Draft 2017 Annual Budget & 2017-18 Action Plan

October 21, 2016

Energy Trust of Oregon

Today's Presentation

Projected 2016 Results

Building Blocks

Draft 2017-2018 Action Plan Highlights

Draft 2017 Budget

Discussion and Feedback

Next Steps

14 Years of Affordable Energy

From Energy Trust's investment of $1.3 billion in utility customer funds:

Nearly 600,000 sites transformed into energy-efficient, healthy, comfortable and productive homes and businesses

10,000 clean energy systems generating renewable power from the sun, wind, water, geothermal heat and biopower

$5.6 billion in savings over time on participant utility bills from their energy-efficiency and solar investments

17.4 million tons of carbon dioxide emissions kept out of our air, equal to removing 3 million cars from our roads for a year

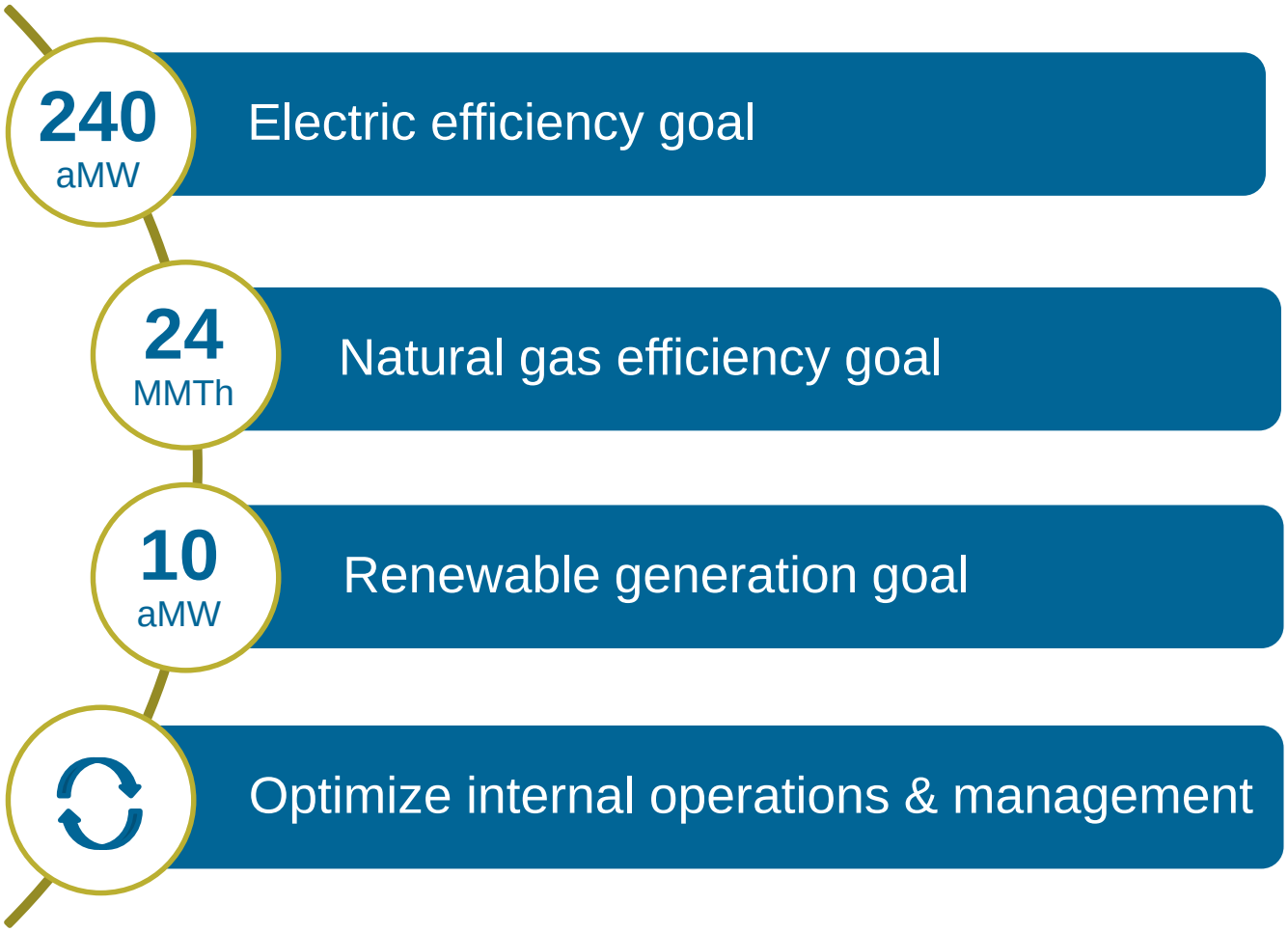
Projected 2016 Results

- ✓ Forecasting to exceed savings goals for all utilities
- ✓ Expenditures are up; levelized costs remain low
- ✓ Two large renewable energy projects are delayed, causing generation shortfall
- ✓ Projecting reserves will be reduced by $36.8 million—more than planned
- ✓ Large pipeline of projects
- ✓ Avista collaboration on track

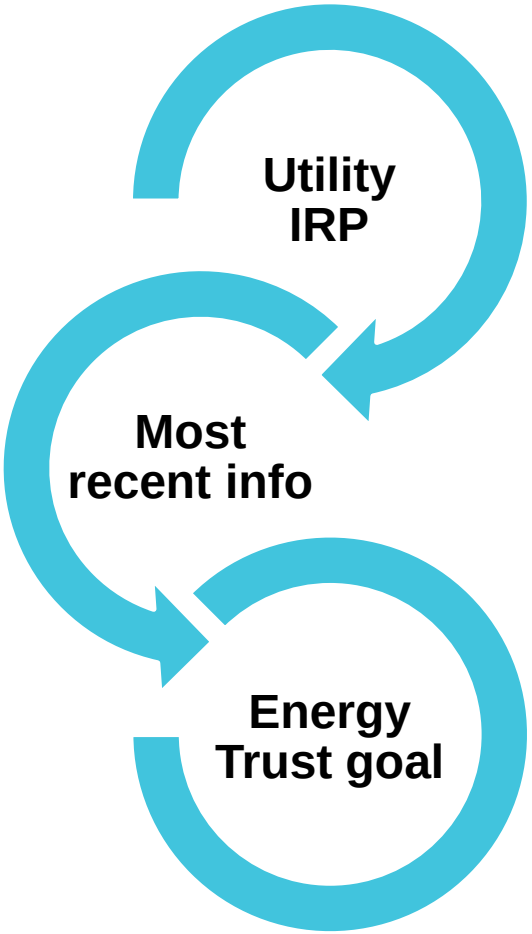
Budget & Action Plan Building Blocks

Building Blocks for Budget & Action Plan

2015-2019 Strategic Plan Goals



Budget and Action Plan Annual Goals

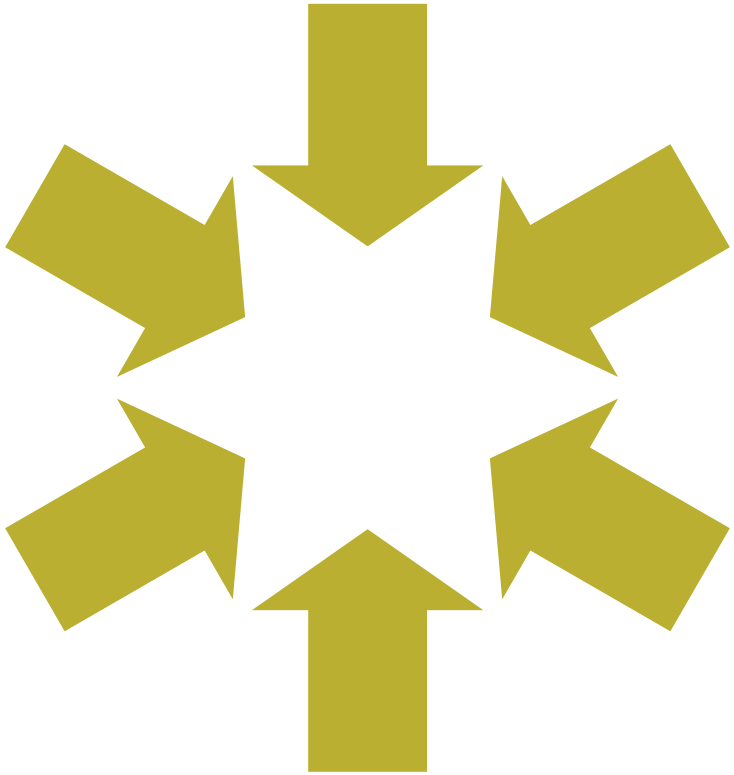


- Energy Trust annual savings goal for each utility approximates Integrated Resource Plan (IRP) target
- Two year IRP cycle
- Energy Trust goal can be higher because of new information
- Utilities file tariffs to collect funding necessary for Energy Trust to meet goal

Budget and Action Plan Context

Stronger economy, driving project volume

Key unknowns for 2018 programs



More challenging business case

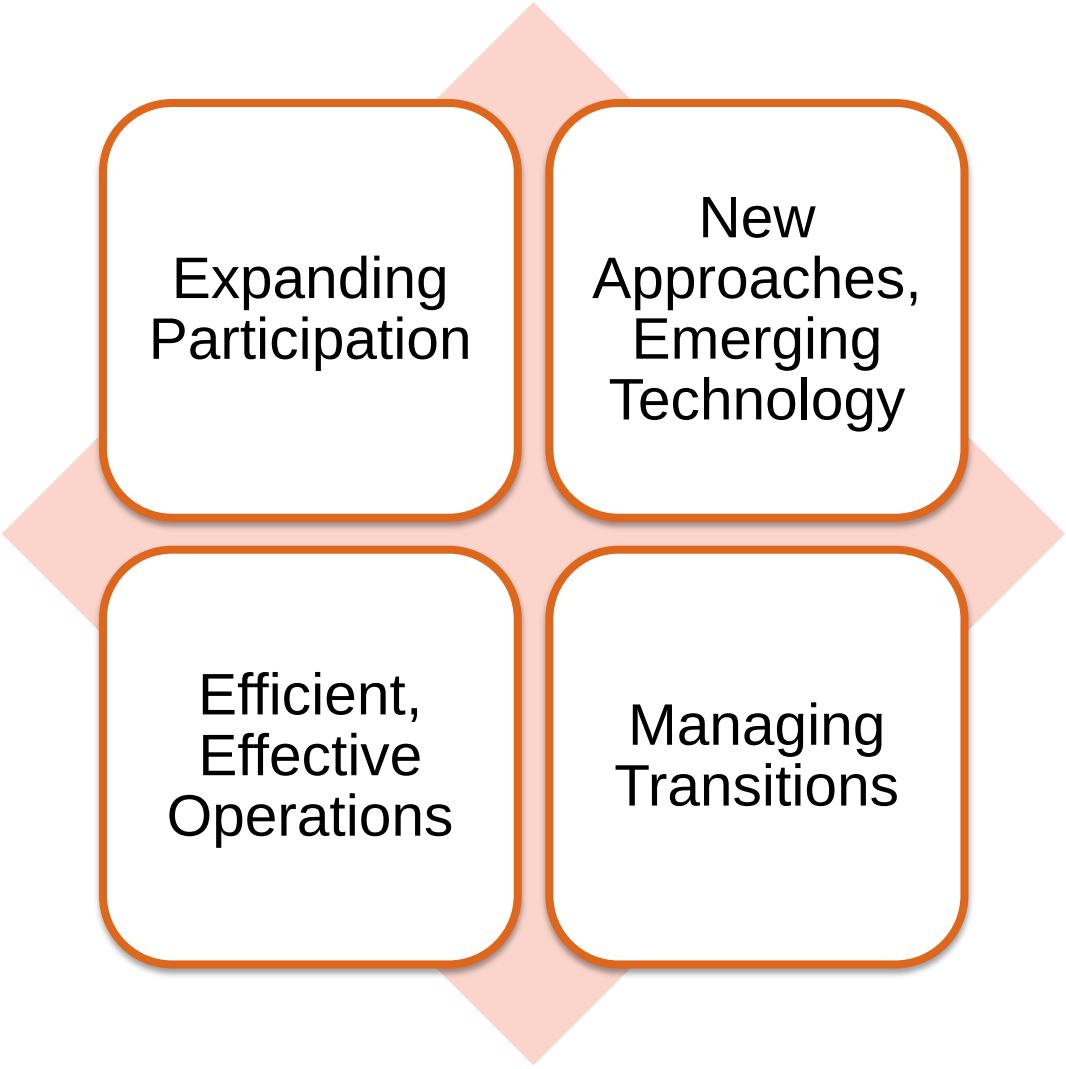
Active policy landscape

Avoided costs

- Stable for efficiency
- Lower for renewables

Oregon is diversifying demographically

Areas of Emphasis



Draft 2017-2018 Action Plan Highlights

Expanding Participation

- Continuing successful 2016 activities
- Growing program outreach and adding business trade allies
- Increasing upstream, retail and direct installation approaches
- Enhancing stakeholder and community engagement
- Continuing strategies to reach rural customers
- Expanding informational resources for customers and capacity to respond
- More market research and planning

New Approaches, Emerging Technology

- Supporting new markets
  - Cannabis production
  - Emission control technologies
  - Energy performance management approaches
  - Smart thermostats and utility-led demand response
- Implementing pilots
  - 8 approved and 4 pending
- Investing in NEEA efforts
- Exploring roles in new areas
- Developing educational approaches

Managing Transitions

- Responding to solar policy decisions
- Expanding project development
- Responding to rapidly changing LED market
- Implementing measure changes
- Implementing residential changes
- Engaging trade allies proactively
- Offering Avista customers full range of programs
- Continuing outreach to complete Executive Director transition

Efficient, Effective Operations

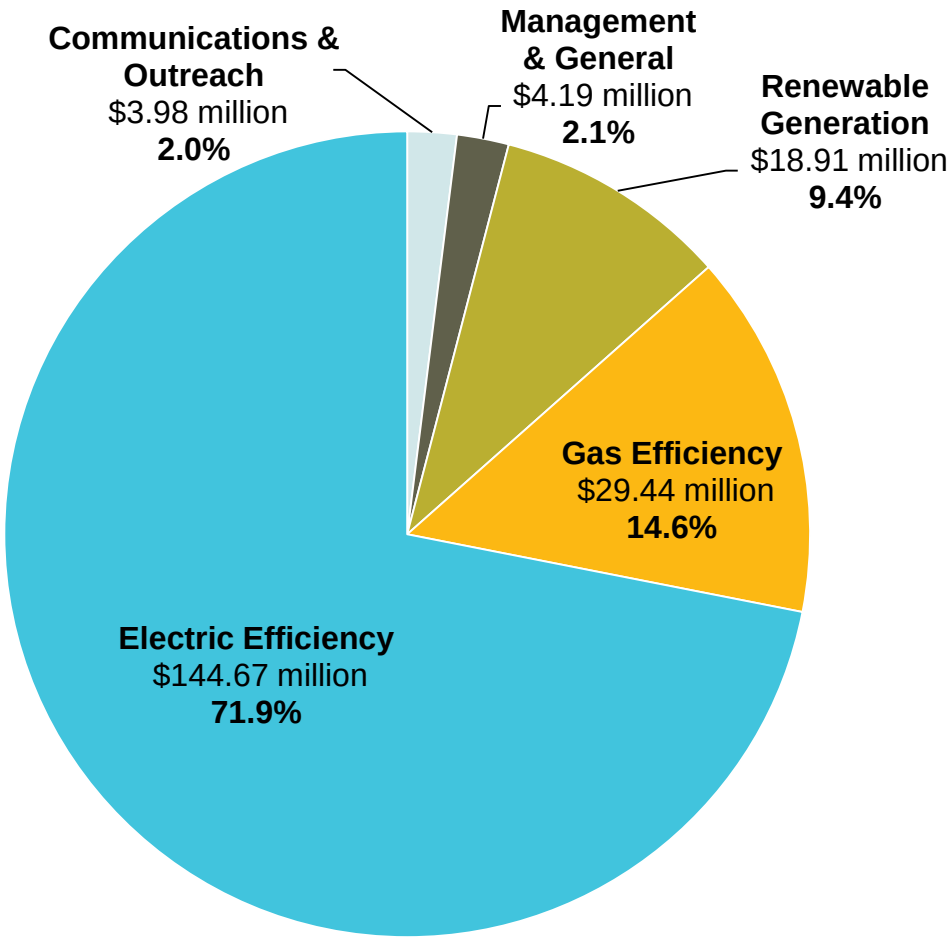
- Expanding instant incentives, upstream rebates and online forms
- Continuing data and system enhancements
- Increasing use of data and analytics
- Providing trade ally support
- Launching revised program packages
- Leveraging government and municipal initiatives
- Supporting utility engagements as a channel to customers
- Fostering a diverse workforce

Draft 2017
Annual Budget

2017 Draft Budget Summary

- Investing **$201.2 million** to acquire
  - **56.88 aMW** and **7.74 MMTh** through efficiency
  - **2.75 aMW** through renewable generation
- Electric savings up by **3.3%**; gas savings up **29.2%**
- Delivering highly cost-effective energy at **3.0 cents/kWh** and **31.5 cents/therm** levelized
- Overall renewable generation down **33.4%** while standard solar is up **3%**
- Overall **spending up 6.4%** due to increased project volume and growth in incentive, delivery and internal costs
- **Incentives up 6.7%** and represent **57.3%** of total planned expenditures
- Revenue up significantly; reserves on target, down from prior years
- Staffing costs at **6.6%**, well below OPUC performance measure
- Low administrative and program support costs at **5.8%**

2017 Budgeted Expenditures



Budgeted expenditures of $201.2 million, up 6.4% from 2016 budget
Continued drawdown of reserves will cover expenses in excess of anticipated revenue

2017 Renewable Energy Programs

	Total Budget 2016		Total Budget 2017	
	$ Million	aMW	$ Million	aMW
Other Renewables	$5.8	0.01	$6.5*	10,472 kWh
Solar	$15.6	4.12	$13.2	2.75
Total	**$21.4**	**4.13**	**$19.7**	**2.75**

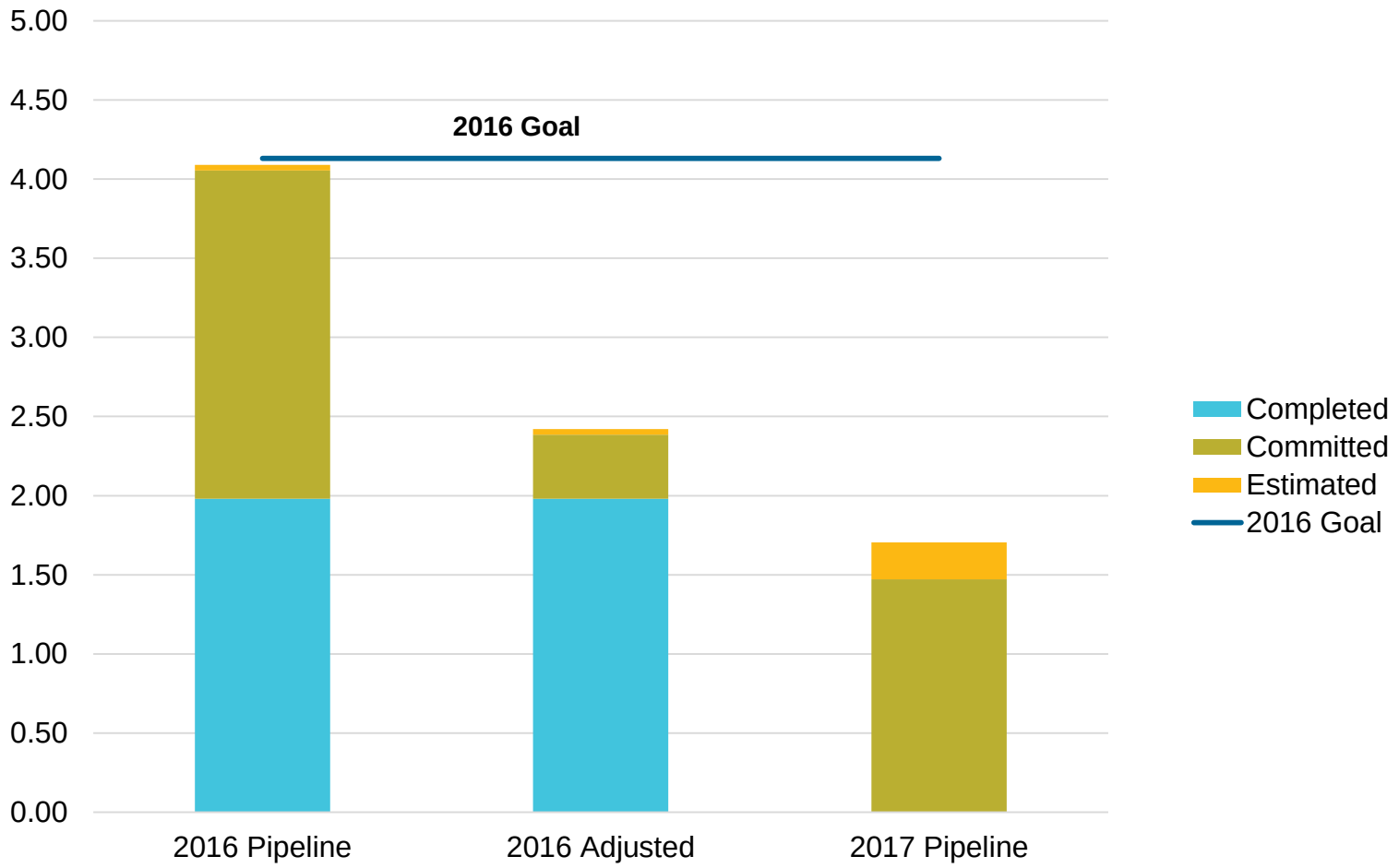
* Other Renewables expenditures include:

- Milestone payments on five projects completed, with generation claimed in prior years (29%)
- Project development assistance payments for potential generation in future years (49%)
- Staff, professional services, outreach and other allocated costs (22%)
- Commercial operation payment for two small wind projects scheduled for completion in 2017 (1%)

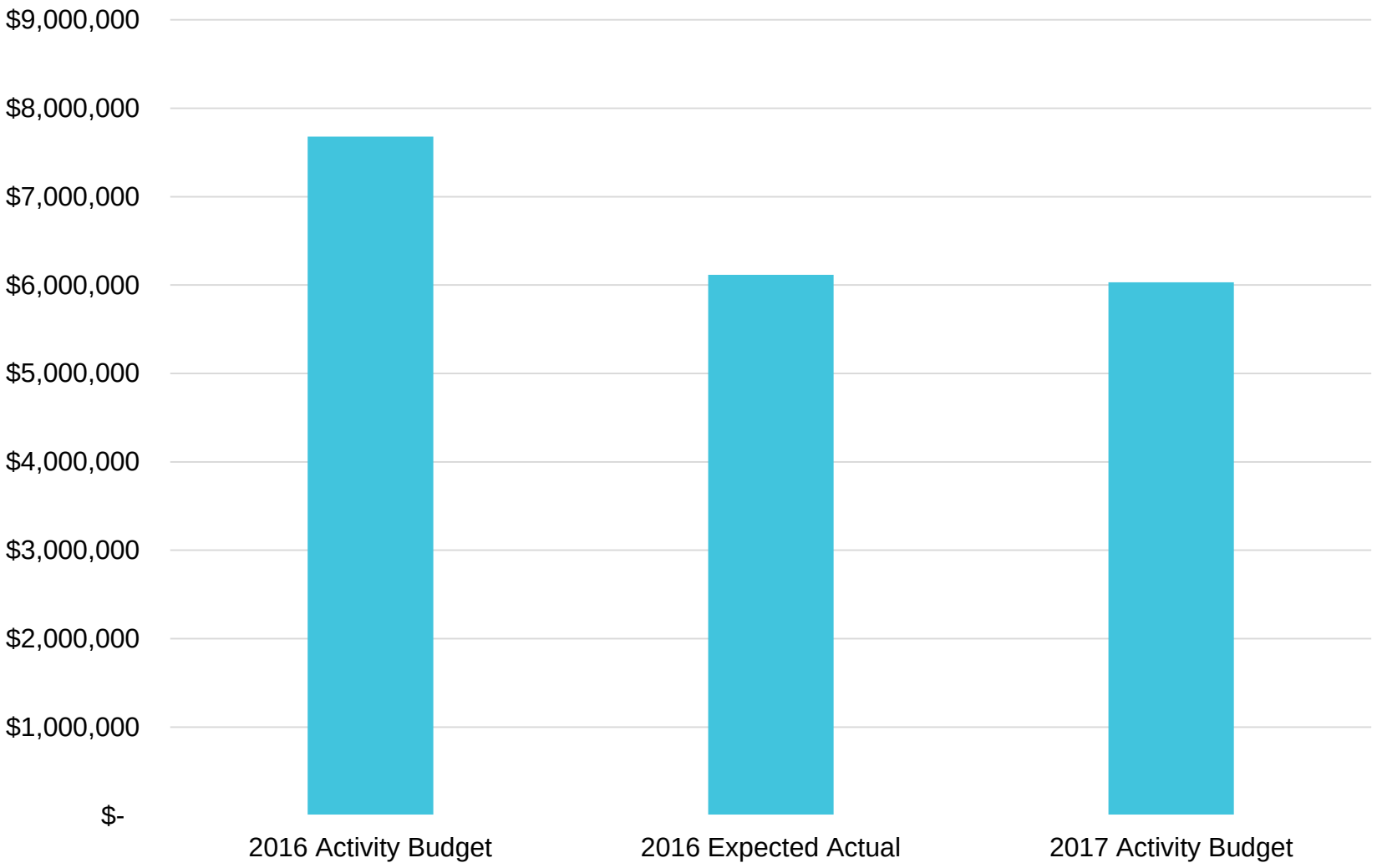
33.4% less generation than 2016 budget of 4.13 aMW

Investing $19.7 million in incentives, services & program delivery for clean, renewable power

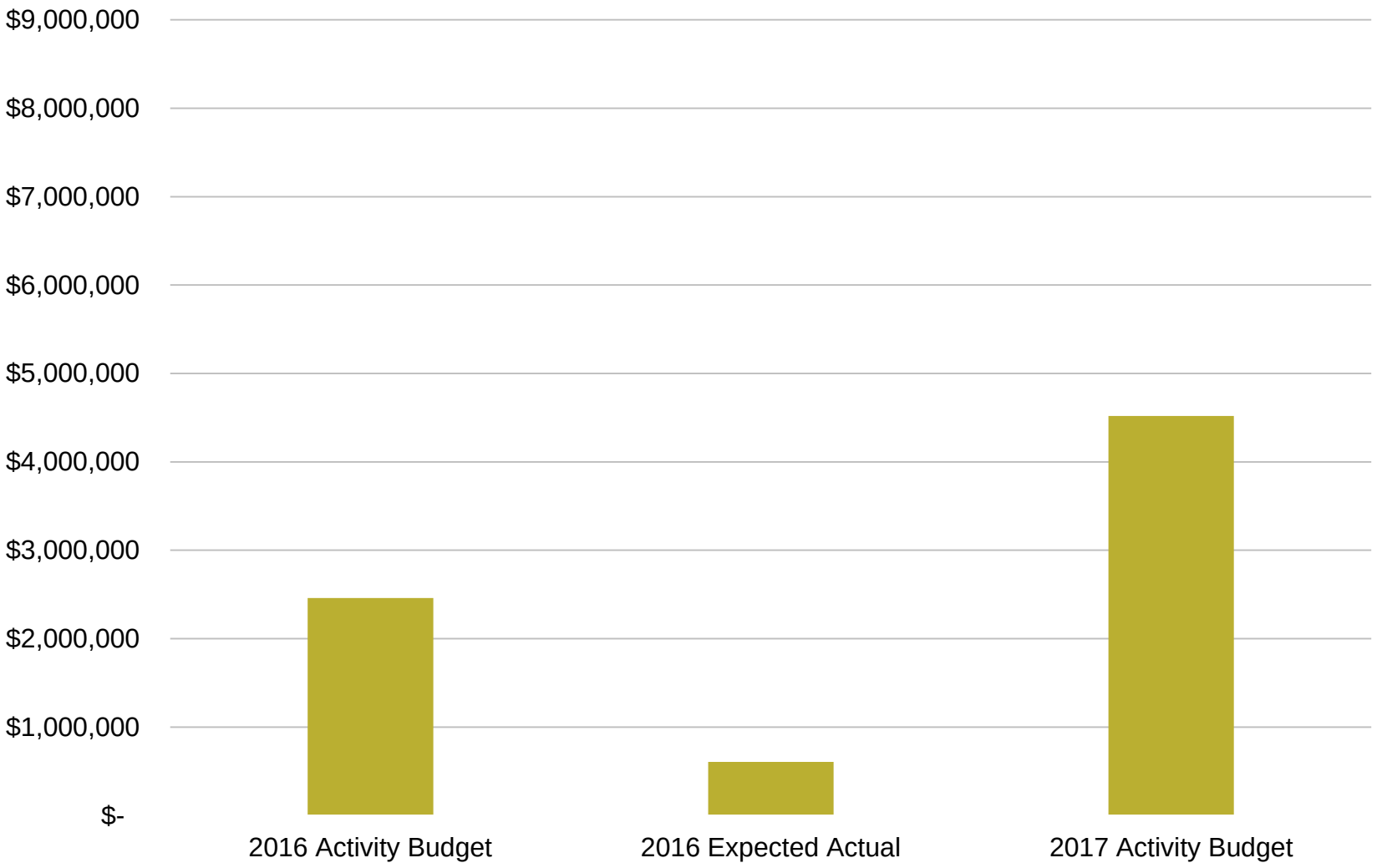
PGE & Pacific Power (aMW) Generation 2017



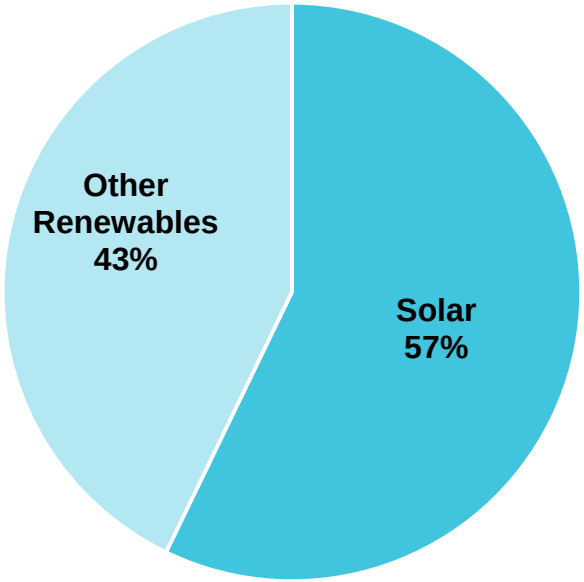
Solar: PGE (Activity)



Other Renewables: PGE (Activity)



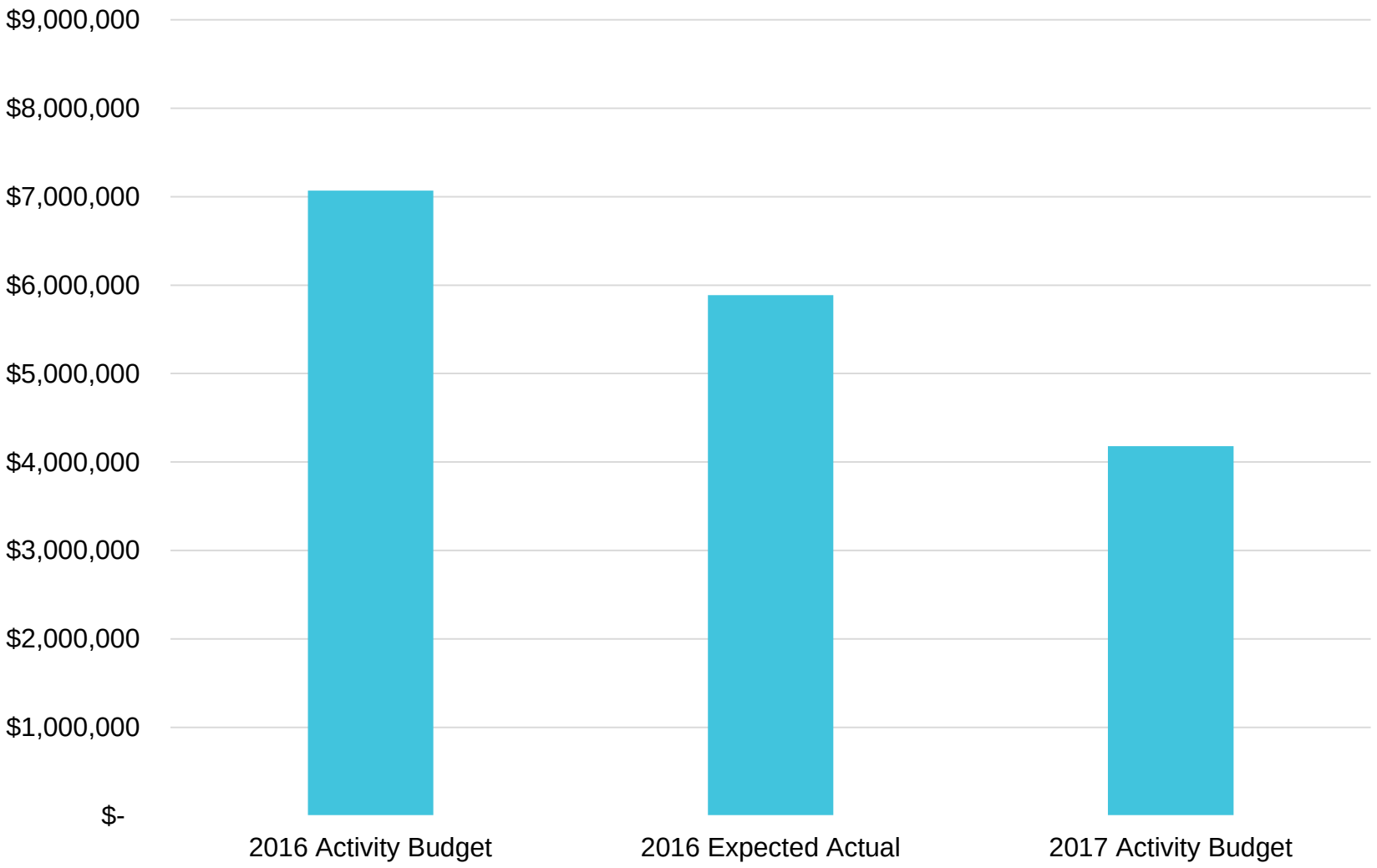
2017 Renewable Energy Activity Budget: PGE



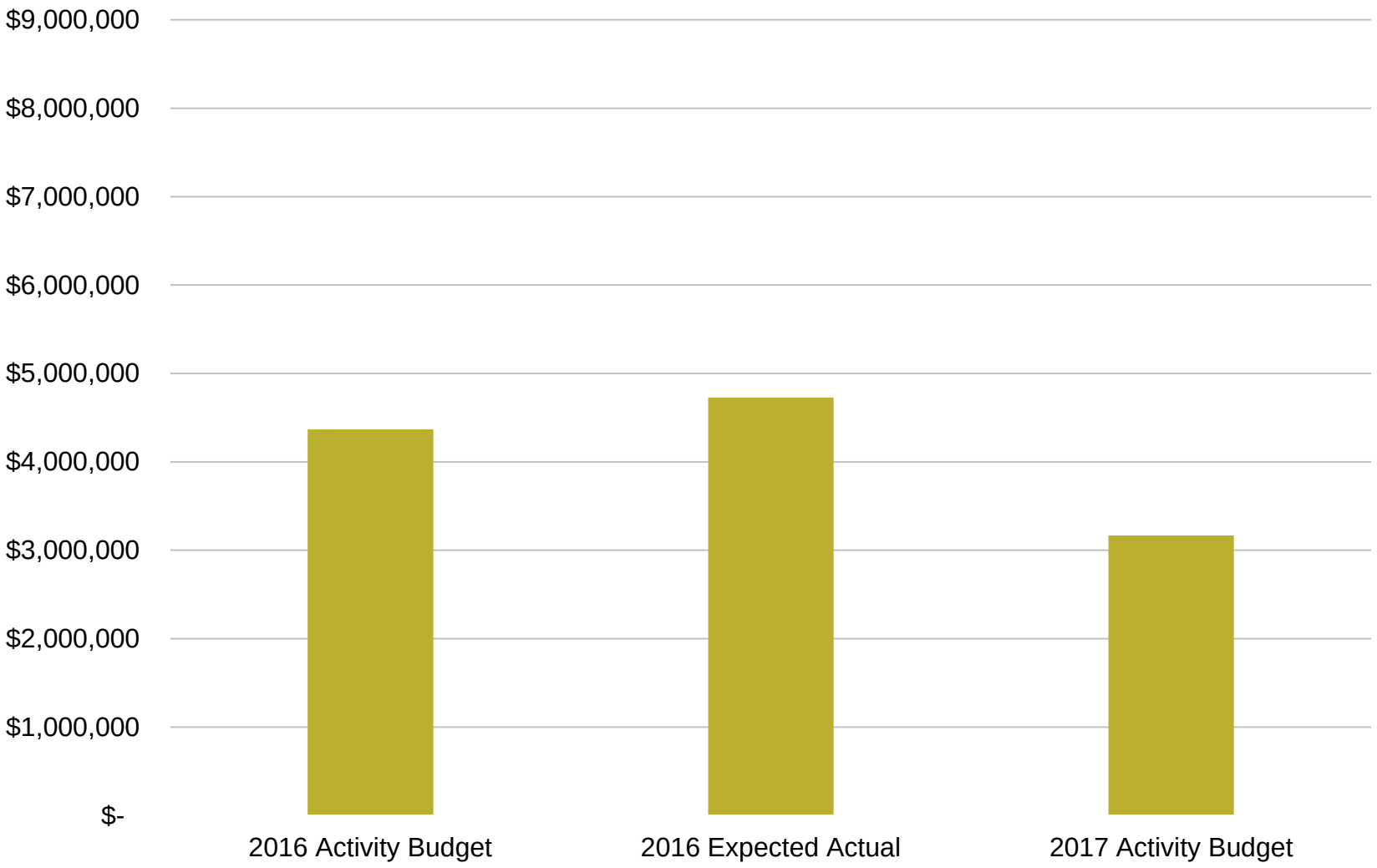
	$ Million	% of Budget	aMW
Other Renewables	$4.5	43%	0.61
Solar	$6.0	57%	0.94
Total	**$10.5**	**100%**	**1.55**

- Slightly weighted to solar
- Commitments expected for non-solar project(s) and project development assistance

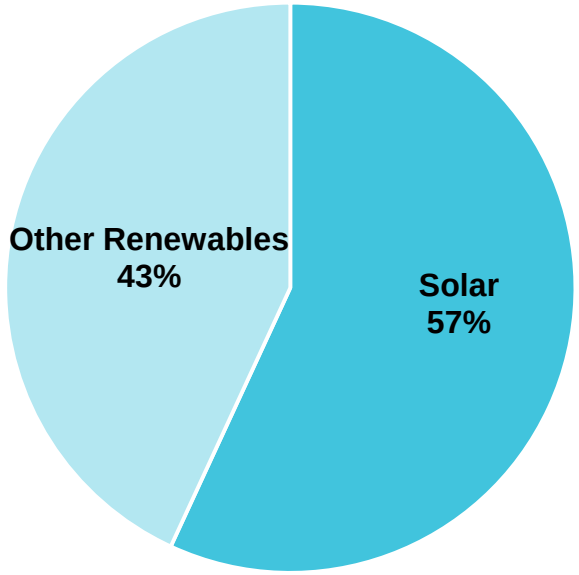
Solar: Pacific Power (Activity)



Other Renewables: Pacific Power (Activity)



2017 Renewable Energy Activity Budget: Pacific Power



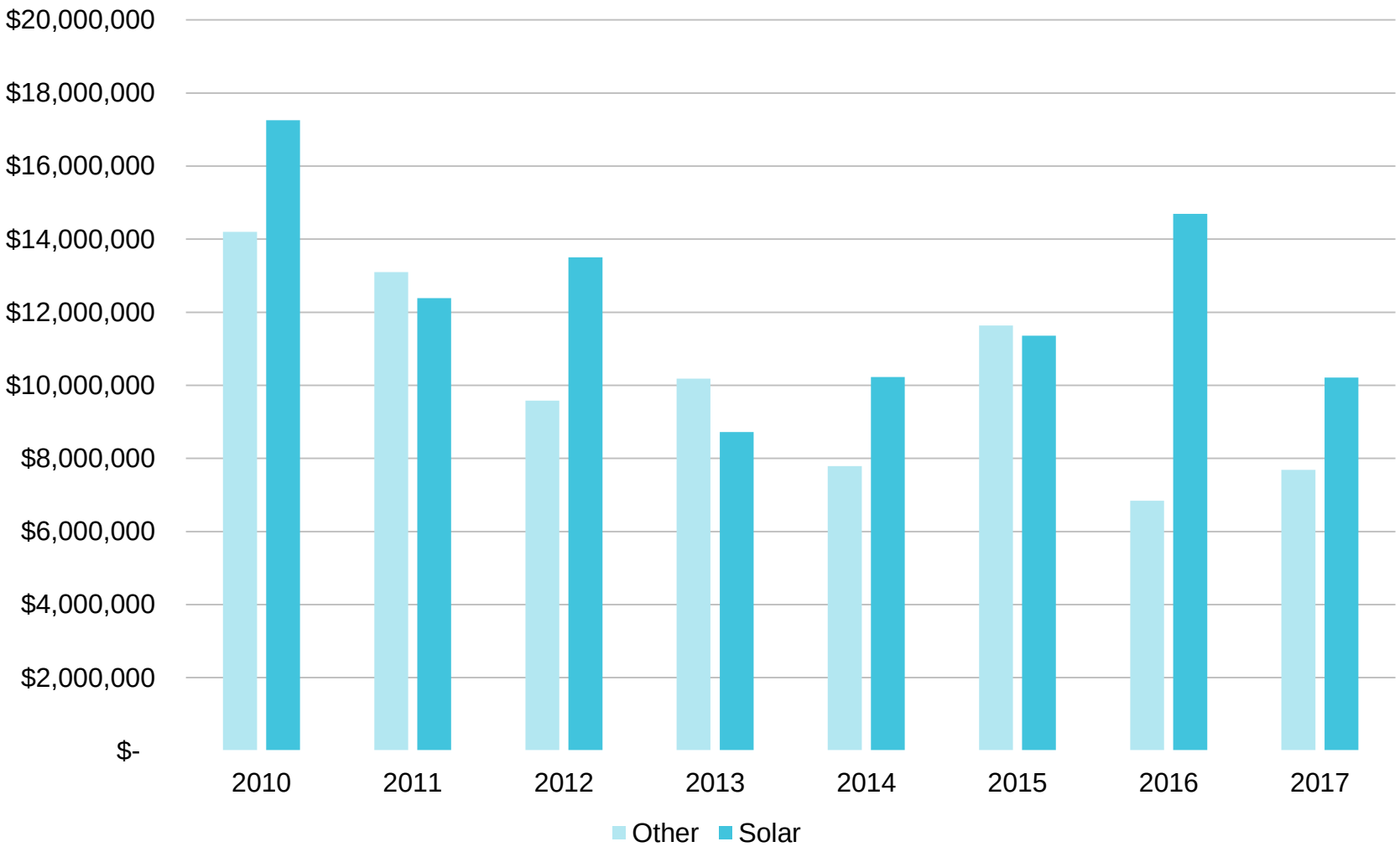
	$ Million	% of Budget	aMW
Other Renewables	$3.2	43%	0.20
Solar	$4.2	57%	0.57
Total	**$7.3**	**100%**	**0.77**

- Slightly weighted to solar
- Significant project development assistance included in non-solar budget, mostly hydropower

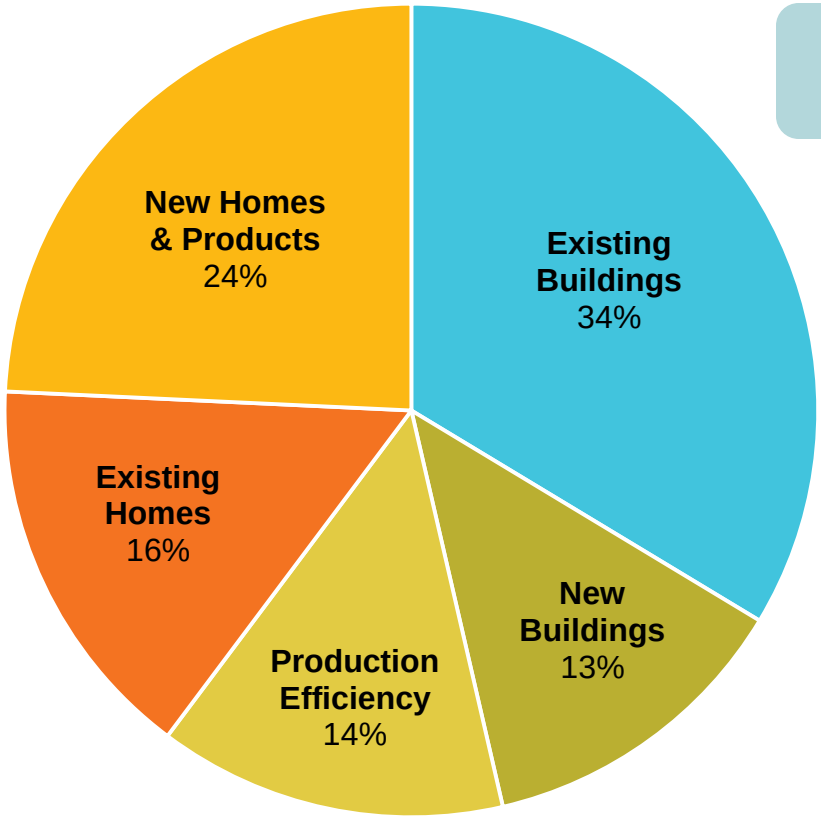
2017 Renewable Energy Activity Budget and Generation

	Total costs		
	$ Million	% Total	aMW
Other Renewables	$7.69	43%	0.8
Solar	$10.21	57%	1.5
Total	**$17.90**	**100%**	**2.3**

Renewable Energy Activity Budget Trends



2017 Natural Gas Savings by Program

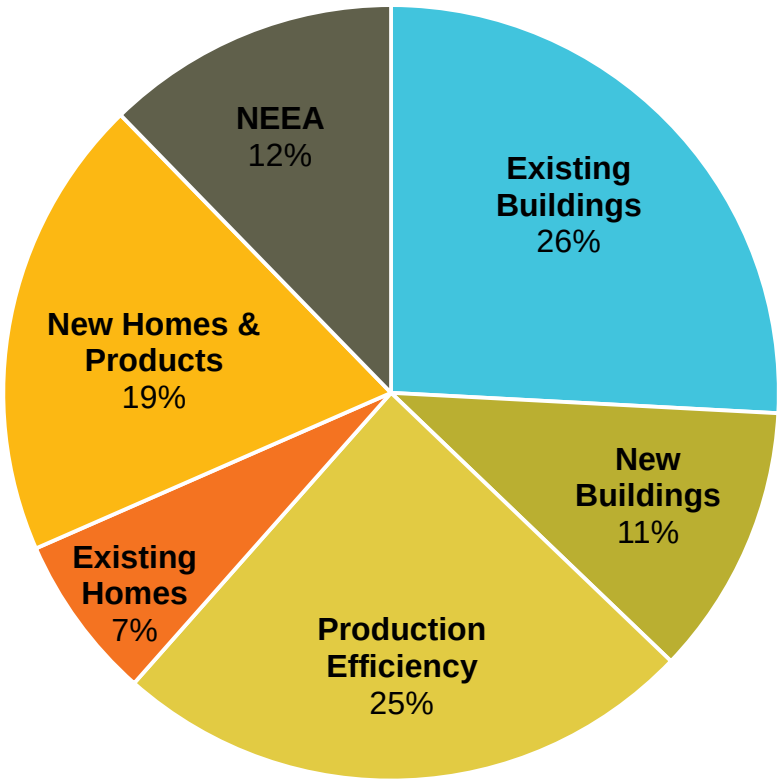


7.74 million annual therm goal
31.5 cents/therm levelized

A 29.2% increase in natural gas savings over 2016 budget

Investing $29.4 million in incentives, services and program delivery for residential, commercial, industrial, agricultural and public sector customers

2017 Electric Savings by Program



56.88 aMW goal
3.0 cents/kWh levelized

A 3.3% increase in total electric savings over 2016 budget

Investing approximately $144.7 million in incentives, services and program delivery for residential, commercial, industrial, agricultural and public sector customers

NEEA Goals and Budget

	2016 Savings Goal	2016 Savings Re-forecast	2017 Savings Goal	2017 Budget ($ Million)	2017 Levelized Cost (per kWh)
PGE (aMW)	4.12	4.25	4.12	$4.32	1.3¢
Pacific Power (aMW)	2.86	2.95	2.87	$3.00	1.3¢
NW Natural	-	-	-	$1.07	N/A
Cascade Natural Gas	-	-	-	$0.11	N/A

2017 Utility Savings & Generation Summary

	2016 Budget Savings & Generation (Net) aMW or MMTh	2017 Budget Savings & Generation (Net) aMW or MMTh	Prior IRP target for 2017 (Net) aMW or MMTh	2017 Budget ($ Million)	2017 Budget Levelized Cost Per kWh or therm
PGE (Efficiency)	33.66	35.23*	31.87	$94.55	3.0¢
Pacific Power (Efficiency)	21.42	21.64*	19.94	$56.23	2.9¢
NW Natural (Oregon)	5.25	6.54*	4.40	$25.16	30.8¢
NW Natural (Washington)	0.27	0.28*	0.26	$2.07	55.5¢
Cascade Natural Gas	0.47	0.57*	0.36	$2.49	33.9¢
Avista	-	0.34	0.34	$0.97	20.0¢
PGE (Renewable Energy)	1.09	1.16	N/A	$10.05	N/A
Pacific Power (Renewable Energy)	3.04	1.59	N/A	$9.66	N/A

MMTh: million annual therms
aMW: average megawatts

** Energy Trust is proposing updated IRP targets for these utilities based on these 2017 savings goals. Additional savings opportunities have been identified over and above the prior IRP targets for 2017*

Customer Benefits from 2017 Investments

- **$707 million in future bill savings** from energy improvements made in 2017 with help from Energy Trust
- Enough clean **energy to power 46,000 homes** and **heat 14,700 homes**
- Improved air quality by **avoiding 292,000 tons** of carbon dioxide
- Continued **high customer satisfaction**
- **Expanded access and participation** statewide
- Training and **support for 2,400 local businesses**

Ro1

Budget Outreach Schedule

October & November

RAC/CAC presentations Oct. 21

Draft budget online, Oct. 26

Board of Directors, Nov. 2

Public webinar, Nov. 4

OPUC public meeting, Nov. 8

Public comments due Nov. 9

Comments reviewed, final adjustments

RAC/CAC updates, Nov. 16

December

Final proposed budget online, **Dec. 7**

Board of Directors, **Dec. 16**

Action on Final Proposed
2017-18 Budget and Action Plan

+ www.energytrust.org/about/budget
Send comments to info@energytrust.org

Discussion and Feedback

- What questions do you have?
- What information needs clarification?
- Other feedback?

+ www.energytrust.org/about/budget
Send comments to info@energytrust.org

+ Comments due November 9

Thank You

info@energytrust.org
1.866.368.7878

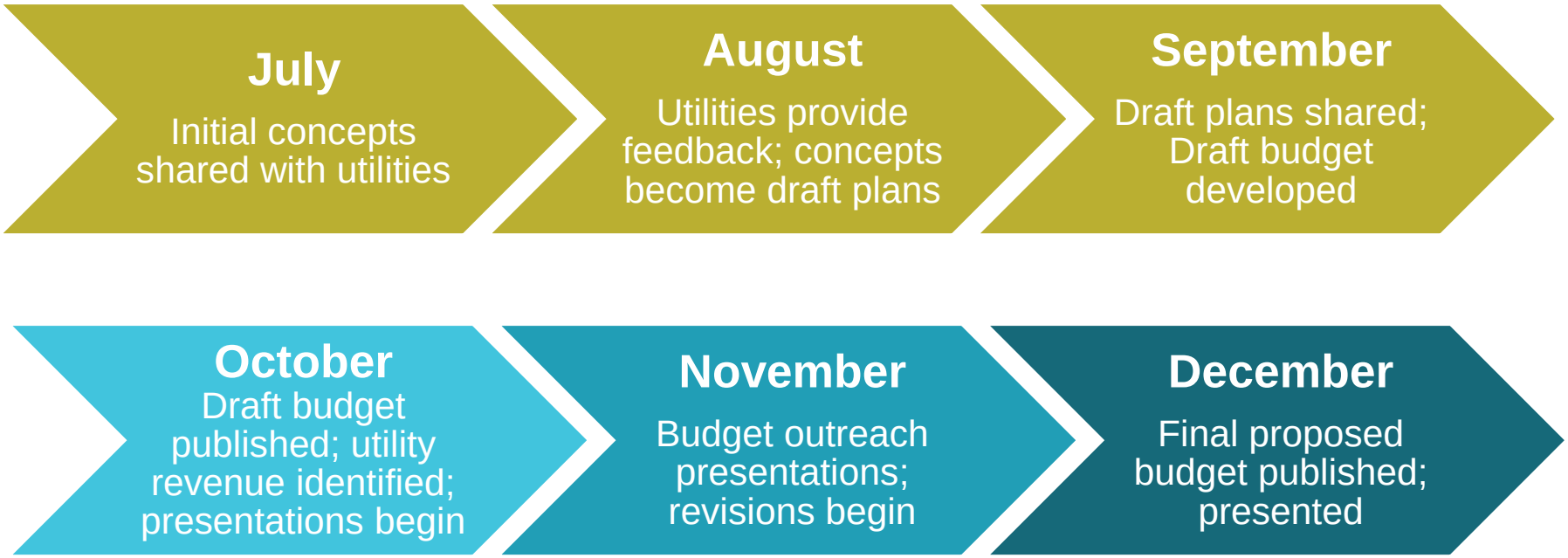
Supplemental Information

Projected 2016 Results by Utility

	Budgeted 2016 Savings Goal (Net)	Budgeted 2016 Levelized Cost	Projected 2016 Savings (Net)	Projected % of 2016 Savings Goal (Net)	Projected 2016 Levelized Cost
PGE (Efficiency)	33.66 aMW	2.9¢/kWh	35.31 aMW	105%	2.9¢/kWh
Pacific Power (Efficiency)	21.42 aMW	3.0¢/kWh	22.65 aMW	106%	2.7¢/kWh
NW Natural (Oregon)	5.25 MMTh	32.3¢/therm	5.64 MMTh	107%	30.6¢/therm
NW Natural (Washington)	0.27 MMTh	33¢/therm	0.33 MMTh	124%	41¢/therm
Cascade Natural Gas	0.47 MMTh	41.1¢/therm	0.53 MMTh	113%	31.8¢/therm
PGE (Renewable Energy)	1.09 aMW	9.4¢/kWh	1.44 aMW	132%	6.5¢/kWh
Pacific Power (Renewable Energy)	3.04 aMW	2.8¢/kWh	0.98 aMW	32%	8.6¢/kWh

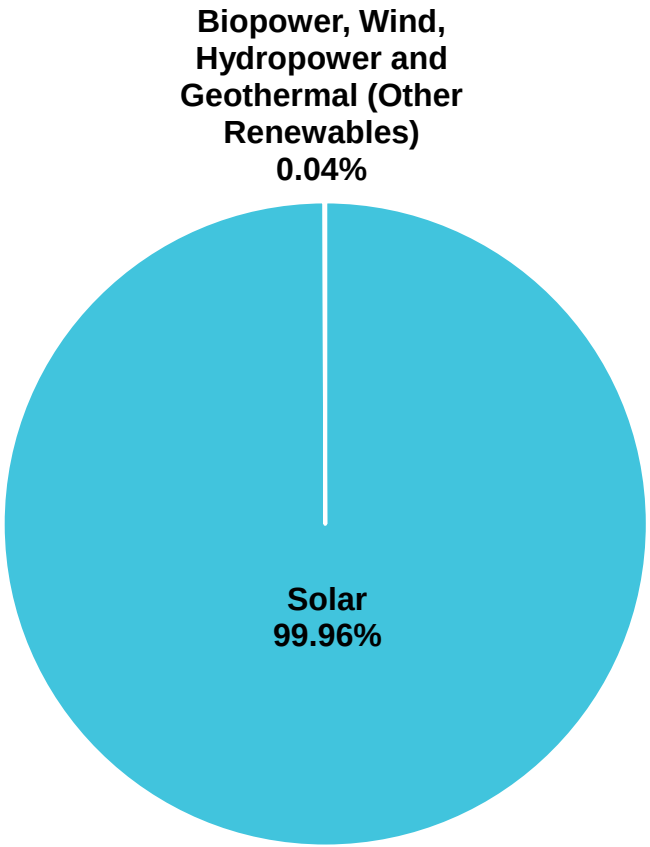
MMTh: million annual therms
aMW: average megawatts

Budget and Action Plan Development Process



Backup Slides

2017 P&L (Generation - aMW)



2.75 aMW goal

- 2.75 aMW (vs. 2.84 in 2016)
- Small amount of non-solar generation – two small wind projects
- Lots of project development assistance that will bear fruit in the coming few years

PGE: 2017 RE Generation, Budget by Program (P&L)

	2016 Generation Goal aMW	2016 Forecast Generation aMW	2017 Generation Goal aMW	2017 Budget ($ Million)	2017 Levelized Cost/kWh
Other Renewables (0%*)	-	-	-	$2.7	0.0¢
Solar (100%)	1.09	1.44	1.16	$7.4	5.6¢
TOTAL	**1.09**	**1.44**	**1.16**	**$10.1**	**7.6¢**

* % of total 2017 generation

Pacific Power: 2017 Renewable Energy, Budget by Program (P&L)

	2016 Budget Generation in aMW	2016 Forecast Generation in aMW	2017 Budget Generation in aMW	2017 Renewables Cost ($ Millions)	2017 Levelized Cost/kWh
Other Renewables (0%)	.01	0.01	0.00	$3.8	2,808.7¢
Solar (100%*)	3.03	0.97	1.59	$5.8	3.2¢
TOTAL	**3.04**	**0.98**	**1.59**	**$9.7**	**5.3¢**

* % of total 2017 generation

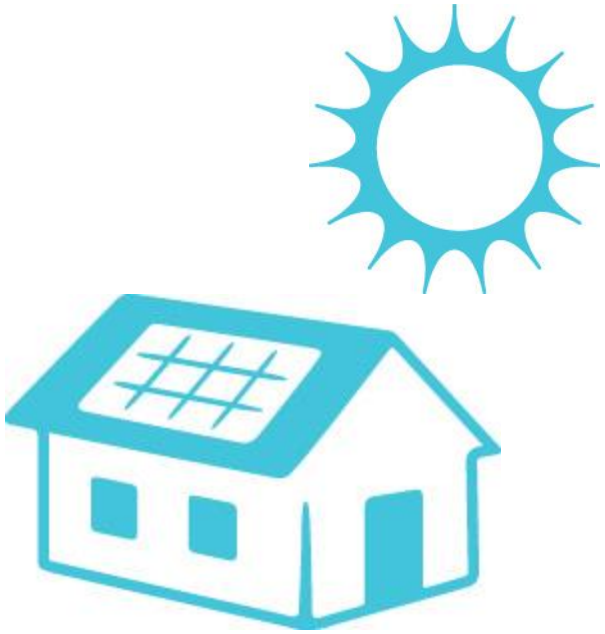
Solar and Storage Pilot Project

RAC - October 2016

Energy Trust of Oregon

Outline

- RMI eLab Accelerator
- Oregon Path to Solar+Storage – The Plan
- Oregon Path to Solar+Storage – The Process
- Solar+Storage in Oregon Today
- The Path Forward



RMI Electricity Innovation Lab (eLab) Accelerator Bootcamp

RMI eLab Accelerator

Invitation-only, four-day working meeting brings together teams throughout North America that are working on high impact and innovative projects at the electricity system's distribution edge. The purpose of the workshop is to take these projects to the next level through structured sessions designed to rapidly accelerate progress.

RMI eLab Accelerator

RMI eLab Accelerator

RMI eLab Accelerator

RMI eLab - Cohort

TEAM NAME:
Air Force Energy Assurance
JOINT BASE MCGUIRE-DIX-LAKEHURST, NJ

TEAM NAME:
Berkeley Microgrid Resiliency Project
BERKELEY, CA

TEAM NAME:
EVs as a Sustainable Grid Solution
HAWAII

TEAM NAME:
Oregon Path to Solar+Storage
OREGON

TEAM NAME:
Minnesota e21 Initiative
MINNESOTA

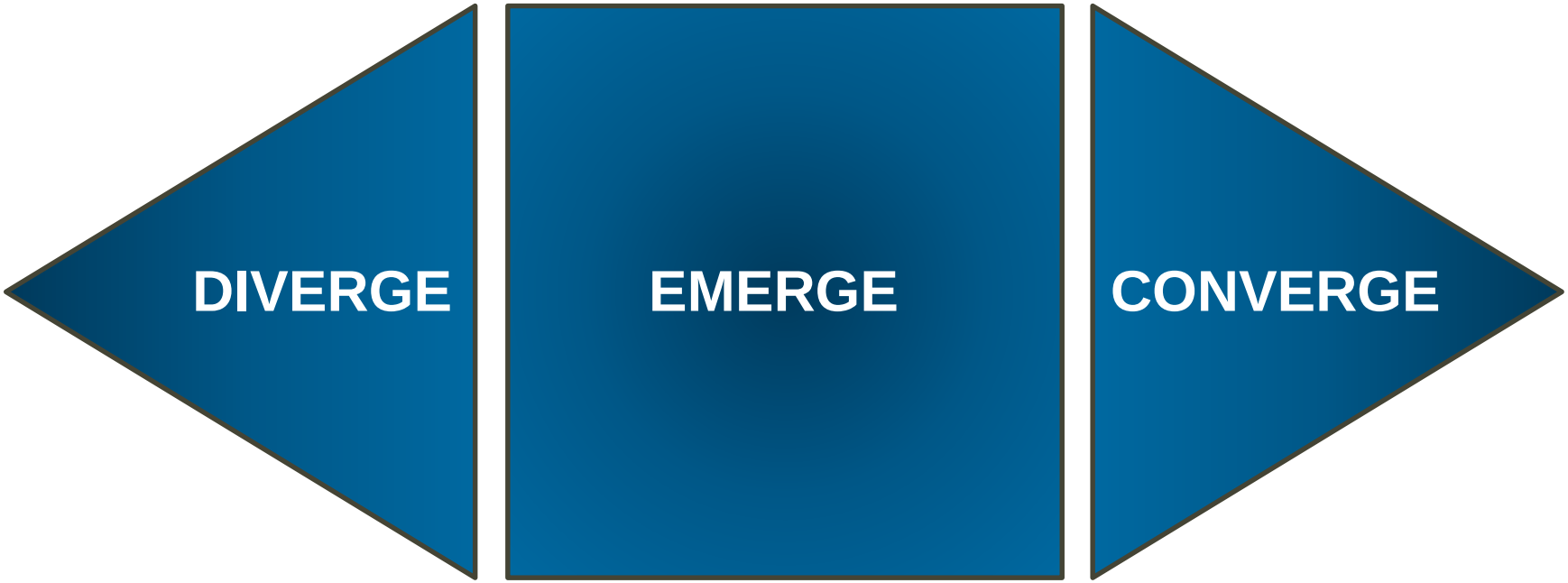
TEAM NAME:
Eugene Grid Resiliency
EUGENE, OR

TEAM NAME:
Microgrid Program Planning
RHODE ISLAND

TEAM NAME:
Power the Tower
FRESNO, CA

TEAM NAME:
Electrifying New York City Transportation
NEW YORK, NY

RMI eLab - The Process



RMI eLab Accelerator
Oregon Path to Solar+Storage
The Plan

RMI eLab – 2016 Focus Areas

1) New Business Models:

– Projects exploring new utility business models, market structures, and regulatory efforts focused on maximizing the value of distributed energy resources (DERs)

2) Energy Innovation Districts:

– Projects demonstrating or piloting innovative local DER solutions such as microgrids, downtown clean energy zones, net-zero districts, and others

3) Rate Design and DER Value Creation:

– Projects tackling new rate designs, compensation mechanisms, deployment strategies, and engagement programs focused on DER value creation

RMI eLab – Project Goals

Team: Oregon Path to Solar+Storage

Project Objective:

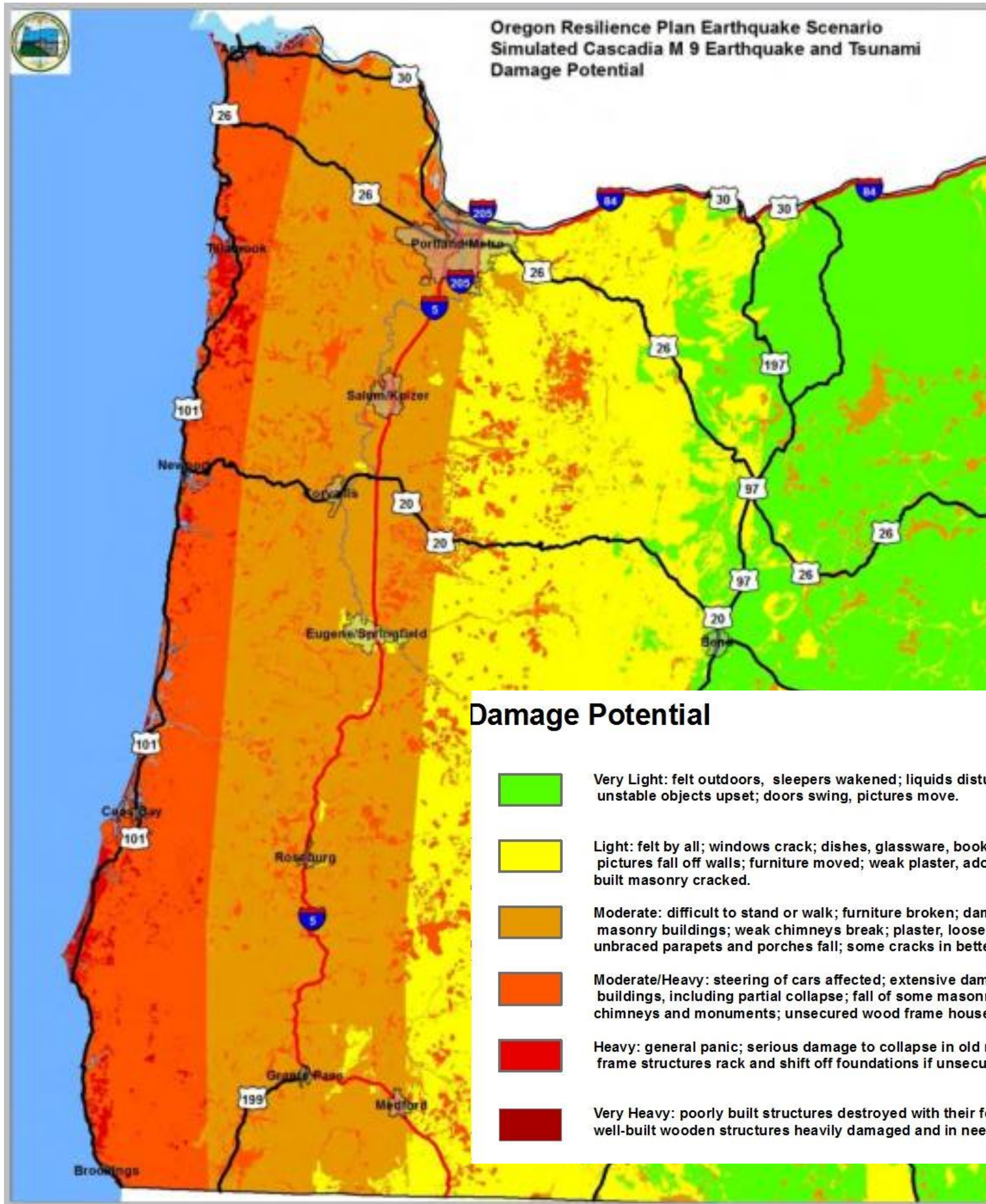
We propose to develop a pilot program for deploying solar+storage at several sites in Oregon to identify the benefits, challenges, and solutions to those challenges for customers and utilities.

RMI eLab – Project Goals

Team: Oregon Path to Solar+Storage

Project Description:

Solar+storage has the potential to bring about a smarter, greener and more flexible electric grid along with more resilient buildings and communities. Our goal is to develop the elements of a joint utility-Energy Trust solar+storage pilot program that will generate lessons learned and information that can be used to support future growth of this technology in the state. Achieving this goal will require more understanding of the benefits solar+storage can create for customers and the utility, the challenges related to deployment and financing, and how technology can be incorporated into existing utility programs.



Damage Potential

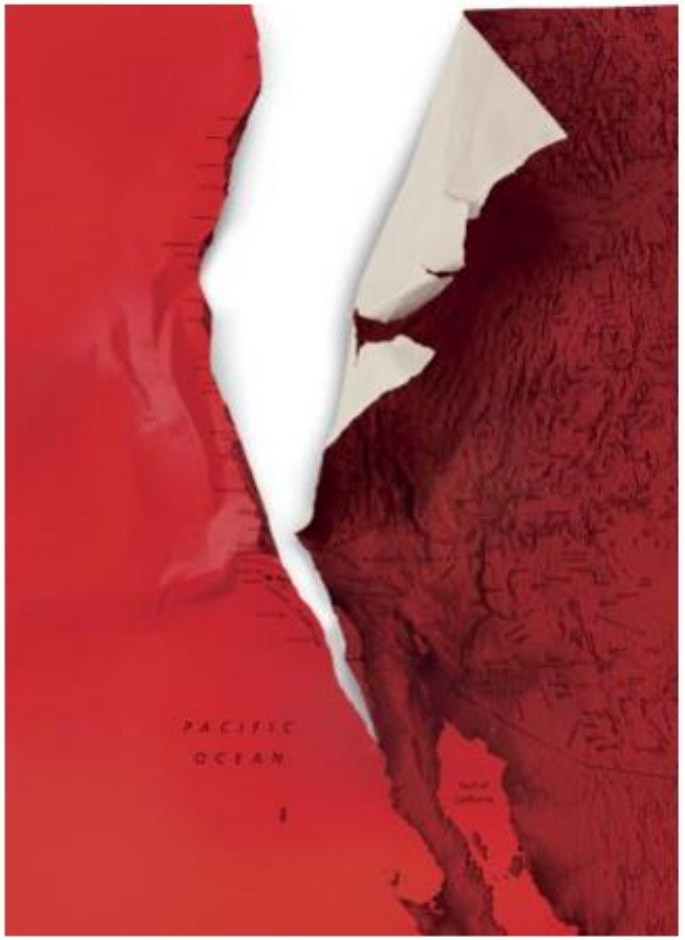
- Very Light: felt outdoors, sleepers wakened; liquids disturbed or spilled; small unstable objects upset; doors swing, pictures move.
- Light: felt by all; windows crack; dishes, glassware, books fall off shelves; pictures fall off walls; furniture moved; weak plaster, adobe buildings and poorly built masonry cracked.
- Moderate: difficult to stand or walk; furniture broken; damage to poorly built masonry buildings; weak chimneys break; plaster, loose bricks, cornices, unbraced parapets and porches fall; some cracks in better masonry buildings.
- Moderate/Heavy: steering of cars affected; extensive damage to unreinforced masonry buildings, including partial collapse; fall of some masonry walls; twisting and falling of chimneys and monuments; unsecured wood frame houses move on foundation.
- Heavy: general panic; serious damage to collapse in old masonry buildings; wood frame structures rack and shift off foundations if unsecured; underground pipes broken.
- Very Heavy: poorly built structures destroyed with their foundations; bridges and well-built wooden structures heavily damaged and in need of replacement.

THE REALLY BIG ONE

An earthquake will destroy a sizable portion of the coastal Northwest. The question is when.

BY KATHRYN SCHULZ

"OSSPAC estimates that in the I-5 corridor it will take between one and three months after the earthquake to restore electricity, a month to a year to restore drinking water and sewer service, six months to a year to restore major highways, and eighteen months to restore health-care facilities. On the coast, those numbers go up. Whoever chooses or has no choice but to stay there will spend three to six months without electricity, one to three years without drinking water and sewage systems, and three or more years without hospitals. Those estimates do not apply to the tsunami-inundation zone, which will remain all but uninhabitable for years."



The next full-margin rupture of the Cascadia subduction zone will spell the worst natural disaster in the history of the continent.

ILLUSTRATION BY CHRISTOPH NIEMANN; MAP BY ZIGGYMAJ / GETTY

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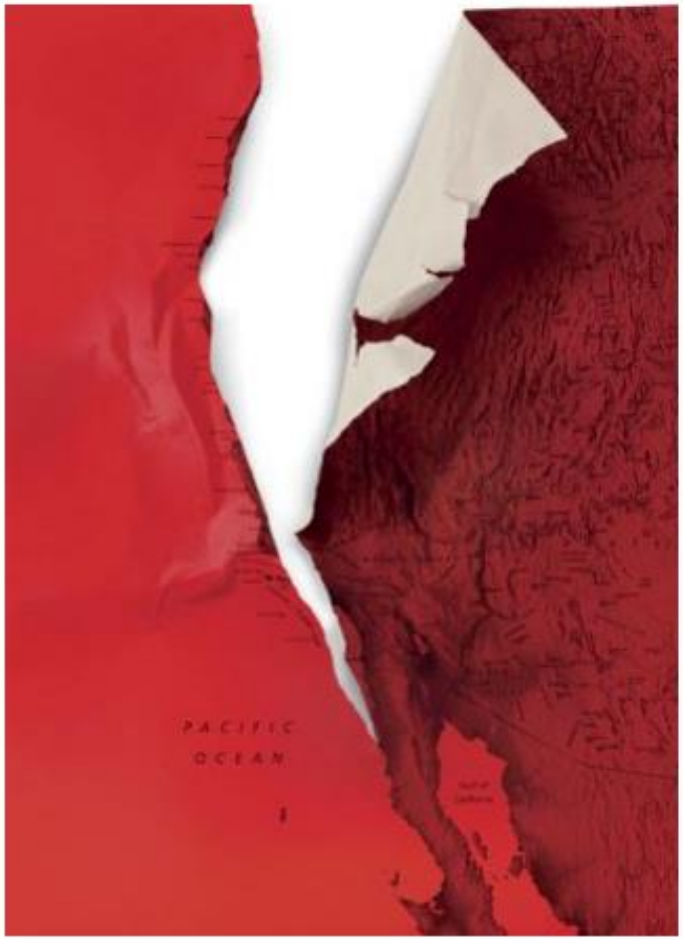

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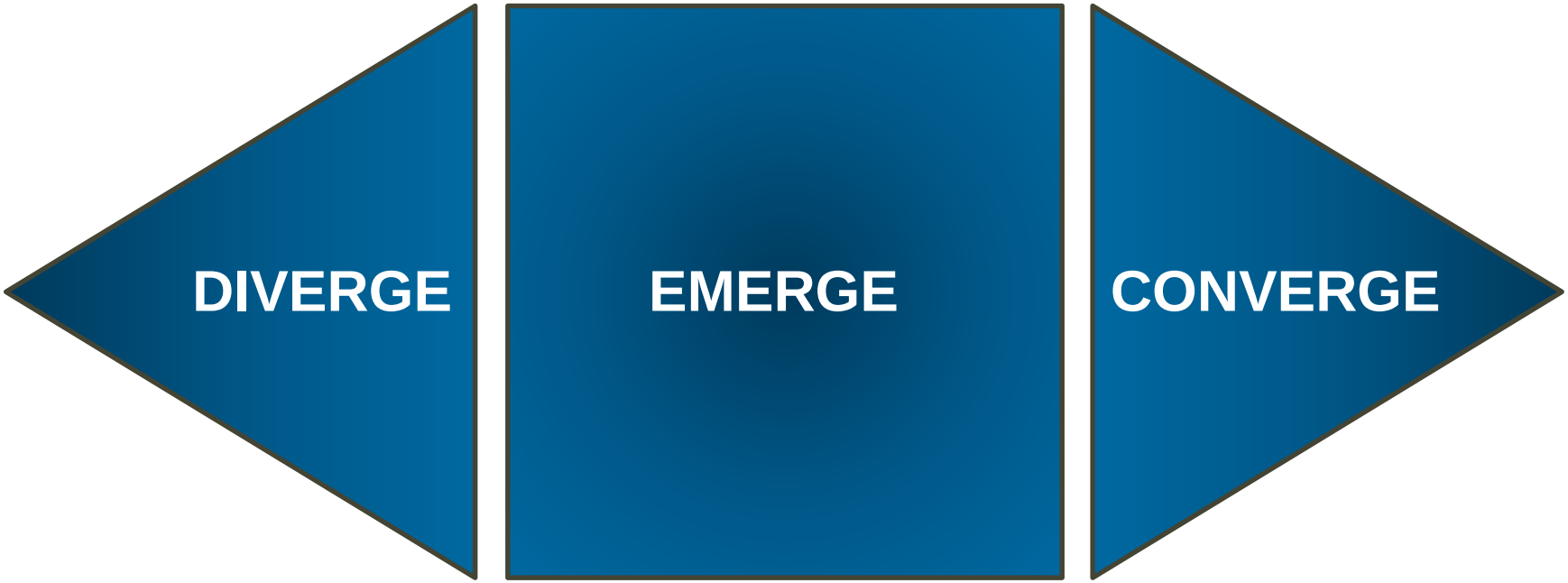
ILLUSTRATION BY CHRISTOPH NIEMANN; MAP BY ZIGGYMAJ / GETTY

RMI eLab Accelerator
Oregon Path to Solar+Storage
The Process

RMI eLab - The Process



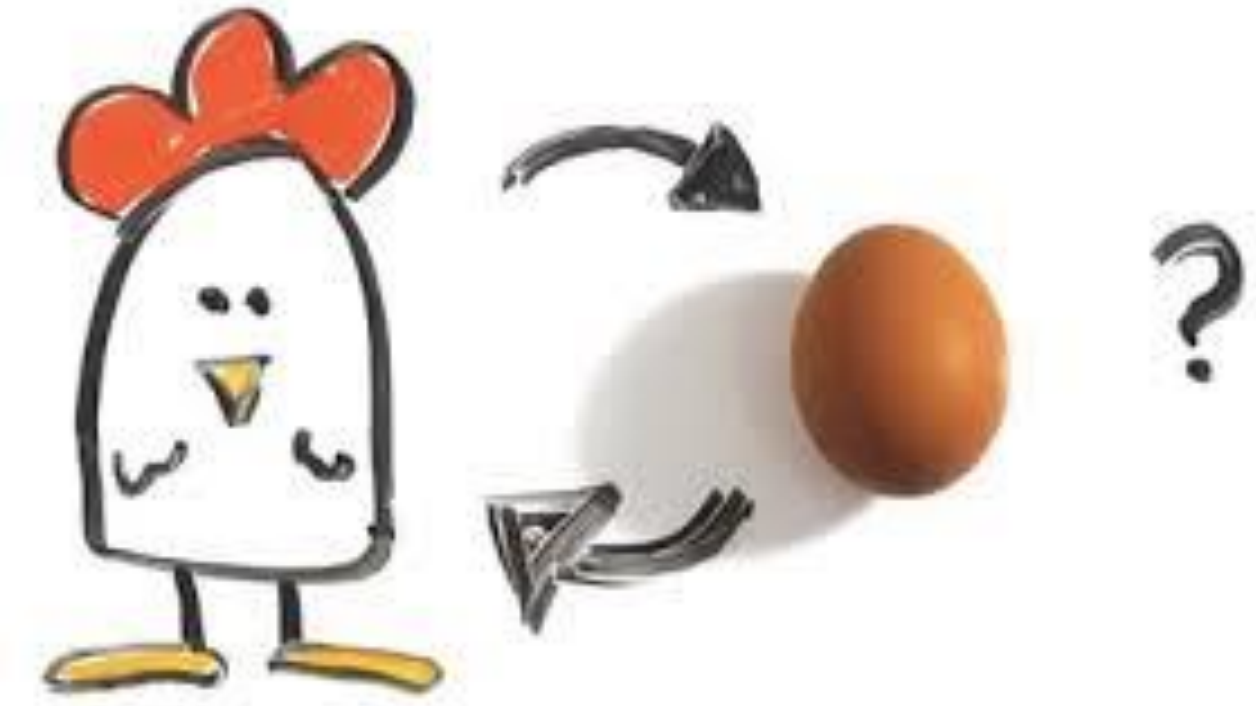
Diverge – What is the current reality?

- Why is this important to you?
- What do you want get out of our time together?
- Why does this matter?
- Why solar+storage?
- What are the barriers?
- Who are the stakeholders?
- Where is the value?

Photo credit: Joan Effinger

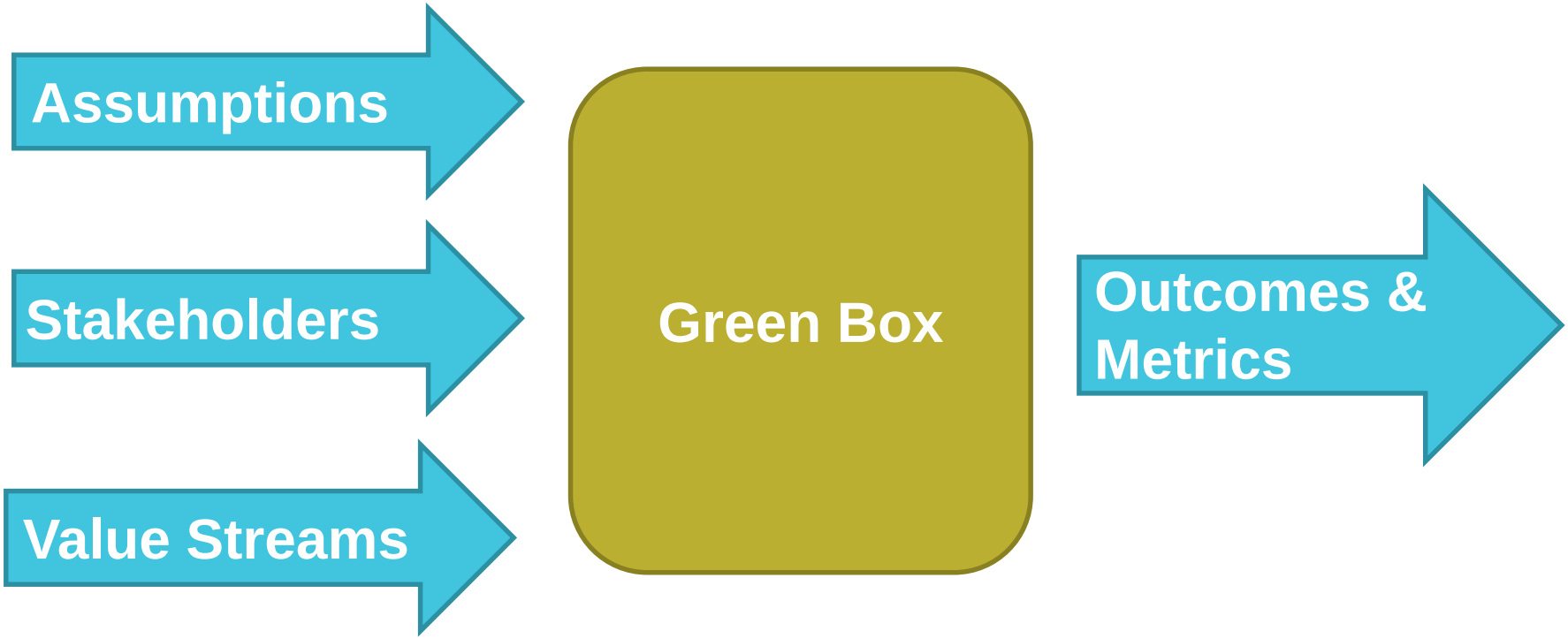
Emerge – What is the perfect future?

Converge – What is holding us back?

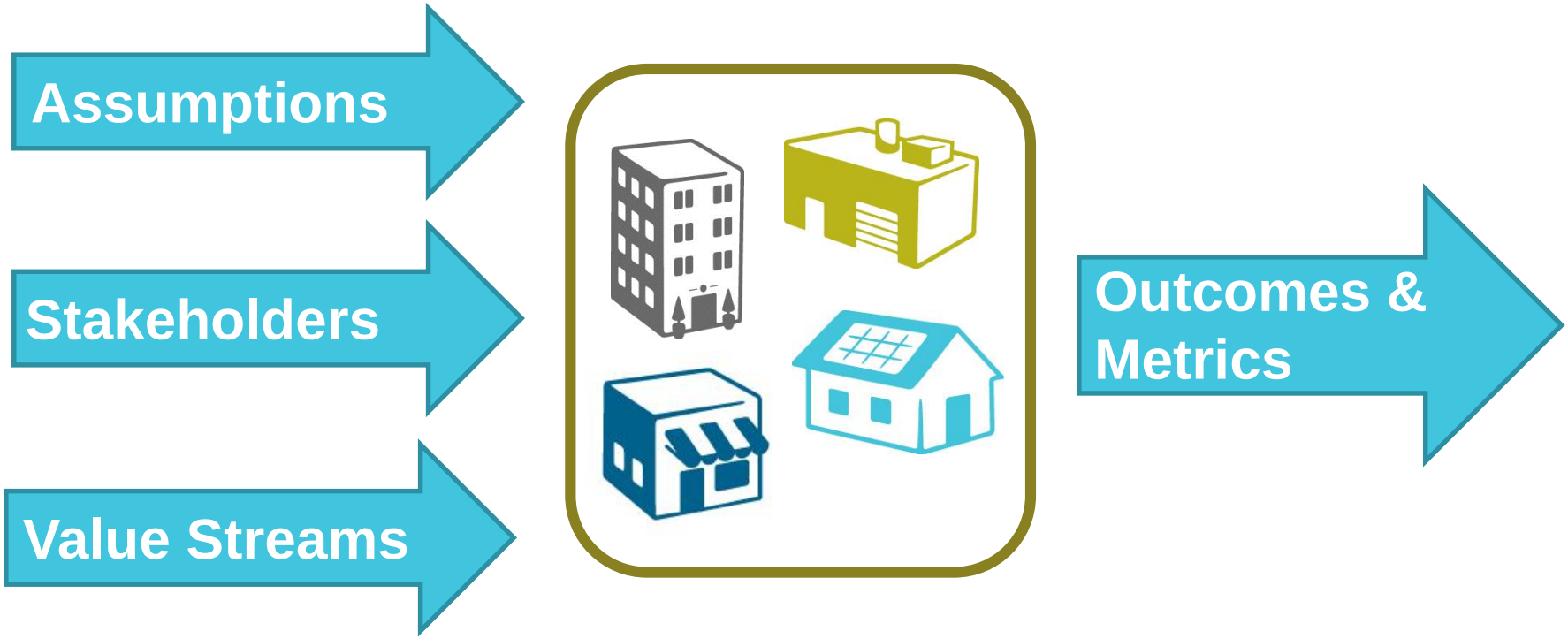


Adorable GIF credit: Joan Effinger

Converge – Iterate to solve



Converge – Iterate to solve



Solar + Storage in Oregon
Present Day

Solar + Storage for Backup

Advanced Solar + Storage

Photo credit: Tesla

Advanced Solar + Storage

Photo credit: Tesla

Advanced Solar + Storage

Photo credit: Sonnen

Advanced Solar + Storage

Photo credit: Sonnen

Solar + Storage Projects in Oregon

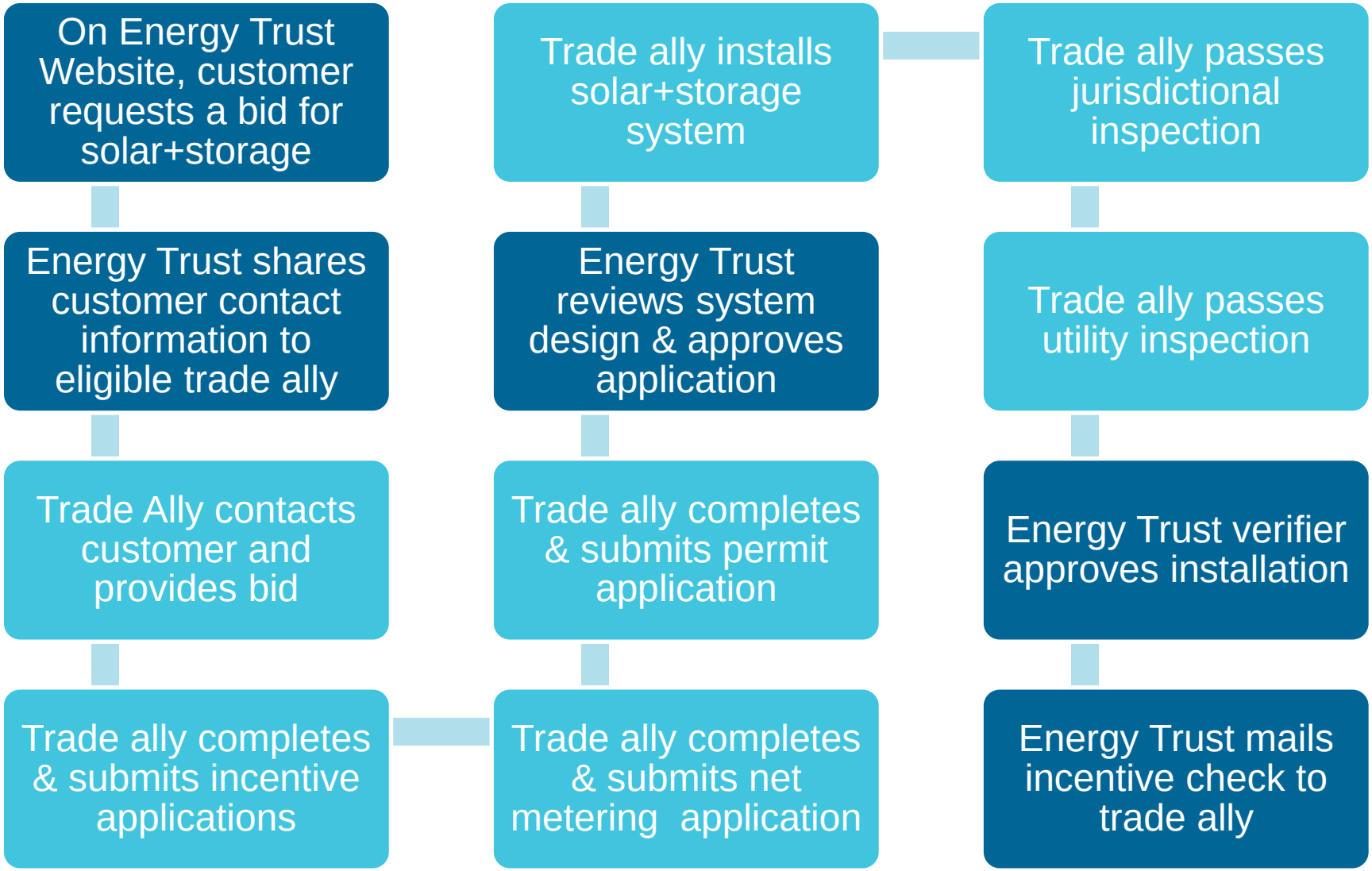
Table 1. Installed Energy Trust solar microgrid systems in Oregon as of September 15, 2015.

	Pacific Power		PGE		TOTAL
Category	Residential	Commercial	Residential	Commercial	
Solar + Storage	31	6	11	3	51
Advanced Solar + Storage	18	-	3	4	25
Solar Backup Capable	446	32	164	15	657
Microgrids Installed	**495**	**38**	**178**	**22**	**733**
Total Installations	3,451	522	5,817	464	10,254
% of Total	**14%**	**7%**	**3%**	**5%**	**7%**

Table 2. In-progress Energy Trust solar microgrid systems in Oregon as of September 15, 2016

	Pacific Power		PGE		TOTAL
Category	Residential	Commercial	Residential	Commercial	
Solar + Storage	2	-	-	-	3
Advanced Solar + Storage	3	1	3	-	6
Solar Backup Capable	34	10	27	6	77
Microgrids In-Progress	**39**	**11**	**30**	**6**	**86**
Total Applications In-Progress	198	50	369	43	660
% of Total	**20%**	**22%**	**8%**	**14%**	**13%**

Solar + Storage Project Lifecycle



EnergyTrust of Oregon

Solar Electric Installation Requirements

Developed by Energy Trust of Oregon

V 19

2.7.3 When a hard wired production meter is installed, the solar system meter shall have a UV-resistant label identifying it as the Customer Owned Solar Generator Output.

2.7.4 All hard wired meters shall be set at 000000 or 999999 at time of shipment to the installer to ensure accurate and consistent "start" readings for every system.

2.8 Battery-based Systems

2.8.1 Batteries shall be located in a secure enclosure that meets seismic requirements and is weatherproof as needed.

2.8.2 Access to live battery terminals shall be limited per Oregon Electrical Specialty Code.

2.8.3 Flooded lead acid batteries shall be housed in an enclosure with adequate spill containment and vented to the outdoors, with a nearby clearly marked OSHA 29 approved safety kit.

2.8.4 Battery and inverter cables shall be properly sized, with secured crimps and lugs on ends. Lugs and terminals shall be listed for the wire type used.

2.8.5 Charge controller and inverter settings shall be appropriate for the installation's batteries, and set for grid-tied optimum performance.

2.8.6 Temperature compensation probes for inverter and/or charge controller shall be installed to control battery charge properly.

2.8.7 Array configuration shall operate within current and voltage limits of charge controller, accounting for temperature-adjusted array voltage under record high and low temperatures for that location.

2.8.8 For hybrid systems utilizing wind or micro-hydro turbines in addition to PV, battery overcharge protection using turbine regulation and/or diversion controller and diversion load shall be installed.

2.8.9 Ground fault protection shall be added to the System if required by code and not included in the inverter.

2.8.10 Customer manual shall include instructions for operation, maintenance and safety procedures for batteries, charge controller and inverter.

2.8.11 Systems with lithium ion batteries must use an appropriate battery management system.

3.0 Customer Manual

Upon completion of installation, Program trade ally shall provide the customer with a manual (the "Customer Manual") and instruct the customer on proper system operation and maintenance. The Customer Manual shall be bound in a durable fashion. Please instruct the customer to have the Customer Manual along with the system permit(s) (approved electrical and, where applicable, building permit) available on site for the Energy Trust. The Customer Manual shall include, at minimum:

- System Overview Page that summarizes:
  - System's size and operating conditions
  - Make and model of modules and inverter(s)
  - Start-up and shut-down procedures
  - Emergency and service contact information

(3.0 continued on next page)

Solar + Storage in Oregon
The Path Forward

Solar+Storage Pilot Description

Goal: Use the limited number of projects under this effort for both Energy Trust and utilities to learn.

1. Feasibility studies to determine the technical and financial viability of installing advanced solar+storage systems at their site.

   Energy Trust will provide 50% cost match for study.

2. Installation of advanced solar+storage systems.

   Energy Trust will provide standard solar installation incentive.

Accomplishments

- Collaboration with Portland BPS
  - Resilient Power Working Group
  - Hazard Mitigation Action Plan

Table ES-3. High and Medium-Priority Actions from the Mitigation Action Plan Matrix

Action Number and Description	Implementation Priority
PBEM-10—Work with Office of Neighborhood Involvement Disability Program Coordinator to promote participation in the Additional Needs Registry through the Public Alerts system.	High-E
PBEM-12—Audit PBEM's suite of plans to evaluate whether plans meet the needs of people with disabilities, people with language barriers, and other access and functional needs populations. Develop a transition plan to update all plans.	High-E
PBEM-23—Develop an emergency communications plan to distribute emergency messages to immigrant and refugee communities in language-appropriate and culturally appropriate ways.	High-E
BPS-1—Promote and fund energy independence projects in low-income neighborhoods and communities.	High-E
BPS-2—Plan for solar + battery storage systems, which can serve as mini power-supply stations or provide residents the ability to shelter in place after any electricity supply-disrupting event, at varying scales (project, neighborhood and district) and locations (critical City facilities, low-income housing, community gathering spots).	High-E
BPS-3—Encourage solar + battery storage demonstration projects at critical City facilities, in low-income neighborhoods and in other strategic locations.	High-E
BPS-7—Support *2015 Climate Action Plan* and *Climate Change Preparedness Strategy* actions that relate to adaptation planning and natural hazard mitigation actions.	High-E
BPS-10—Develop an emergency service plan for solid waste removal in multifamily properties after a disaster event.	High-E
OEHR-1 — Prior to and during implementation, review all actions for negative externalities and to ensure vulnerable populations are protected from displacement or other disproportionate burdens.	High-E

Note: PBEM = Portland Bureau of Emergency Management; BPS = Bureau of Planning and Sustainability; OEHR = Office of Equity and Human Rights

Accomplishments

- Collaboration with Portland BPS
  - Resilient Power Working Group
  - Hazard Mitigation Action Plan

- Active engagement with both Pacific Power and PGE on barriers to advanced solar+storage
- Coordination with PUC on developing the solar+storage feasibility assessment offer
- Commitment from major storage vendors to be involved
- Customers from both Pacific Power and PGE expressing an interest in participating in the pilot

Market Barriers

- Contracting necessary for customer owned system
- Communication capability to provide grid services
- Lack of rate structure or tariff to value storage
- Lack of general information for customer education
- Misperceptions of system safety
- Jurisdictional permitting
- Net-metering advanced solar+storage
- Federal tax credit requirements

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Energy Trust of Oregon