



# PV Group – The SEMI Global PV Initiative

*An Update for the U.S.  
Department of Energy and  
Its Partners  
May 25, 2010*

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# Outline

- ❖ About SEMI & PV Group
- ❖ Why PV?
- ❖ PV Group Initiatives
  - Standards
  - Policy
  - Roadmapping
  - Feed-In Tariff White Paper
  - DOE PV Manufacturing Initiative
- ❖ Strategic Alliances
- ❖ Thank You

Teaching students about solar energy



**PVGroup**  
PV GROUP WHITE PAPER – THE SOLAR PV LANDSCAPE IN INDIA  
AN INDUSTRY PERSPECTIVE

APRIL 2008

**The Solar PV Landscape in India  
An Industry Perspective**

**INTRODUCTION**

This paper attempts to provide an overview of the state of solar photovoltaic (PV) in India. It presents the case for PV in India from a technical, market, opportunity, as well as from a social justice perspective. It briefly presents the current state of the Indian PV industry, outlines important challenges, and makes key recommendations that could accelerate the growth, adoption and proliferation of the technology in India.

The report is the first of its kind to represent the 'voice' of the Indian PV industry and to highlight the industry perspective. It is supported by leaders of the Indian PV industry and the USDOE India PV Advisory Committee, and is an average research finding consensus and developing a strong collaborative model that could assist the growth of the Indian PV industry.

"In this India's energy, the Sun occupies centre stage, as it should, being literally the original source of all energy. We will pool all our scientific, technical and managerial talents, with financial resources, to develop solar energy as a source of abundant energy to power our economy and to transform the lives of our people. Our success in this endeavor will change the face of India!"

—Indian Prime Minister, Dr. Manmohan Singh, releasing the National Action Plan on Climate Change in 2008

**EXECUTIVE SUMMARY**

**The Case for PV in India**

India is poised at the threshold of opportunity to grow and expand its role in PV adoption and manufacturing, and eventually to become a global leader in this technology.

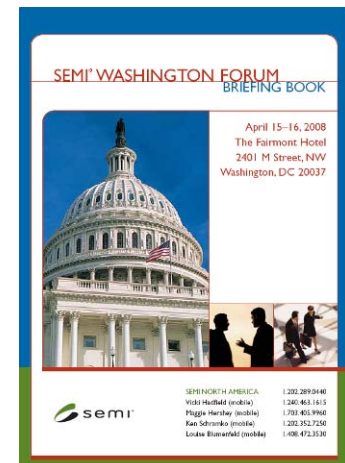
Specific drivers for PV in India include the country's rapidly rising primary energy and electricity needs, the persistent deficit situation, the country's over-dependence on coal for electricity generation and as well as its rapid economic growth to 7% of its GDP. The solar resource in India is abundant, and with abundant irradiation, with most parts of the country enjoying 300 sunny days a year, solar PV provides an avenue to the country's energy strategy.

There is a strong potential for off-grid PV deployment in India, both in rural areas and border, in the areas of rural lighting and electrification, for providing telephone pay phones, health care, disaster preparedness for the existing network of cellular towers across the country, computer power

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A Case for PV in India- White Paper



Washington Forum

# About SEMI

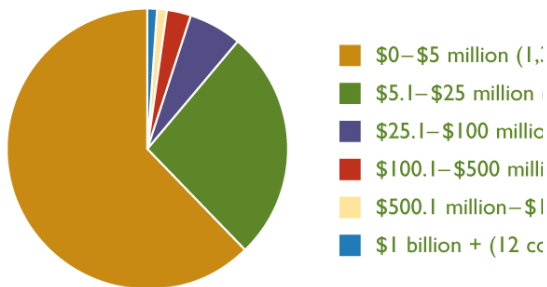
- ❖ Global industry association w/ offices in US, Belgium, Germany, France, China, Taiwan, Singapore, Korea, Japan, Russia, and India
- ❖ 1900+ member companies (440+ PV)
- ❖ Established 1970 to serve the semiconductor supply chain
- ❖ Today serves members in:
  - Semiconductor, Photovoltaic, Flat Panel Display, Emerging Markets – MEMS, LED/SSL, Printed Electronics, and Nanotechnology
- ❖ Governed by Board of Directors with extensive advisory committee and Special Interest Group (SIG) structure

# SEMI Membership Worldwide

SEMI Members participate in the global supply chains for the manufacturing of

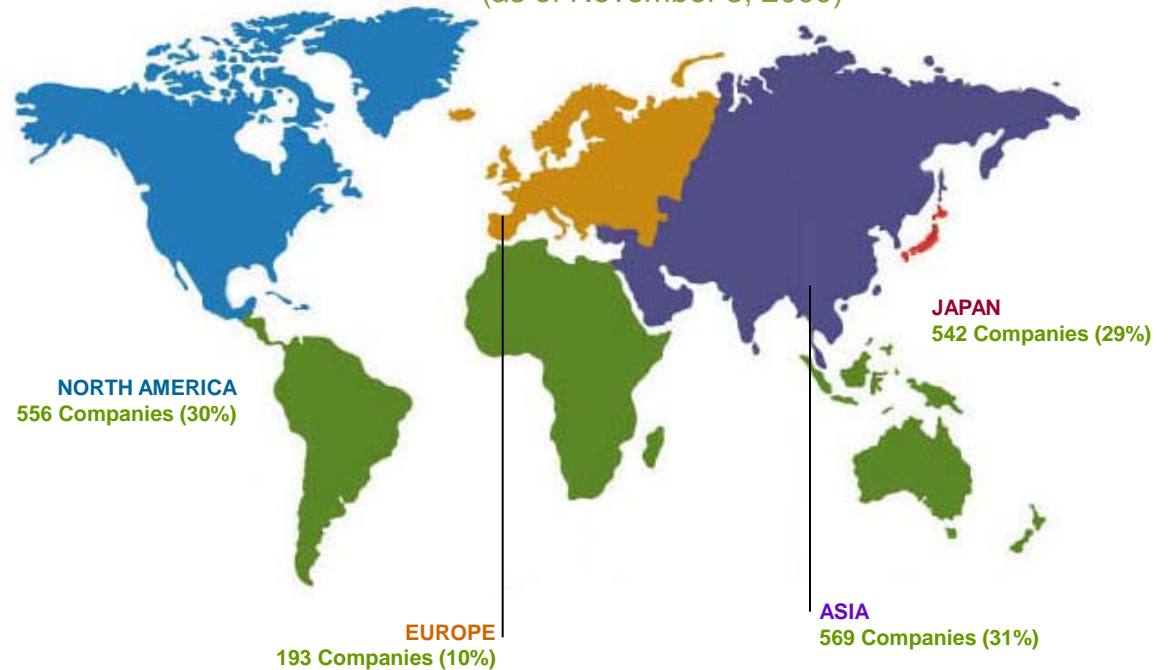
- Semiconductor
- **Photovoltaic**
- Flat Panel Display
- Nanotechnology
- MEMS
- LED / SSL

## Member Companies by Annual Revenue



## SEMI Members Worldwide

(as of November 3, 2009)



**1860 Total SEMI Members including 178 Affiliate, Allied and Associate Members**

# Why PV?

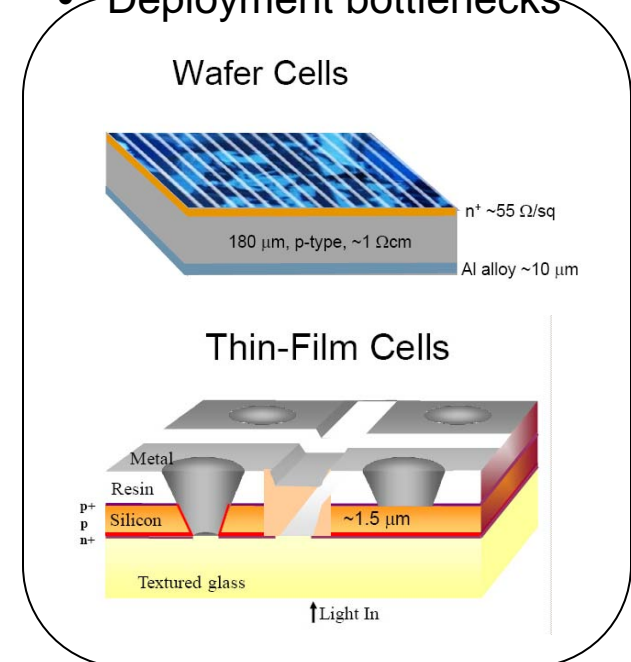
- ❖ Over the past 5 years, SEMI members and other industry stakeholders in the semiconductor and FPD industries have expanded their business into PV
- ❖ As a semiconductor technology, PV is a natural extension of our members' product portfolio
- ❖ Increasingly favorable legislation in mature and new markets and historic technology know-how have created significant opportunities for our members
- ❖ And... PV pure players need representation on a regional and global level

# PV Group: A Global Opportunity

- ❖ PV is a semiconductor technology that will benefit from chip industry experience
- ❖ Similarities in
  - Materials
  - Processes
  - Process Integration
  - Equipment
  - Yield
  - Innovation
  - Learning Curve Acceleration
- ❖ Leverages expanding existing core competencies
  - Supply Chain Collaboration
  - International Standards development
  - Industry research and statistics
  - Global public policy and advocacy
  - Global PV events and conferences

## Unique Challenges

- Policy driven
- Industry structure (vertically integrated, turn-key systems, etc.)
- Deployment bottlenecks



## PV Group- A SEMI Special Interest Group Established January 2008



- More than **440 SEMI member companies** form PV Group, many of them with history and expertise in semiconductor manufacturing
- **87 PV “pure players”** have joined since January 2009
- Advisory Committees established in Europe, North America, China, India, Taiwan and Korea

# PV Group Initiatives

- ❖ Regional PV Advisory Committees provide strategic guidance to deliver on specific objectives and tasks
  - US PV Advisory Committee focused on
    - Manufacturing
    - Public policy
    - EH&S/sustainability
- ❖ All SEMI core competencies extended to PV
  - International Standards
  - Public policy
  - Market intelligence
  - EHS
  - Education
  - Events

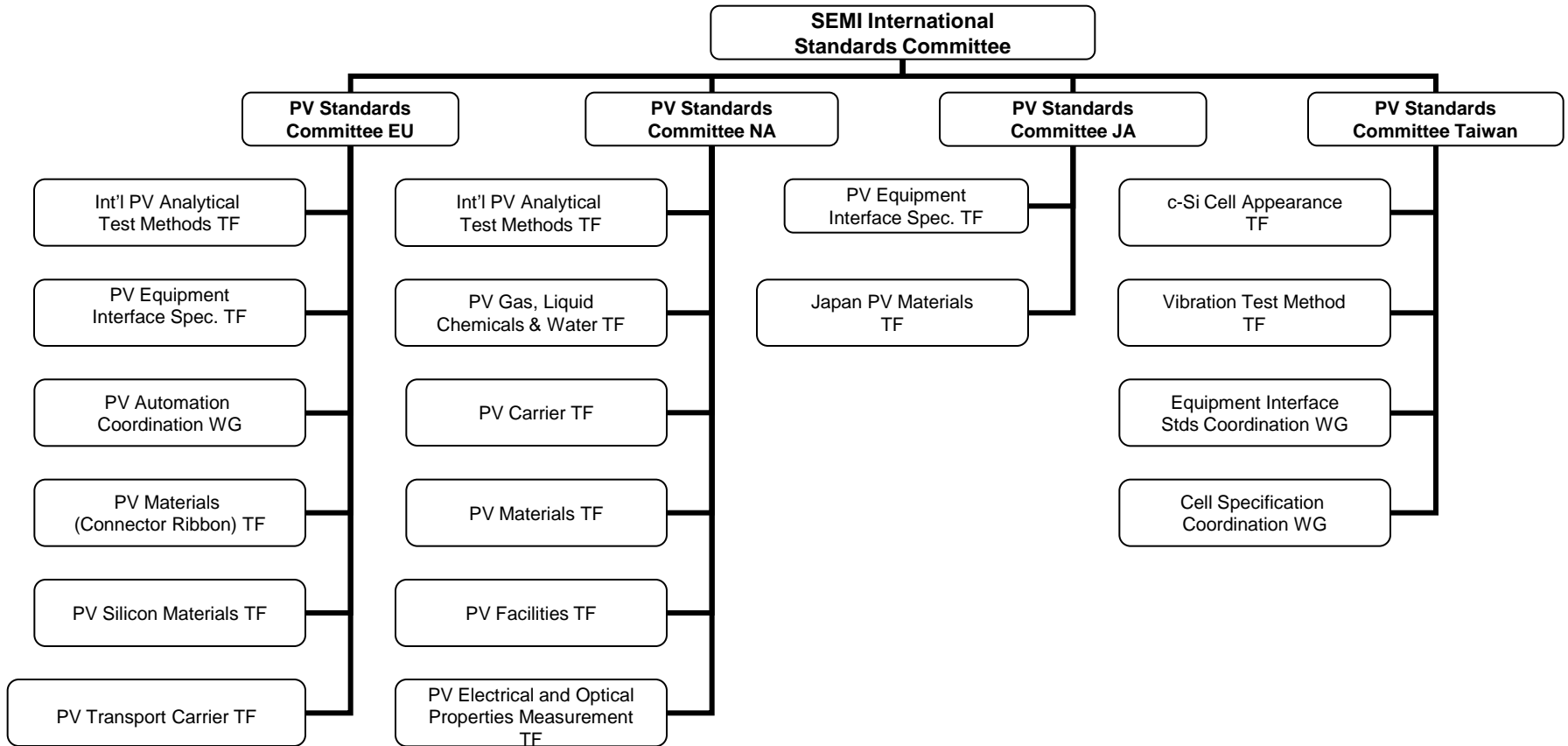




# PV Standards [1] – Global Committee

- ❖ Global PV Standards Committee as part of SEMI International Standards Program
- ❖ 400 volunteer experts enrolled to date
- ❖ Chapters in Europe, US, Taiwan, Japan (China in formation)
- ❖ Critical tasks:
  - Review and leverage existing SEMI (and other) Standards and Safety Guidelines for PV applicability
  - Seek stronger engagement of cell/module community

# PV Standards [2] - Organization



## PV Standards [3] - Focus of Current Activities

- ❖ PV wafer and cell transport carriers
- ❖ Thin film substrate dimensions
- ❖ Single substrate tracking
- ❖ Equipment to equipment communication
- ❖ Solar grade silicon feedstock
- ❖ Connector ribbon
- ❖ Minority carrier lifetime
- ❖ Transparent conductive oxide
- ❖ Cell specification template
- ❖ Impurity test methods
- ❖ Process chemicals and gases
- ❖ Cell and module vibration test method
- ❖ Cell appearance
- ❖ Cell defect detection

# US Public Policy [1]

## ❖ Energy Bill

- Urging Congress to pass energy legislation this year. This should include a strong renewable energy standard and creation of a Green Bank.

## ❖ Manufacturing Tax Credit

- Urging Congress to remove the cap on the advanced energy manufacturing tax credit (covers both solar/PV and LED)

## ❖ Section 1603 Grant in lieu of Investment Tax Credit

- Expires 2010 – SEMI and others support extending through 2012 so more projects can come on line
- Could be included in a “Green Jobs” bill that might be introduced next month
- Urging Congress to extend the Treasury Department’s Section 1603 grants in lieu of investment tax credit program through 2012.

# US Public Policy [2]

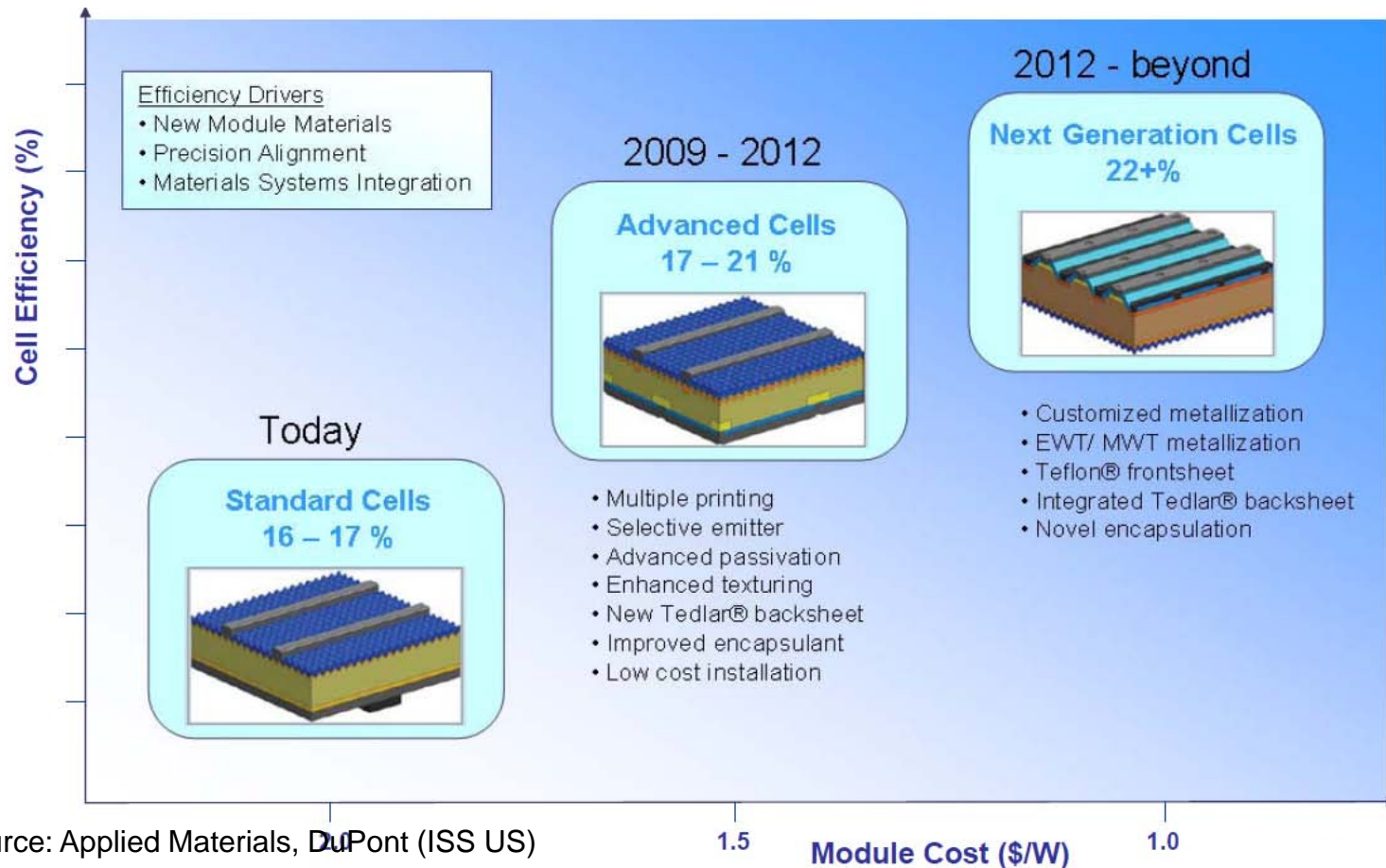
## ❖ DOE PV Manufacturing Initiative

- Create consortia of stakeholders to work together to leverage what they bring to the table collectively rather than working alone
- Goals: accelerate technology development, strengthen U.S. manufacturing and create jobs, help develop a workforce by partnering with universities
- SEMI in discussions with potential partners with emphasis on standards activities, roadmapping and EHS; concept papers due in a few weeks with formal applications later in summer

## ❖ Solar Technology Roadmap Act

- SEMI supportive of efforts to bring more federal funding to solar research, but concerns in the greater solar community that bill will restrict use of the funds to a narrow group of technologies and pick “winners” and “losers.”
- SEMI supports ongoing efforts to address those concerns and move a bill forward that will strengthen financial support for federal R&D for solar technologies

# Opportunities for Collaboration



# Roadmap Activities

- ❖ “Group of 8” engagement in Europe
  - March 2010: 8 major European c-Si cell manufacturers formed Special Interest Group in SEMI PV Group Europe auspices to work on crystalline silicon technology roadmap
  - Early draft/conceptual paper available upon request
  - Next update: Intersolar Europe 2010, June in Munich
- ❖ US Industry Collaboration Effort
  - Started with joint DOE/PV Group workshop in 2009
  - Survey and survey results webinar in October/November '09
  - Next workshop at Intersolar North America 2010 in July

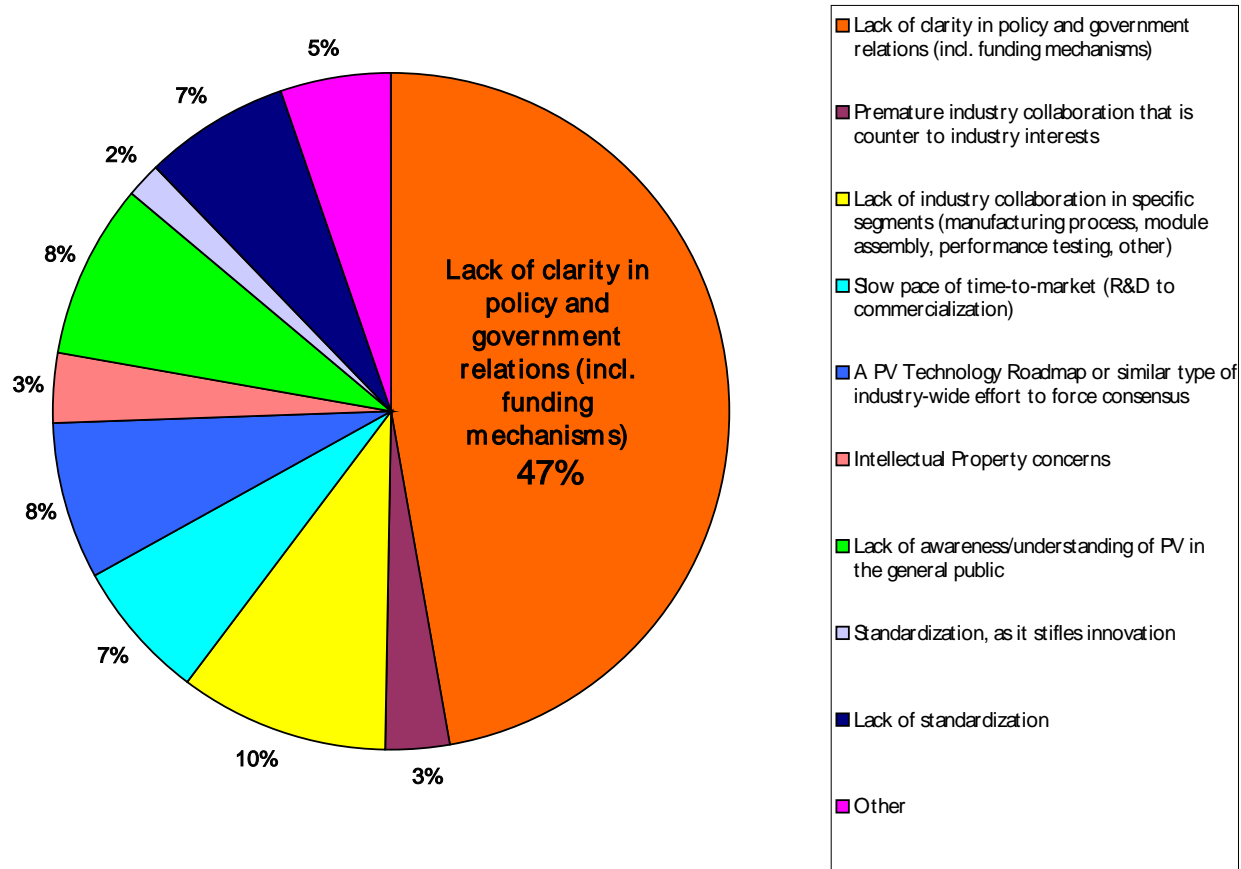
# PV Industry Collaboration in the US

- ❖ **Joint DOE/PV Group Roadmap Workshop, July 2009**
- ❖ **PV Group global PV industry collaboration survey** released in September 2009
  - Distributed to all supply chain segments
  - 392 responses (4,000+ sent)
- ❖ **Results Webinar November 18**
  - Results indicate clear need/desire for collaboration and focus on policy
  - Solicited feedback on key priorities and suggestions for path forward
  - Recording posted at [http://www.pvgroup.org/NewsArchive/CTR\\_033052](http://www.pvgroup.org/NewsArchive/CTR_033052)

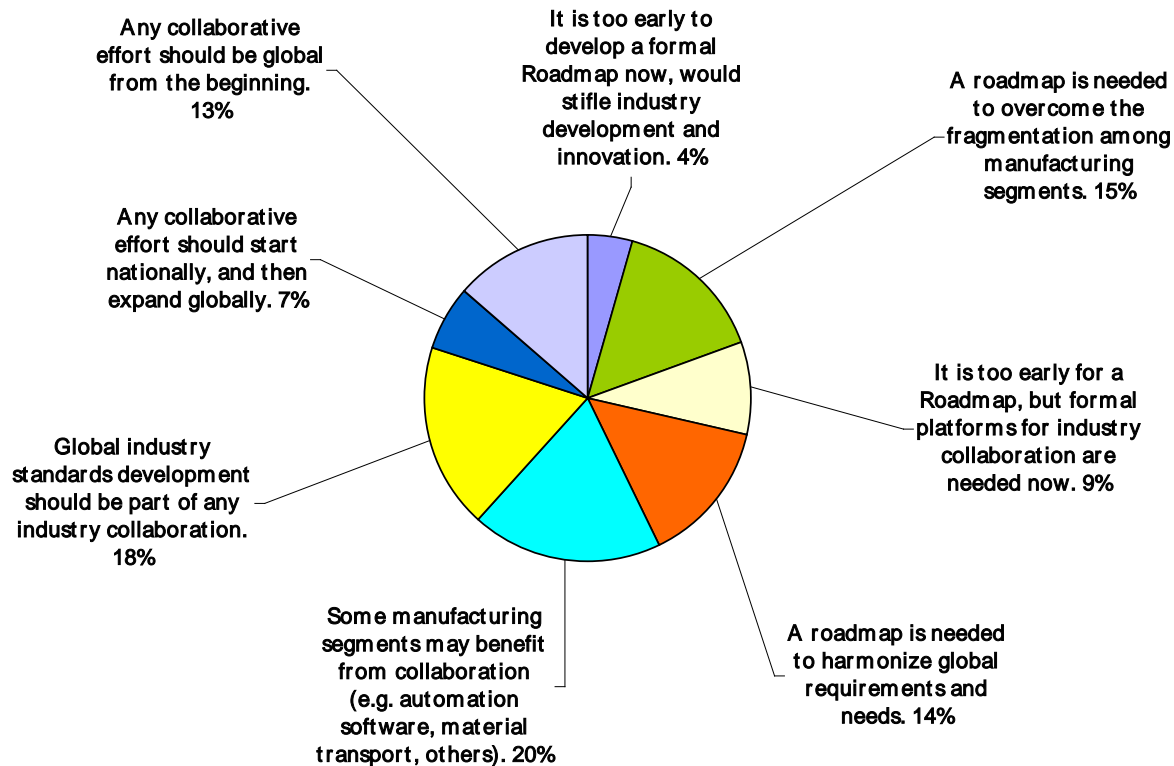
- ❖ **What Have We Learned?**
  - Stakeholders in all segments indicate need for collaboration
  - Needs vary greatly and need to be prioritized
  - International effort preferred
  - Favorable policies continue to be essential for accelerated solar energy deployment in all major markets
  - Identify ways to bridge local, regional, global as well as segment-specific issues, take holistic view where possible without impacting ongoing developments



# Result Samples: Top Bottlenecks for PV Industry Development



# Results Sample: Barriers to Successful PV Development on a Global Scale



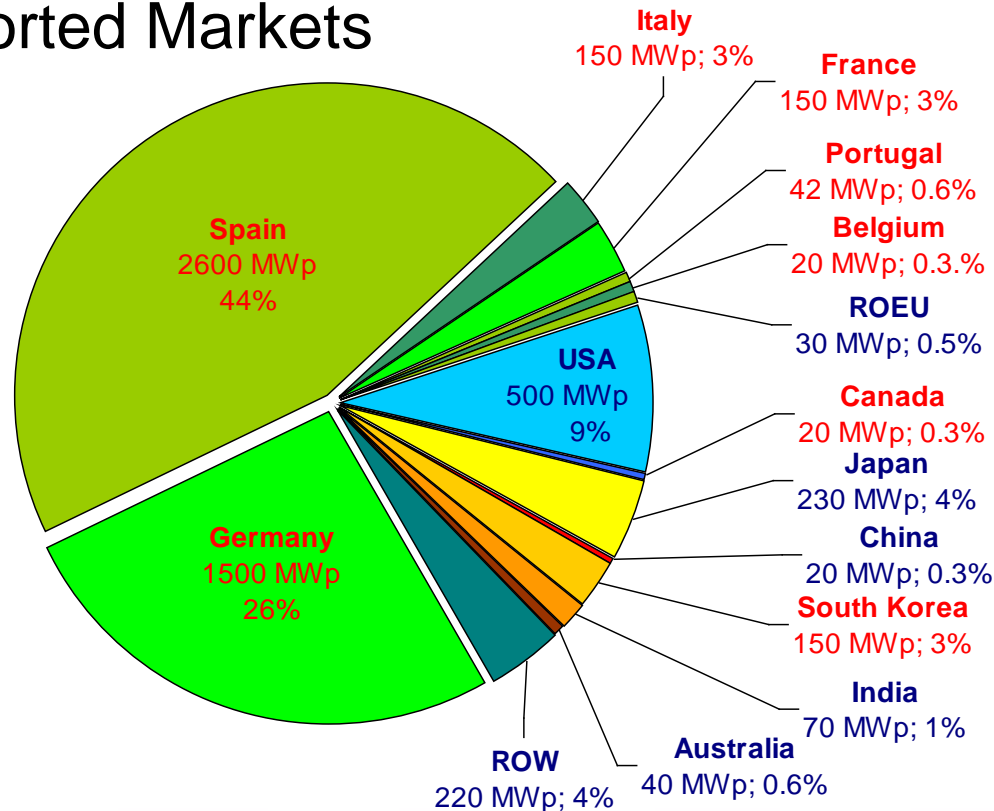
**>50% of respondents favor some form of collaboration**

## Feed-in Tariff White Paper – Released December 8, 2009 (Highlights)

- ❖ Goal: Promote widespread understanding of international PV demand incentives and identify policy Best Practices to create steady demand and profitable investments
  - Intended as serious and credible support for general policy principles, not as support for any specific legislation or policy action in any country, region or municipality.
- ❖ Key Principles:
  - Stable and predictable public policies
  - Transparent and streamlined
  - Open and accessible
- ❖ Best Practices include:
  - Technology differentiation
  - Generation cost-based rates sufficient to spur demand
  - Purchase and interconnection requirements
  - Fixed price and long-term payments
  - Predictable declines and sun-setting

# Policy Drives the Market

- ❖ Over 80% of 2008 PV Demand From Feed-in Tariff Supported Markets

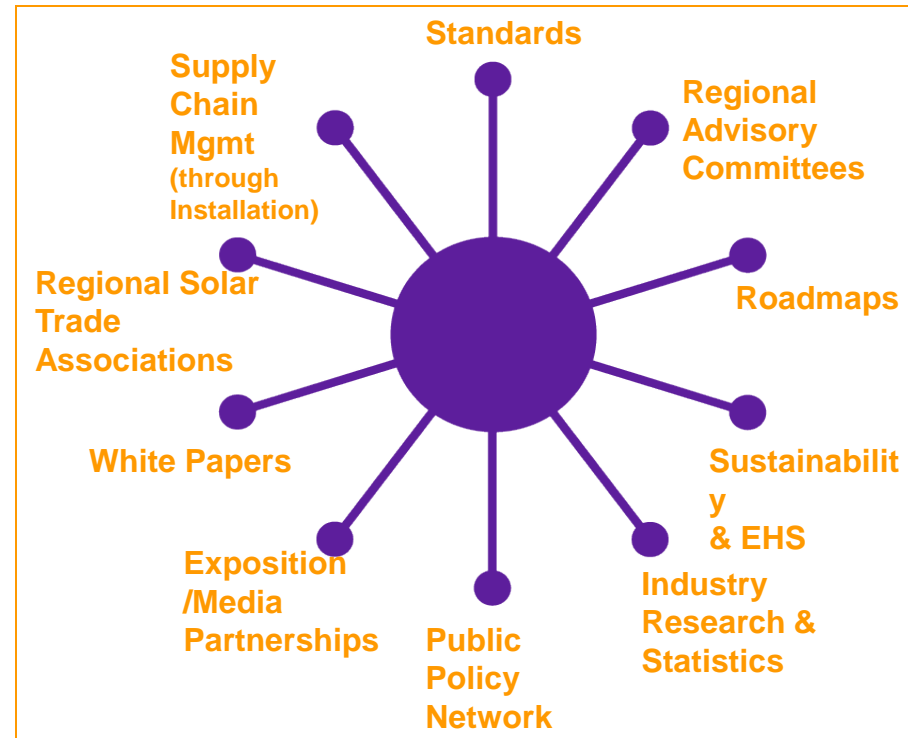


**Red Letters:  
Countries with  
Feed-in tariff  
schemes**

Slide courtesy G. Stryi-Hipp, January 2009, Source: Preliminary figures of different National PV Associations,

# Strategic Alliances – A Core Principle

- ❖ Collaboration and strategic alliances with other organizations and government agencies have been a core principle in SEMI for 40 years
- ❖ PV supply chain dynamics demand strength in core competencies and intelligent partnerships in adjacent segments and areas of lesser expertise
- ❖ Partners benefit from PV Group's global footprint, strong regional communities and breadth of service portfolio
- ❖ Partner include NREL (industry collaboration), Solar Alliance, CALSEIA (policy), SolarTech (manufacturing), Greentech Media, Lux Research (market research)



# Thank you for your support!

- ❖ We wish to thank the Department of Energy for supporting our members' efforts in bringing clean, solar energy to US homes and businesses!
- ❖ In a concerted effort among government agencies, industry, research institutes and national/regional organizations, we can accelerate the pace of making it happen.
- ❖ If you wish to continue the dialogue, please contact me at [bweiss@semi.org](mailto:bweiss@semi.org)