National Renewable Energy Laboratory
Innovation for Our Energy Future

Science and Technology Perspectives on R&D Partnerships

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National Center for Photovoltaics
National Renewable Energy Laboratory

DOING BUSINESS WITH NREL
THE 22ND NREL INDUSTRY GROWTH FORUM
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NREL is a national laboratory of the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, operated by the Alliance for Sustainable Energy, LLC.



National Center for Photovoltaics

The National Center for Photovoltaics (NCPV) focuses on innovations in technology that drive PV industry growth. The NCPV is directed to use U.S. national laboratories and universities to accelerate PV as a viable energy option in the United States.

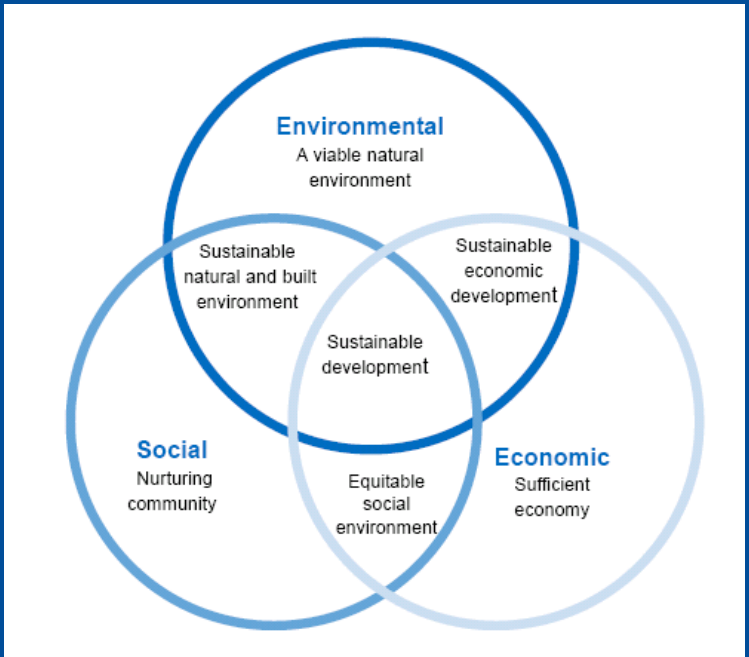


Our Focus: Making PV More Sustainable

Economical
- *Raw Materials Usage*
- *Abundant Materials*
- *Manufacturability*
- *Efficiency*
- *Durability*

Environmentally Safe
- *Non-Toxic Alternatives*
- *Aqueous-Based Materials*
- *Reuse, Reman, Recycle*
- *Environmental Impact Assessment*

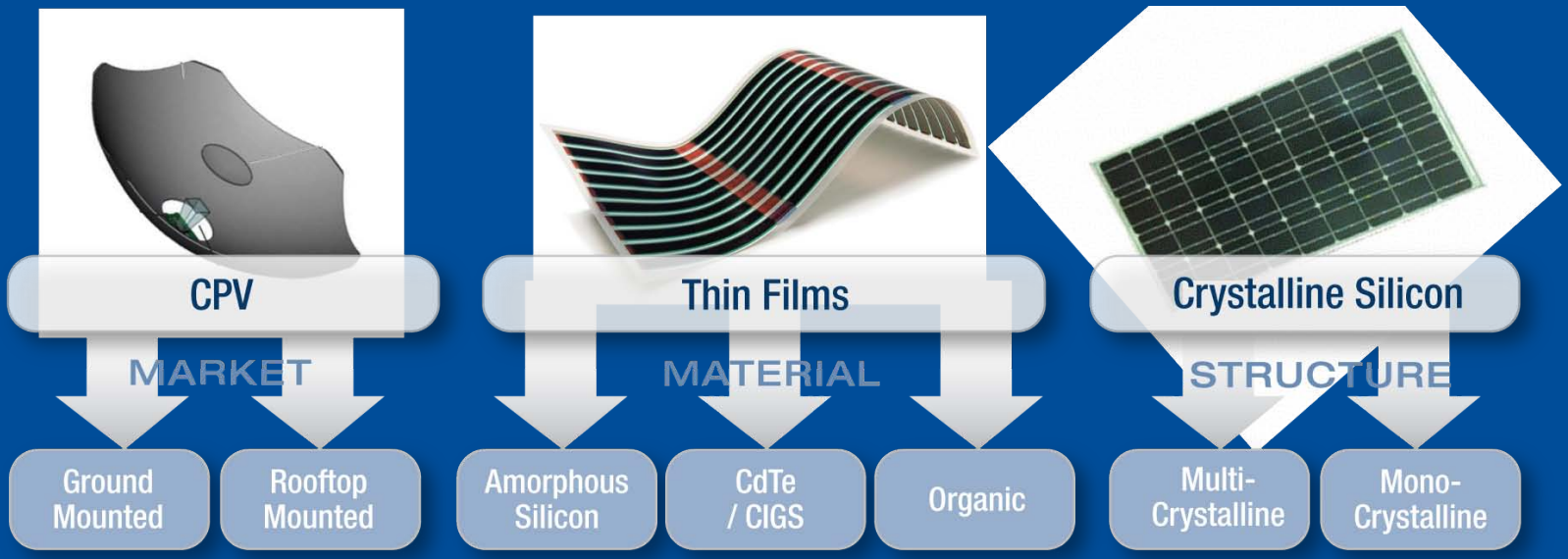
Societal
- *Market Assessment*
- *Reliability*
- *Building Integrated (BIPV)*
- *Productization*



Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
– *UN Bruntland Commission*

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Helping to Make PV the Power of Choice

NCPV Technology Portfolio

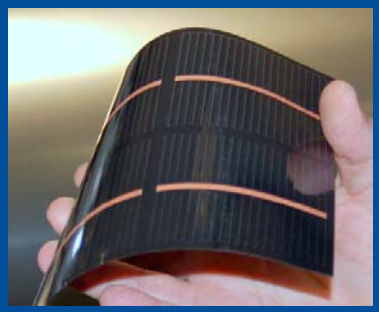




20x–100x



III-V MJs, 500x



CdTe, CIGs, a-Si ~1–2 um

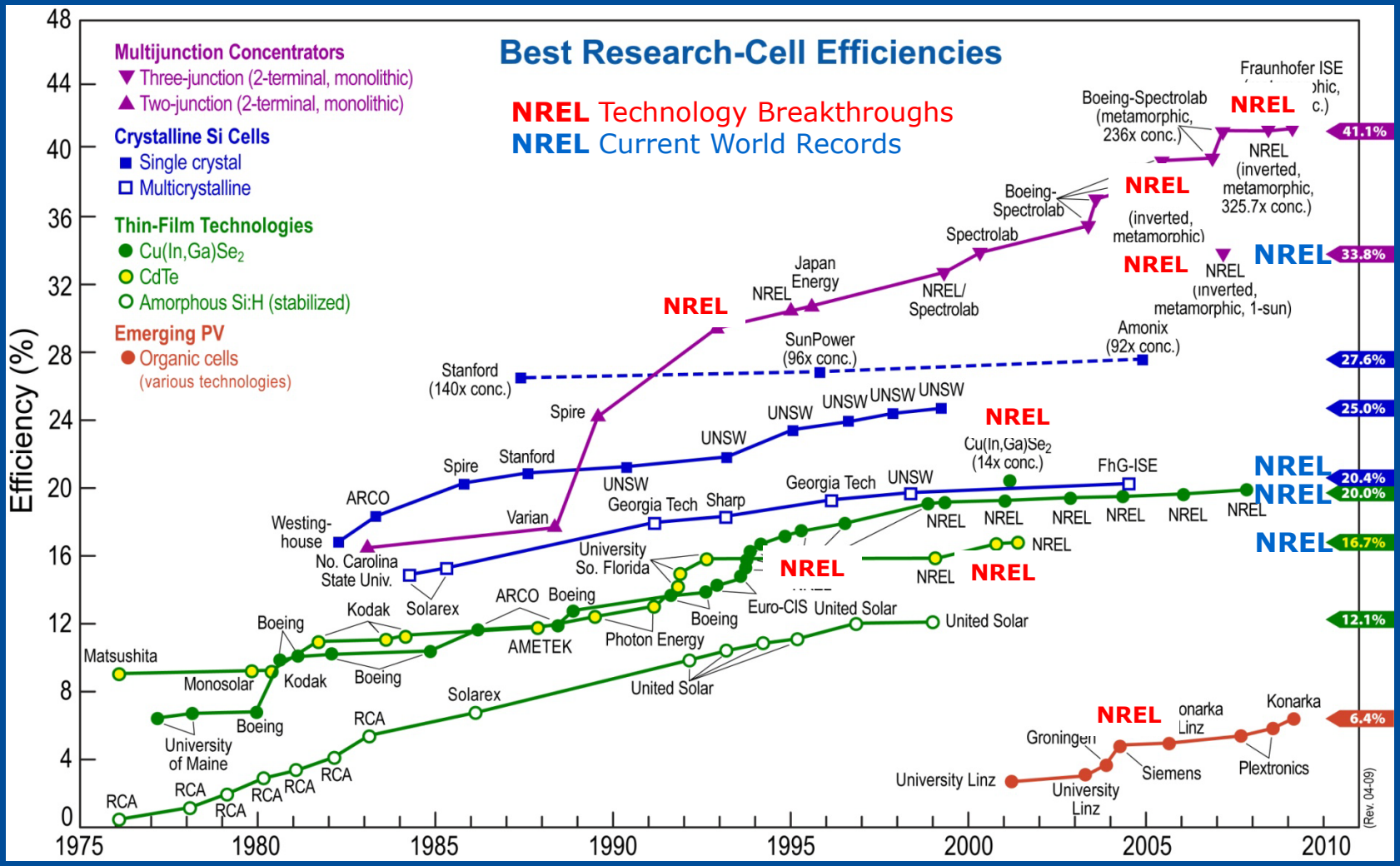




c-Si ~180 um

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Working with the NCPV

Incubator
New Pre-Incubator
Technology Pathway Partnerships
PV Supply Chain
Future Generation Program
PV Manufacturing Initiative

TPPs
Ammonix
SunPower
Soliant
General Electric
Konarka
Nanosolar
BP Solar
Greenray
Uni-Solar
Dow Chemical

Ind. CRADAs
Plextronics
SiXtron
Corning/Varian

Incubator
Calsiolar
Sol Focus
MicroLink Devices
SoloPower
PrimeStar Solar
AVA Solar
Plextronics
Innovalight
Spire Solar
Solexel
1366 Technologies
Solasta
Skyline

Pre-Incubator
Banyan Energy
Crystal Solar
ISET
TiSol
Ascent Solar Technologies
EPIR Technologies
MicroLink Devices
1366 Technologies
Lightwave Power
Vanguard Solar
Semprius
SpectraWatt
Luna Innovations

Universities
Toledo
Delaware
Florida
Arizona State
Cal Tech
RIT
MIT
Penn State
Georgia Tech
Stanford
UC Davis
CSM
Colorado
Colorado State
Illinois
Michigan
South Florida
Washington

Next Gen
Wakonda
Voxtel
Solasta
Solexant
Soltaix
Voxtel

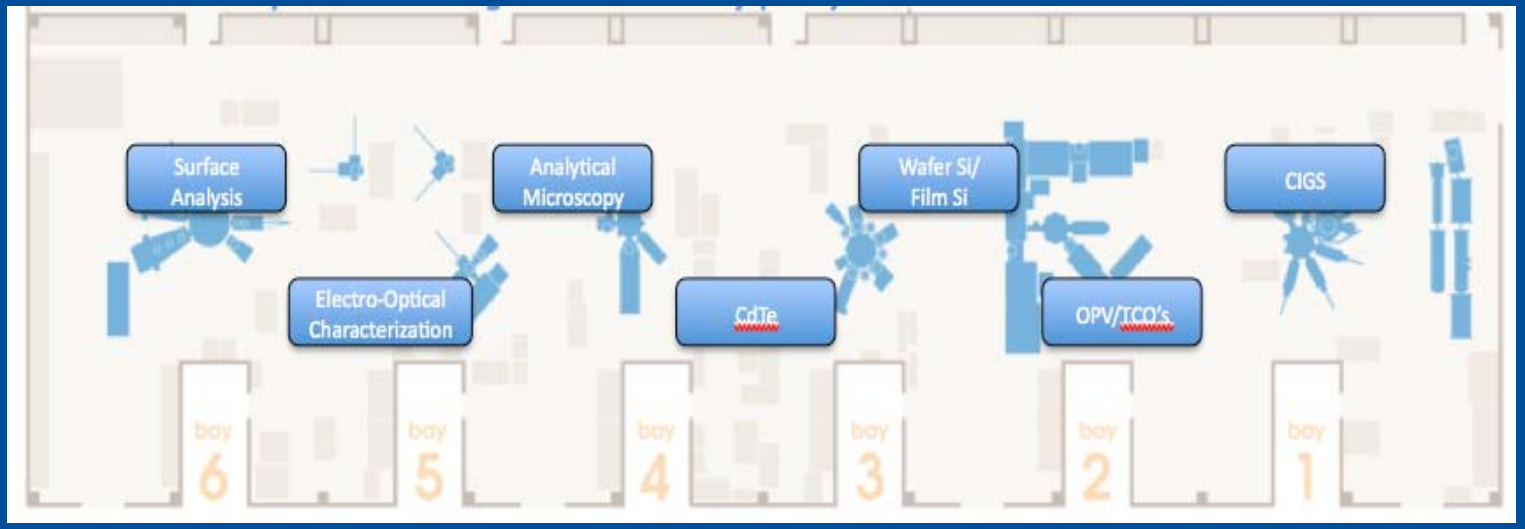
NREL T&E
1366 Technologies
3M
AMONIX
ADCO
Advent Solar
Applied Materials
Applied Optical Sciences
BASF
BP Solar
BRP Manufacturing
Dow Chemical
CaliSolar
Dupont
First Solar
GT Solar
Infoscitex
Innovalight
Konarka
NanoSolar
PrimeStar Solar
Solar Power Industries
SolFocus
Schott Solar
Skyline Solar
Spectrolab (Boeing)
SunPower
TruSeal
Uni-Solar

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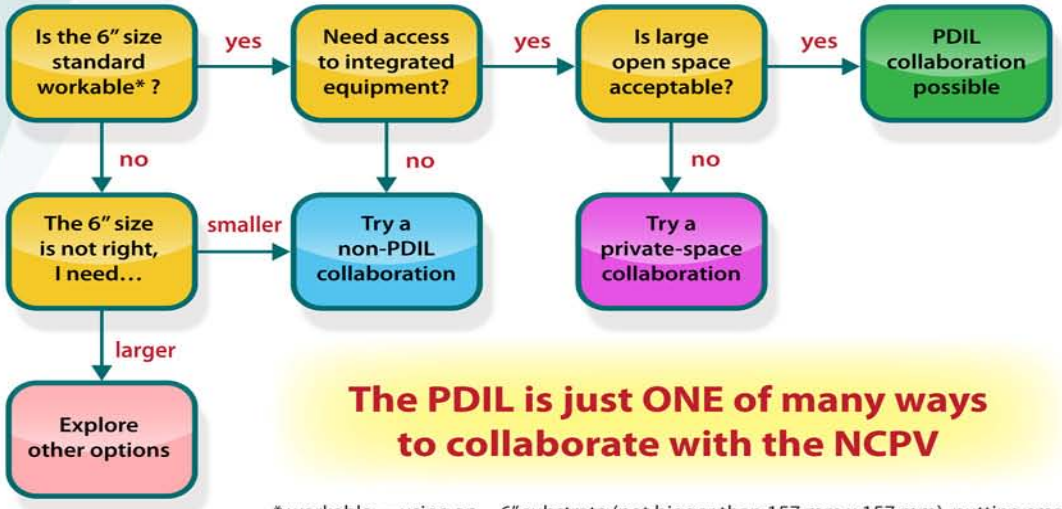
Process Development and Integration Laboratory (PDIL)







Is the PDIL Right for YOU?

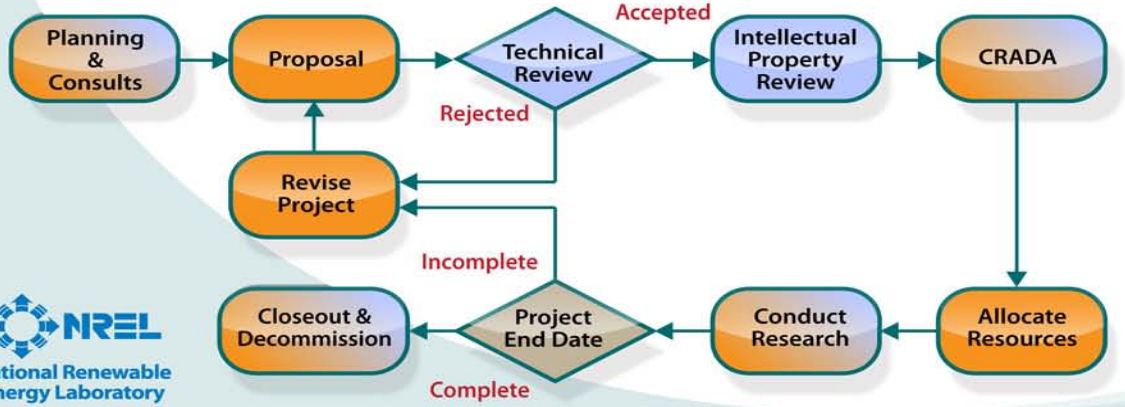


The PDIL is just ONE of many ways to collaborate with the NCPV

* workable = using an ~ 6" substrate (not bigger than 157 mm x 157 mm), putting smaller substrates in a larger platen, or cutting an ~ 6" piece out of a larger substrate

PDIL Proposal Process

All integrated processes require having an NCPV "champion"



National Renewable Energy Laboratory

NREL Collaboration Methods

Cooperative Research & Development Agreements (CRADAs)

Subcontracted Research (Request for Proposals, RFPs)

Sponsored Research or Work-for-Others (WFO)

- Interagency Agreement-Government (IAG)
- Funds-In Agreement (FIA)
- Technical Services Agreement (TSA, typically > $25K)
- Analytical Services Agreement (ASA, < $25K)

Foreign National Program

Teacher, Graduate, and Internship Programs

No-Funds Transfer Collaboration on an NCPV Project

Sabbaticals (to NREL or by NREL staff externally)

www.nrel.gov/technologytransfer/

PDIL Process Development & Integration Laboratory

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