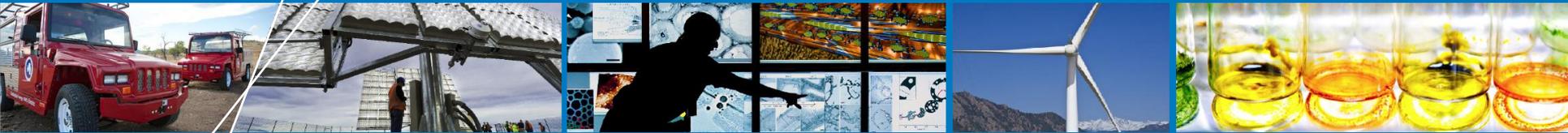


NREL's Renewable Energy Finance Tracking Initiative (REFTI)



2H 2011 Summary

Developed by:
Michael Mendelsohn
Ryan Hubbell
Strategic Energy Analysis Center

April 26, 2012

Housekeeping

Presentation, webinar recording, and aggregated spreadsheet data will be made available at the NREL RE Finance website:

<http://financere.nrel.gov/refti>

Confidentiality

- Ensuring respondent confidentiality is critical to NREL
- Data gathered through REFTI will only be used for:
 - *Providing aggregate values for model inputs*
 - *Reporting trends*
 - *Participant-specific data will not be utilized or distributed in any way*
- Please let us know if you have any concerns over data provided through this webinar
 - *Any concerns will be addressed prior to releasing slides to public*

About the Data

- Data provided voluntarily through a questionnaire and not validated by NREL
- 2H 2011 total respondents for *Primary Questions* (#'s 3 – 7) were 12
 - 1 Wind, 4 PV<1MW, 7 PV≥1MW
- Total respondents for *Secondary Questions* (#'s 8 – 11) were between 24 - 28
- Unless otherwise specified, bin range answer midpoints were used to calculate weighted averages by technology
- Potential concerns:
 - Duplicate data
 - Misunderstanding questionnaire
 - Small sample size

Spreadsheet Format

Characteristics of Survey Respondents

Composition of firms responding to this survey

Firm Composition

Answer Options	Response Count	Response Percent
Equity Financier	28	3.6%
Debt Financier	17	2.2%
Developer/Installer/ Integrator	293	38.0%
Utility	33	4.3%
Counsel / Consultant	121	15.7%
Energy Consumer	34	4.4%
Government / Research / Advocacy	85	11.0%
Manufacturer / Supplier / Distributor	48	6.2%
Other	113	14.6%
answered question		772
skipped question		0



Firm Composition

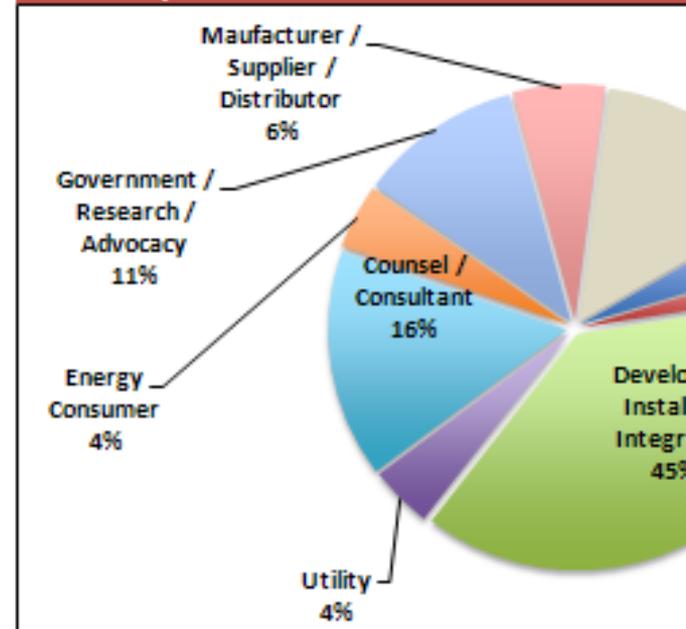


Table of Contents

- Characteristics of Survey Respondents
- Project Information (closed financing during the period)
 - Financial structure, project-level debt & equity
 - Power Purchase Agreement (PPA) structure
- Barriers and Incentives
 - Governmental incentive programs
 - Barriers to project development
- Development “Soft” Costs (New)
- Bonus question (1603 Expiration)

REFTI Questionnaire: Q1

* 1. Primary renewable energy development business.

Project Development Role

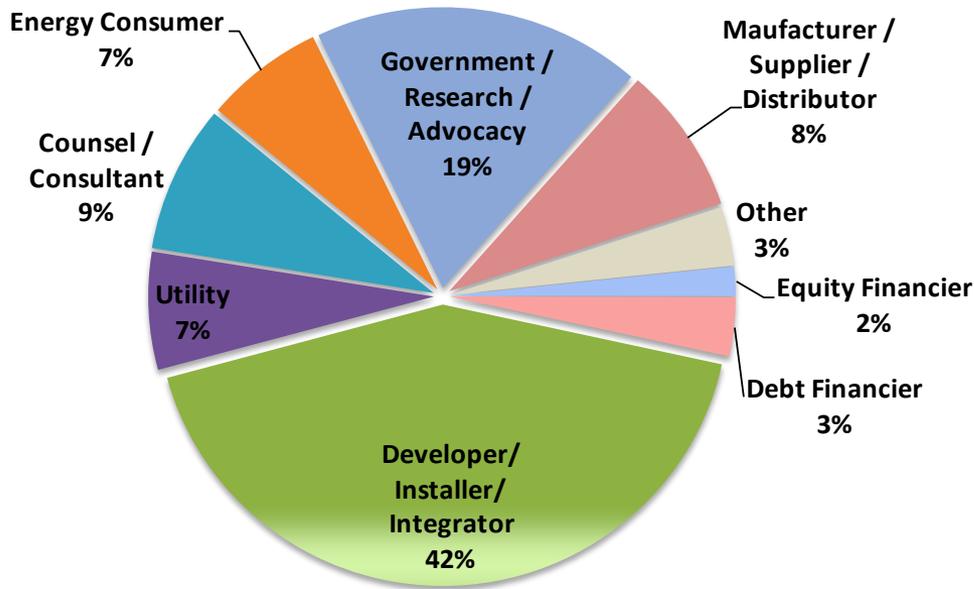
Primary Technology

What best describes
your role and primary
technology being
developed?

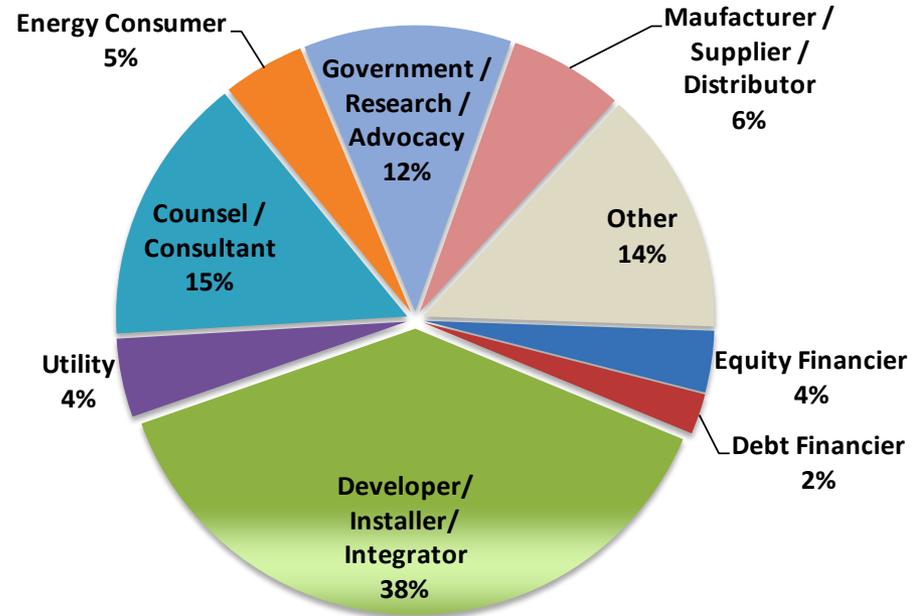
Comment on project development role or technology

Participation: Industry Representation

Respondent Industry Representation - 2H'11



Aggregate Industry Representation (Q4'09 - 2H'11)



- 59 people entered 2H 2011 questionnaire
- 813 respondents have reported data over the entire REFTI timeframe.

REFTI Questionnaire: Q3

*** 3. Please describe your current project(s).**

of Projects that Closed
Financing

MWs Financed

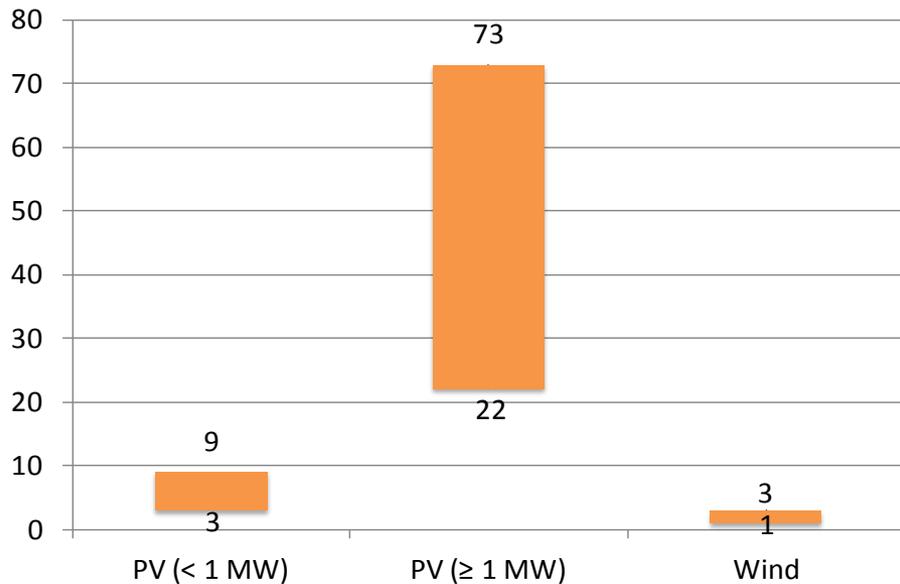
Primary Financial Structure

Primary Technology

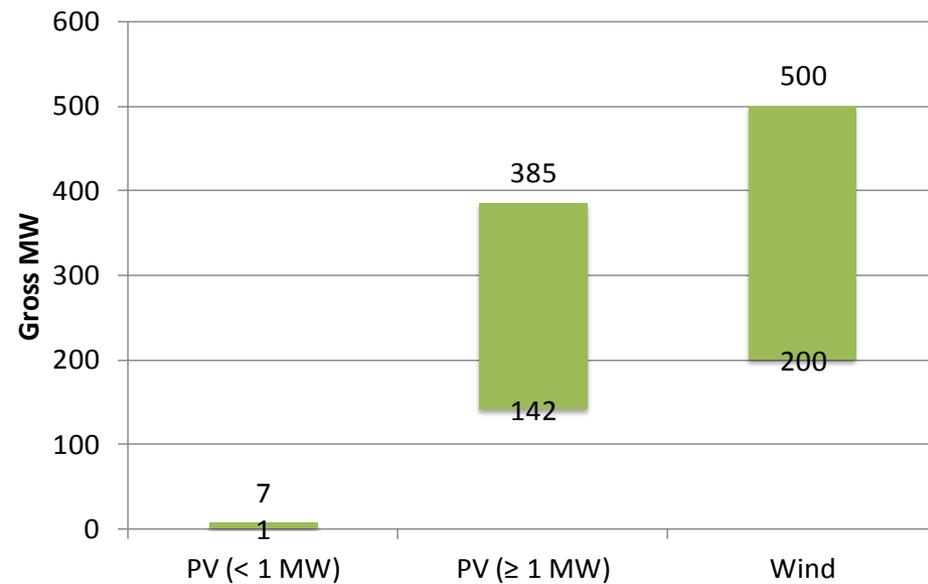
Other Financial Structure (please specify)

Current Projects 2H 2011

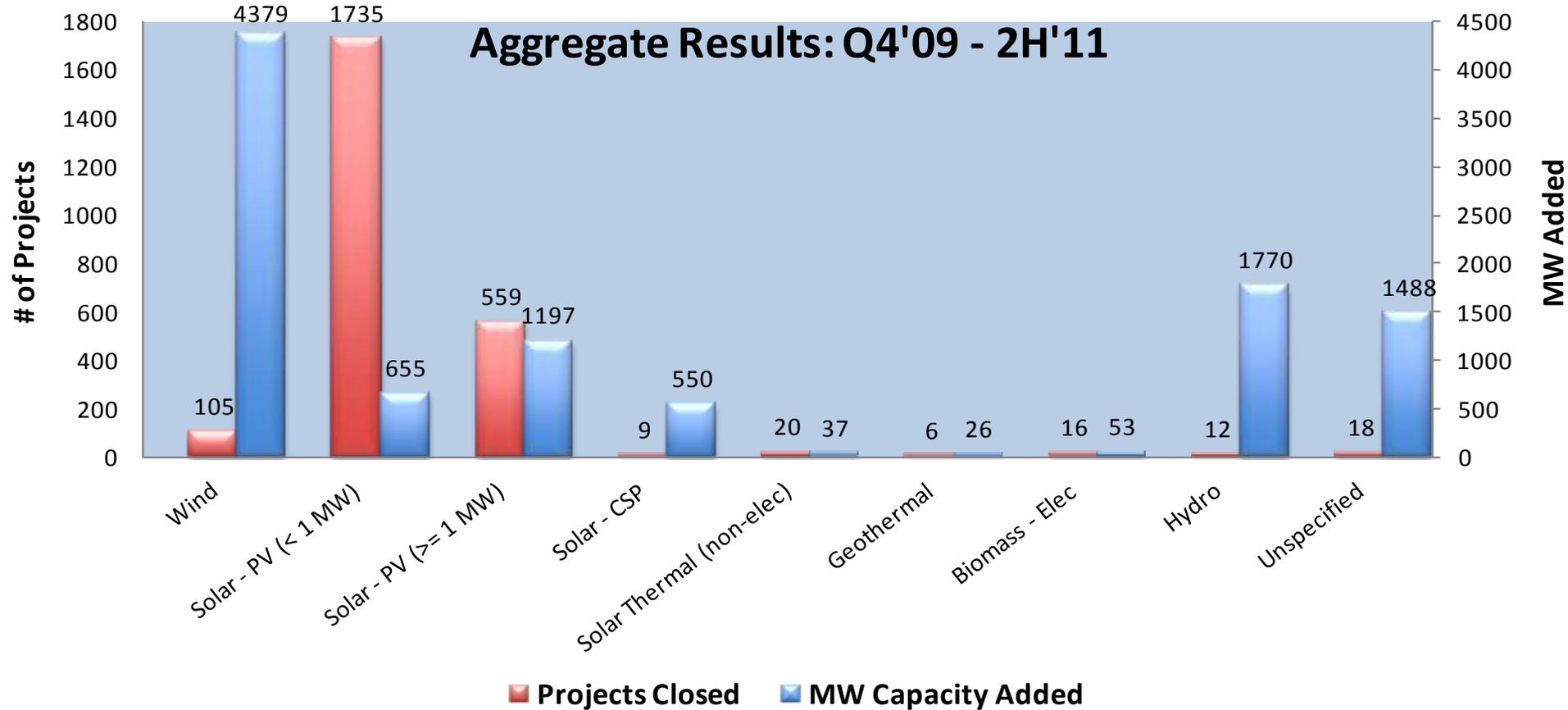
Number of Projects Financially Closed - 2H'11
High/Low Range



Capacity Financially Closed - 2H'11
Reported High/Low Range



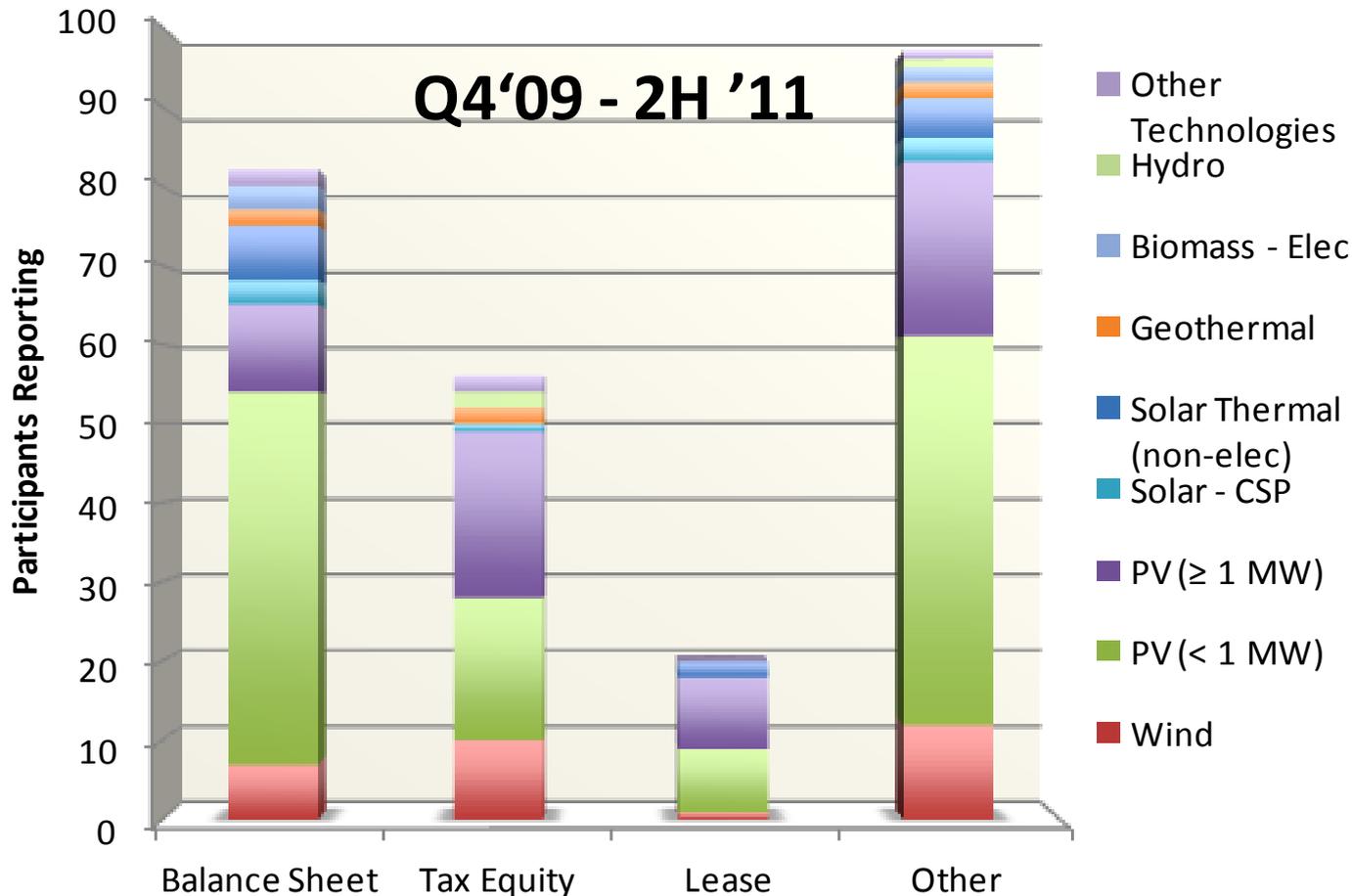
Project Development Reported to REFTI



• Since Q4 2009, REFTI has collected information on approximately 2,482 projects, representing around 10,160 MW (based on midpoint of bin ranges).

Financial Structure

Q4'09 - 2H '11

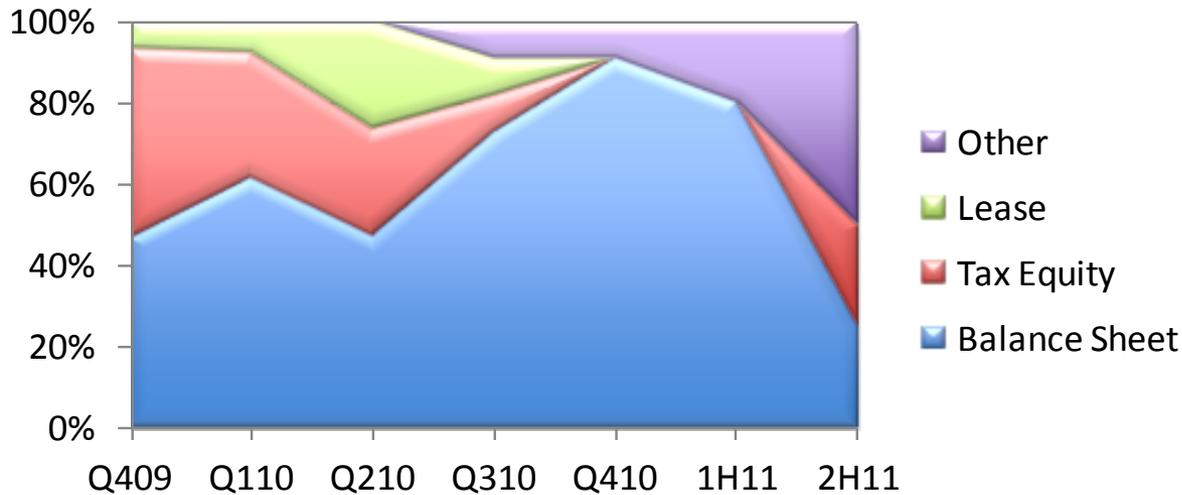


2H 2011 “Other” responses include:

- Proprietary partnership structure between IB , owner/asset manager, developer
- Congressionally appropriated
- Institutional fixed-rate notes; commercial bank debt and equity partner with no flip.

Solar Financial Structure - Trend

Financial Structure - PV < 1MW



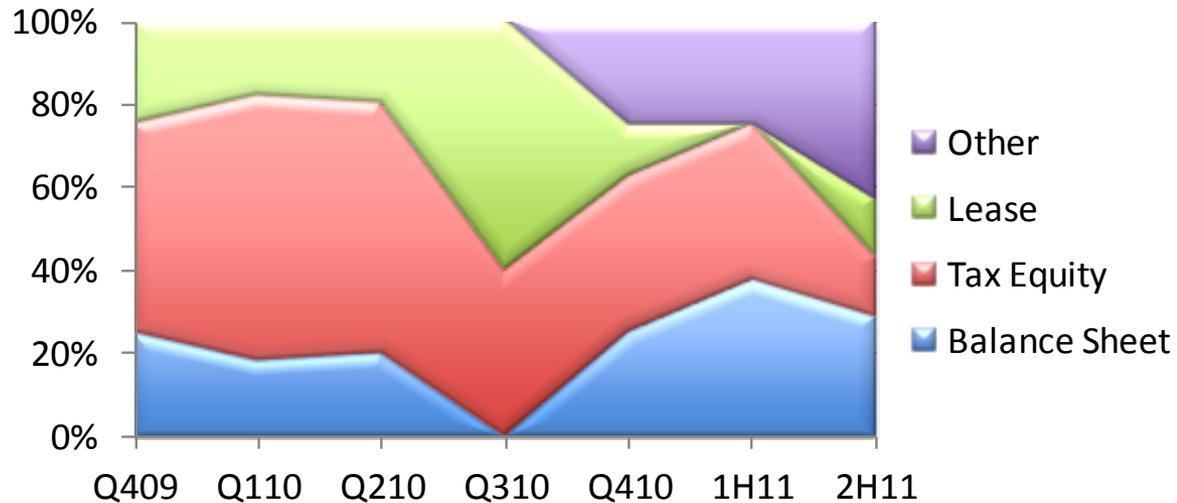
- Balance Sheet financing dropped significantly from 91% to 25% for Small PV
- “Other” reporting 50% in 2H 2011.

1H 2011 Approx Closed Capacity = 265 MW
 2H 2011 Approx Closed Capacity = 263 MW

- “Other” increased to 43% in 2H 2011 for Large PV
- Balance Sheet increased to 29%
- Tax equity shrunk to 14%.

1H 2011 Approx Closed Capacity = 4.2 MW
 2H 2011 Approx Closed Capacity = 2.7 MW

Financial Structure - PV ≥ 1MW



REFTI Questionnaire: 2H 2011 - Q4

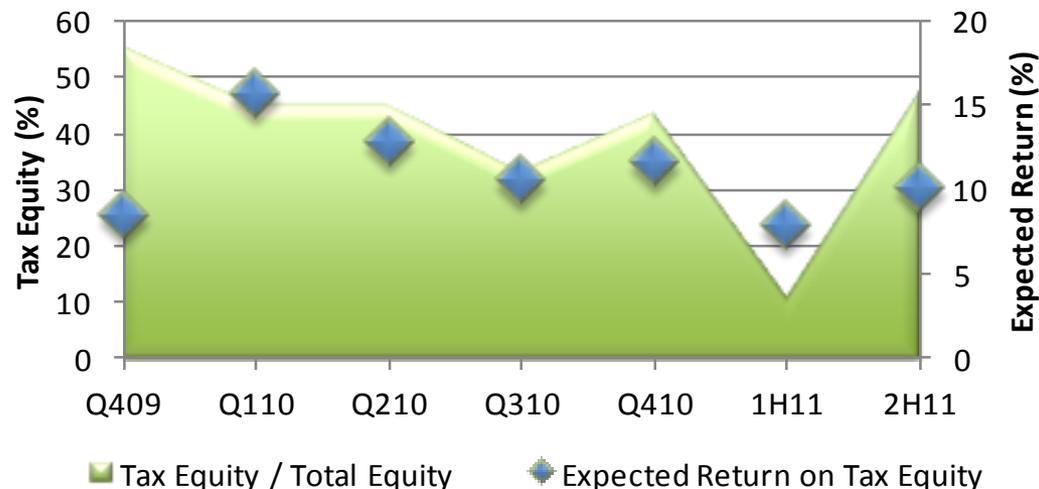
* 4. What are the Tax equity and Developer equity investments in the project(s)?

	Tax-Investor Equity / Total Equity (%)	Expected Return on Tax-Investor Equity (%)	Expected Return on Developer Equity (%)
Primary Technology	<input type="text"/>	<input type="text"/>	<input type="text"/>

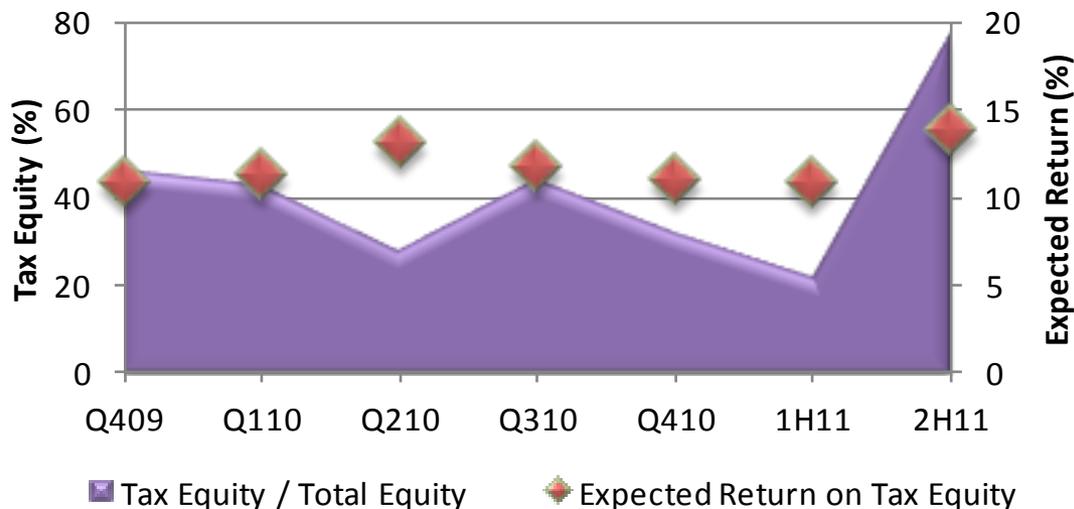
Tax Equity Ratio vs. Expected Return

- Both Tax Equity ratio and Expected Returns rebound from 1H 2011 drop-offs in 2H 2011
- Correlation evident between Equity ratio and returns.

PV < 1MW



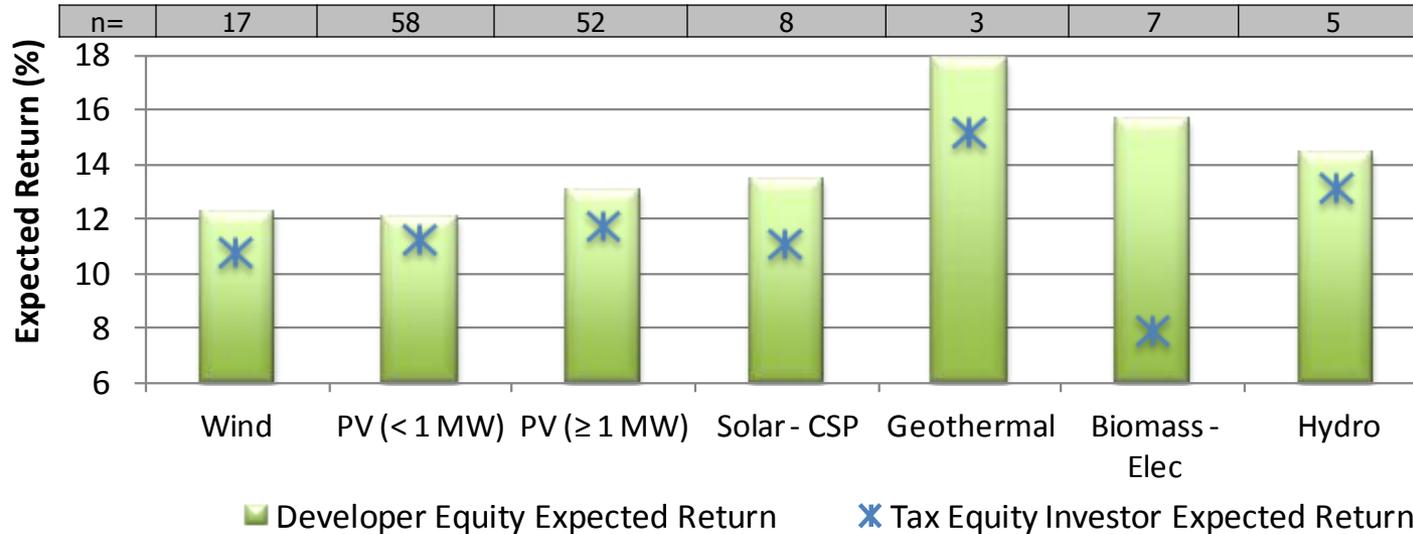
PV ≥ 1MW



- Large PV equity ratio eclipses prior period levels between 22 – 46%
- Expected Returns trending slightly higher for Large PV
- Correlation between Tax Equity beginning in Q3 2010 for Large PV

Expected Returns on Equity

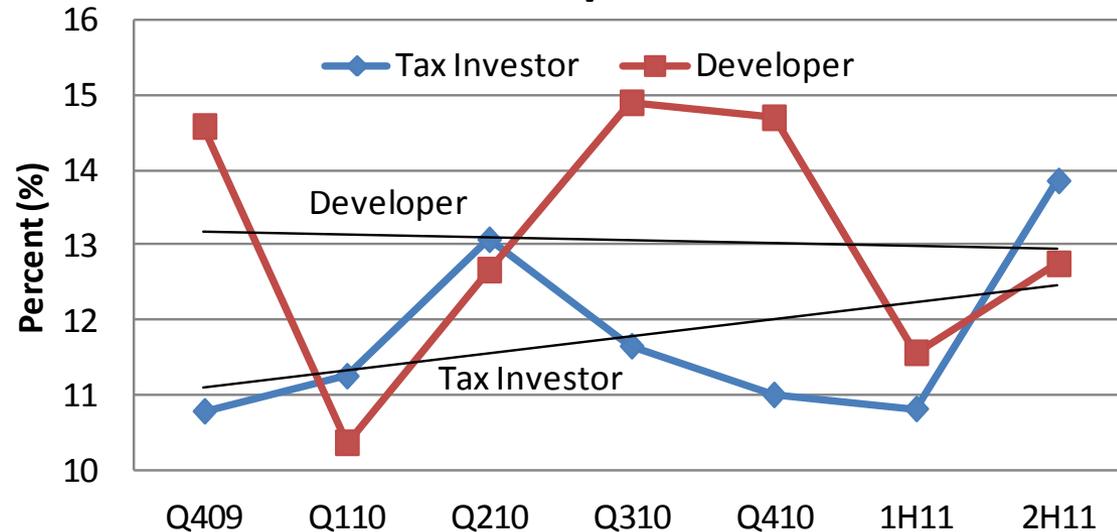
Weighted Average (Q4'09-2H'11)



- Average spread between Tax Equity and Developer returns is 240 BPS
- Solar Developer return variance within 200 BPS, Tax Equity within 70 BPS.

- Wide expected Tax Equity return range reported for Large PV in 2H 2011 between 8 – 18%
- Most all other technology Developer and Tax Equity trends undefined or flat.

PV ≥ 1MW Expected Returns



REFTI Questionnaire: Q5

***5. Please describe the Term (i.e. permanent) Debt of the project(s).**

	Debt / Total Capital (%)	Avg. All-In Cost of Debt (%)	Debt Term (yrs)	Avg. Debt Coverage Ratio Required
Primary Technology	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Cost of Debt

Q4 2009 – 2H 2011

Quarter Weighted Average Range

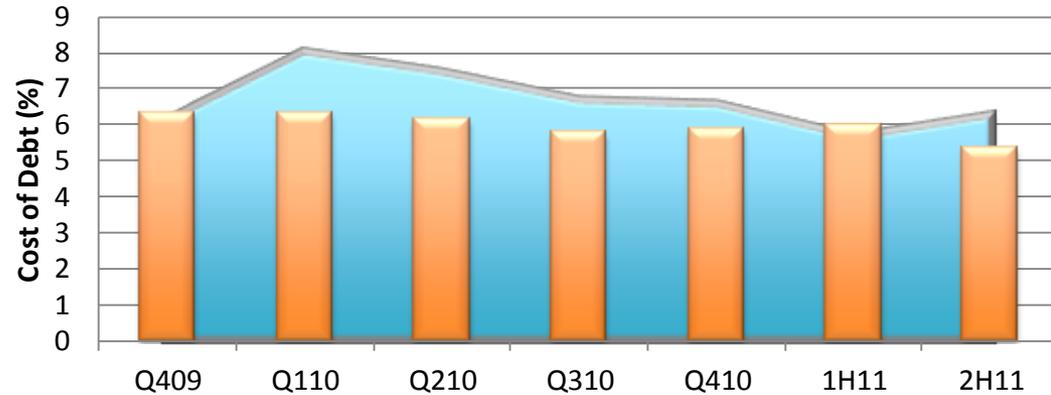
Wind	4.9 - 11 %
Small PV	4.5 - 7.6 %
All Technologies	5.7 - 8.0 %

2H 2011

Response Range

Large PV	4 - 8.5 %
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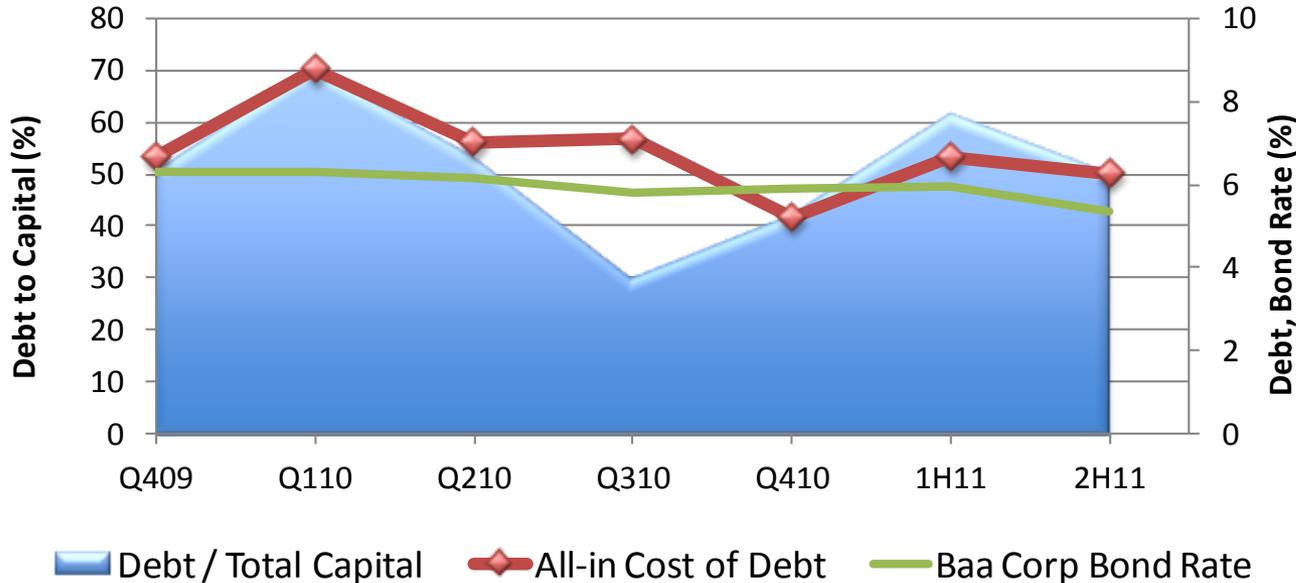
Avg. All-in Cost of Debt - Trend



PV ≥ 1MW

All Technologies

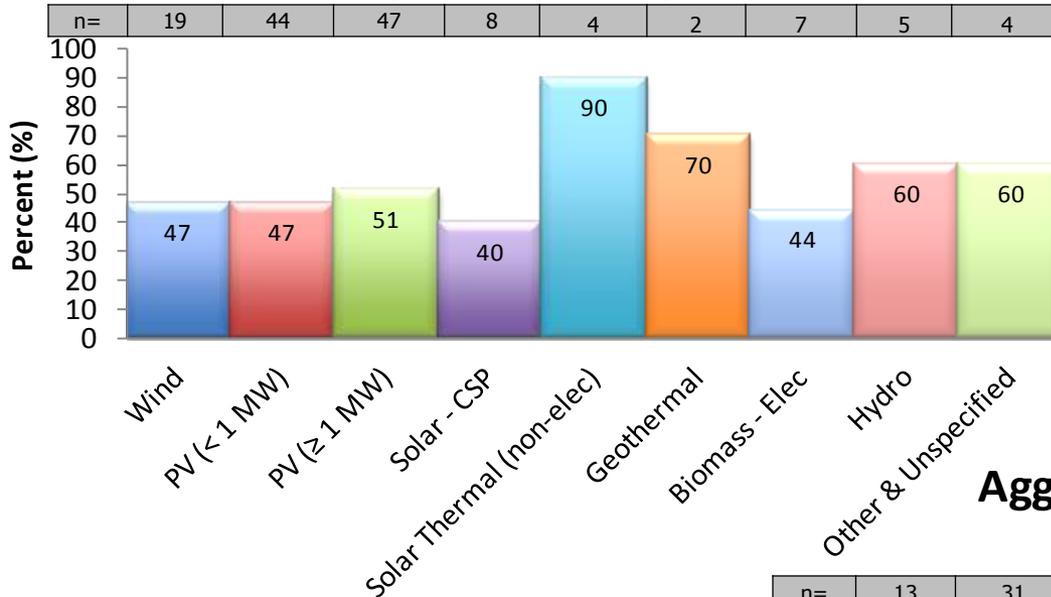
Moody's Baa Corp Bond Rate



Debt / Total Capital All-in Cost of Debt Baa Corp Bond Rate

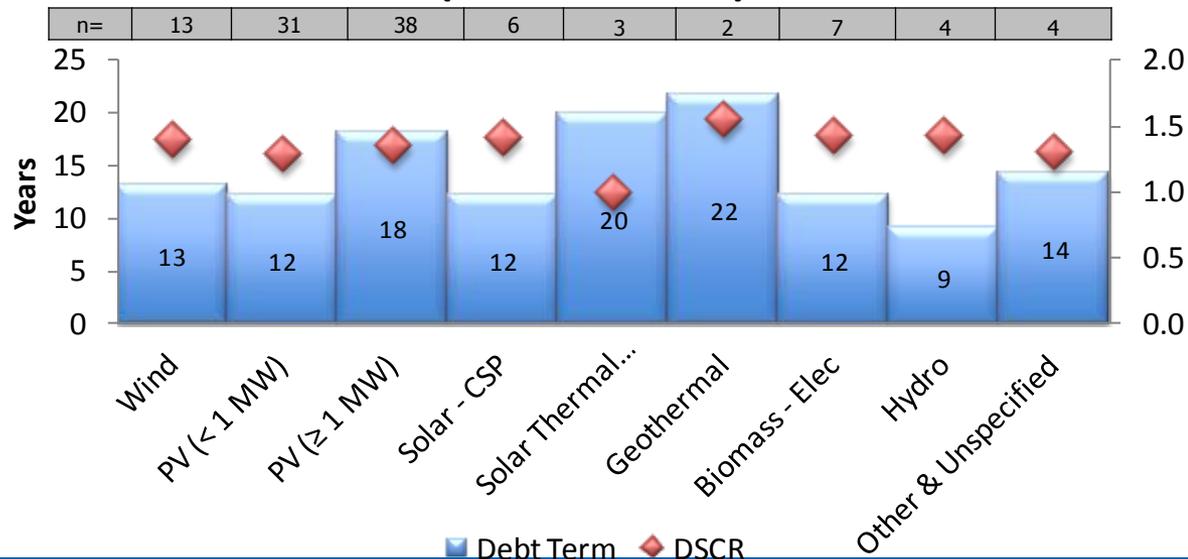
Debt to Capital, DSCR, Tenor

Aggregate Debt to Capital Ratio (Q4'09 - 2H'11)



- Most 2H 2011 respondents reported no debt utilization
- Small PV debt ratio declining to zero debt reported in 2H 2011.

Aggregate Debt Term and DSCR (Q4'09 - 2H'11)



- Wind and CSP DSCR trending up until 2011
- Large PV DSCR trending down since Q1 2010
- CSP Debt Term trending up to nearly 25 years in 1H 2011.

REFTI Questionnaire: Q6

***6. What is the total estimated Installed Costs *before incentives* and Levelized Cost of Energy (LCOE) *after incentives* from the project(s)?**

(LCOE equals the present value of project costs divided by the present value of energy delivered)

Est. Installed Costs (\$ / Watt - net output)

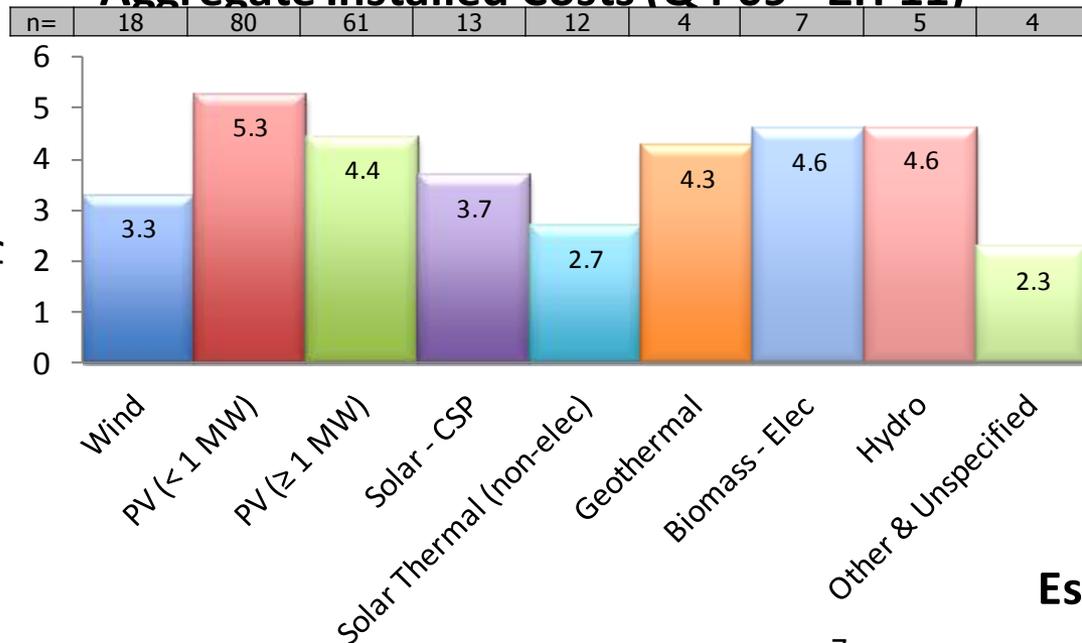
Est. LCOE (¢ / kWh)

Primary Technology



Installed Costs

Aggregate Installed Costs (Q4'09 - 2H'11)

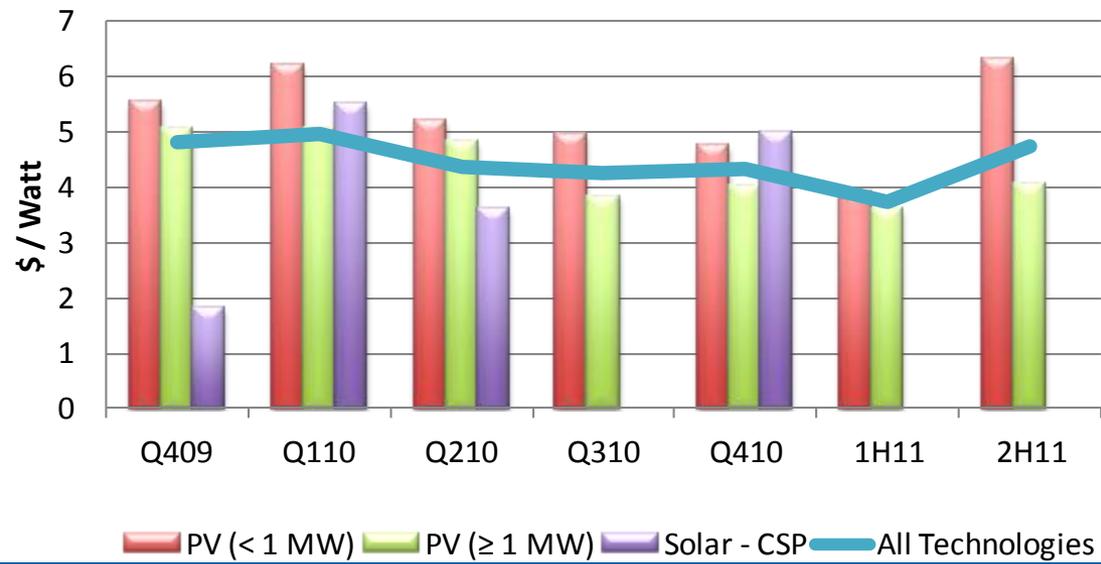


In 2H 2011:

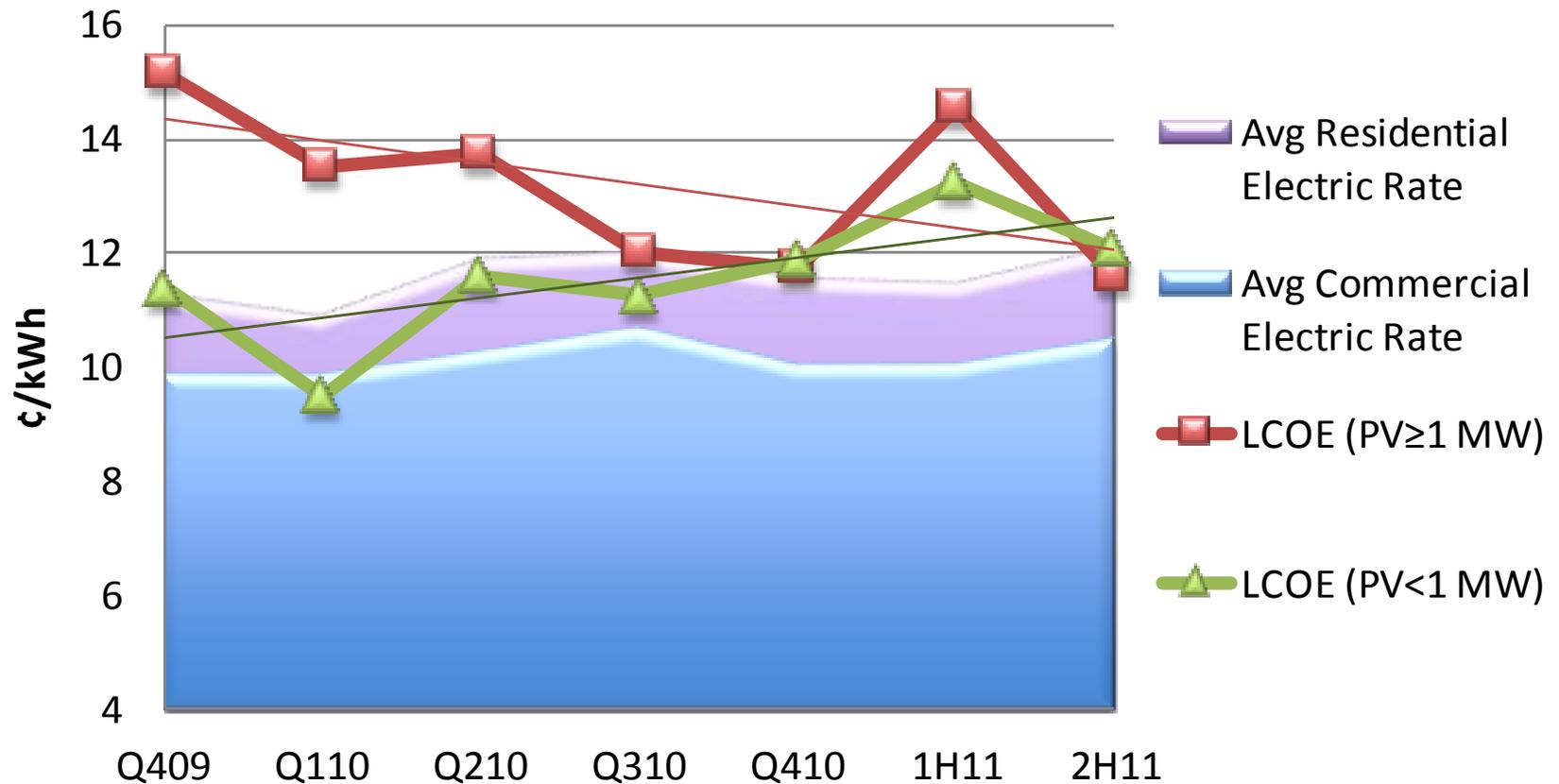
- Small PV reported 4 – 7+ (\$/W) estimated installed cost range
- Large PV reported 3 – 6 (\$/W).

- Large PV most consist quarter-by-quarter, downward trend
- Small PV costs do not appear to be declining

Est. Installed Costs - Trend



LCOE vs. Retail Electricity Rates



- Small and large PV LCOE converge in Q4 2010 and 2H 2011
- Large PV converging on commercial retail rates

Electricity Rates Source: EIA

REFTI Questionnaire: Q7

***7. Please describe the Power Purchase Agreement (PPA) for the project(s).**

PPA Term (yrs)

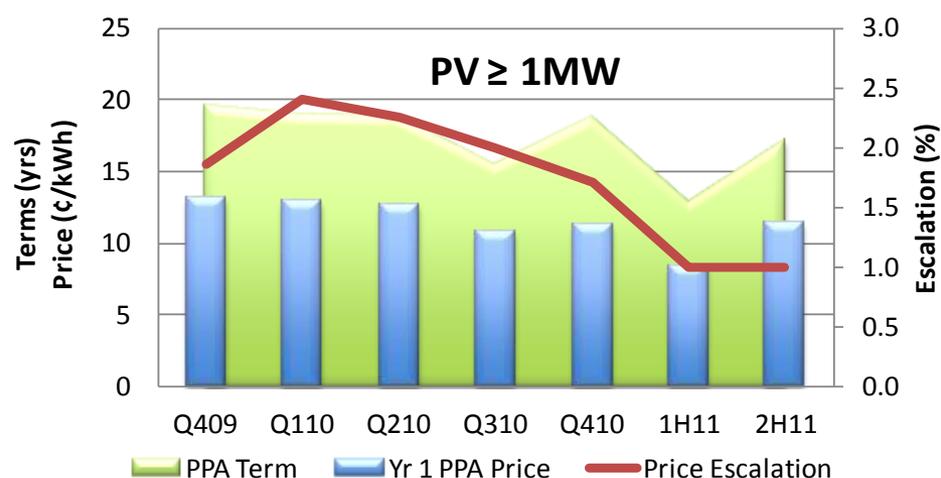
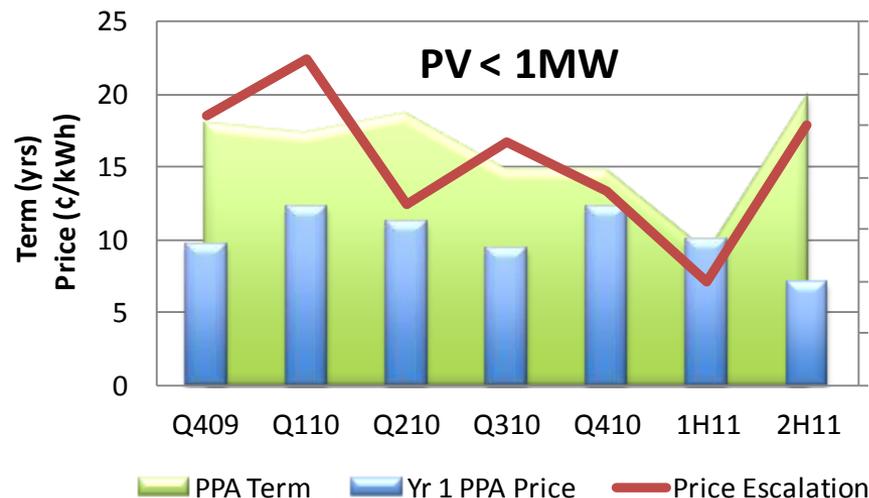
Yr 1 Price (¢ / kWh)

Price Escalation (%)

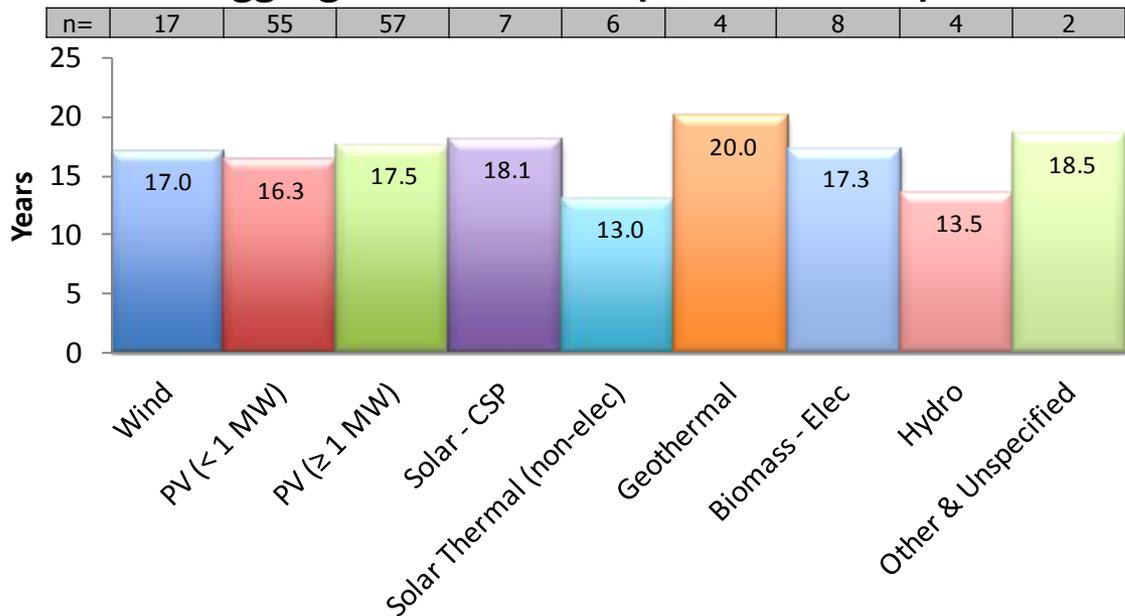
Are RECs Included?

Primary Technology

PPA Term, Price, Escalation Rate



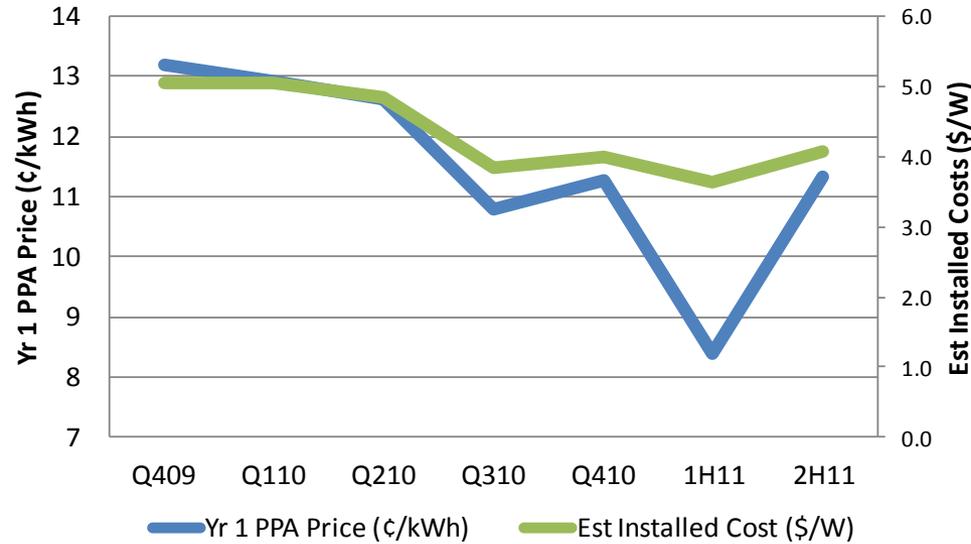
Aggregate PPA Terms (Q4'09 - 2H'11)



- PPA terms reported for 2H 2011 were highest for small PV at 20 years
- Both wind and large PV were around 17.

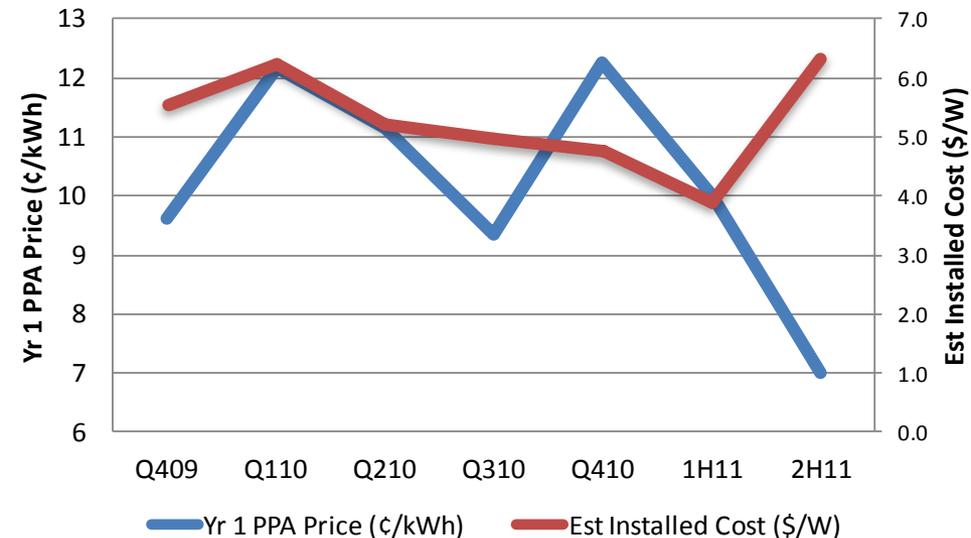
Installed Cost (\$/W) vs. Year 1 PPA Price (¢/kWh)

PV ≥ 1 MW



- Estimated installed costs and Year 1 PPA prices are both trending down and appear to be somewhat correlated for Large PV.

PV < 1 MW



- Year 1 PPA price trending down for Small PV, whereas estimated installed costs relatively flat
- Divergence in trends evident in both Q4 2010 and 2H 2011.

REFTI Questionnaire: Q8 (secondary)

8. Please provide the primary form of governmental incentives utilized by the project(s).

Depreciation

Federal Incentive

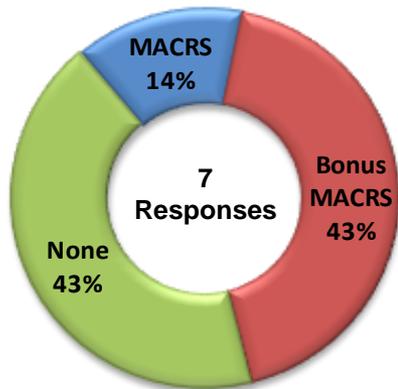
State Incentive

Primary Technology

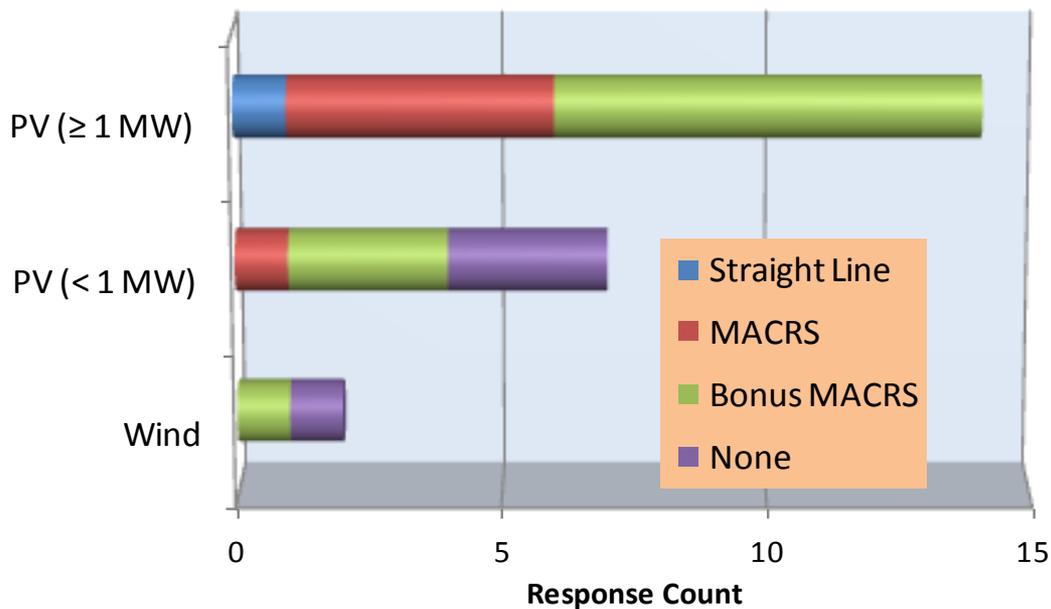
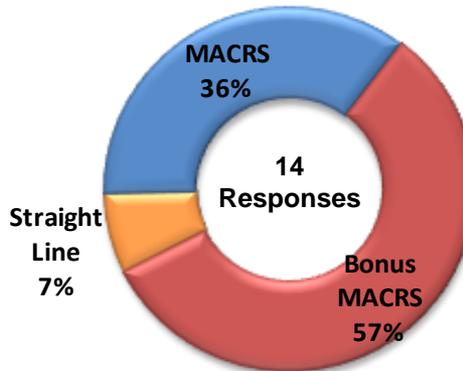
Comments related to government incentives?

Depreciation Incentives Utilized – 2H 2011

PV (< 1MW)



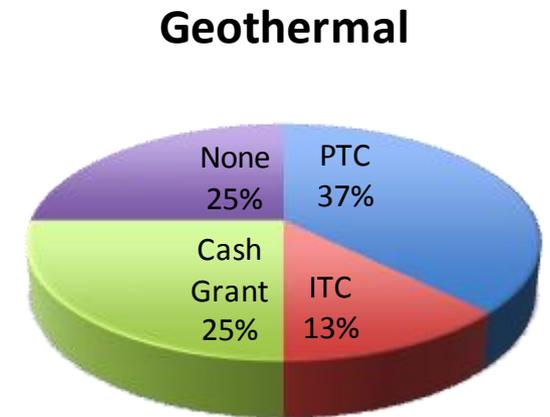
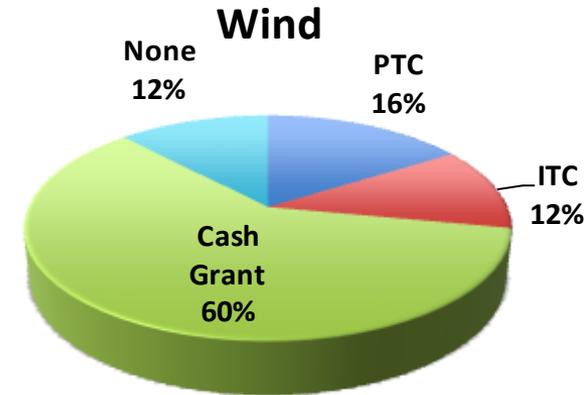
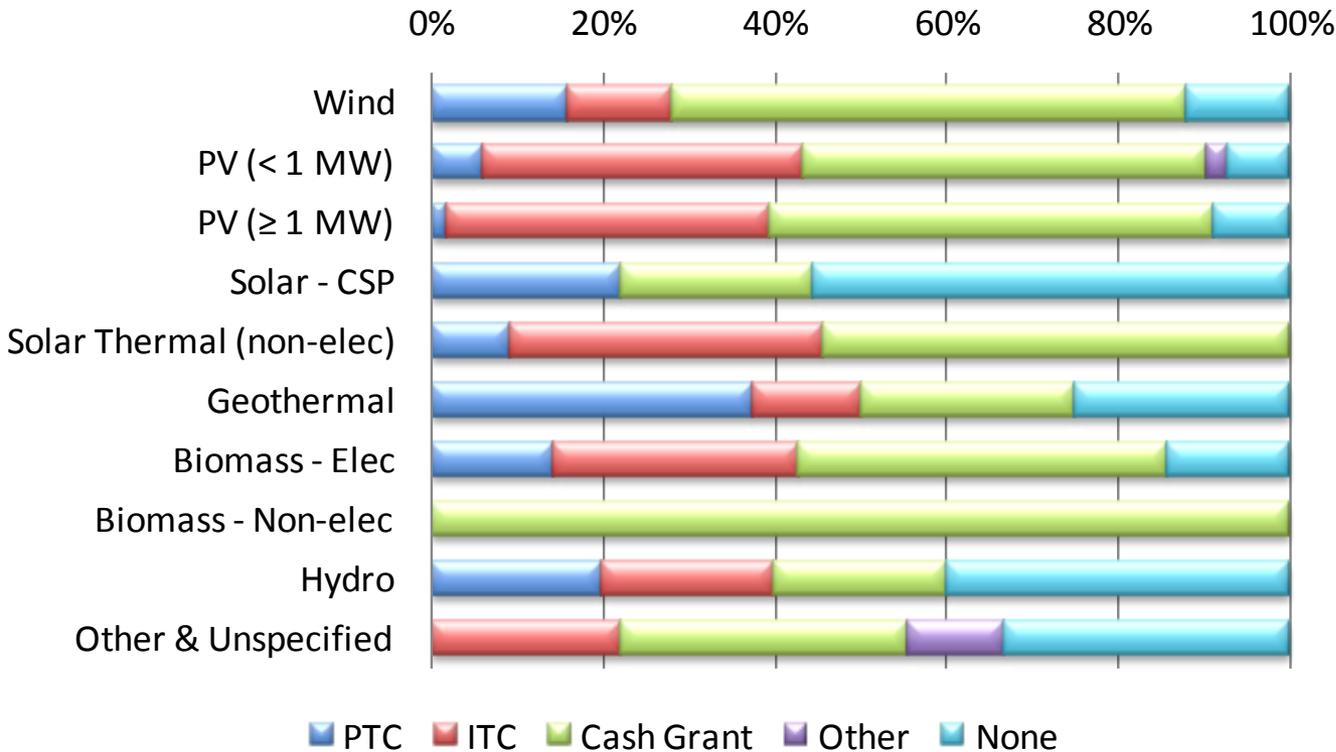
PV (≥ 1MW)



- Nearly half of small PV are not using depreciation incentives
- All large PV reporting utilization of depreciation incentive
- Bonus MACRS is by far the most popular depreciation incentive.

Federal Incentives Utilized

Aggregate Federal Incentives Utilized (Q4'09 - 2H'11)



- Cash grant most popular among all technologies (47%)
- PTC is being utilized more (12%), ITC less (31%) in 2H 2011
- 64% of Large PV utilized the Cash grant in 2H 2011

REFTI Questionnaire: Q9

9. Please comment on the *importance* of the listed factors to the development of the project(s).

PPA with Utility

Federal
Incentives

State
Incentives/Mandates

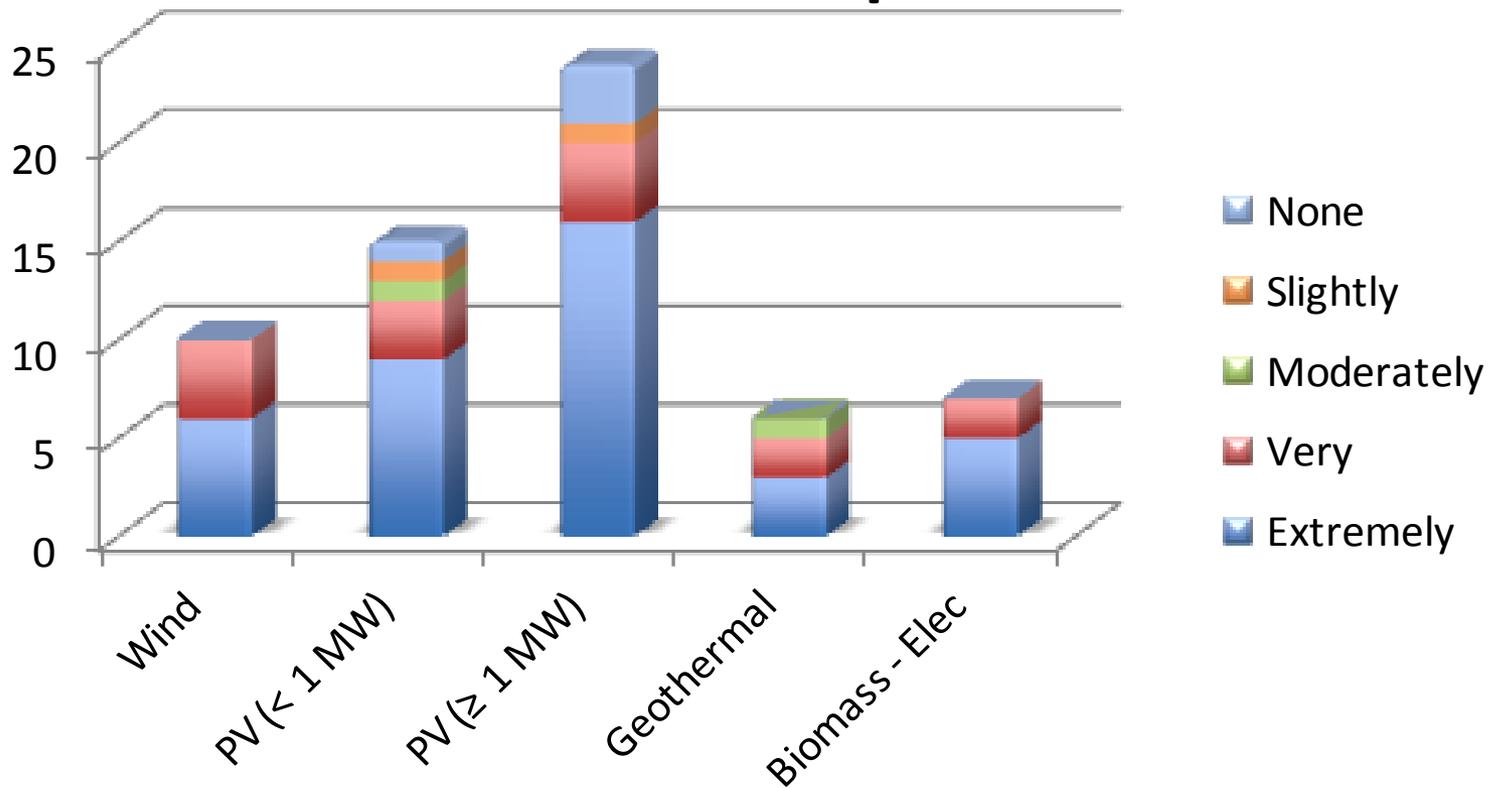
External
Financing

Loan Guarantee

Primary Technology

Federal Incentives

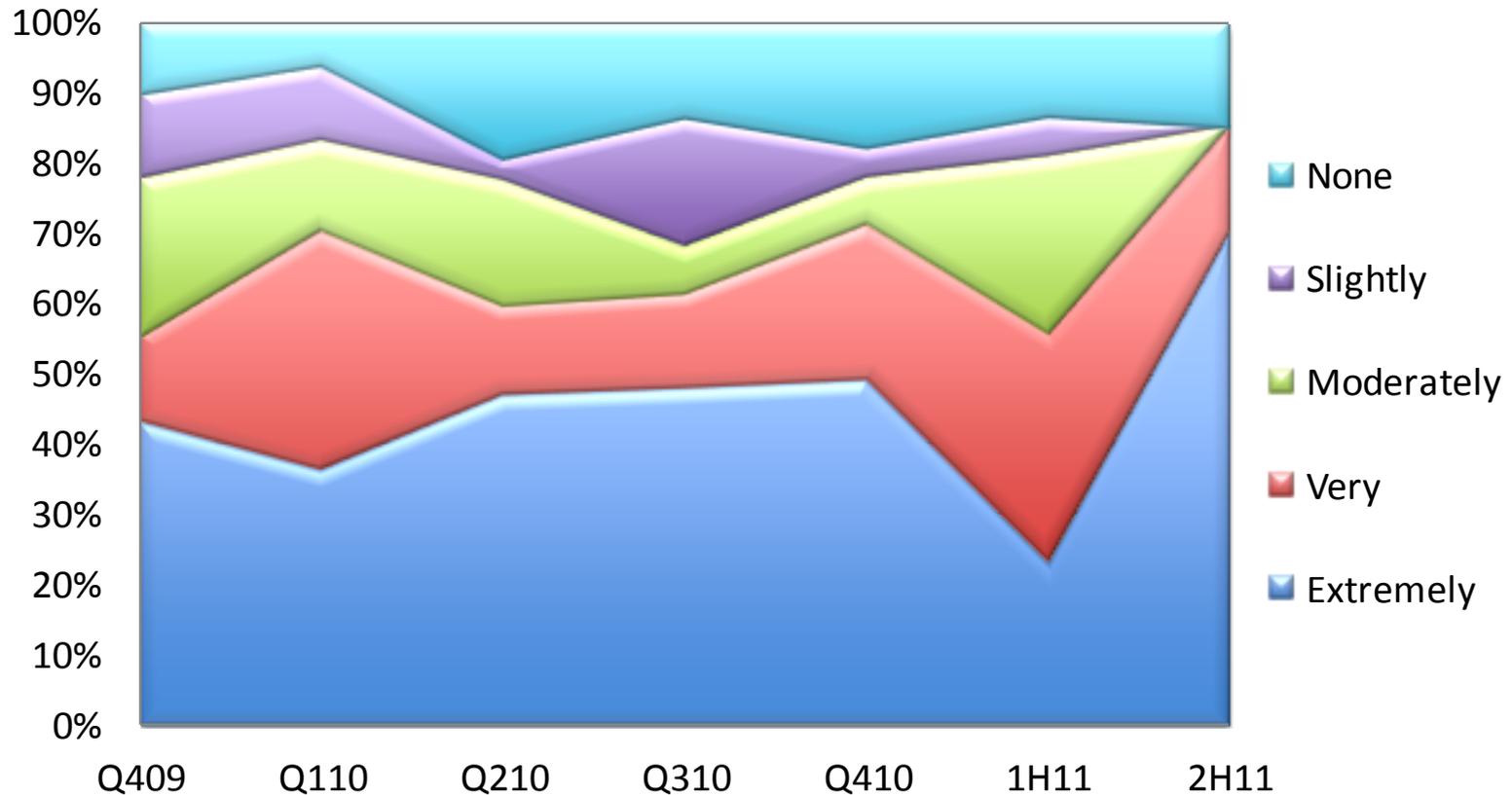
Federal Incentives Importance - 2011



• Federal Incentives were Extremely or Very Important for 84% of all 2011 respondents.

State Incentives

Importance of State Incentives to Project Development - Trend



- State incentives reverse decline in importance with 70% citing Extreme Importance to project development in 2H 2011.

REFTI Questionnaire: Q10

10. What was the *largest* barrier to project development and how did it impact the project(s)?

Barrier

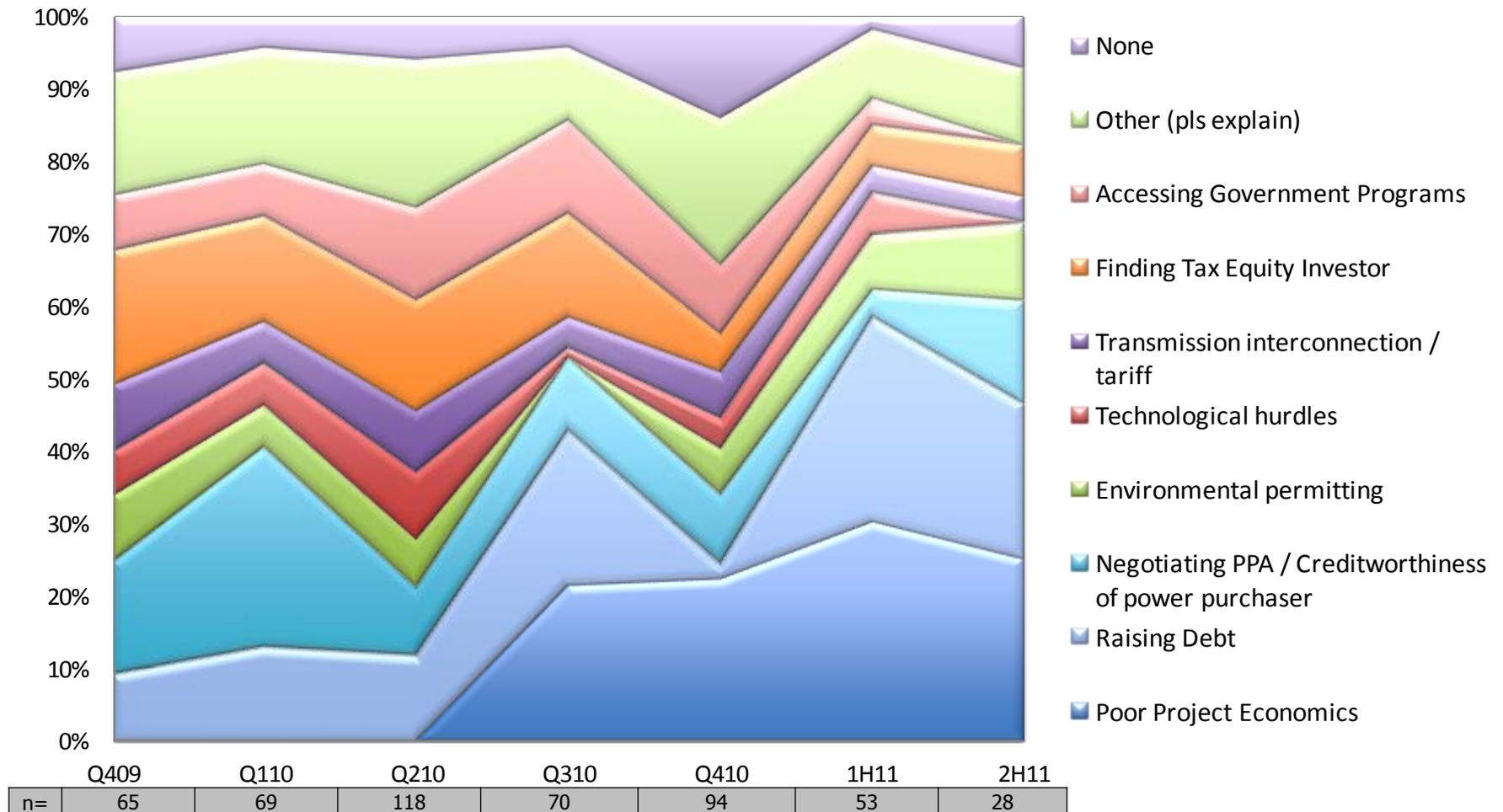
Impact

Primary Technology

Comments Related to Barriers and Impact?

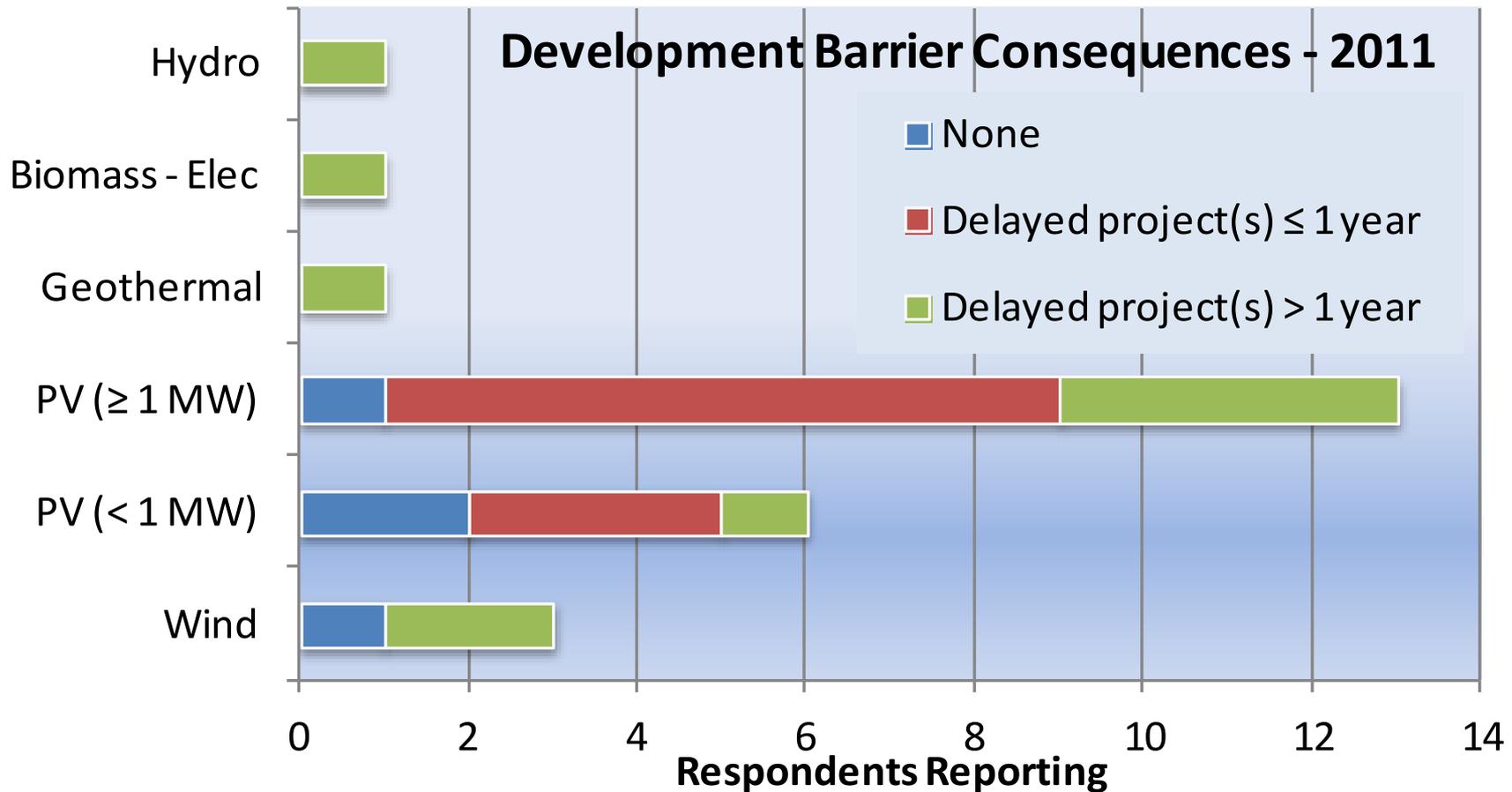
Largest Barriers to Development - Trend

Largest Barrier to Development - Trend



- Small PV and CSP: Project Economics issues declining to 0 in 2H 2011
- Large PV: declining PPA Negotiation barriers

Consequences of Development Barriers



- 64% of all respondents over REFTI period (Q4 2009 – 2011) reported Project Delay as the greatest consequence of development barriers
- No projects were reported to be abandoned in 2011 as compared to previous periods in 2010 where up to 25% reported being abandoned.

REFTI Questionnaire: Q11

Q11

Edit Question



Move

Copy

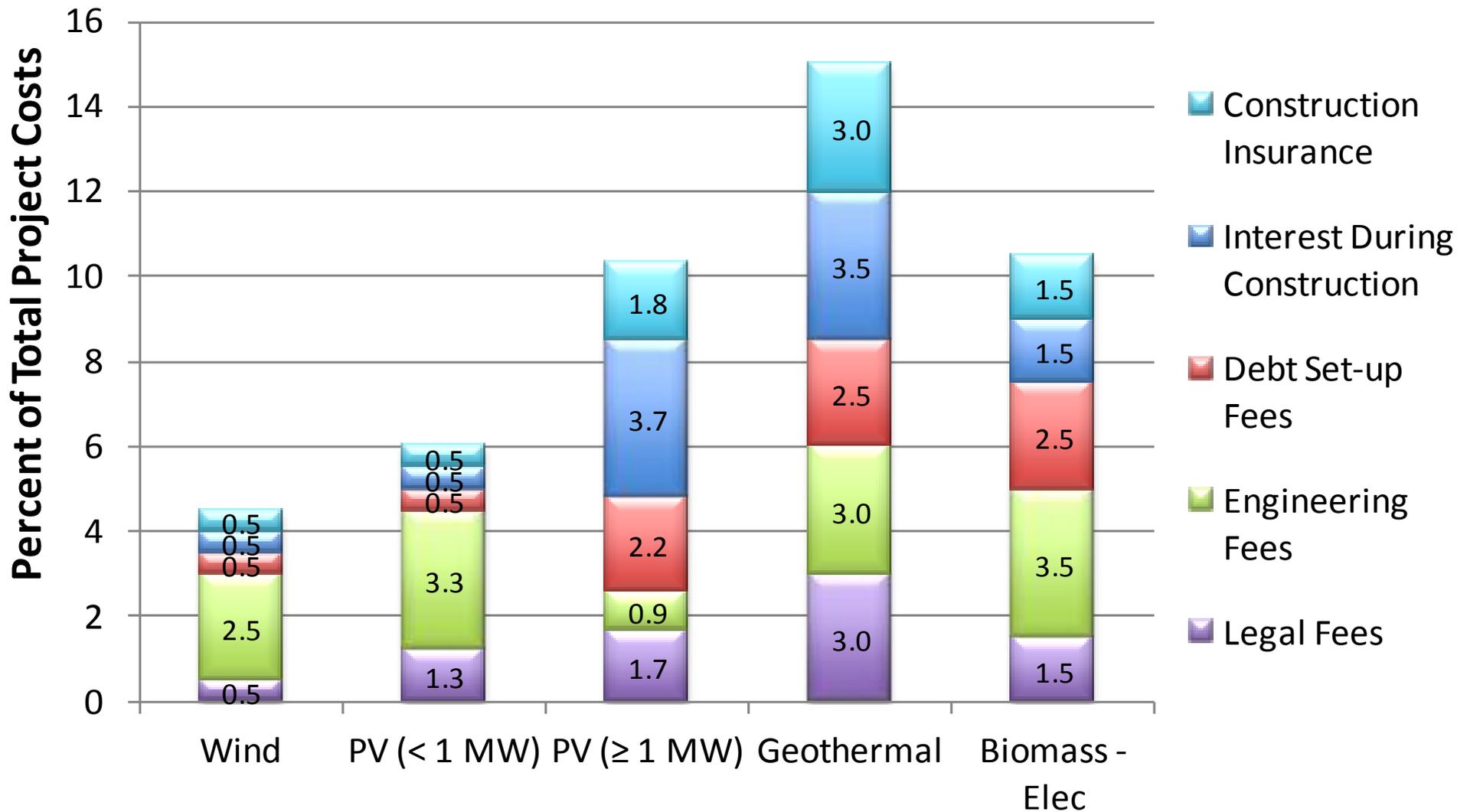
Delete

11. How costly were the following development costs (in % of total project cost)?

	0 - 1%	1 - 2%	2 - 3%	3 - 4%	4 - 5%	5% +	N/A
Legal fees	<input type="radio"/>						
Independent engineering	<input type="radio"/>						
Debt set-up fees	<input type="radio"/>						
Interest during construction	<input type="radio"/>						
Construction insurance	<input type="radio"/>						

Other (please specify)

Combined “Soft Costs” – 2H 2011



REFTI Questionnaire: Q12

12. Will 1603 expiration impact your business?

- Yes, by small amount (< 25% drop in kW installed)
- Yes, by large amount (25%-50% drop in kW installed)
- Yes, by very large amount (> 50% drop in kW installed, requires project sale / abandonment)
- No negative impact / positive impact
- Not sure
- Not applicable

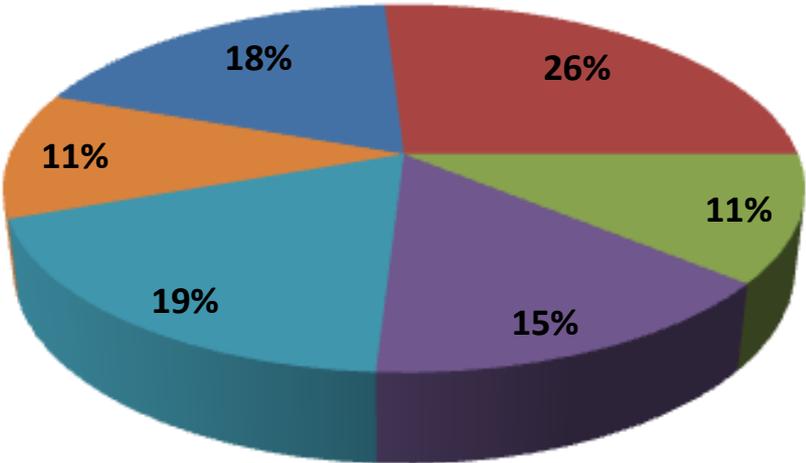
REFTI Questionnaire: Bonus Question

Will 1603 expiration impact your business?

- Yes, by small amount (< 25% drop in kW installed)
- Yes, by large amount (25%-50% drop in kW installed)
- Yes, by very large amount (> 50% drop in kW installed, requires project sale / abandonment)
- No negative impact / positive impact

■ Not Sure

■ Not applicable



27 respondents

THANK YOU

REFTI results and presentations available at:

<http://financere.nrel.gov/finance/REFTI>

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