Solar Energy Technologies Program

DOE Solar Program– PV Subprogram
1.) Whole Program Overview
2.) Subprogram Overview

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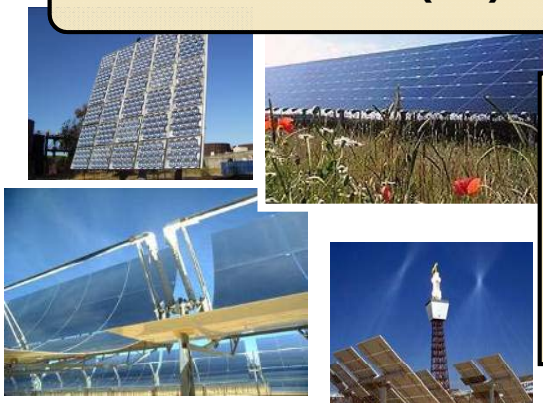
The mission of DOE's Solar Energy Technologies Program is to

Accelerate the wide-spread adoption of solar electric technologies across the United States

Photovoltaics (PV)

DOE SETP



Concentrating Solar Power (CSP)

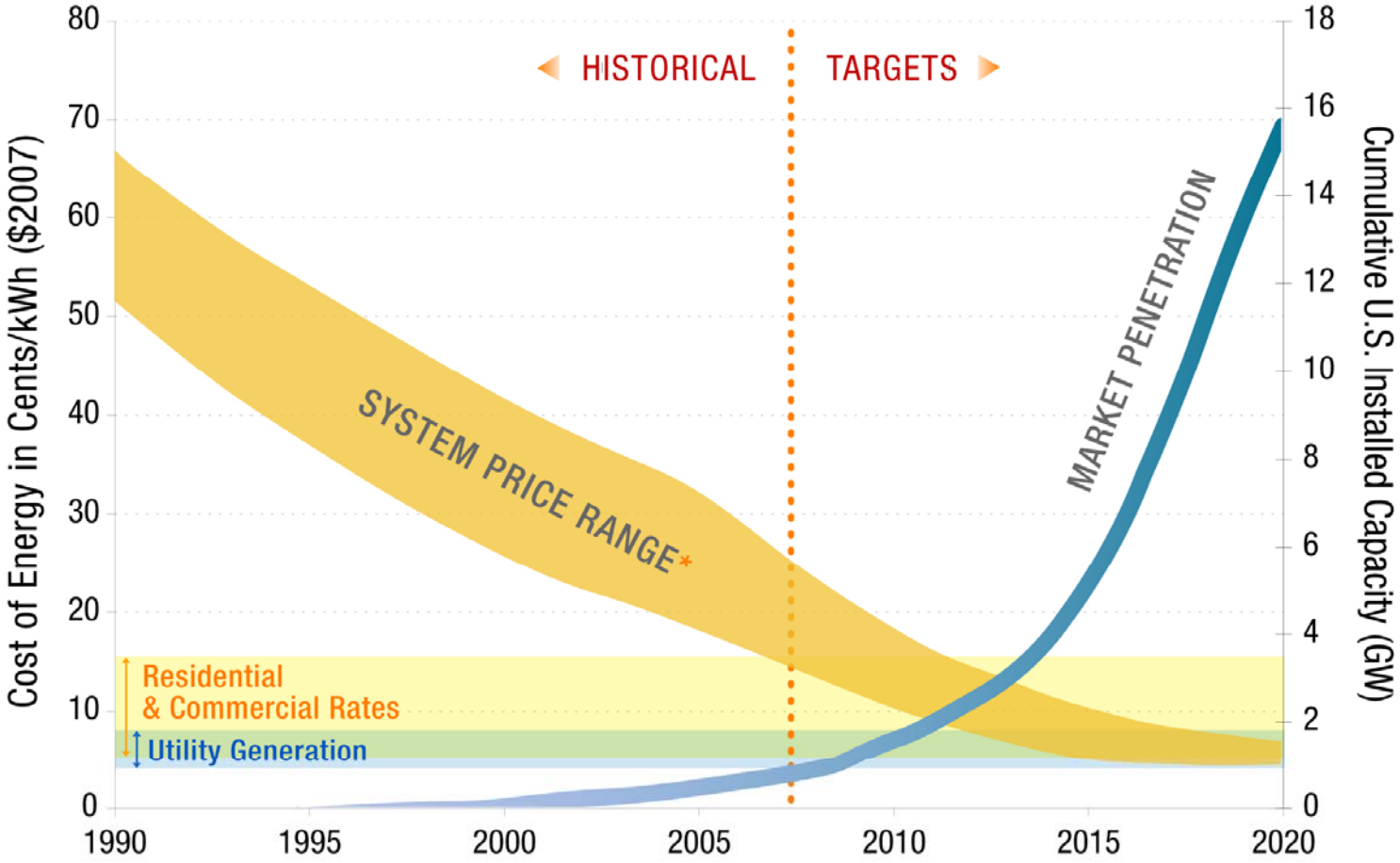
Market Transformation

Grid Integration

Distributed Generation
on-site or near point of use

Centralized Generation
large users or utilities

The SETP is focused on enabling high penetration of solar energy technologies and has the goal of achieving grid parity by 2015



Market Sector	Current U.S. Market Price Range (¢/kWh)	Cost (¢/kWh) Benchmark 2005	Cost (¢/kWh) Target 2010	Cost (¢/kWh) Target 2015
Residential	5.8 - 16.7	23 - 32	13 - 18	8 - 10
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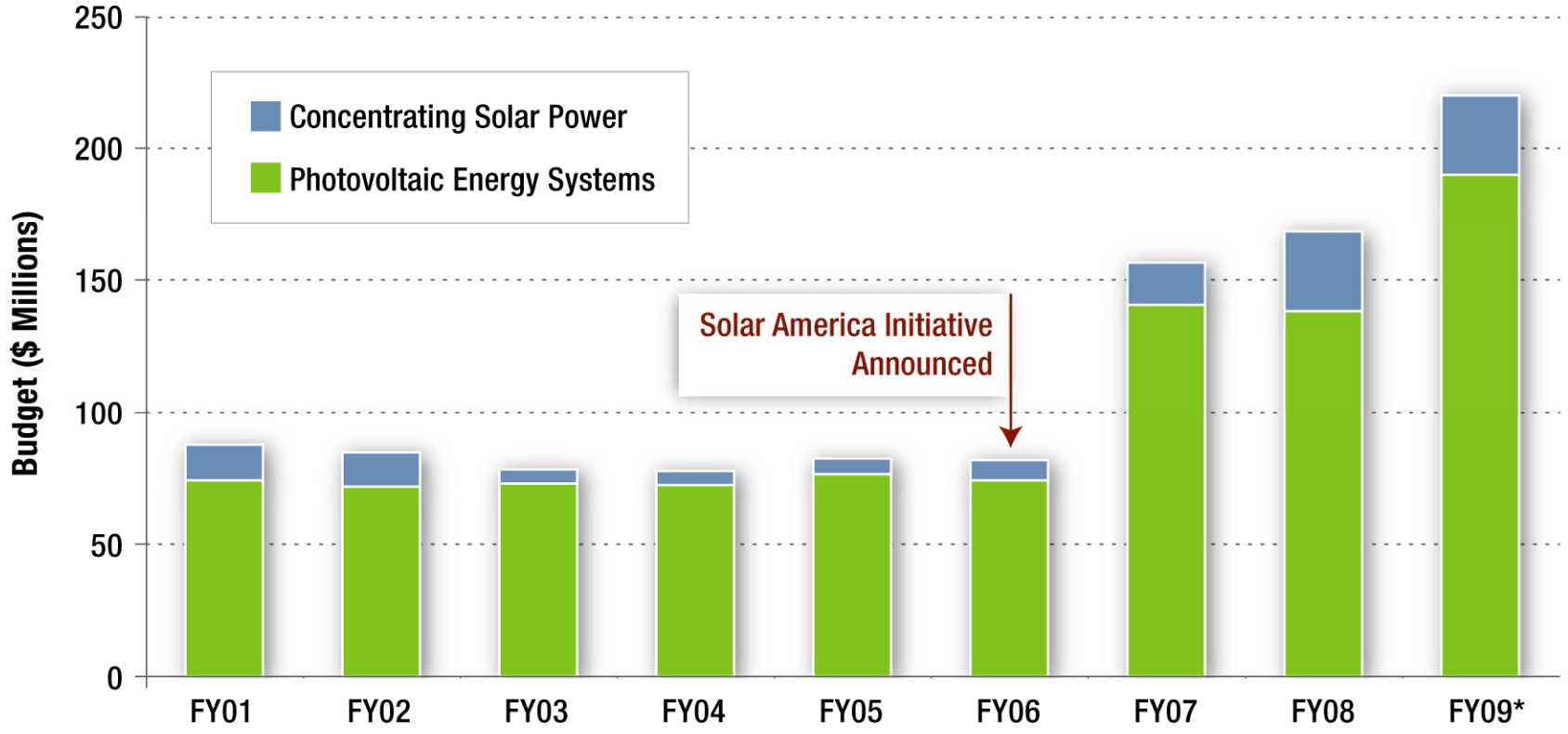
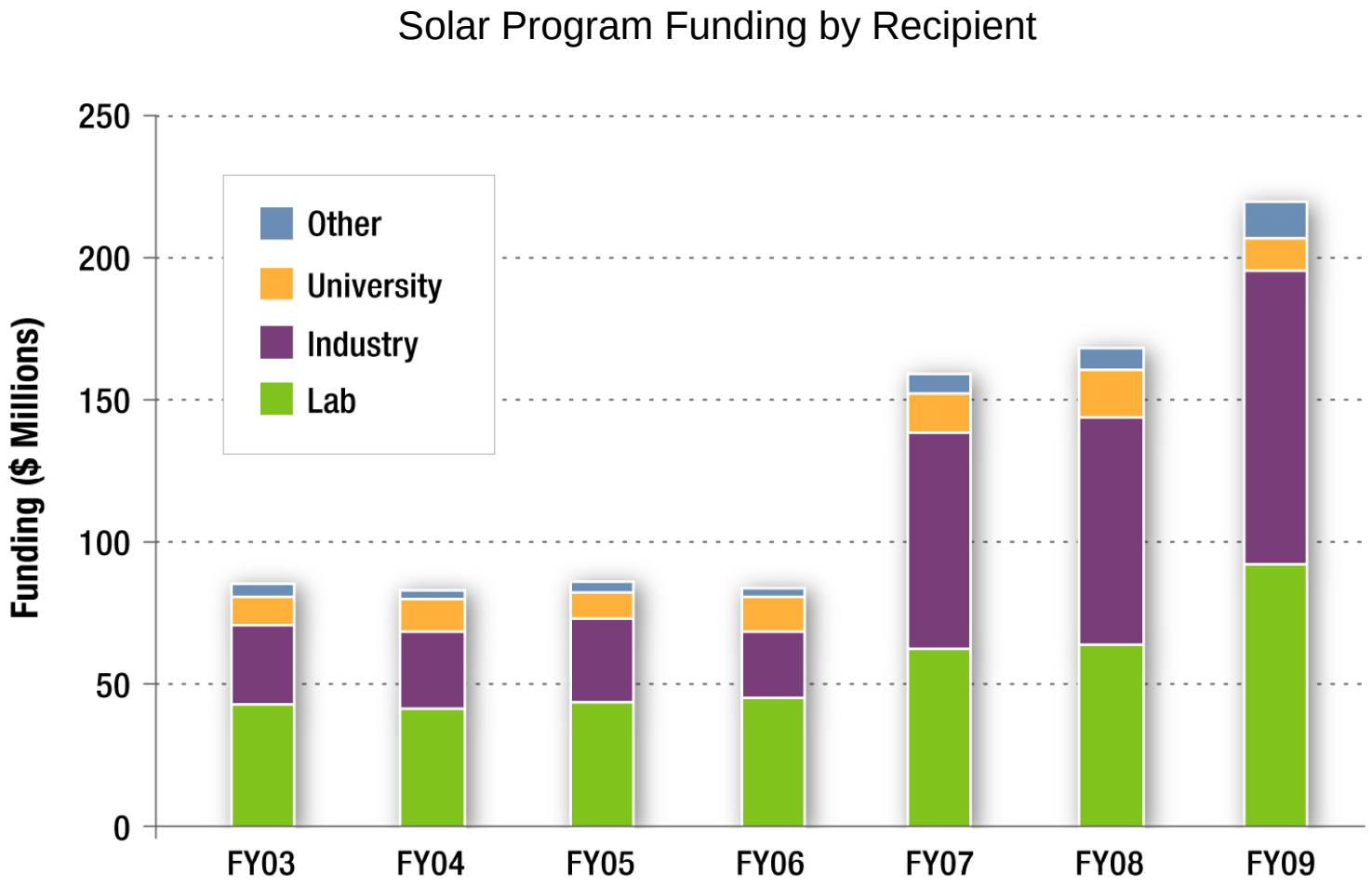
Funding for the SETP has been increased in response the Solar America Initiative



*President's request for FY09 was $150M, current House mark is $220M, current Senate mark is $229M.

SETP Funding Breakout to Labs, Universities and Industry



DOE Solar Program– PV Subprogram

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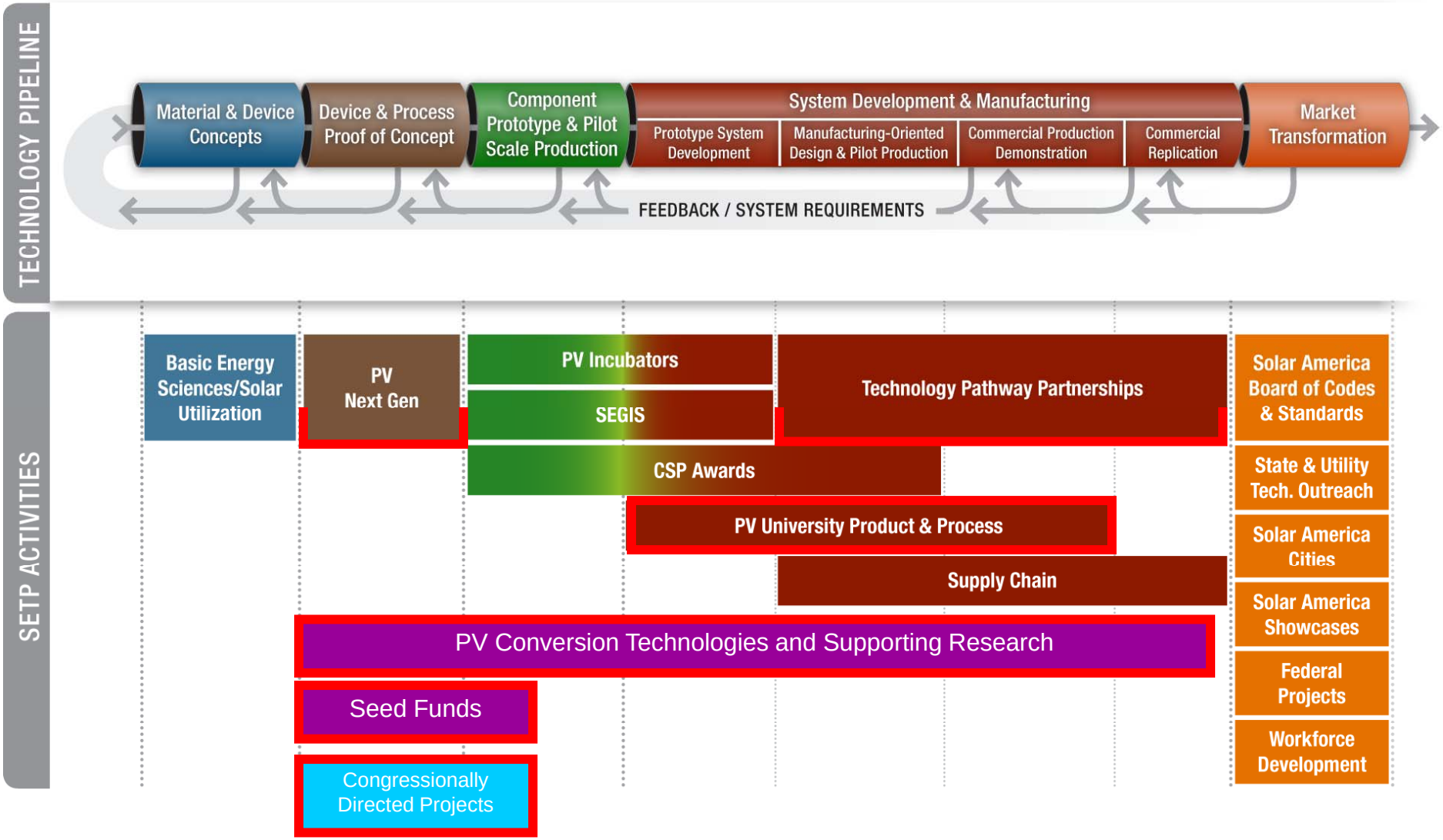
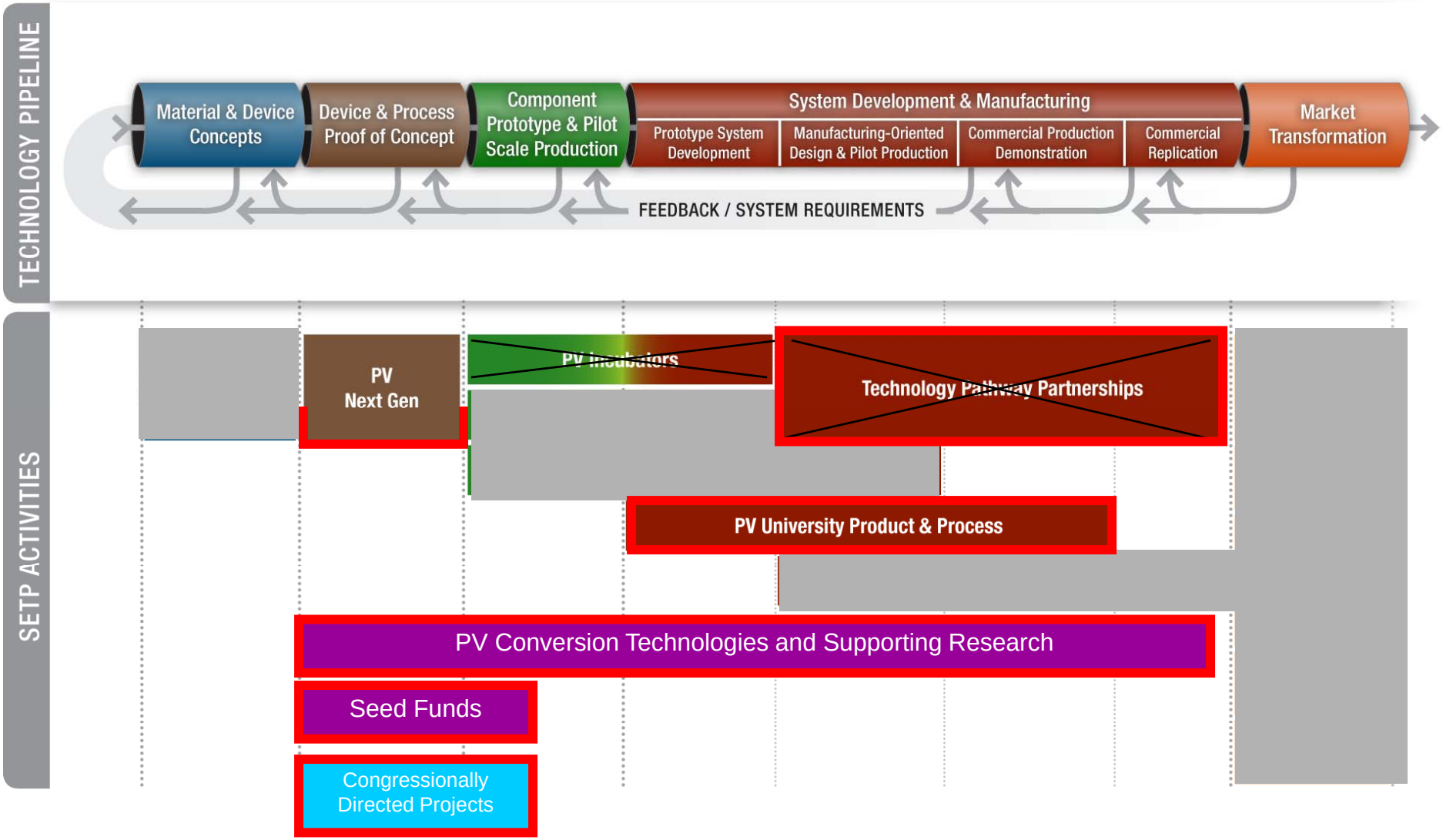
Major Solar Program PV Subprogram Elements



Major Solar Program PV Subprogram Elements

Projects going through Stagegate Review are not reviewed in this Peer Review

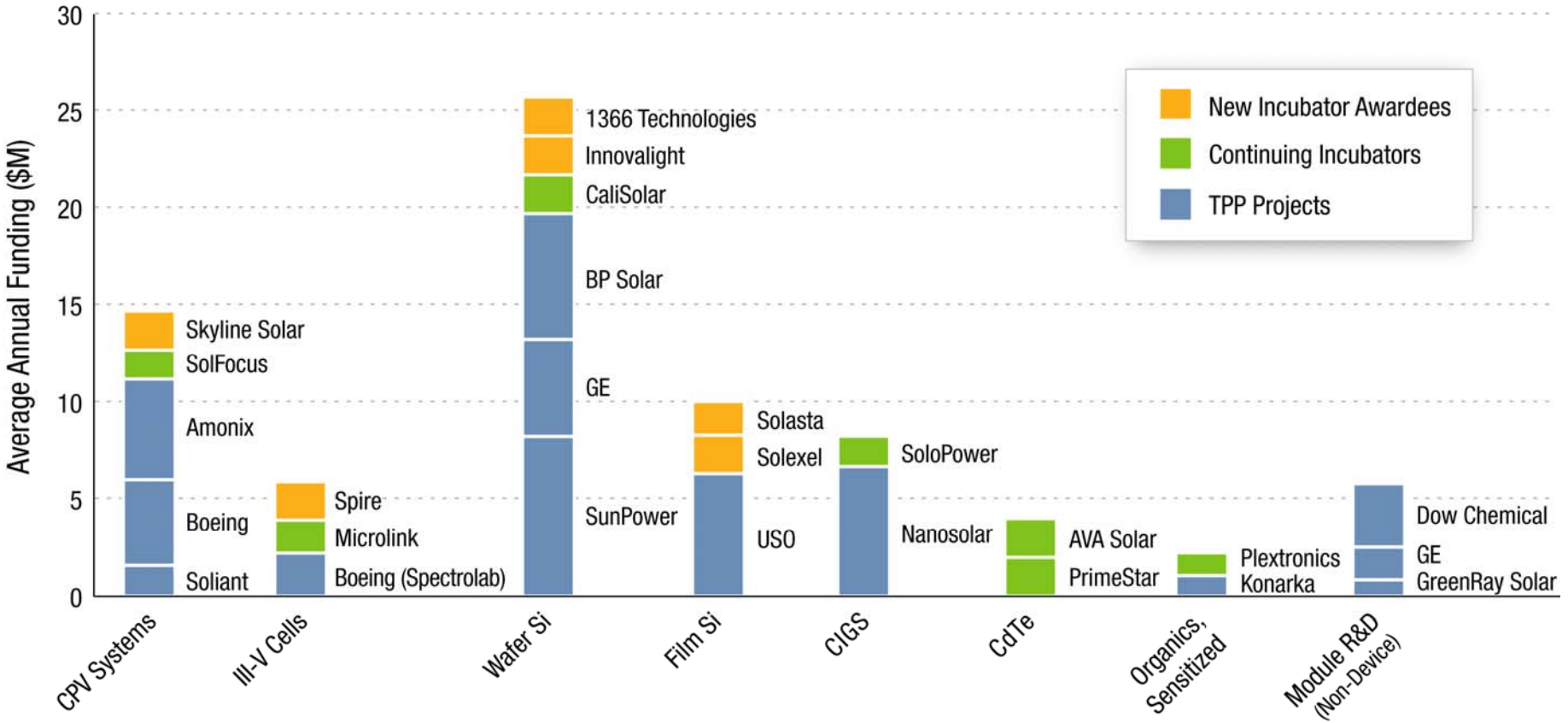


Incubator and Technology Pathway Partnership projects

PV Incubators First Round
- Award duration: **18 months**
- **10 awards**
- Total: **Up to $27 M over 18 months**

Technology Pathway Partnerships
- Award duration: **3 years**
- **11 awards**
- Total: **Up to $168 M over 3 years**

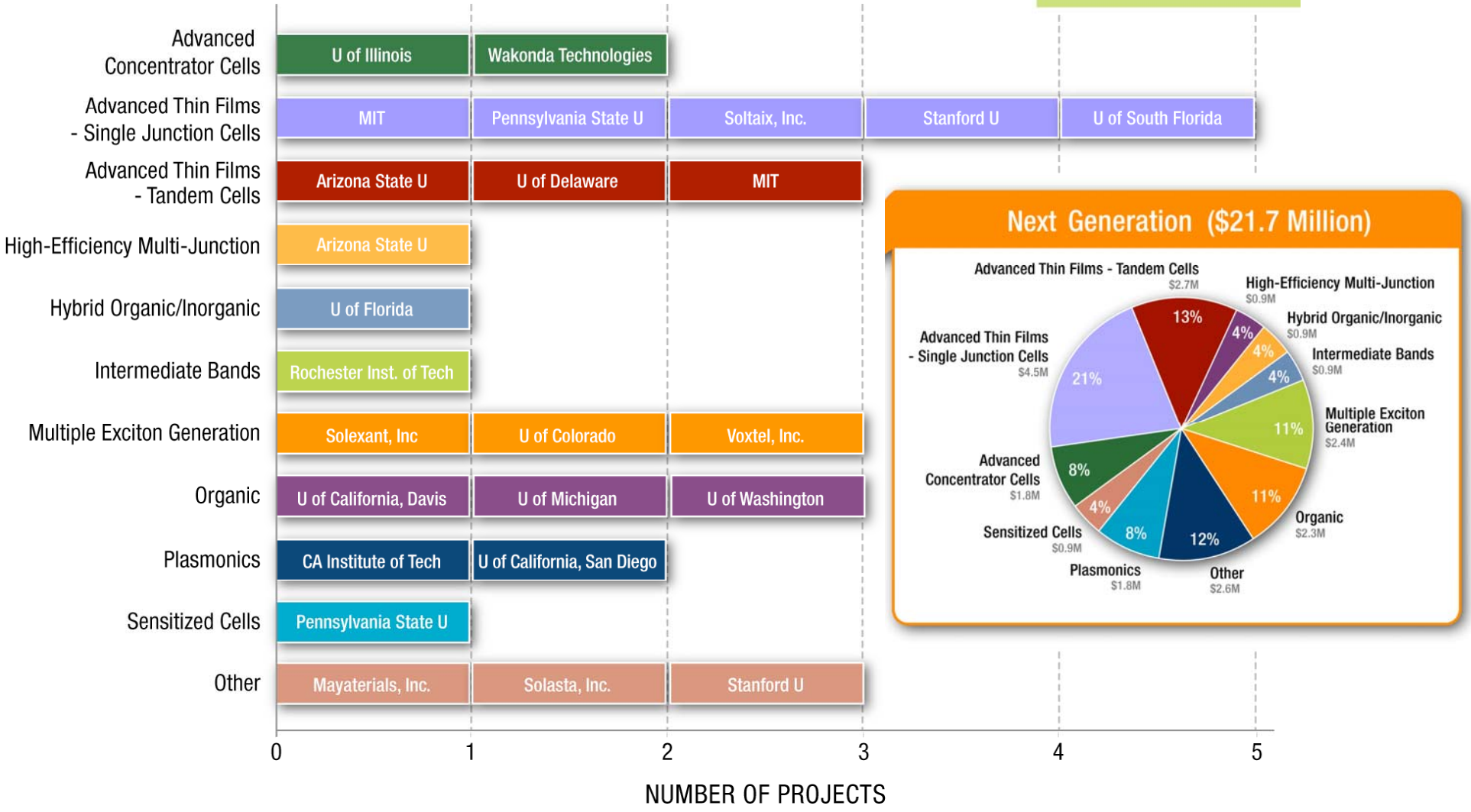
Incubators Second Round
- Award duration: **18 months**
- Award amount: **Up to $2-3 M**



Next Generation PV projects

Next Generation PV Device and Process

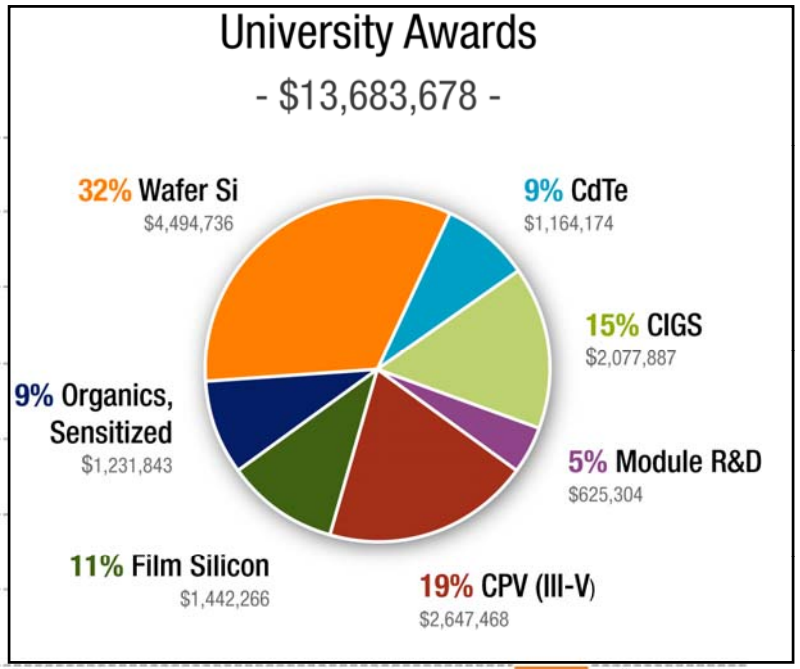
- Award duration: **3 years**
- **25 awards**
- Total: **Up to $21.7 M over 3 years**

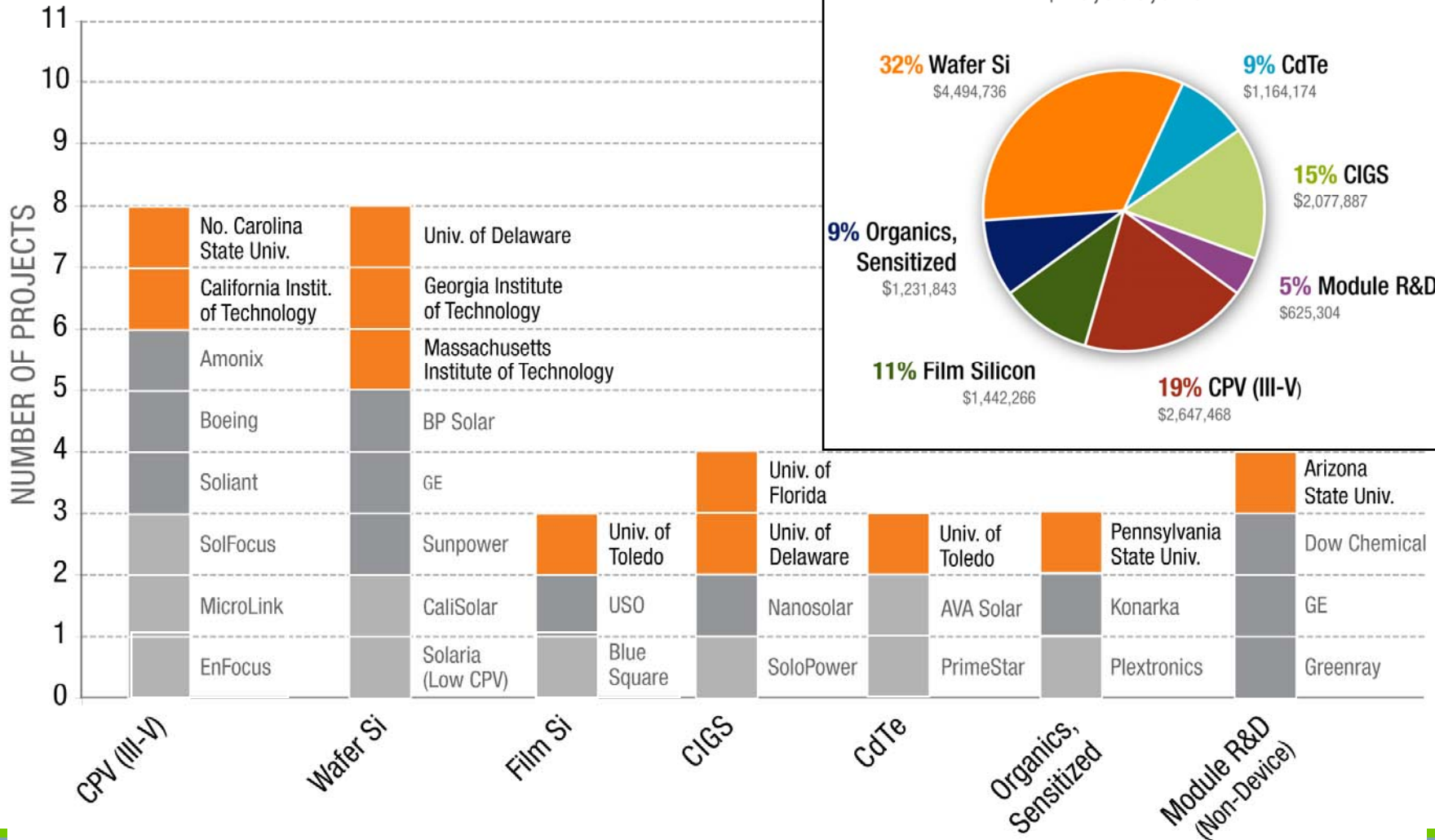


University Product and Processes

University Product and Process Development Support

- Award duration: **3 years**
- **11 awards**
- Total: **Up to $13.7M over 3 years**





National Lab Research– NREL, Sandia, ORNL

- Conversion Technologies ~ $12M
  - Wafer Si
  - Film Si
  - Cd Te
  - CIGS
  - Organic PV
  - Sensitized Cells
  - CPV
  - Polycrystalline Tandems
  - Theory and Computational Science
  - Transparent Conducting Oxides
- Supporting Research ~ $11M
  - Measurements and Characterization
    - Cell and Module Performance
    - Analytical Microscopy
    - Electro-Optical Characterization
    - Surface Analysis
  - Process Development and Integration Laboratory
- Seed Funds ~ $2M
  - Thin c-Si cells
  - Polymeric Semiconductor OPV
  - 3rd Gen OPV Devices
  - Thin III-V cells
  - Carbon Nanotube Architectures
  - Nanocrystal Solar Cell
  - Si Quantum Dot Solar Cells
  - Multi TC & Self-Healing Imp Barriers
  - Amorphous Oxide Semiconductors
  - Transparent Conducting Layers

PV R&D related Congressionally Directed Projects

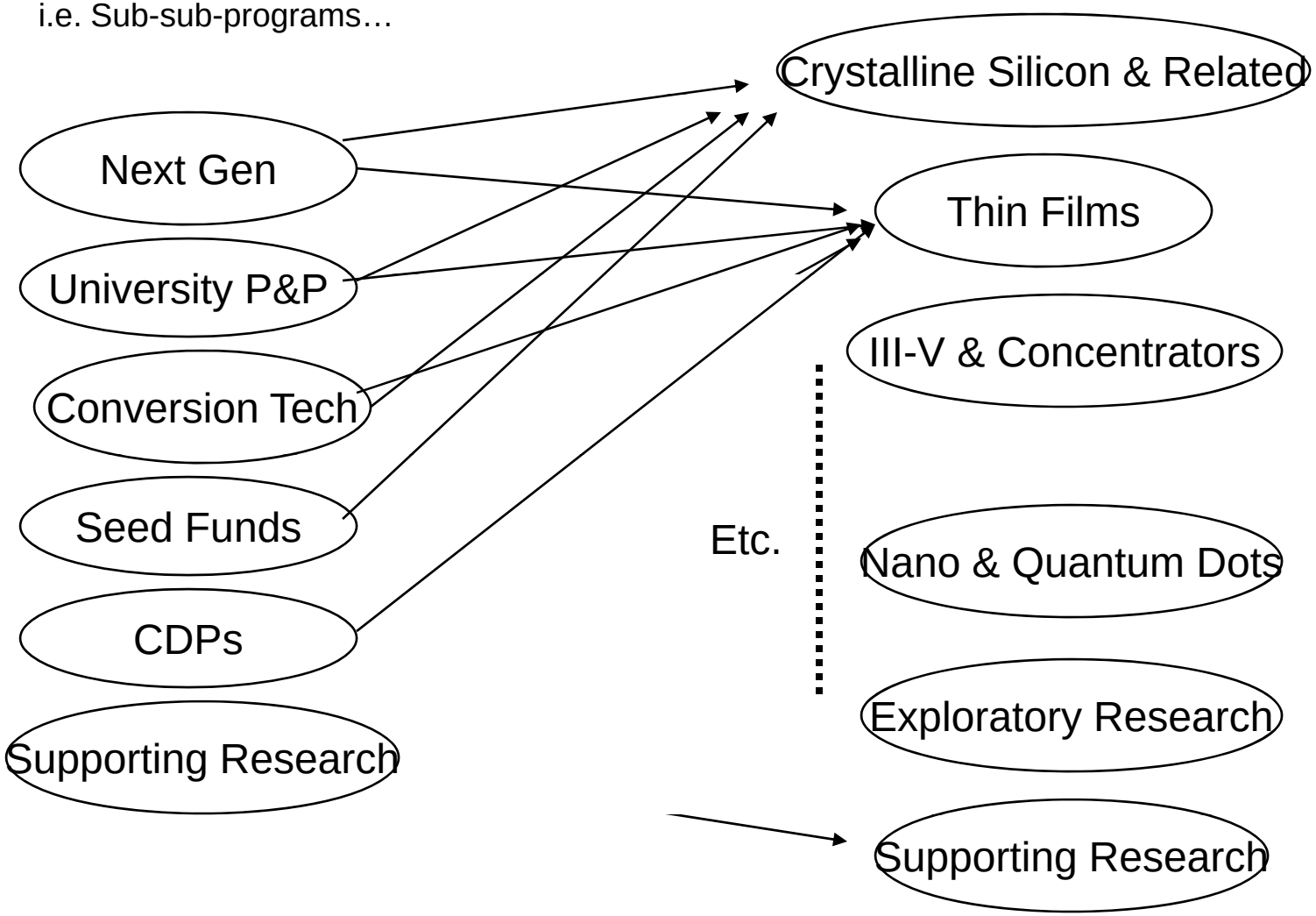
- PV R&D CDPs ~ $12M
  - High Efficiency Cascade Solar Cells (NM)
  - University of Arizona Photovoltaic Concentrator Development (AZ)
  - North Dakota State University, Center for Nanoscale Energy
  - Nanostructured Solar Cells (AR)
  - University of Nevada, Las Vegas, Solar Cell Nanotechnology (NV)
  - University of Nebraska, CIBS Solar Cell Development (NE)
  - Conductive, Transparent Coatings Solar Cell Research Project (MA)

How PV Subprogram maps to Peer Review Tracks

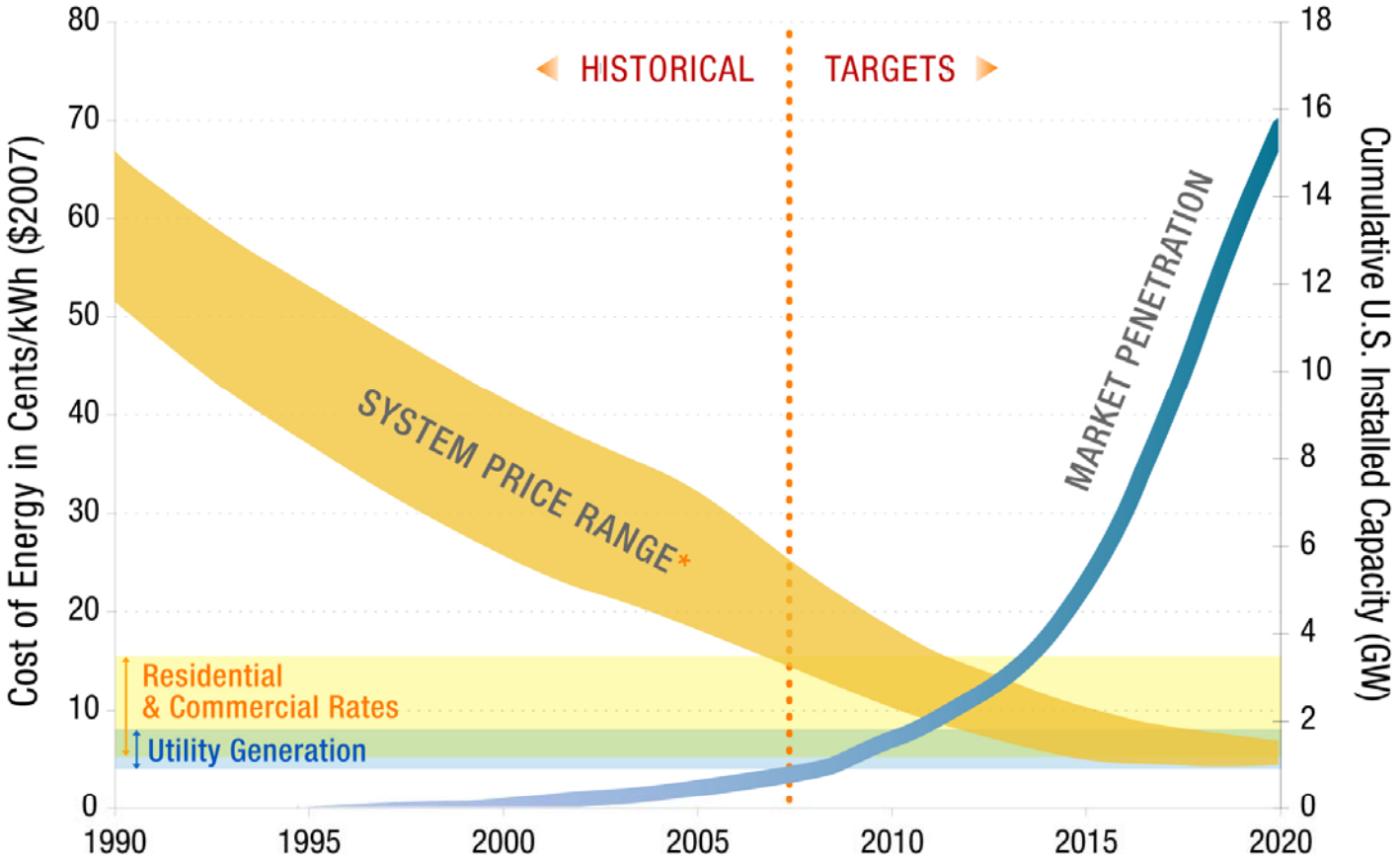
PV Subprogram organization

i.e. Sub-sub-programs…

Peer Review Track organization



Solar Program goals are tied to the Levelized Cost of Energy, a high level metric



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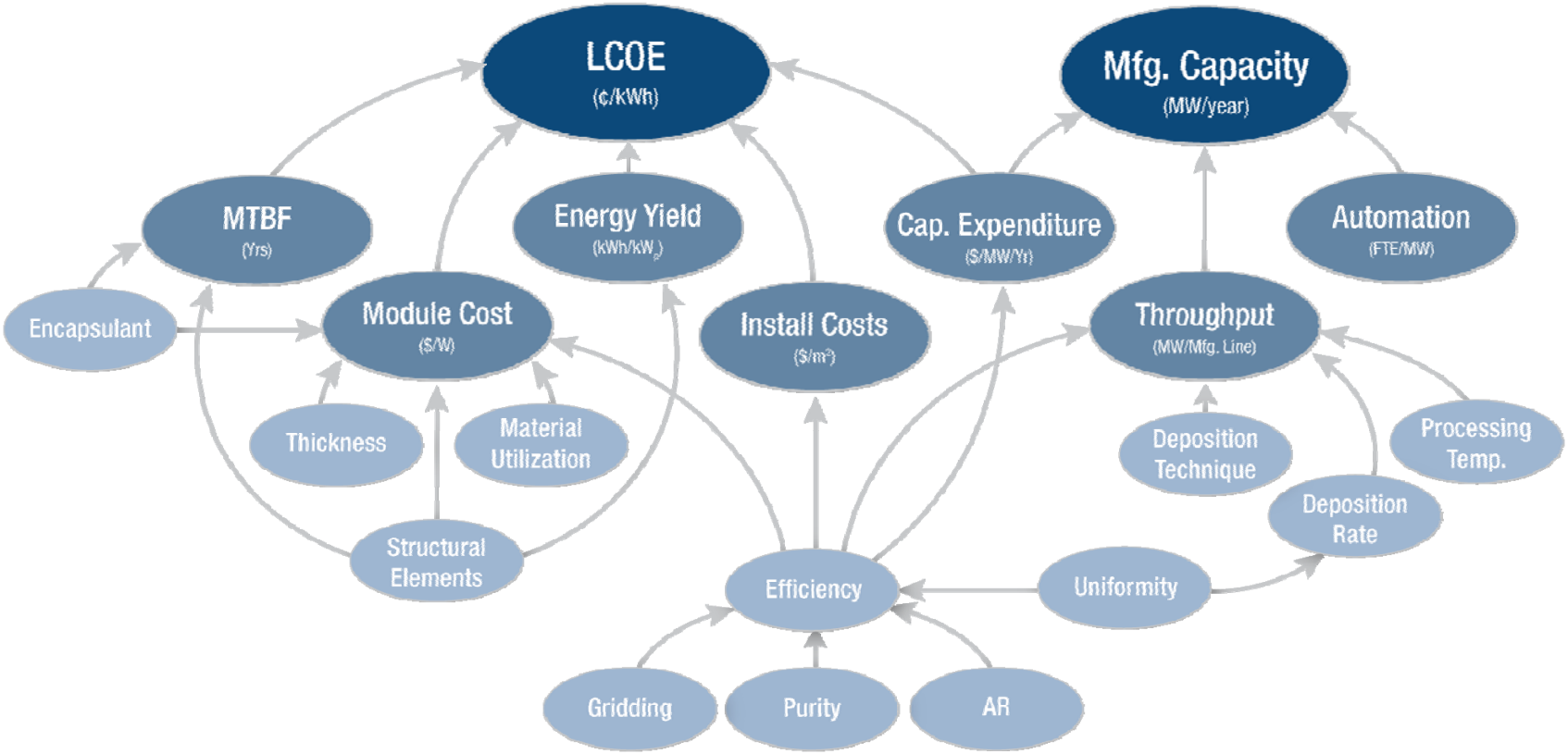
Projects target lower level metrics which affect LCOE and Manufacturing Capacity



SWOT– PV Subprogram

- **Strengths**
  - Tech Development (great tech diversity across disruptive and revolutionary technologies)
  - Voice – people listen to DOE (reputation is money)
  - Great transparency into industry (trends, comparison)
  - World Class resources, especially National Lab personnel
- **Weaknesses**
  - Maintaining relevancy of Lab R&D and supporting activities
  - Communication with stakeholders and coordination with other R&D organizations
  - Lag between budget appropriations and management of project
- **Opportunities**
  - Track installations and costs to record progress of grid parity
  - Financial crisis puts more attention on DOE's role to support technology development and deployment
  - DOE as coordinator could increase manufacturing advances by organizing industry consortia and roadmaps
  - A lot of talented scientists and engrs want to work in this area
- **Threats**
  - Fall out from failure to execute large budget increase
  - Proprietary concerns make coordination and collaboration untenable in industry

Management Challenges and Opportunities

Challenges

- Stimulus bill brings new challenges for spending in wise ways
- New Secretary with a new agenda; unclear what the importance of photovoltaics and applied research will be
- Research at national labs continues to be a large part of the budget, needs to be managed with care
- Managing Congressional earmarks to align with portfolio as much as possible
- Interagency coordination more important than ever

Opportunities

- Stimulus bill makes funding more research in critical areas possible
- Research at a broader number of DOE National Labs may bring new strengths to portfolio
- Opportunity to take stock of current market realities and retune portfolio with new solicitations, possibly with more emphasis on earlier, riskier technologies
- New companies serving the PV space may free up traditional national lab support areas