

Solar Power: Coming of Age



Greg Rosen
Helio Micro Utility, Inc.
Presented to Ag Outlook Forum
February 22, 2008

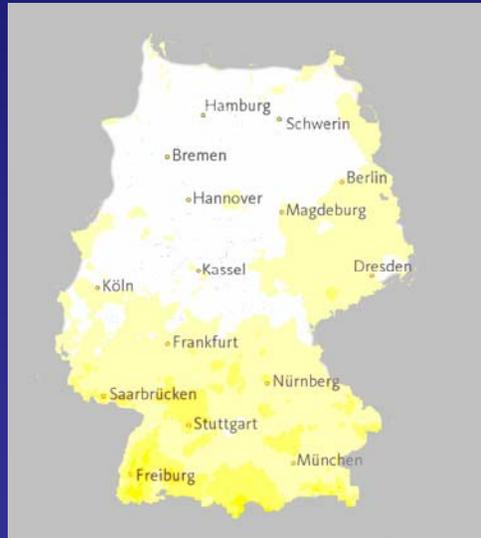
Why Solar? Why Now?

- There's space for it & it works
- Solar costs are dropping
- Opportunity cost of not deploying alternatives to fossil-fuel based electricity is increasing
 - Conventional electricity prices are increasing
 - Gov't is starting to monetize negative environmental externalities of fossil fuels
- Corporate America is making money off solar

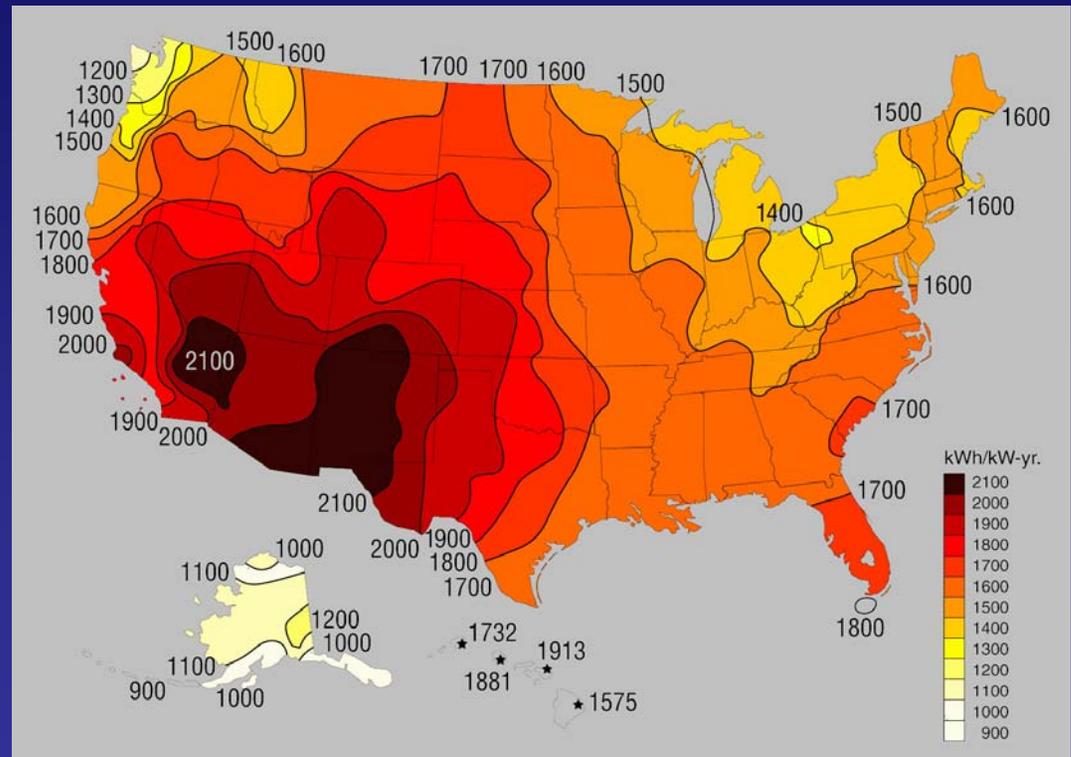


Solar Resources

Just 2.5% of Southwest U.S. available land is enough to power U.S.
(Scientific American 12/16/07)



Incentive \$0.48-70 kWh



Incentive \$0.14-20 kWh

Source: SEIA

Concentrating Solar (CSP)



CSP costs are declining as well and the first large scale system in ~20 years was built

Bavaria Solar Park - 10 MW

Dual Use: solar power and sheep grazing



In U.S. Nellis Air Force Base is 15 MW, Macy's will have 9 MW on 28 stores

Source: SunPower

J&J Skillman, NJ – 505 kW



Source: SunPower

FedEx - Oakland Hub, CA – 904 kW



Source: SunPower

Lowe's - Union City, CA – 690 kW



2.4 MW on 4 stores

Source: SunPower

Power and Shade - 1 MW

World's Largest PV Carport, US Navy



Residential Retrofit - 6 kW



Integrated Solar Roof Tiles

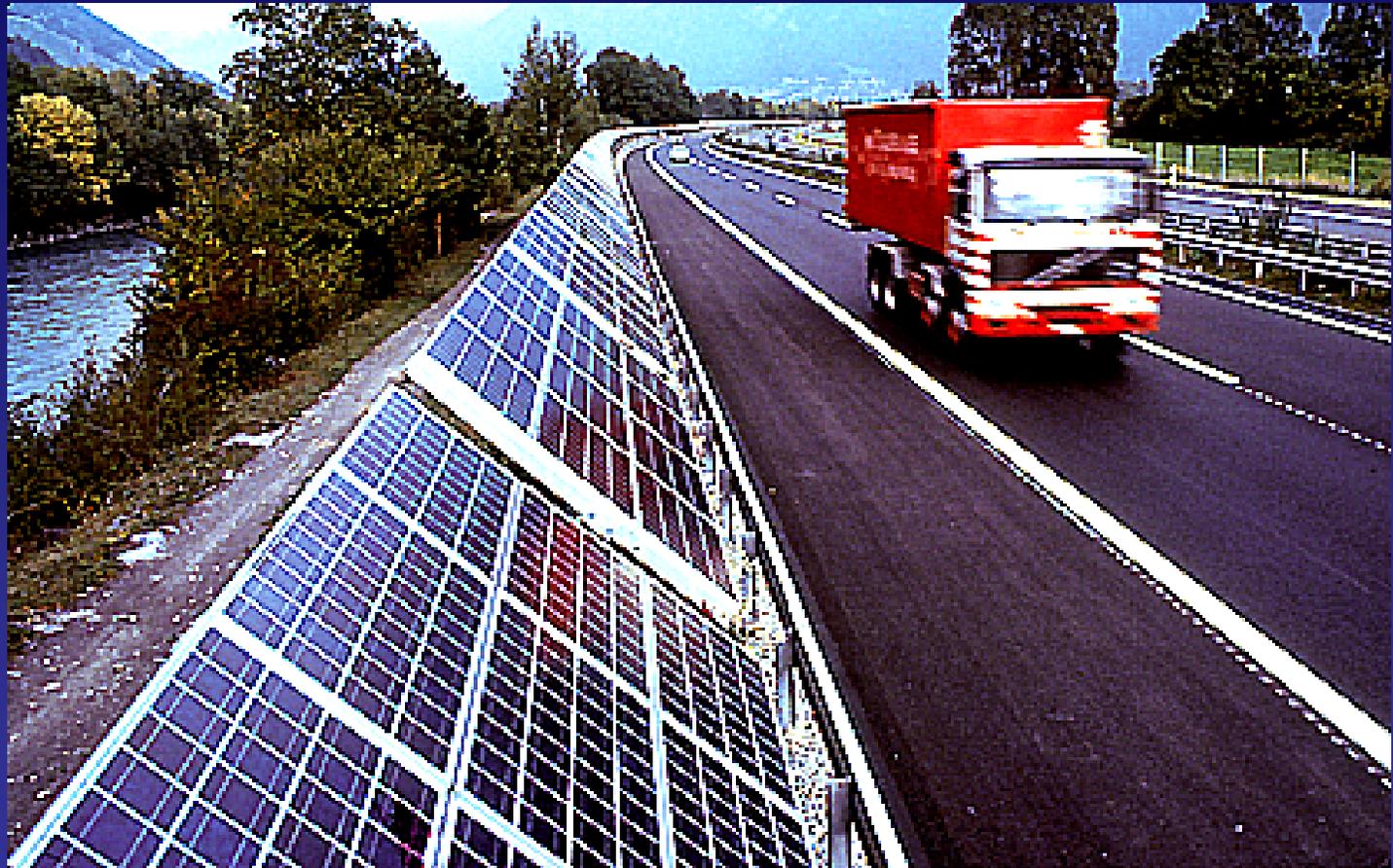


BIPV - The Netherlands



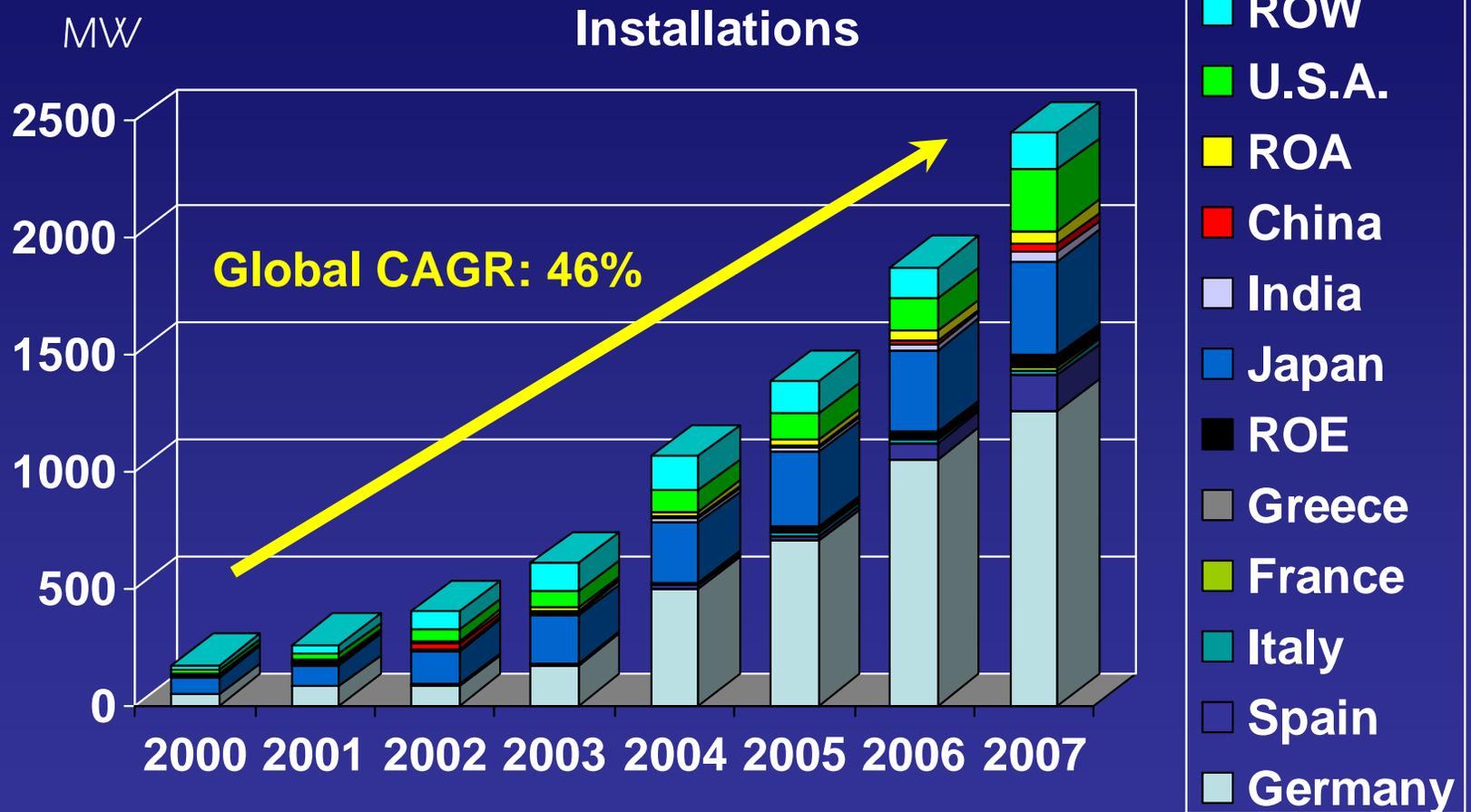
Solar Skylights, The Netherlands

Available Space - Switzerland



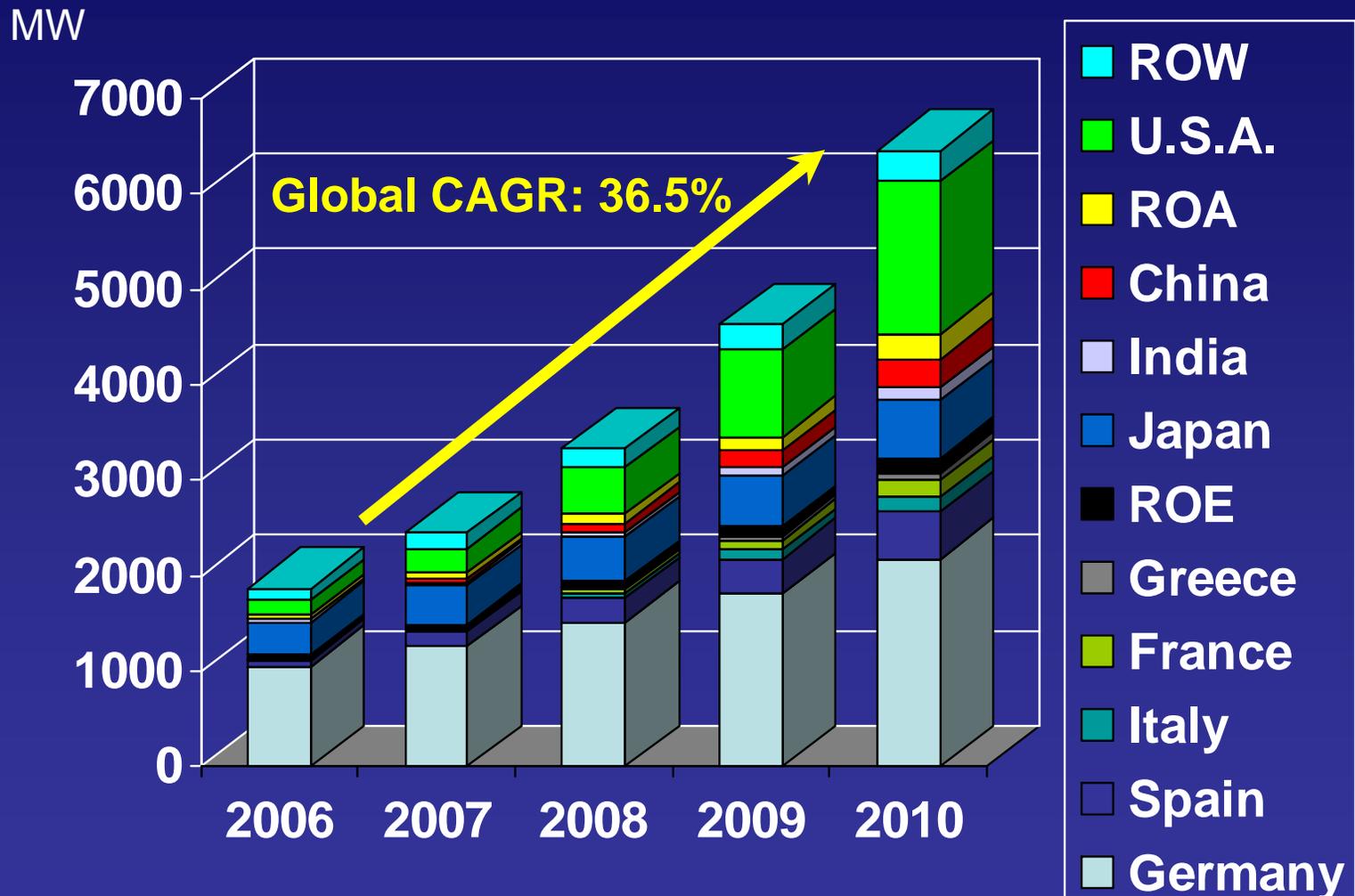
Solar on highway sound walls, Switzerland

Historic Growth



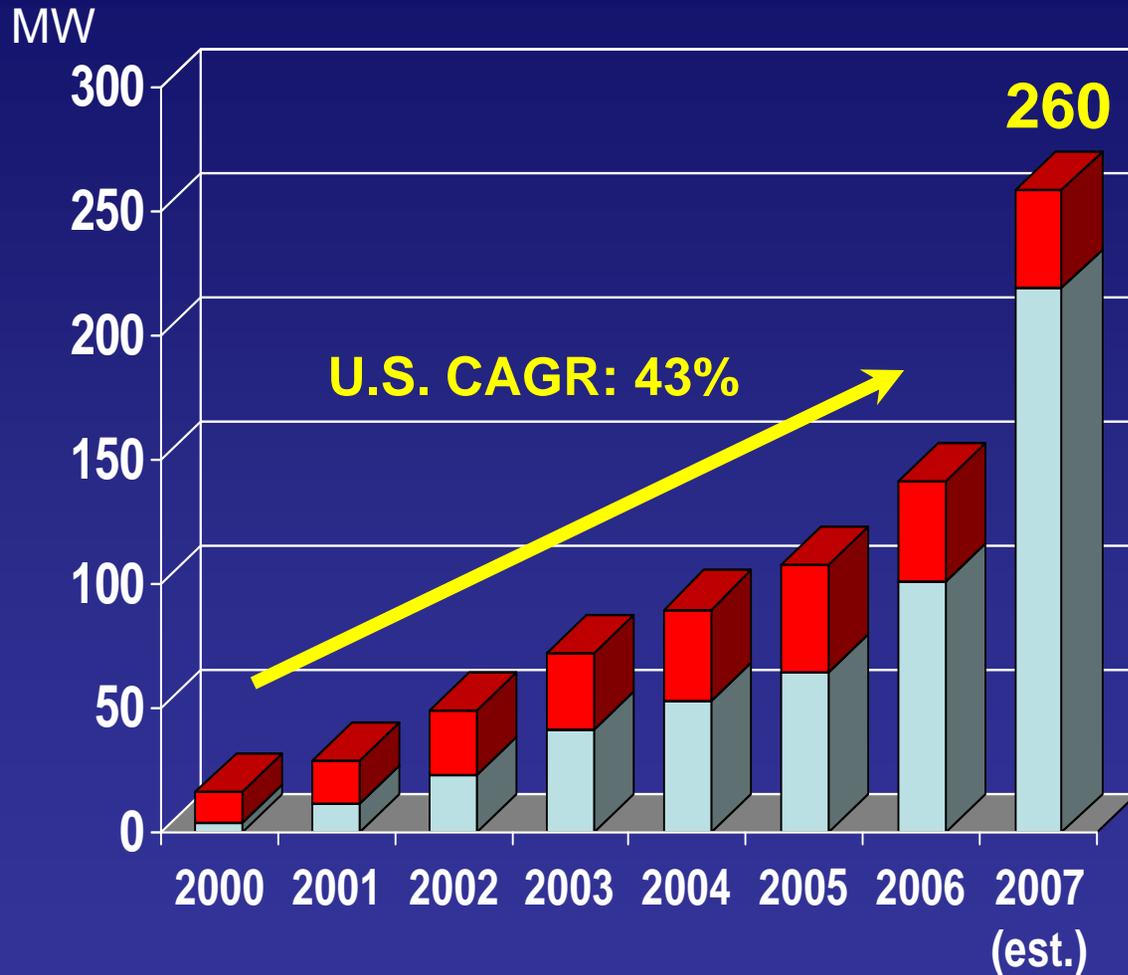
Source: PVNEWS

Global PV Demand Projections



Source: PVNEWS

US Market Growth



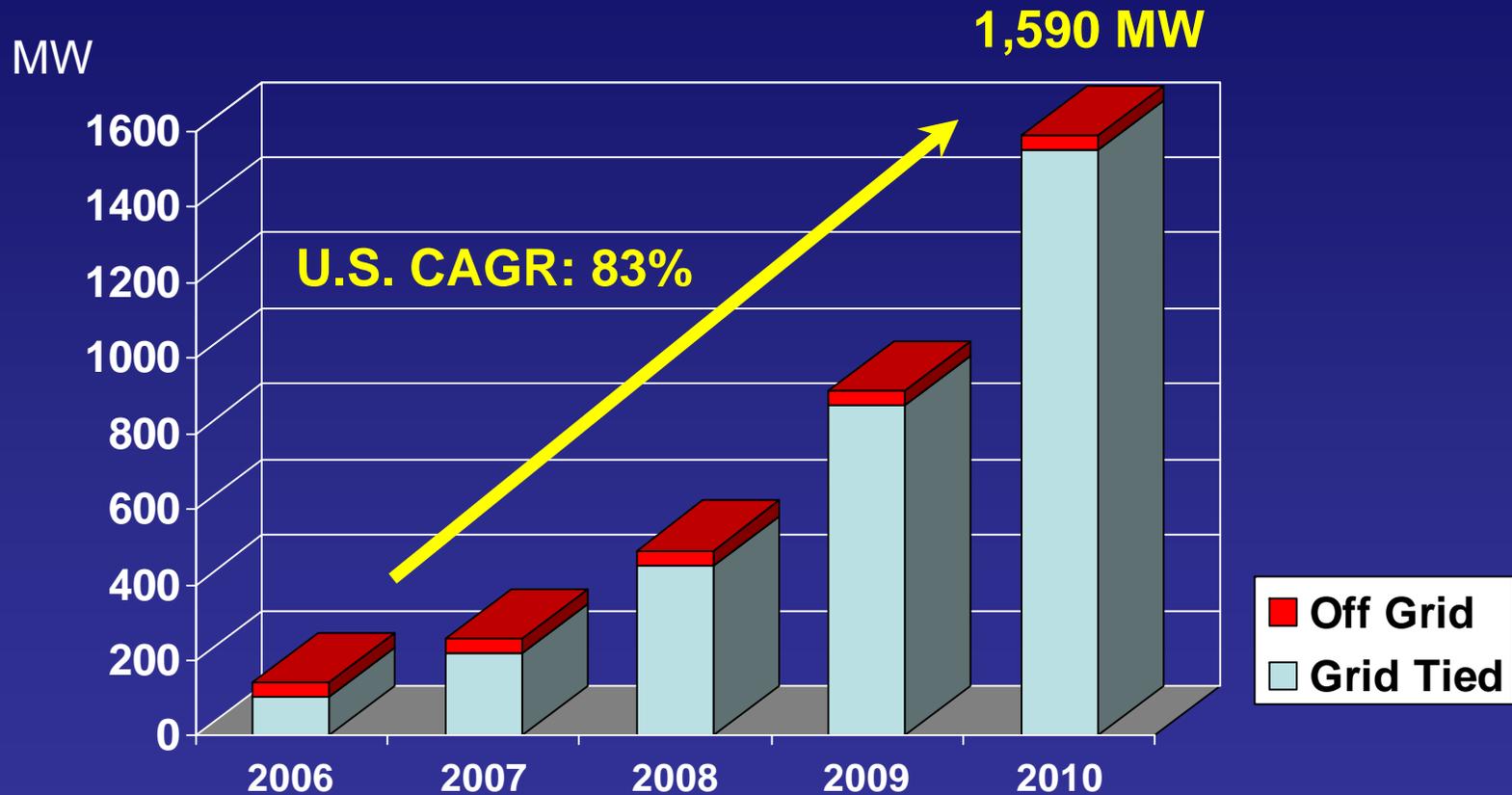
- From 2005-2006:
- Grid connected up 55%
 - Total U.S. up 32%

- From 2006-2007:
- US Market up over 80%

■ Off Grid
■ Grid Tied

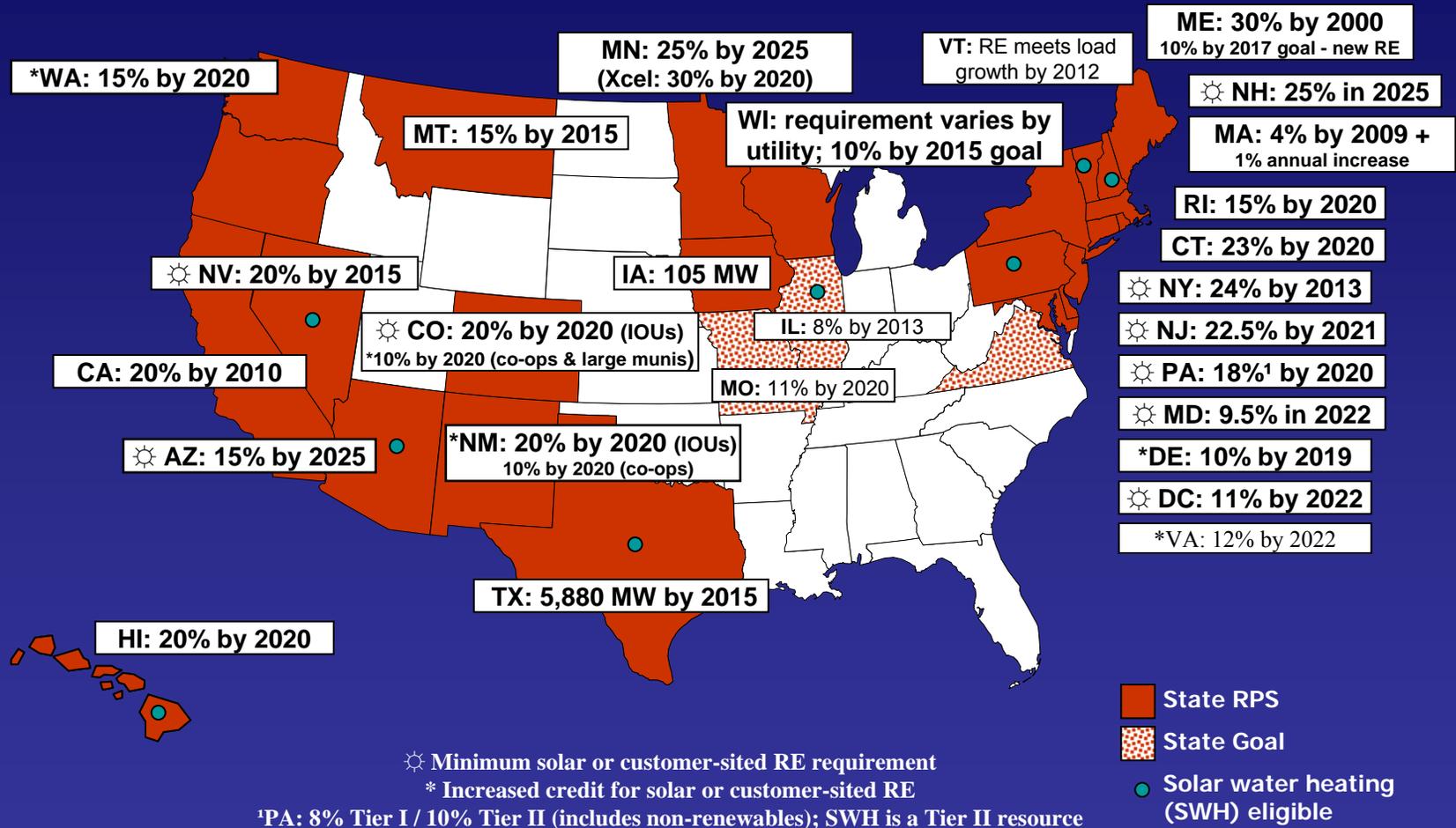
Source: PVNews

US Market Demand Forecast



Source: PVNews

Existing State RPS Requirements: 23 States and Washington D.C.

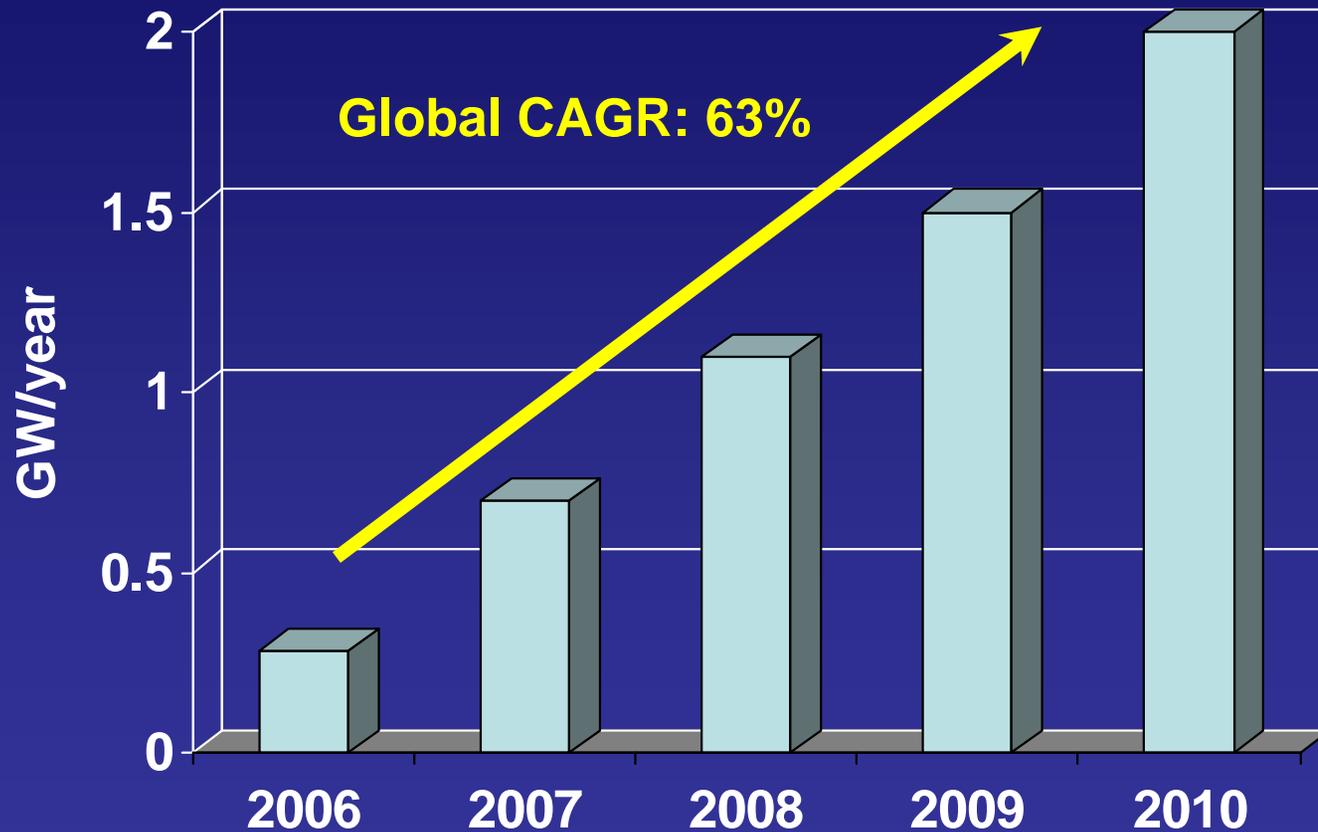


Next-Generation PV



Thin Film – *How fast will it grow?*

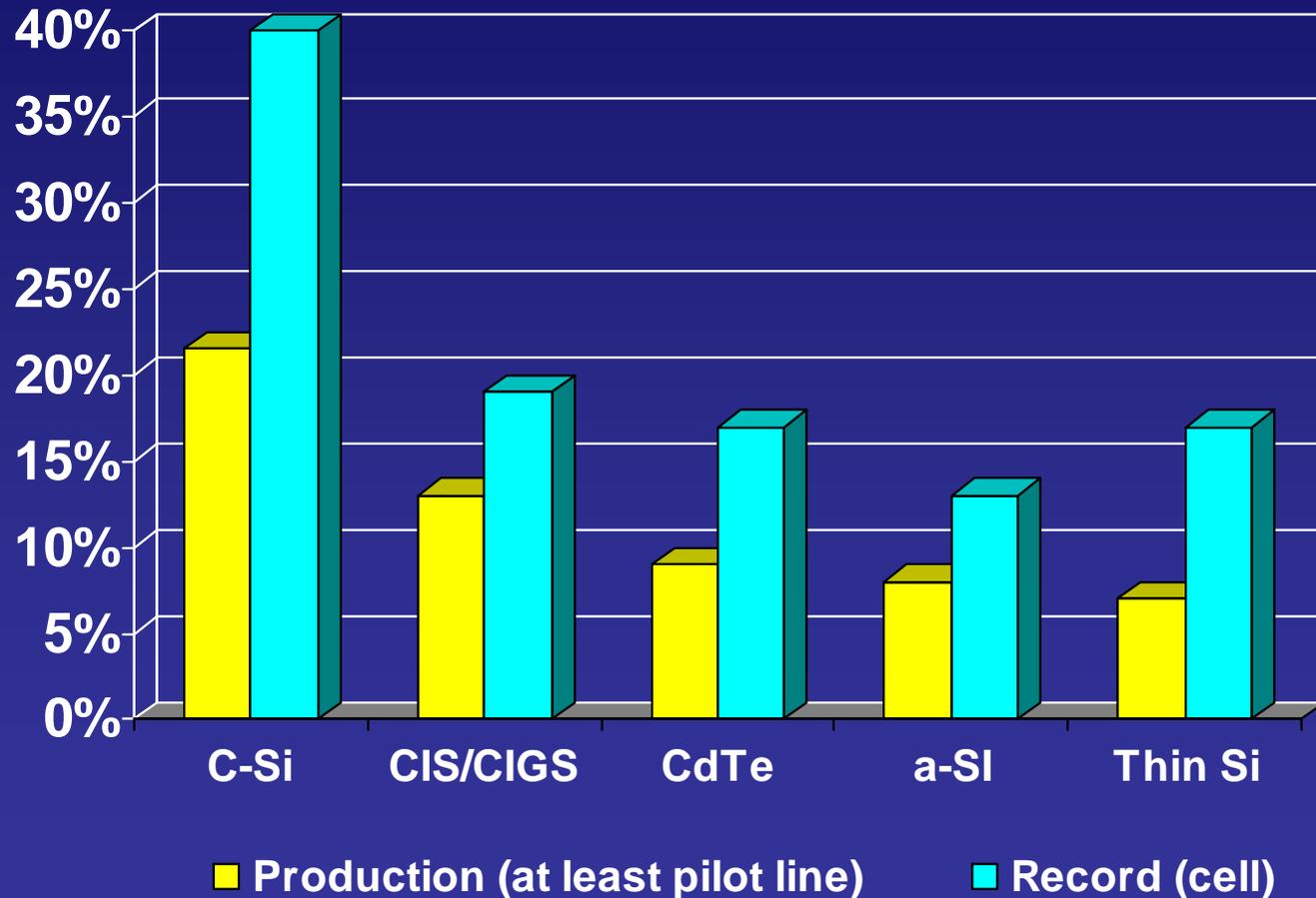
Thin Film Cell/Module Production



Source: Photon

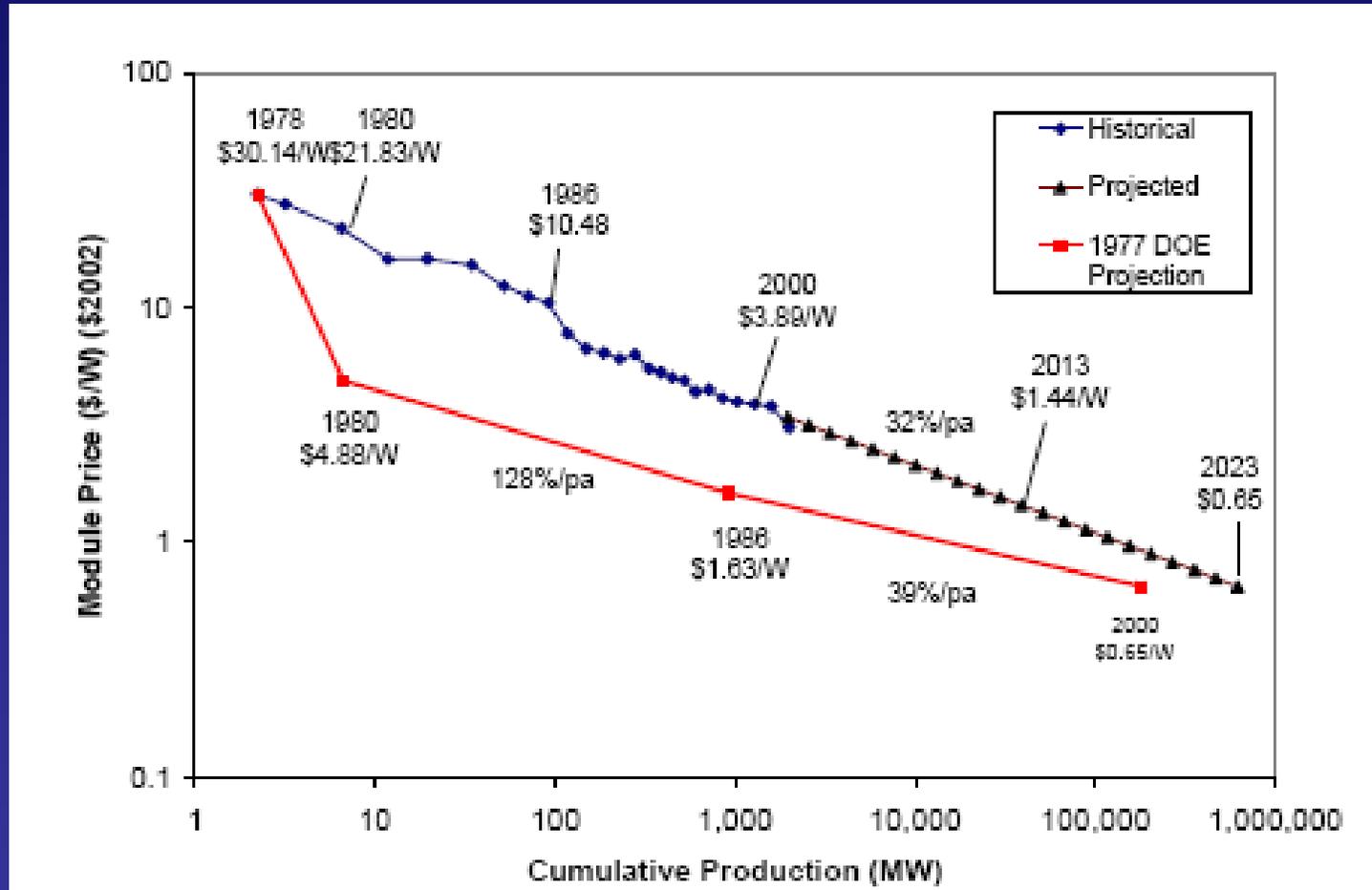
Comparing Efficiencies

Comparing Production and Record Efficiencies - 2006



Source: Photon, NREL, UNSW, & Company Announcements

Declining Cost of PV



Escalating Cost of Electricity

- California (PG&E, SCE) – 20%
 - TOU \$0.37-45/kWh
- Massachusetts – 27.5%
- Connecticut – 22.4%
- New Jersey – 20%
- Nevada – 15%
- Arizona (APS) – 20%
- Hawaii – 100% since 2002
- Colorado – 15%
- DC – 38%
- Maryland – 72%



Electricity rates rarely go down

Source: SunEdison, SEIA

Keeping Momentum

- Long-Term Federal Incentives renewal
- Nation-wide Interconnection and Net-Metering
- Solar Carve-Outs in Renewable Portfolio Standards
- National Carbon Policy that Monetizes Solar Benefits
- Expansion of R&D to \$250 million/yr
- Educate the public on the value of solar



Thanks
Gregory Rosen
Helio Micro Utility, Inc.

WWW.HELIOMU.COM