

# Solar Energy for New Jersey

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# Outline

- Energy Usage Perspective
  - Conventional Solar Types
  - Frontier/Research Solar
  - Suitability for NJ
  - Discussion Points
- [http://www1.eere.energy.gov/solar/solar\\_america/publications.html](http://www1.eere.energy.gov/solar/solar_america/publications.html)



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# U.S. Energy Flow, 2002 (Quads)

80% of energy for the transportation sector and 69% of energy for electricity generation/use is lost

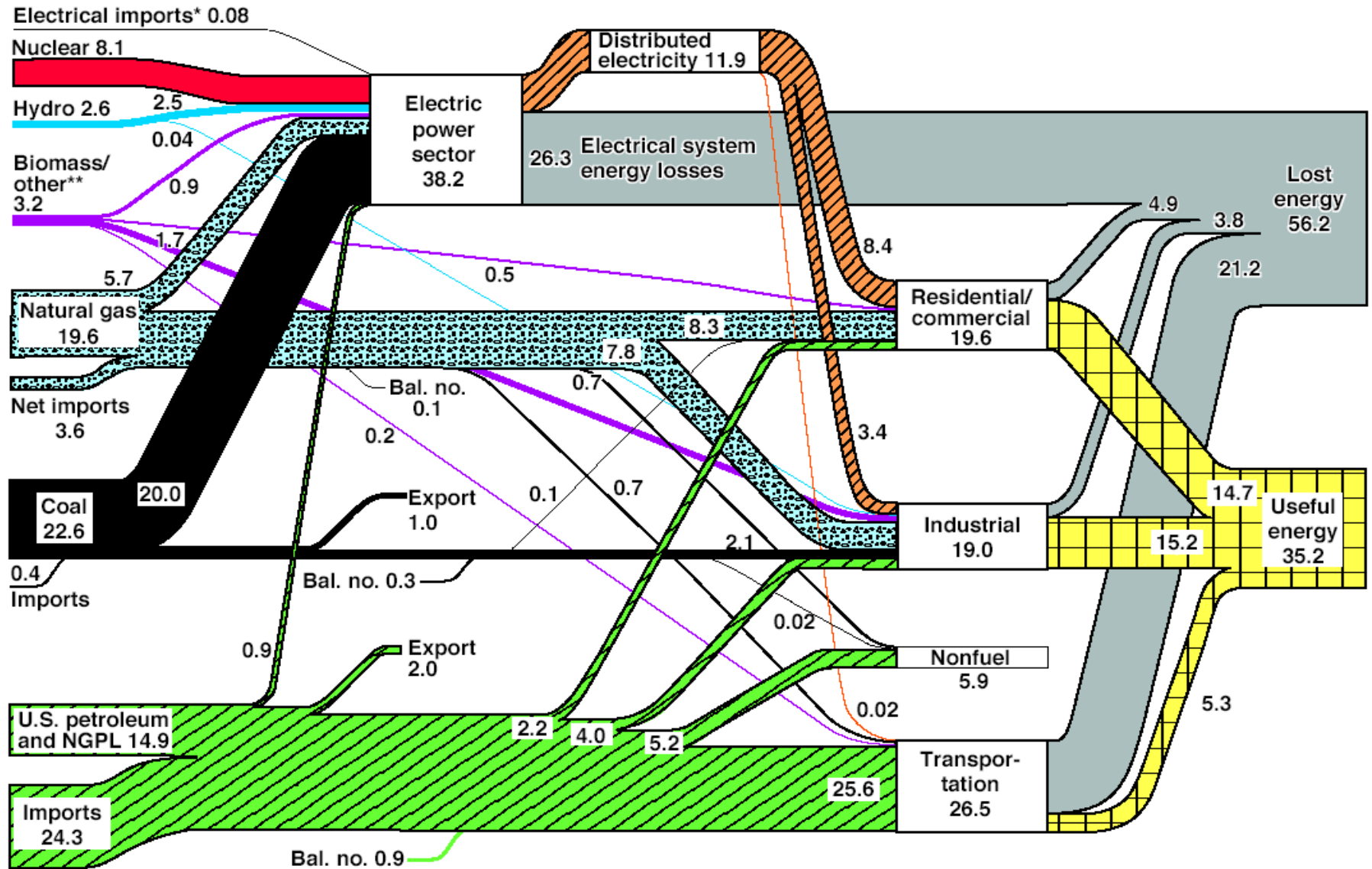
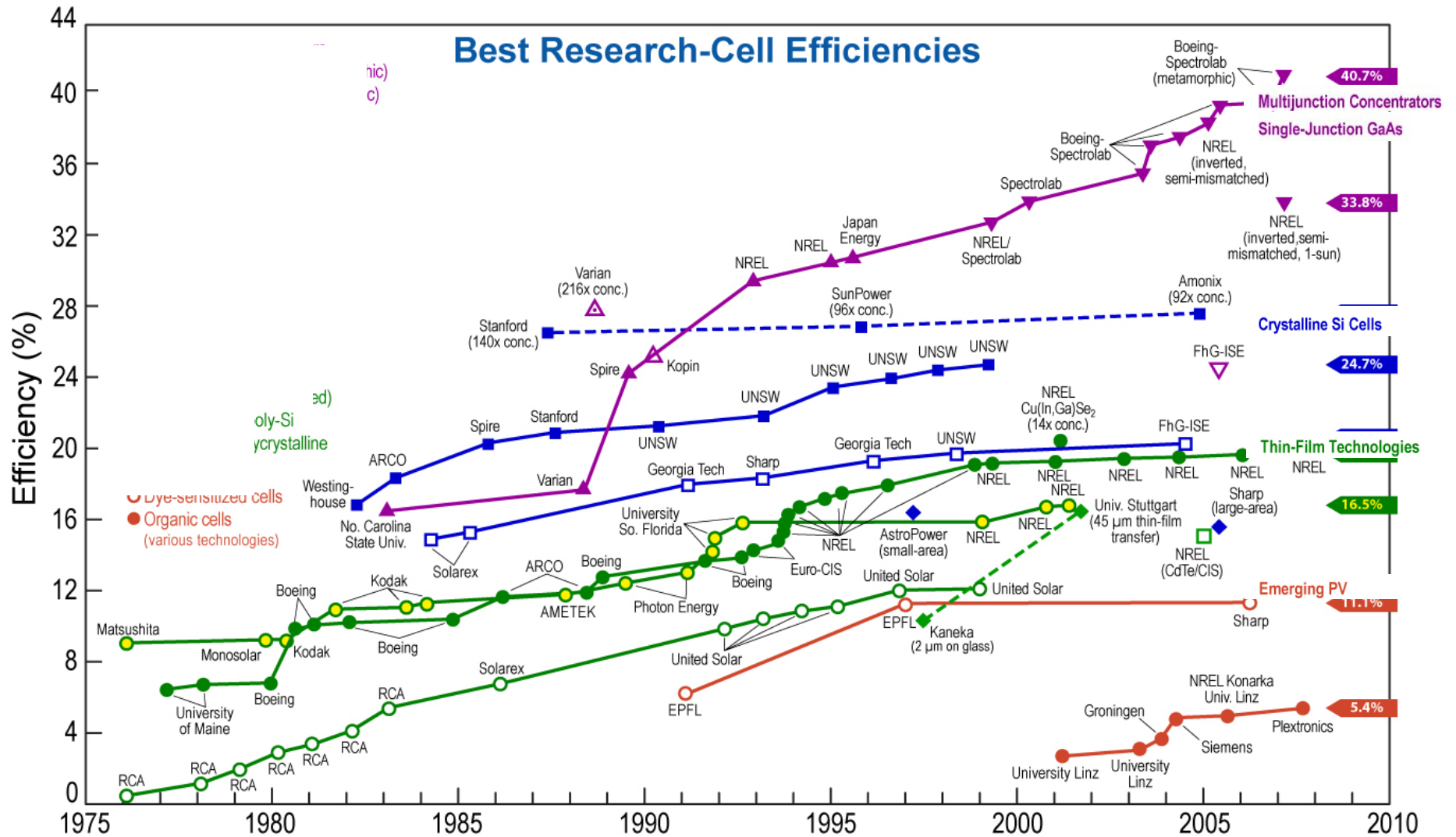


Figure credit: Patricia Dehmer, US Department of Energy, Basic Energy Sciences.

June 2004  
Lawrence Livermore  
National Laboratory  
<http://eed.llnl.gov/flow>

# The Current State of Photovoltaics



Kazmerski *et al.* NREL website

Rev. 11-07-07

# Specific Technologies

- Single Crystal Silicon
- Thin Film Silicon
- CdTe Thin Film
- “CIGS” Thin Film
- Research/Exploratory Solar Cells Options

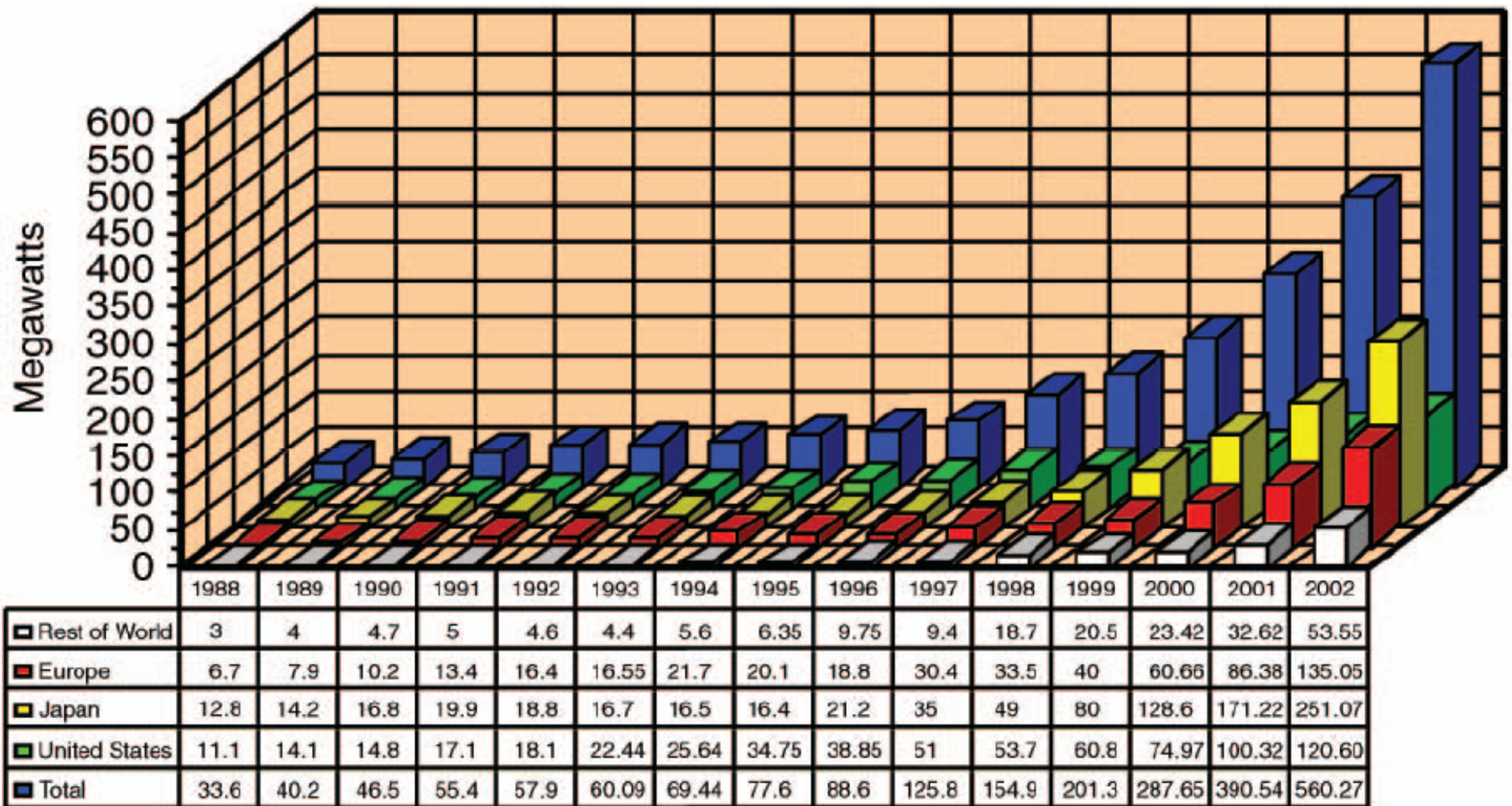


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# Solar Cell Production Number's



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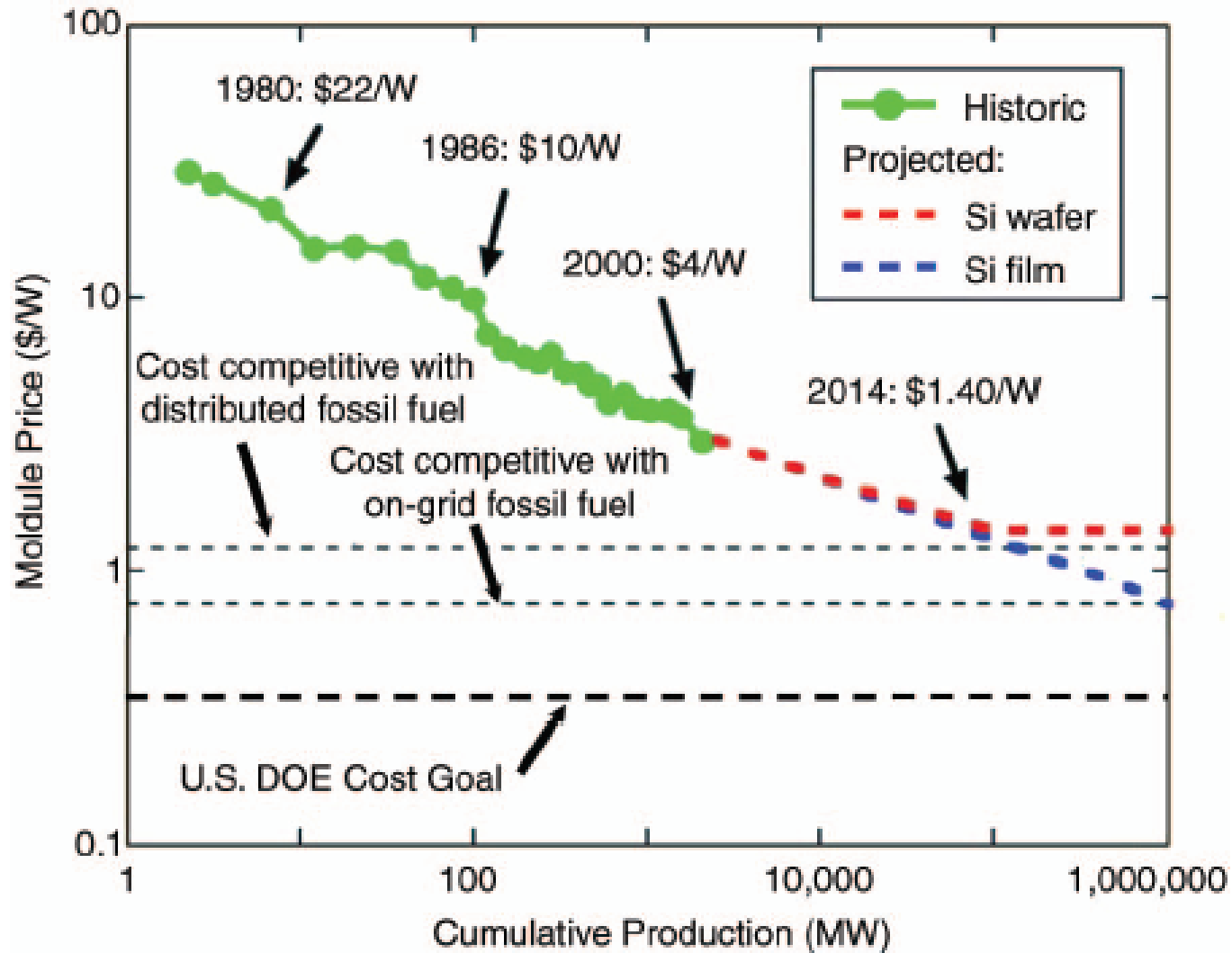
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From: S. E. Shaheen, D. S. Ginley, and G. Jabbour, MRS Bulletin **30** (2005) 10.

# Solar Cell Costs

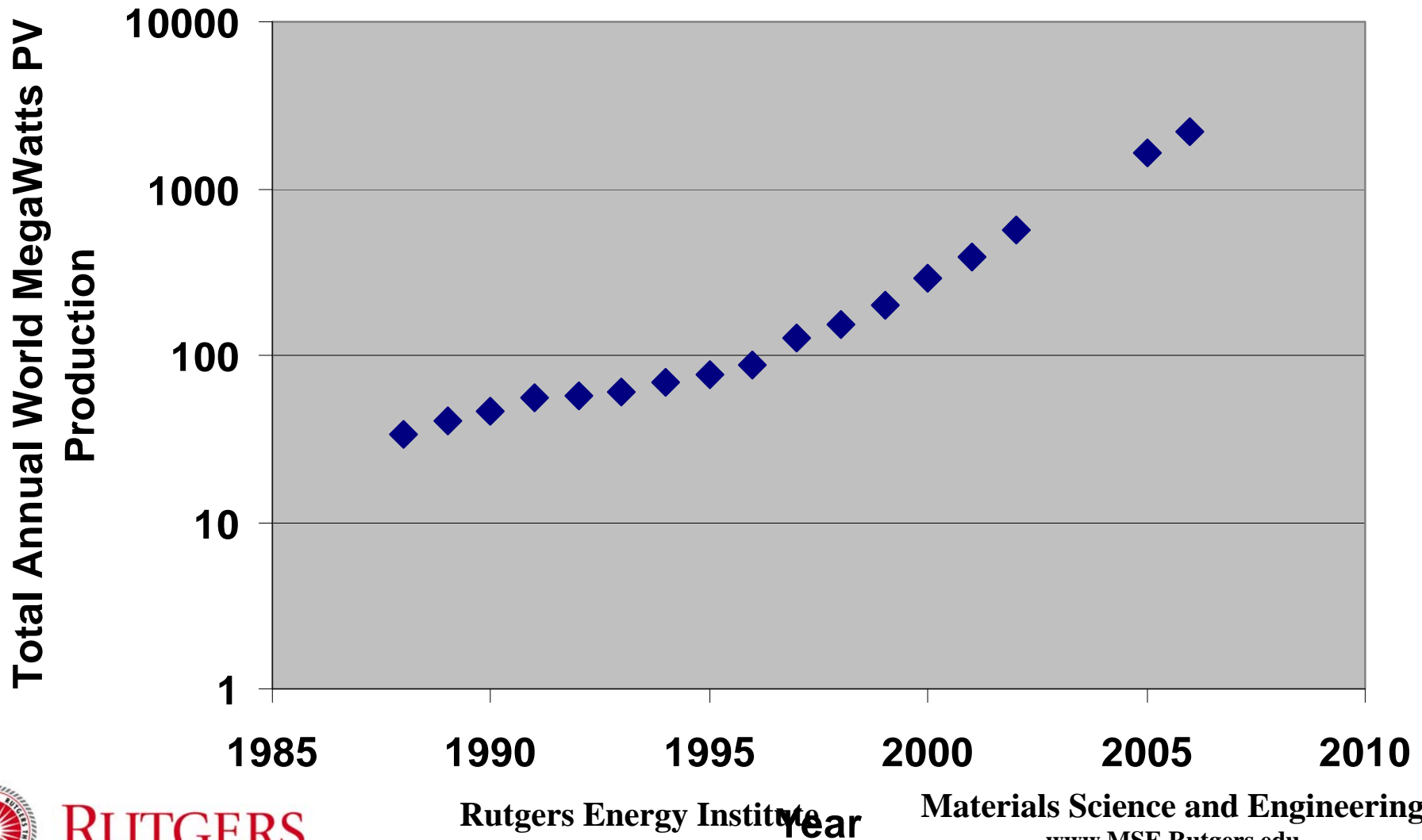


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# Recent History PV Production Growth



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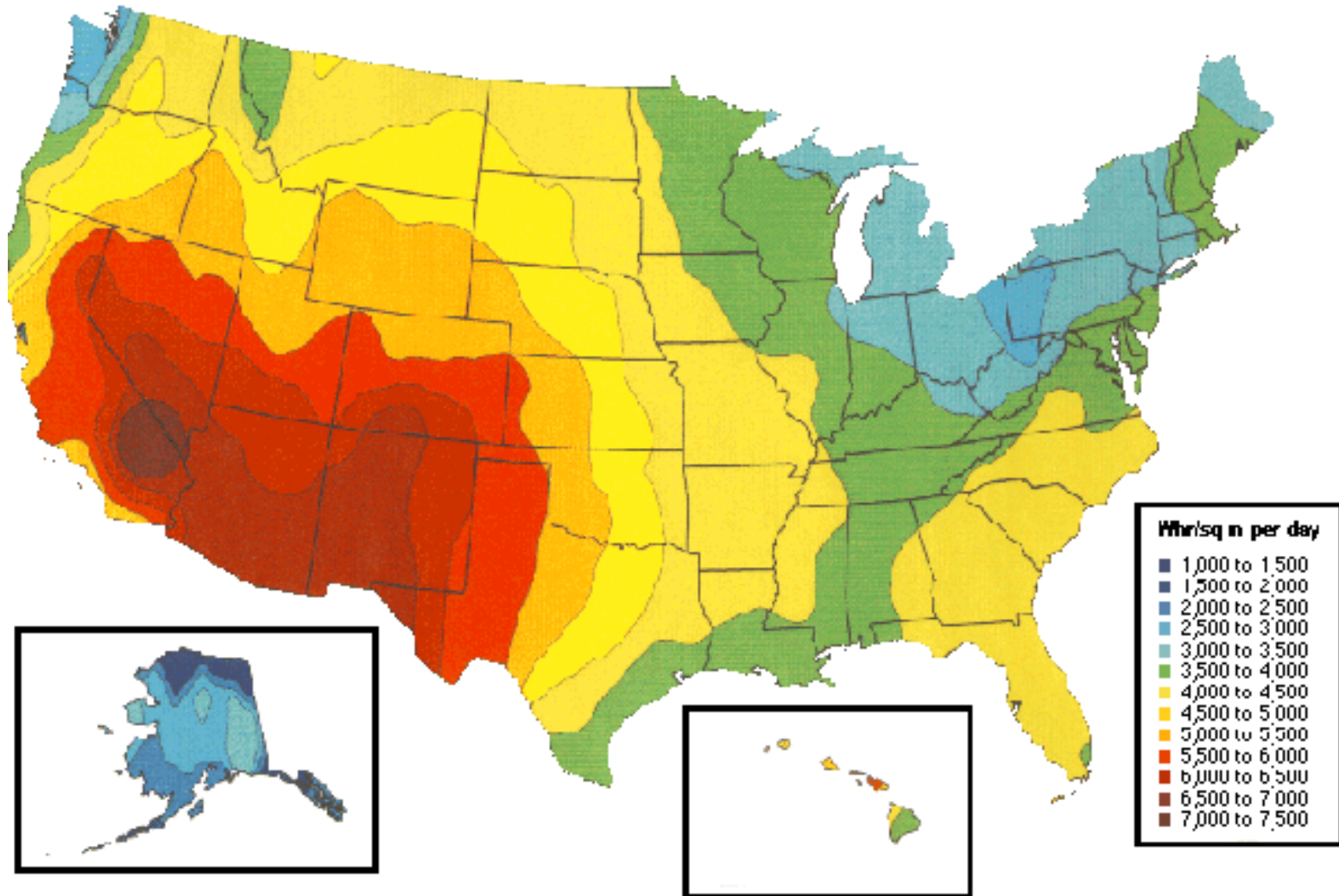
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# Observations

- Cost Keeps Solar from Broad Installation.
- Notice units though: Watts vs. WHrs
- Solar Cell Installations have a **Pay-Back Period** → “Rational” Installation Depends on Many Assumptions (interest rate, sun light, optimal tilt/shading, etc.)



# Solar Resource by Region



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Figure From: NREL

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# Frontier Technologies

- Organic Solar
- Dye Sensitized Solar
- Intermediate Band Solar
- Multiple Exciton Generation Systems
- Nanotechnology Enabled Systems



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# Strategic View

- **Key Driver 1: Higher Efficiency**
  - MEG, “Nano”, Intermediate Band, MultiJunction
  - Spectrum Realities
  - Electrical Circuit Realities
- **Key Driver 2: Lower Cost Processable Systems**
  - Organic PV
  - Dye Sensitized Solar – System Optimization Factors



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# Discussion Points

- Partner Industry with University Labs
- Push Frontier Technologies – Can be Economic Development for NJ
- Characterization Infrastructure – microscopy – cell efficiency – electrical properties.
- Education of NJ Residents to Operate at the Cutting Edge.



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