



Finding Pennsylvania's Solar Future June 8, 2017 Stakeholder Meeting Summary

Markets & Business Models Workgroup

The business model subgroup of the June 8, 2017 stakeholder meeting convened for two hours following a presentation by VEIC on the baseline and alpha (i.e., 10% solar by 2030) modeling scenarios. The working group was presented with a draft Purpose statement and Principles of Workgroup Interaction. There are photos of the white board notes taken during the discussion at the end of this document.

The draft Purpose Statement that was initially presented to the group read as follows:

Developing a dynamic process for stakeholder engagement and empowerment that will transform Pennsylvania's solar electric portfolio over the coming decades, such that the Commonwealth is poised to achieve a solar future with diverse job opportunities at all income levels, locally resilient communities, a robust energy industry and where both firms and families seek out Pennsylvania for the future. The group decided that the purpose statement could be addressed later online.

The group decided that the proposed Purpose statement was not relevant to the Markets & Business Models workshop, and felt that it should be completely reworded to be more representative of the specific goals of solar businesses. Most group members indicated that the Purpose Statement should include more focus on markets and businesses and building the value of solar. Other members felt that it should include outreach, advocacy, communications, education, cooperation among producers of all scales/size, as well as customer focus, including quality of life issues and affordability. Rather than spend more time on trying to finalize the Purpose statement, the group elected to move forward with agreement to revisit the Purpose statement via online collaboration.

Some group discussion focused at clarifying the goal, which was defined as "10% solar by 2030?" This goal of the project was defined in the application to the Department of Energy and refers to retail sales of electricity for solar energy generated/located in Pennsylvania. Generation that occurs in other states, even though part of PJM Interconnection is not included in this goal. The end result of the modeling and narrative may change the goal percentage upward or downward.

The group decided on the following Principles of Workgroup Interaction (i.e., how the group will interact with one another during the stakeholder process):

- Discovering, not telling
- Facilitators guiding the dynamic process, not directly the process
- Working with a question-based format for engagement
- Embracing feedback from all stakeholders
- Allowing time and space for exploring potential
- Ask "why am I talking/why am I not talking"
- Raising hands to ask questions

Defining Key Stakeholders

Participants also expressed the desire to define “Who are the stakeholders?” as well as to define what is/are the market(s) that the group should consider. The group defined “markets” as 1) residential; 2) commercial; 3) industrial; 4) Emerging (transportation, storage, etc).

The group also asked the question, “How do we connect, engage and empower stakeholders?”

Identifying Pivotal Factors

The stakeholder group then reviewed, edited, and agreed upon a definition for “pivotal factors,” which they defined as: “Pivotal factors are those that would optimize the benefits for economy and environment, for solar development and for families, communities and businesses.” The group inserted the word “communities” into the definition.

The remainder of the meeting was devoted to reviewing a list of potential pivotal factors derived from feedback during the March 2 meeting. Stakeholders reviewed the provided list and added to the list (refer to the summary list of those pivotal factors and the photos of the lists created at the stakeholder meeting at the end of this summary.)

After a group review and discussion of all pivotal factors, participants were asked to list the top five most impactful pivotal factors in their opinion (i.e., the factors that would be the largest game changer for solar by 2030 for Pennsylvania). Table A summarizes those responses.

The major themes identified by this survey of stakeholder opinions as to the “gamechanging” pivotal factors included:

- *“Financing,”* particularly access to capital and long-term financing including PPAs and SREC pricing as well as long-term wholesale pricing for utility scale projects.
- *Policy and Regulatory changes,* including increasing the solar requirement in the AEPS, protecting net metering and closing the SREC border
- *Technology advances and cost of technology,* including panel and inverter efficiency/costs and innovations/cost of storage
- *Soft Costs,* including marketing/customer acquisition, permitting/zoning fees, workforce development, etc.
- *Community Solar,* including enabling legislation
- *Utility Ownership of Solar*

TABLE A. Summary of Stakeholder Responses to Survey of Top Five Most Impactful Pivotal Factors for Solar through 2030 for Pennsylvania from June 8, 2017 Stakeholder Meeting. Markets & Business Models Workgroup.

Category	Actual Participant Responses	Tally of Responses
Financing		23
	Financing	6
	Incentives (state)/subsidies	5
	SREC price	3
	Long-term Financing	2
	Long-term PPAs	2
	Increase information access to reduce financing costs	1
	Economics	1
	ITC/depreciation	1
	PACE financing	1
	access to capital	1
Policy Changes		14
	Policy Support/Legislation/Regulation	7
	Close SREC border/can additional cheaper solar come in from out of state?	3
	Increase AEPS	2
	Regulatory Rules re: net metering	2
Technology Advances		12
	Technical/System Cost/Progress - panels, storage, efficiency	8
	Storage/battery technology	2
	Cheap solar roofs (Tesla-like)	1
	Cost of storage	1
Soft Costs		11
	Workforce Development/labor costs	4
	zoning and permitting	3
	Marketing environment/marketing	2
	residential solar soft costs	1
	customer accessibility	1
Community Solar		6
	community solar	5
	Require utilities to allow and promote virtual net metering (the simplest variant to community solar)	1
Utility Regulations/Ownership		4
	Allow EDCs/utilities to own solar (ratebase solar)	3
	Utility procurement rules	1
Internalizing Externalities		3
	Value of solar (internalizing the externalities), VOS for climate resiliency	1
	Corporate ESG (environmental, social and governance factors) ratings/adopting and enforcing (+incentiving) triple/quadruple bottom line	1
	Resiliency	1
Utility Scale		2
	Utility scale - can you bid into PJM?	1
	Incentivize utility scale solar (if can't get enough DG adoption)	1

Multi-unit buildings	2
models, policies, financing for multi-unit buildings	1
Allow tenants to install	1
Other	
Rate of electrification of vehicles/half of all transport will be electrical	4
Education/visibility (P4)	4
distribution impacts/interconnection delays/grid integration/load balancing/DS management	2
Ownership models	2
Demand growth/customer demand	2
building codes	1
cooperation/stakeholders working together	1
Land Use/land and roof availability	1
Knowing price point(w/ value)	1
create broad accessibility by diversity of production	1
Requirements to purchase energy (utilities) and/or promote electric car infrastructure and/or add/build solar on both low income and market rate new construction & renovations that increase value of a property to more than twice the median assessed value	1
Low-Income models	1
encourage utilities to look into storage before any need it, so we don't lose time when we expand faster than they expect	1
solar economic vs. wholesale market	1
Limited by rate of adoption - urban vs. rural adoption	1
PJM standards for accepting load	1

Identifying Percentage of DGPV and Utility Scale Solar

During VEIC's presentation of the modeling in the morning, they indicated that they were currently estimating 50% distributed solar PV (DGPV) and 50% utility scale solar in the model.

Stakeholders were asked to provide their opinion about the appropriate mix of DGPV and utility scale solar in the model to reach 10% solar by 2030. The tallied results are provided for in Table B below.

The average of stakeholder responses was 63% utility scale solar and 37% DGPV. There were three respondents who felt that Community Solar should be considered separately so they rated Community Solar in their estimates. The average from these participants showed 23% DGPV, 27% Community Solar and 50% utility scale solar.

TABLE B. Summary of Stakeholder Responses to Survey about Their Opinion of the Distribution of Solar from Distributed (DGPV) and Utility Scale Generation* if Pennsylvania Achieves 10% Solar Penetration by 2030 (June 8, 2017 Stakeholder Meeting; Markets & Business Models Workgroup)

	DGPV	Community Solar	Utility Scale
	5	5	5
	10	10	10
	15	15	15
	20 xx	20 x	20
	25 xx	25	25
	30 xxx	30 xx	30
	35 xx	35	35
	40 xxx	40	40 xx
	45	45	45
	50 x	50	50 xx
	55	55	55
	60 x	60	60 xxxx
	65	65	65 xx
	70	70	70 xx
	75	75	75 xx
	80	80	80
	85	85	85
	90	90	90
	95	95	95
	100	100	100

*Some stakeholders felt that Community Solar should be considered separately from utility scale solar (others felt that they were the same category) so they included Community Solar in their percentage distribution (indicated by red x).

Notes on Pivotal Factors Discussion

These following are the notes taken by the group's scribe regarding the pivotal factors discussion.

- **Financing:** Long-term, fixed? , low risk, loan/lending, PPA, ITC
- **New Construction Requirement:** Building requirements, codes
- **Triple, Quadruple Bottom Line** – New to Pennsylvania
- **Community Solar** – New market, new business model
- **DQL RFP** – solar part of PLR portfolio (4-5 months)
- **House Bill** – storage and microgrids
- **Charging stations, solar w/ storage** – will these be subsidized by ITC?
- **Economics** – What is the actual cost of solar? Germany is half the price (roofs are better, more standardizing)
- **Legislation/Policy/Regulations** – state incentives, net metering, community solar, AEPS (compensate for ITC loss with SRECs), close borders
- **Technical Progress** – cost + efficiency, storage (will help adoption), solar roof
- **Accessibility** – community, multi-tenant units, education, reality of how electricity works, energy literacy
- **Land Use, distribution** – property rights
- **Interconnection** – smart inverters
- **Environmental + Social Goals**
- **Zoning, permitting, soft costs**
- **Market access**
- **Ownership models** – ownership, 3rd party, utility, community solar
- **Low Income Models**
- **Tax Exempt** – non-profit, education, municipality
- **Marketing & Education**
- **Workforce Development**
- **Public Health**
- **Consumer-driven factors**
- **Solar supporters working together**

Questions for Kate/VEIC:

- **How can technical progress play into the model?**
- **How will ITC expiration be reflected in the model?** Can SRECs and border closure compensate?
- **What is the maximum adoption rate for DGPV?** Let that inform utility-scale/community adoption rates

Pictures of Note Boards Creating During Stakeholder Workgroup, June 8

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Purpose Statement: [DRAFT]

Developing a dynamic process for stakeholder engagement and empowerment, that will transform Pennsylvania's solar electric portfolio over the coming decades, such that the Commonwealth is poised to achieve a solar future with diverse job opportunities at all income levels, locally resilient communities, a robust energy industry, and where both firms and families seek out Pennsylvania for the future.

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Principles of Workgroup Interaction:

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Pivotal Factors that would optimize the benefits for economy and environment, for solar development and for families and businesses communities

Ownership Models: (own, 3rd party, utility ownership, community, multi-unit buildings)

- > Financing: (lending, PPA, REIT) use new creative financing
- > Distributed PV (DGPV)
- > Utility Scale solar (m)
- > Low income models
- > Tax-exempt (non-profits, schools, mini) models
- > Marketing & education (Community Choice Aggregators, Solarings)
- > Workforce development
- > Public Health, Environmental, Climate Change
- > Consumer-driven factors

Technology Advances

Defining Markets get to to 100%

- Comfortable place to live Quality of life, affordable, equitable
- Accommo
- Cooperativity among various producers scale size
- Reducing market barriers
- Managing shifting energy use (Revenue models) sensitivity to markets working for all
- Who are customers
- Customer pricing → being cognizant informed

- ^{Available} Land Use / Property Rights
- Distribution Impacts
- Environmental + Social Goals Renewable Energy Goal
- Zoning + Permitting
- Labor Costs / Workforce
- ~~Discounts / Rebates / Incentives~~
- Electrification of Transportation Autonomous Cars, EV

Customer:

~~Market~~ - ~~Utility~~ Industrial

- Commercial / ~~Industrial~~
- Residential
- emerging - transport
- Storage

Customering

Generator: - Utility scale

- Commercial
- Resi
- Community

↓ Market barriers

Utility - attitudes / cooperation

New construction Requirements

Building Requirements

P.A.C.E.

(B) Corp

Microgrids

Apartment owners

- T.O.U. Time of Use
- Demand Response Pricing
- ^{Marketing/} Education for Customers Discounts, Vendors, Materials, Costs, Ethics
- Community-Based (net metering)

- Solar supporters working together
- ~~Keep costs manageable~~ Knowing price point - actual cost
- Building Codes
- Technical Progress Solar roof tiles
- Policy Support (State incentives)
- Panel Cost + Efficiency
- Storage Costs / Accessibility
- Customer accessibility

Value of Solar

- Interconnection Smart meters, investment to grid/share cost
- A.E.P.S. ↑ solar, Border closure
- Market Access
- Financing Long-Term, shared Risk / Risk, Stream of Revenue