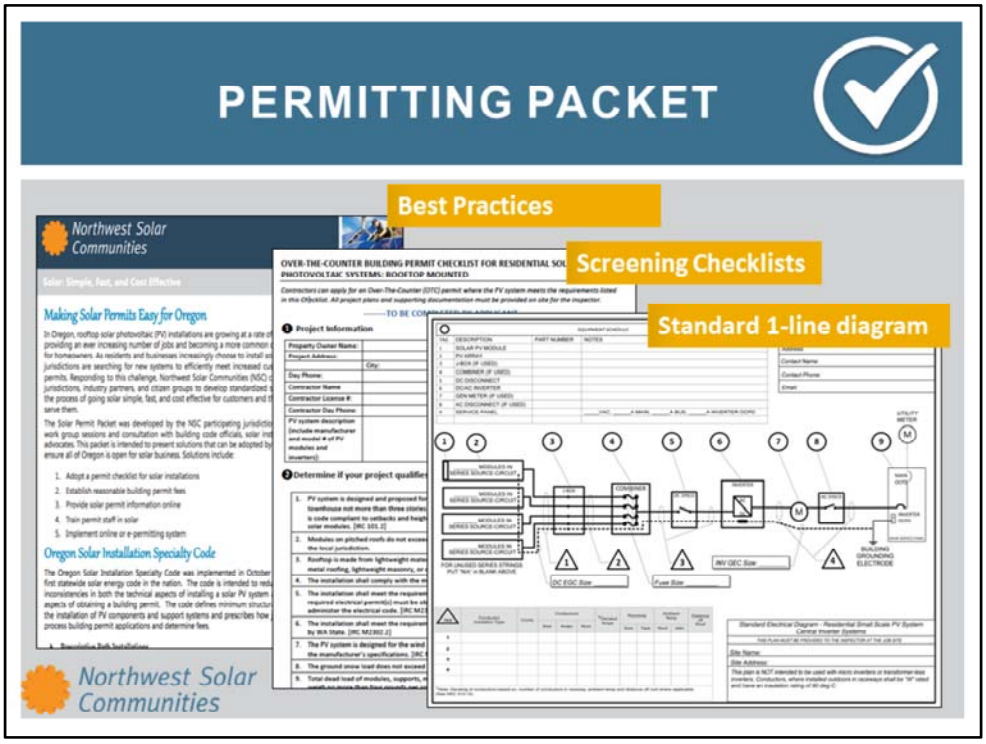
PERMITTING PACKET
Best Practices
Screening Checklists
Standard 1-line diagram
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Making Solar Permits Easy for Oregon
Oregon Solar Installation Specialty Code
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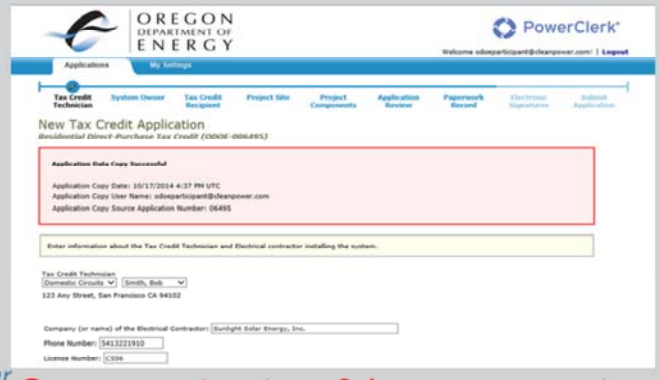
STREAMLINED INCENTIVES

- PowerClerk for Tax Credit
- Next Up: Interconnection Application?



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Saves contractors 2 hours per customer

GRANTS & TRAINING

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PLANNING SUPPORT

- White Papers
  - Solar in Condominiums
  - Solar & Development Regulations
  - Solar in Comprehensive Plans
  - Solar Ready Construction
- Presentations by Work Group members
  - Regional Planner Meetings
  - Regional Collaborations

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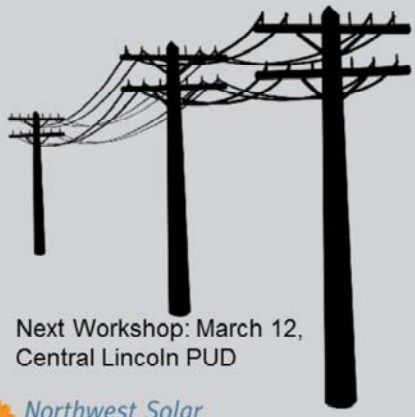
HOMEOWNER ASSOCIATION HELP

INTERCONNECTION SUPPORT

Workshops for Engineers



Next Workshop: March 12,
Central Lincoln PUD

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Best Practices

EXAMPLE: CITY OF HILLSBORO

- ✓Checklist for expedited permit
- ✓Waived permit fee (since 2007)
- ✓Solar specific web page
- ✓Piloting MapDwell
- ✓Online permitting

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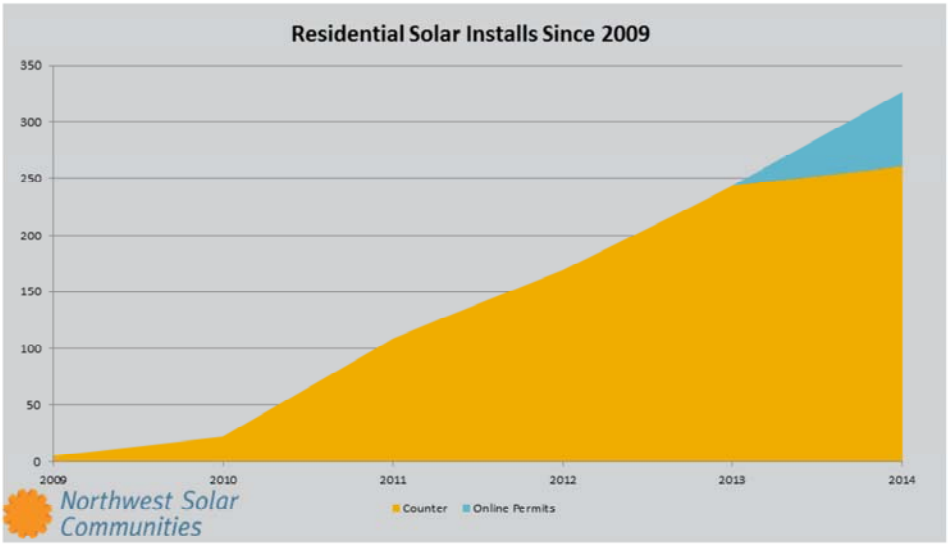
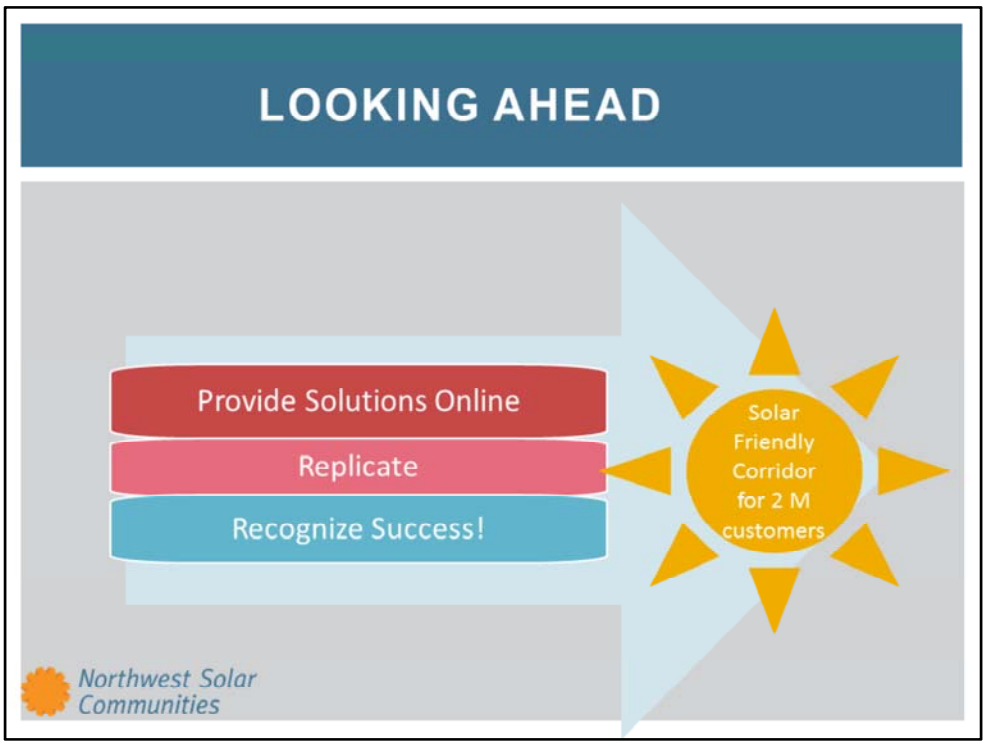
OVER 300 RESIDENTIAL SOLAR PERMITS!



Slide 14

LI7 This information is from Edmonds, WA. Needs updating
Linda Irvine, 3/4/2015

Matt: If your jurisdiction would like to copy Hillsboro, we have the tools to do it, all on our project website, nwsolarcommunities.org., you'll find tools for every area of soft cost reductions.


LOOKING AHEAD
Provide Solutions Online
Replicate
Recognize Success!
Solar Friendly Corridor for 2 M customers
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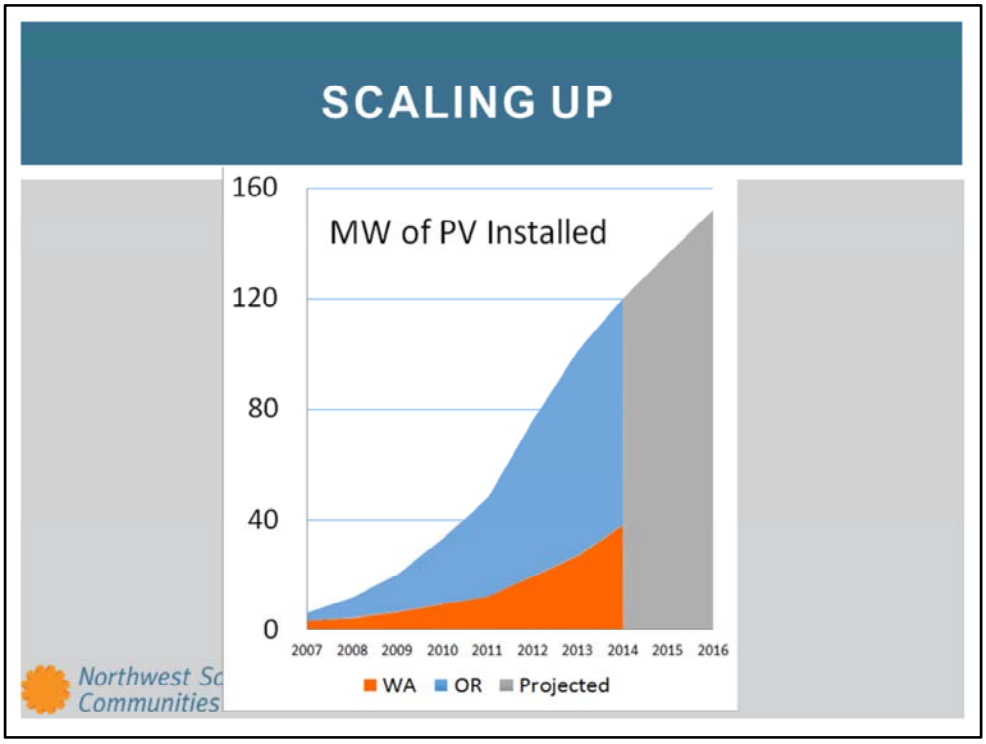

Linda: As you can see in this graph of cumulative megawatts installed in Oregon (blue) and Washington (orange), we are on track to exceed our goal of doubling installed capacity between 2012 and 2016. Doubling the installed capacity will help bring installations to scale and drive down costs. We're at 120 MW, well on our way to exceed 152 MW by end of 2016.

Baseline 2012: 56 MW in OR and 20 MW in WA. (76 total) Now, 2015: 82 MW in OR and 38 MW in WA (120)

Does not count the industrial (large scale) installations.

QUESTIONS? THANK YOU!

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Northwest Solar Communities

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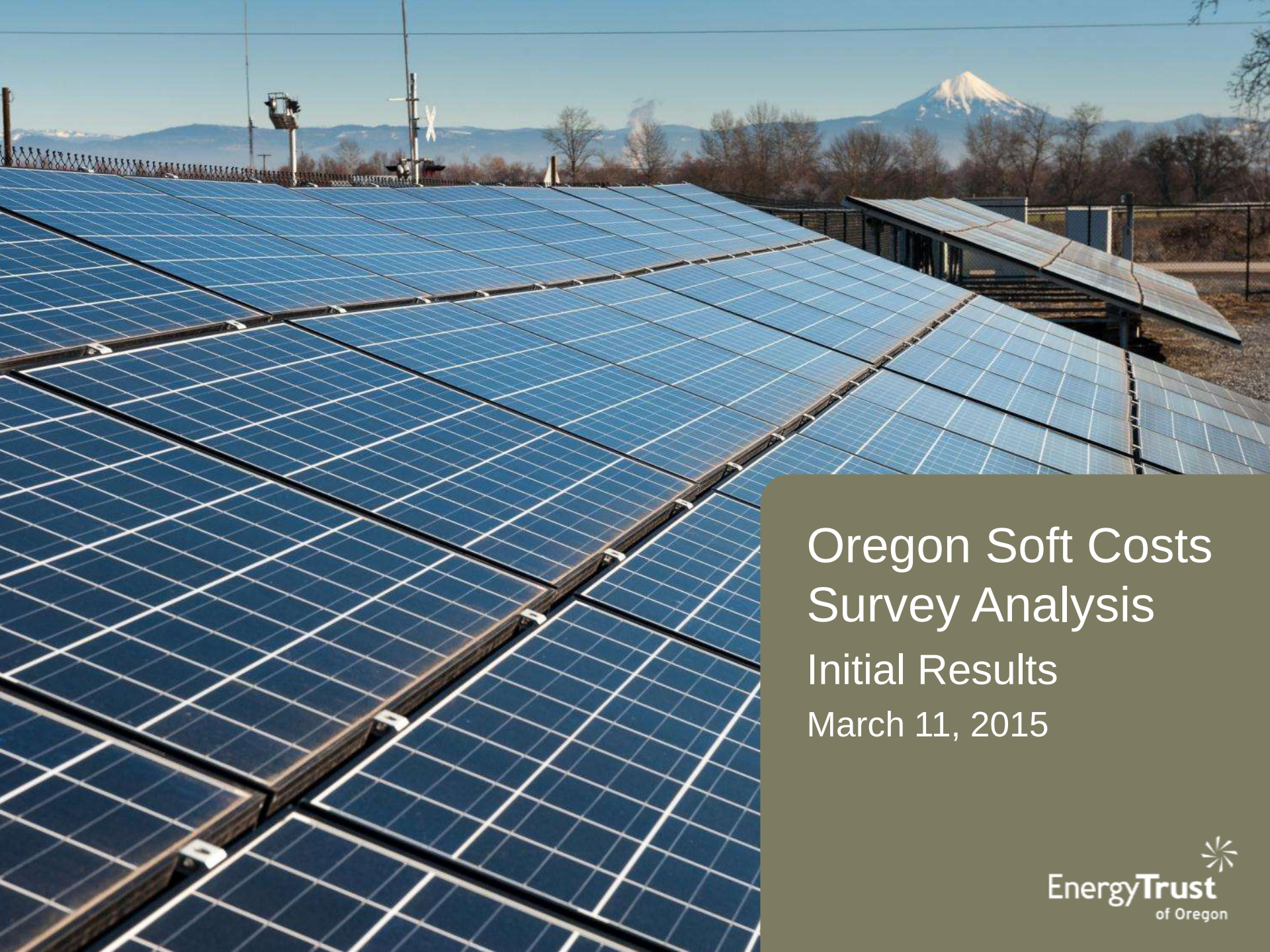


Oregon Soft Costs Survey Analysis

Initial Results

March 11, 2015

Energy Trust of Oregon

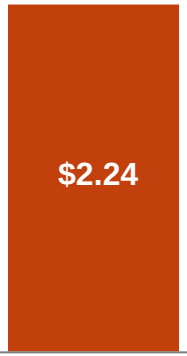
NREL Soft Costs Reduction Roadmap

Charts a pathway to achieve the DOE SunShot targets for installed system prices of $1.50 per Watt for residential systems and $1.25 per Watt for commercial systems by 2020. Published in August 2013

Realizable
Low Uncertainty
Medium Uncertainty
High Uncertainty

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Customer Acquisition ($/W)	$0.67	--	$0.48	$0.53	$0.49	$0.45	$0.41	$0.36	$0.28	$0.19	$0.12
PII+I ($/W)	$0.20	--	$0.19	$0.18	$0.16	$0.15	$0.13	$0.11	$0.10	$0.06	$0.04
Installation labor ($/W)	$0.59	--	$0.55	$0.51	$0.46	$0.42	$0.36	$0.30	$0.24	$0.19	$0.12
Other Soft Costs ($/W)	$1.86	--	$2.10	$1.30	$1.14	$0.97	$0.82	$0.68	$0.56	$0.48	$0.37
Total Soft Costs ($/W)	$3.32	--	$3.32	$2.52	$2.25	$1.99	$1.72	$1.45	$1.18	$0.92	$0.65
Hardware Costs ($/W)	$3.28		$1.90	$2.47	$2.24	$2.00	$1.77	$1.55	$1.32	$1.08	$0.85
Total System Costs ($/W)	**$6.60**	**--**	**$5.22**	**$4.99**	**$4.49**	**$3.99**	**$3.49**	**$3.00**	**$2.50**	**$2.00**	**$1.50**

Solar Cost Categories

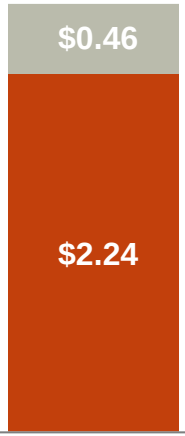


	NREL Solar Roadmap 2014 Forecast
Other Soft Costs ($/W)	$1.14
Customer Acquisition ($/W)	$0.49
PII+I ($/W)	$0.16
Installation labor ($/W)	$0.46
Hardware Costs ($/W)	$2.24
Installed Cost ($/W)	$4.49

Hardware Costs

- Modules
- Inverter
- Racking
- Electrical Components

Solar Cost Categories



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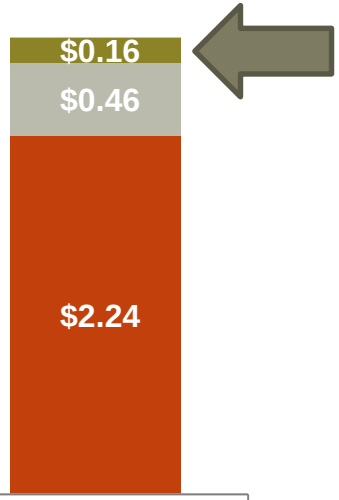
Installation Labor

- Licensed electrical and non-electrical installation labor hours

Solar Cost Categories



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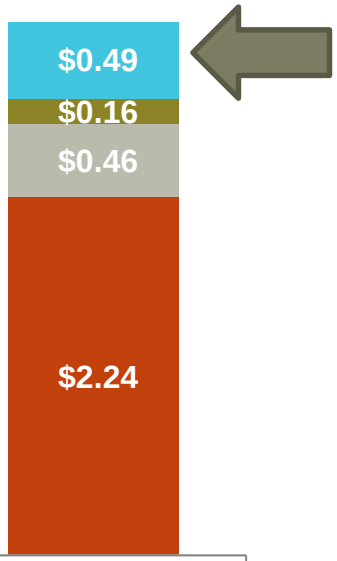
Permitting, Inspection, Interconnection & Incentive (PII+I)

- Preparing install packet
- Submitting packet to utility, ODOE, Energy Trust, and permitting agency
- Meeting inspector, utility technician or solar program verifier

Solar Cost Categories



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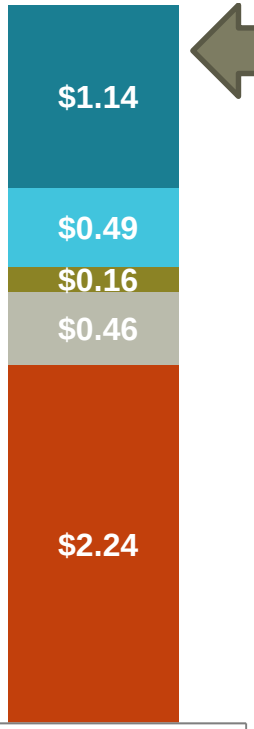
Customer Acquisition

- Marketing & Advertising
- Lead generation
- Sales Calls
- Bid Preparation
- Contract Negotiation
- System Design

Solar Cost Categories



'Other' Soft Costs

- Installer Profit
- Installer Overhead
- Transaction Costs
- Supply Chain Costs
- Sales Tax

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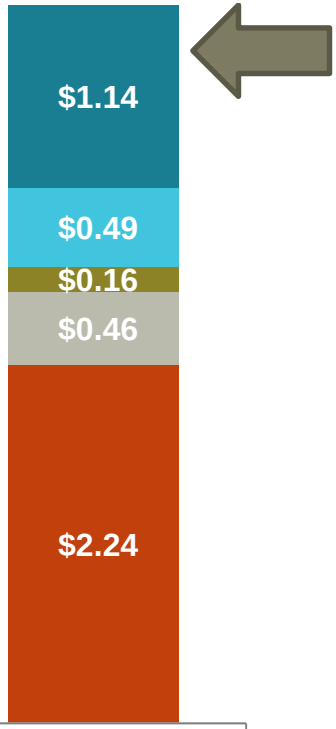

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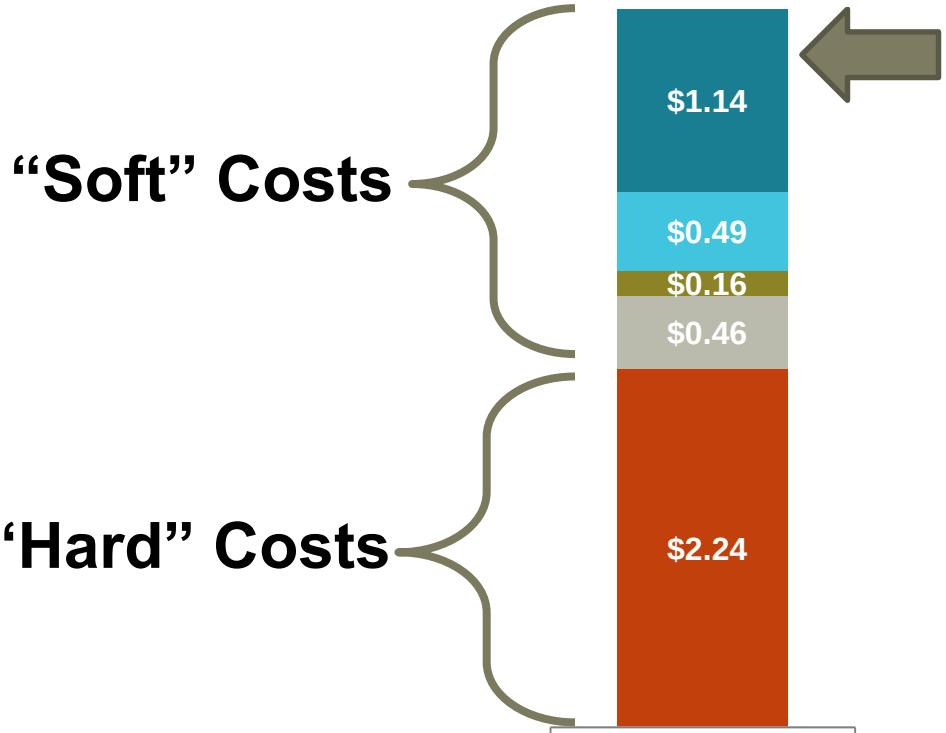
'Other' Soft Costs

- Installer Profit
- Installer Overhead
- Transaction Costs
- Supply Chain Costs
- Sales Tax
- Unaccounted customer acquisition cost
- Rework due to poor quality management
- Inefficiencies in process
- Project cost overruns
- …

Solar Cost Categories



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‘Other’ Soft Costs

- Installer Profit
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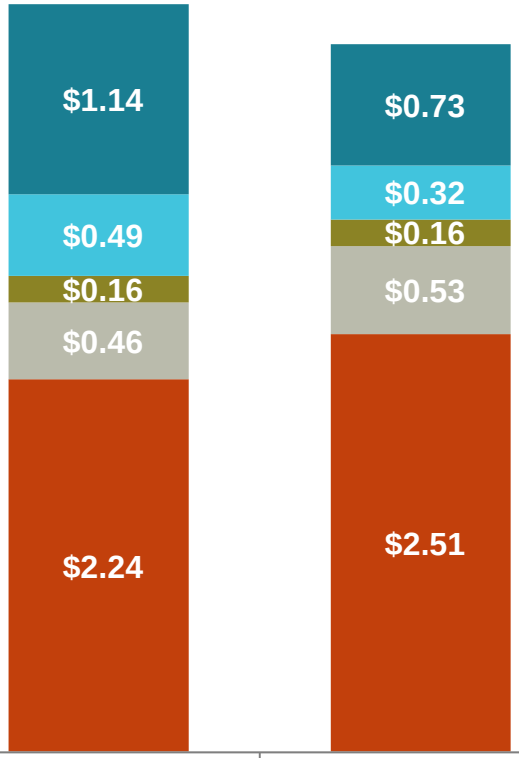
- Rework due to poor quality management
- Inefficiencies in process
- Project cost overruns
- …

Oregon Solar Soft Costs Survey

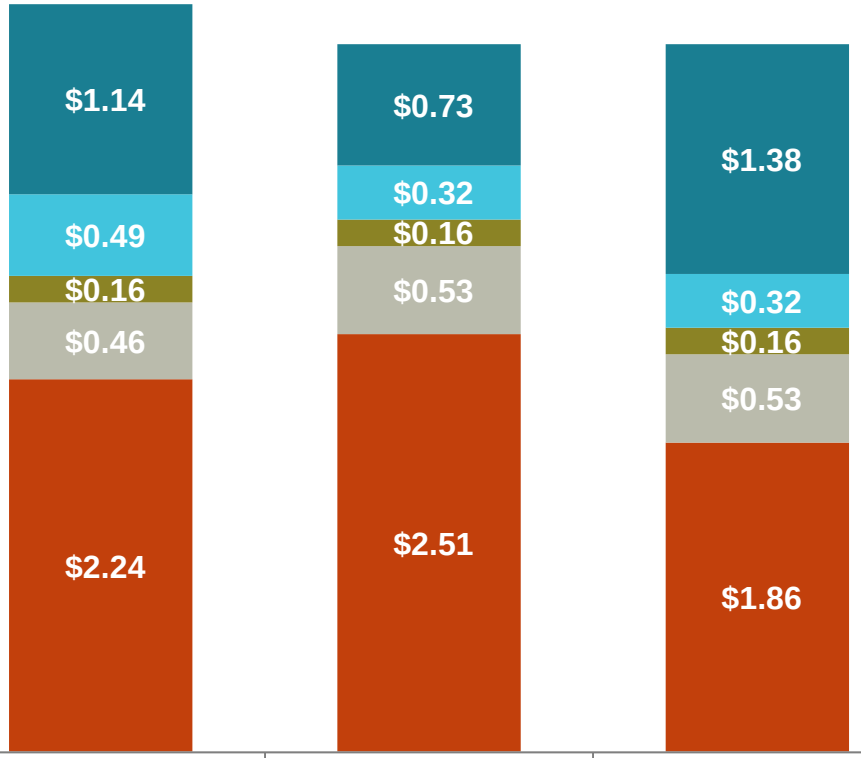
- Modelled after NREL installer surveys
- Surveyed period - Q1 & Q2 2014
- 15 Trade Ally contractors responded
- 566 Installations over 26 Oregon counties
- Average survey completion time = 1 hour
- Support provided by Green Energy Institute, ODOE, and NREL throughout the process

Survey data as reported



	NREL Solar Roadmap 2014 Forecast	Oregon Soft Costs Survey (Reported)
Other Soft Costs ($/W)	$1.14	$0.73
Customer Acquisition ($/W)	$0.49	$0.32
PII+I ($/W)	$0.16	$0.16
Installation labor ($/W)	$0.46	$0.53
Hardware Costs ($/W)	$2.24	$2.51
Installed Cost ($/W)	$4.49	$4.25

Survey data once adjusted



	NREL Solar Roadmap 2014 Forecast	Oregon Soft Costs Survey (Reported)	Oregon Soft Costs Survey (Adjusted)
Other Soft Costs ($/W)	$1.14	$0.73	$1.38
Customer Acquisition ($/W)	$0.49	$0.32	$0.32
PII+I ($/W)	$0.16	$0.16	$0.16
Installation labor ($/W)	$0.46	$0.53	$0.53
Hardware Costs ($/W)	$2.24	$2.51	$1.86
Installed Cost ($/W)	$4.49	$4.25	$4.25

Key Takeaways

1. Oregon PII+I is in line with NREL forecast
2. Customer acquisition is the next largest defined category with realizable cost reduction opportunities
3. “Other” soft costs are not well understood or well defined
4. Individual solar cost categories may not be the best metric with which to gauge success

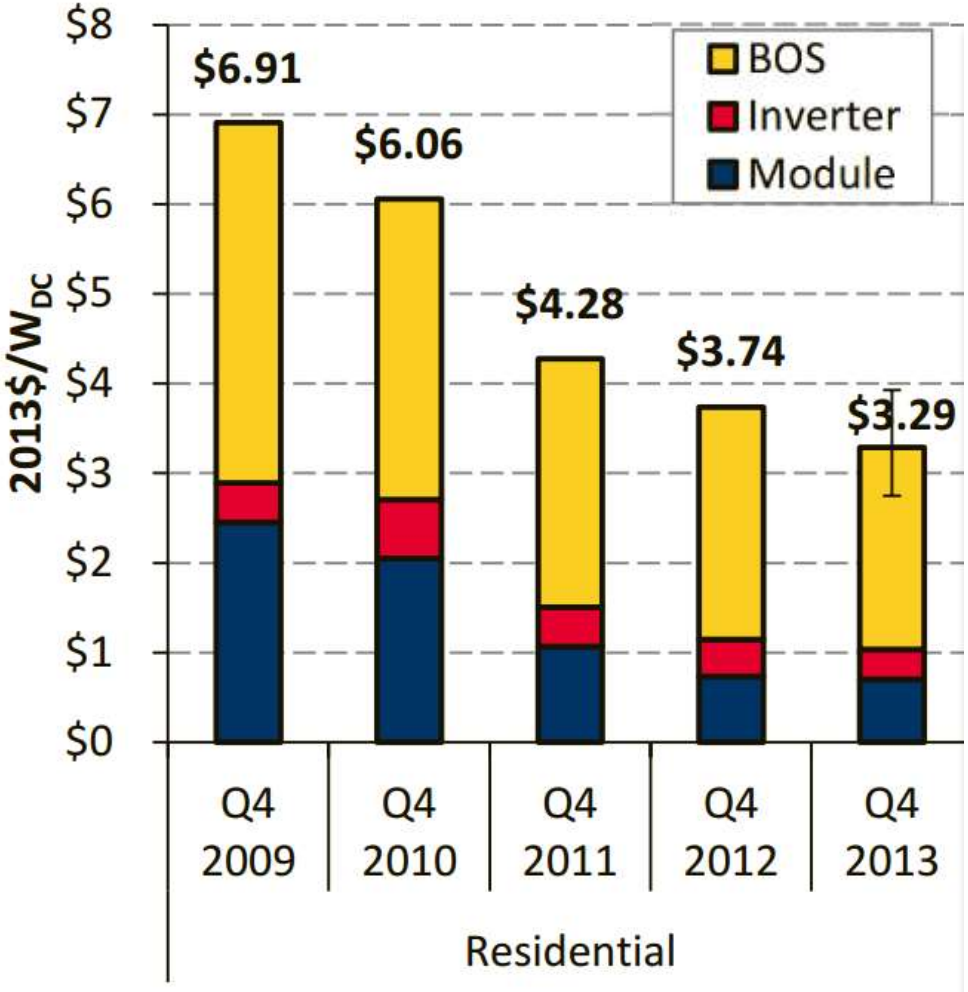
Next Steps

1. Continue working to decrease soft costs
2. Finalize analysis and publish survey report
3. Work with Green Energy Institute to compare Oregon solar market to other states
4. Advertise RFP for an Oregon specific Solar Soft Cost Roadmap

Questions?

Energy Trust of Oregon

Bottom-up Modeled System Price



- Since Q4 2009 modeled system prices have fallen between 16%-19% per year. (Largely due to module price reduction)
- Modeled PV system prices quoted in Q4 2013 and expected to be installed in 2014.