CLEAN RANGE VENTURES™

Cleantech 2.0:

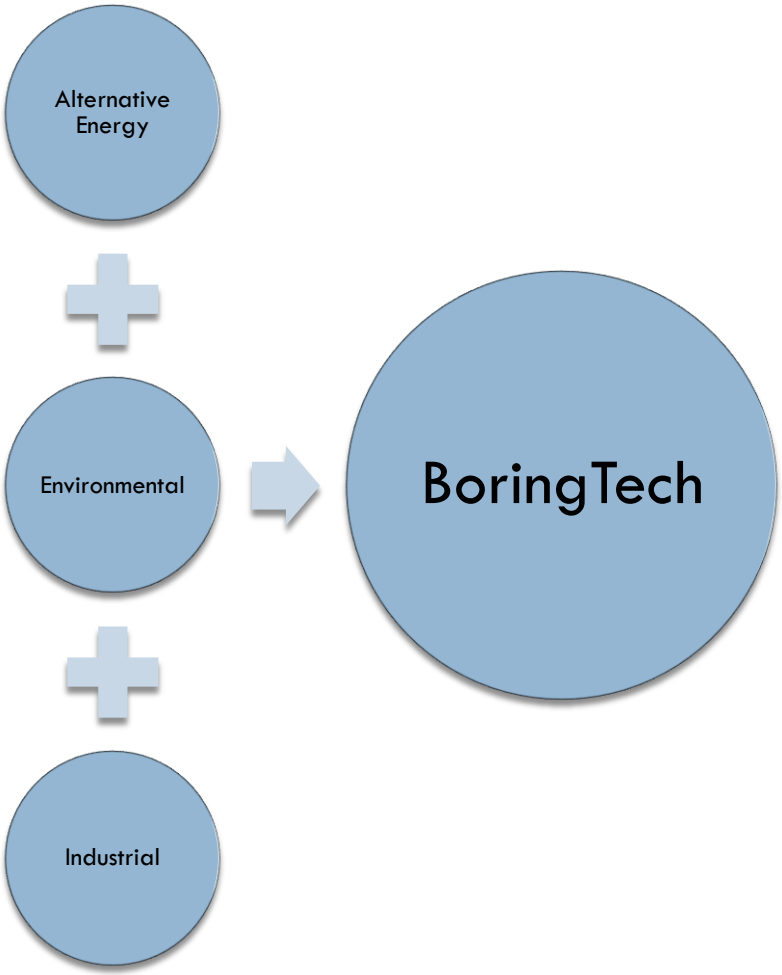
Solving the NanoEnergy Commercialization Gap

October 25, 2011

Today's Big Question

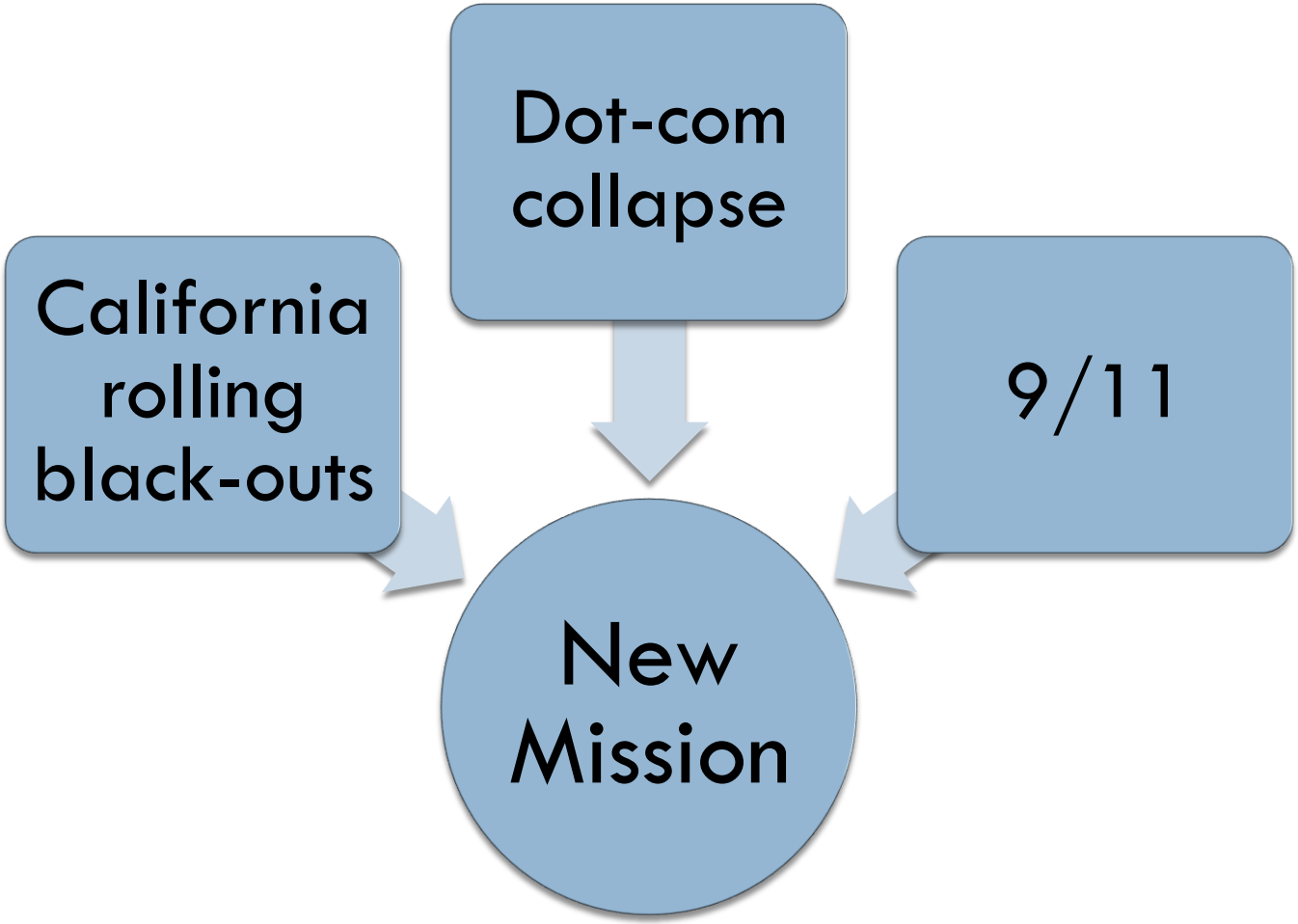
- How long does a new material science-based innovation take to make it to market?
  - Information technology
  - Energy
- What can be done to help this go faster?

BC: Before Cleantech

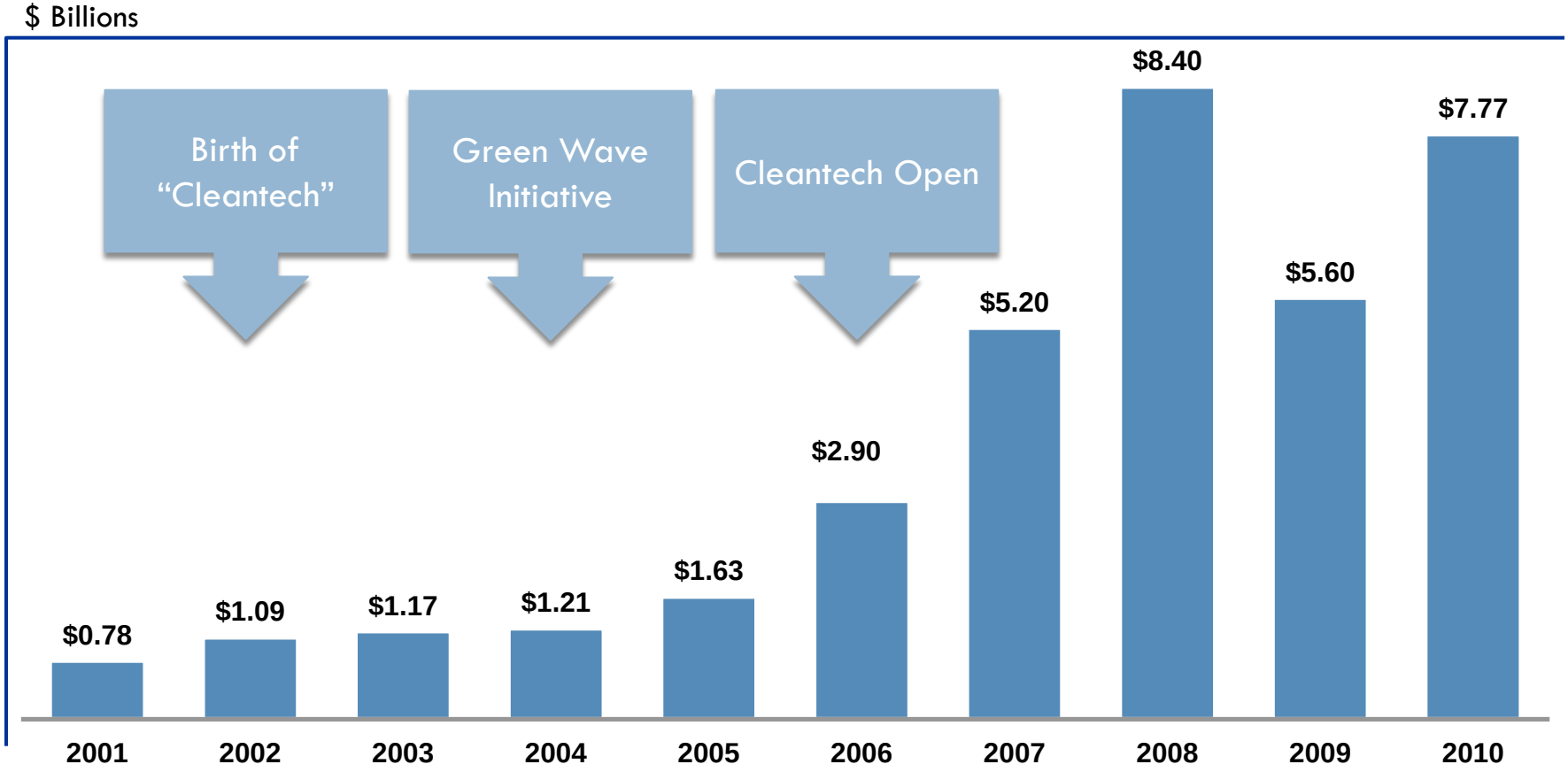


- Utility and corporate limited partners
- Market-driven investing
- Leading VCs:
  - Advent International
  - Enertech
  - Nth Power
- Highest returning category of public equities in 2001

Birth of Cleantech in California



Cleantech Grows Up



Source: Cleantech Venture Network, 2007-2010

Cleantech 1.0 Exuberance

"Greentech is the greatest economic opportunity of the 21st century."

"Silicon Valley will prevail in investing our way out of our energy problems."

"Cleantech is just like semiconductor and biotech investing."

"There will be abundant equity capital for our companies."

"Texas doesn't matter."

"We only need to invest into research."

Lesson: Clean is Different than Tech

Tech

- High Growth / Rapid Adoption
- Rapid Product Obsolescence
- Completely New Products
- High Margins
- Governed by Consumer Demand
- Capital Efficient

Cleantech

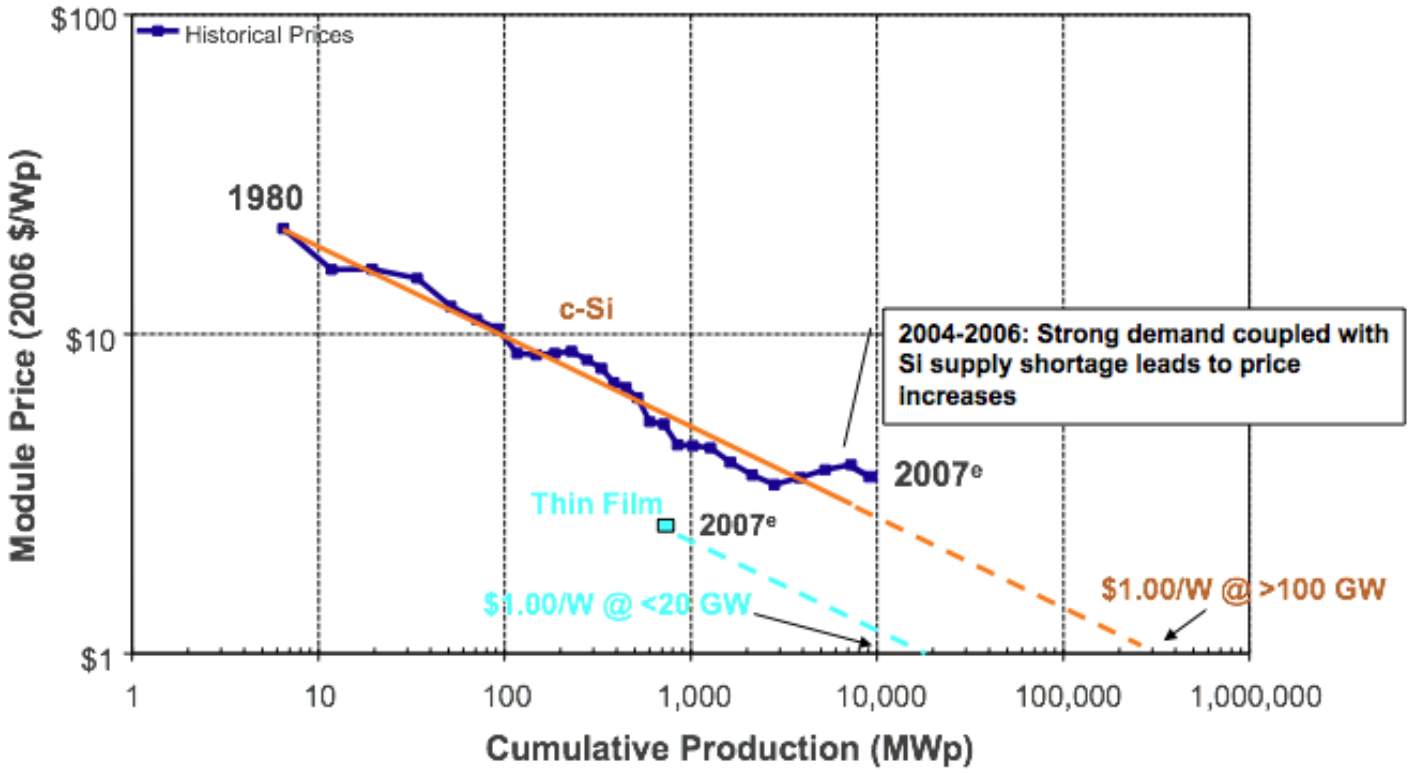
- Slow Adoption
- 30 Year Assets
- Substitutes for Existing Products
- Commodity Margins
- Governed by Asset Depreciation
- Capital Intensive

How Long Does it Take: Solar Test

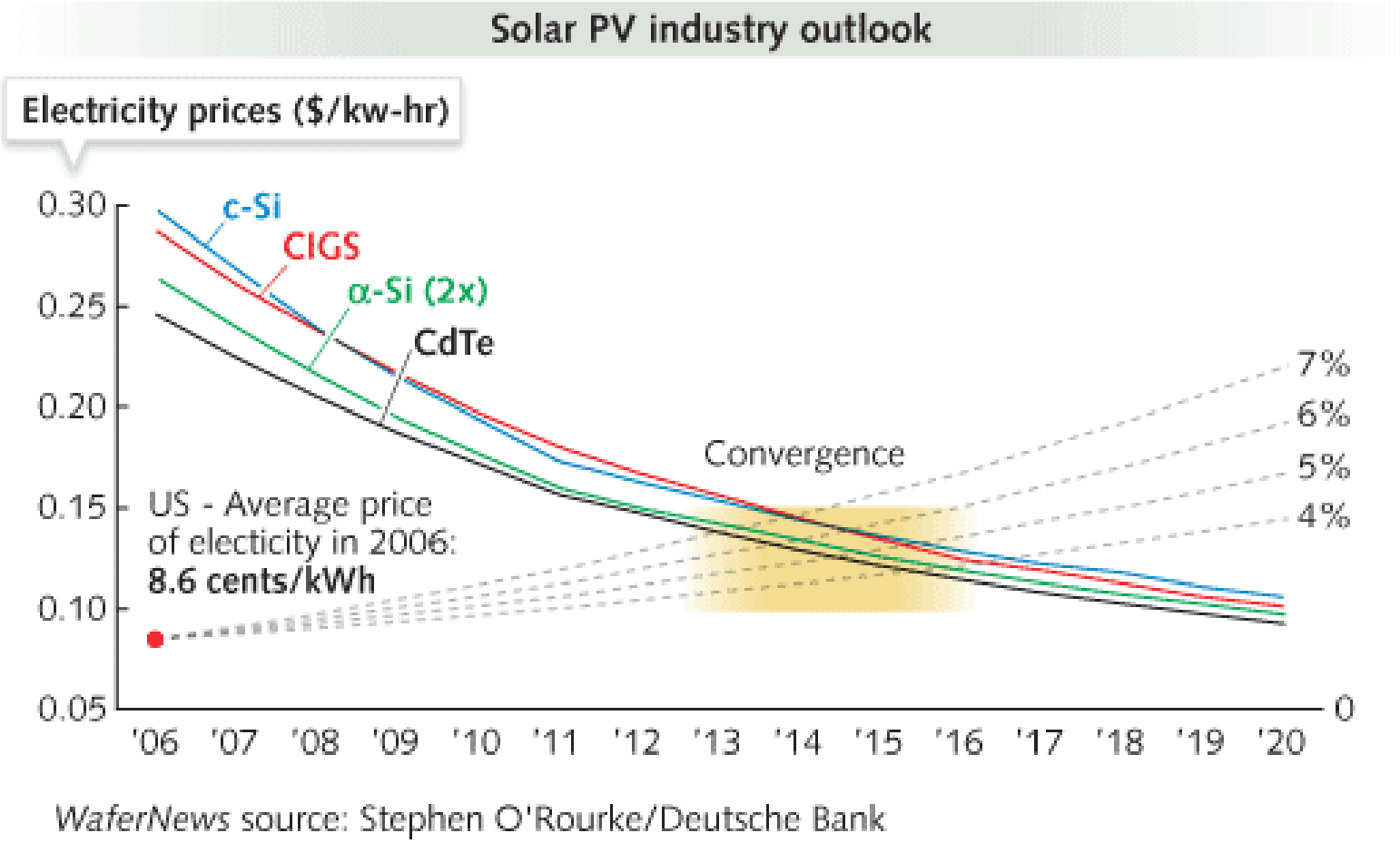
- What year was photovoltaic effect discovered?
- What year was the photoelectric effect quantified?
- When was the silicon photovoltaic cell developed in US?
- When was the first commercial 14% efficient PV cell made?
- Which company was credited with reducing the cost of PV cells from $100/watt to $20/watt in the 1970's?

Source: National Renewable Energy Laboratory

Photovoltaic Cost Curve

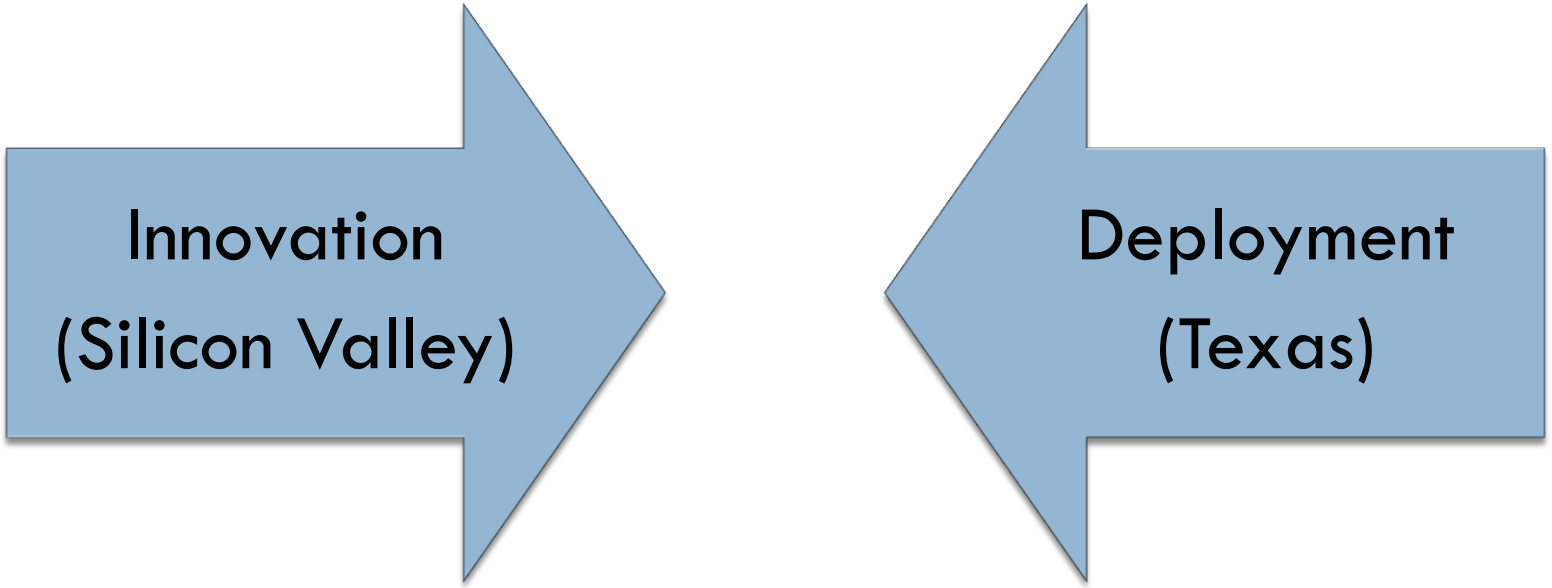


It Takes Time

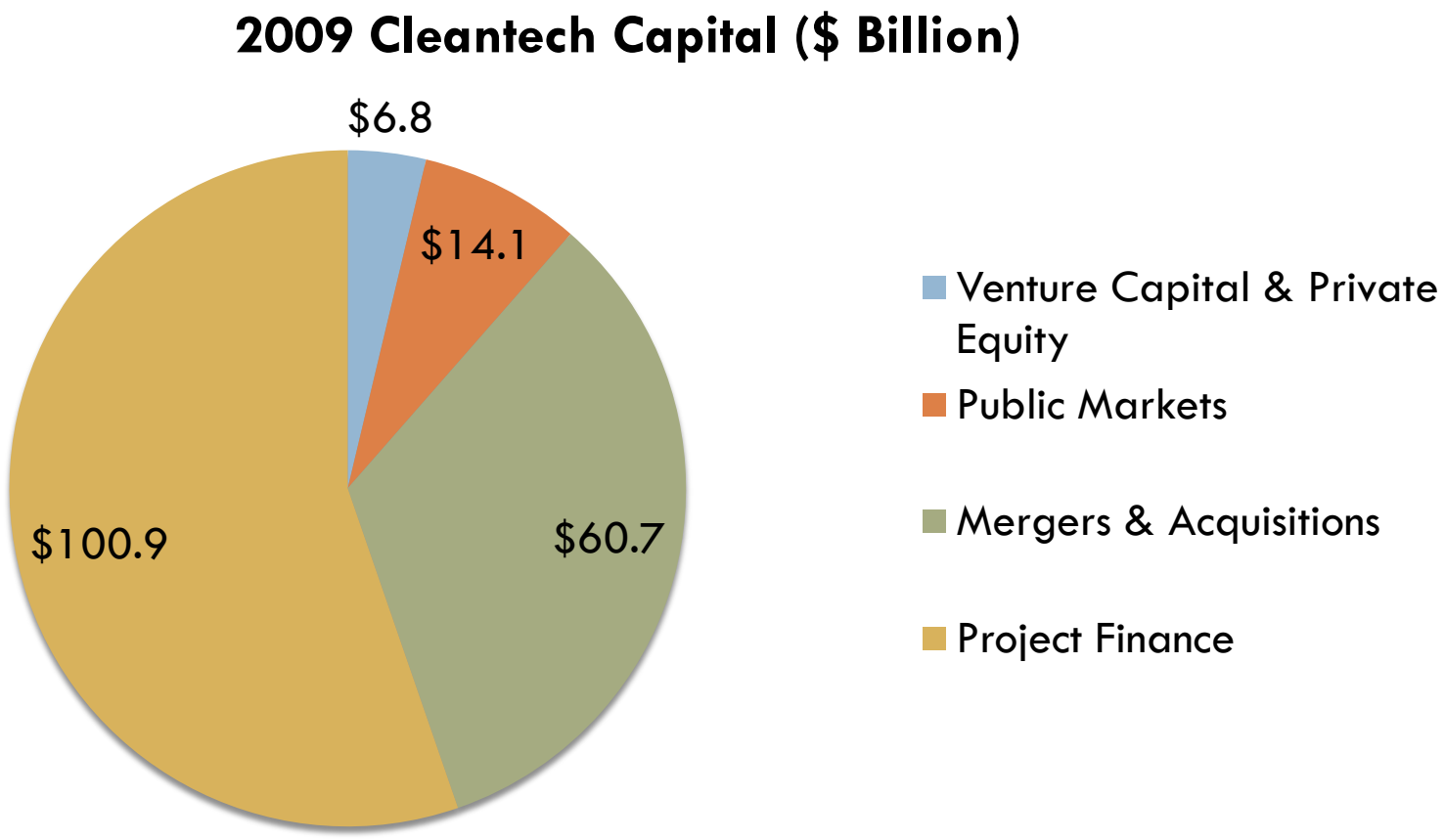


WaferNews source: Stephen O'Rourke/Deutsche Bank

The Real Cleantech Valley of Death



Cleantech Requires more than VC



Source: Bloomberg/New Energy Finance 2010

Cleantech 1.0 vs. Cleantech 2.0

Immature Market

- Infrastructure Investments
- IPO Exits
- Generalist Investors

Technology-Push Investment Thesis

- Expensive Pilot Facilities & Labs
- Disruptive Investments
- Stand-Alone Solutions
- Stealth Innovation
- Silicon Valley Innovations
- Domestic Market Focused
- Government Bailouts

Maturing Market

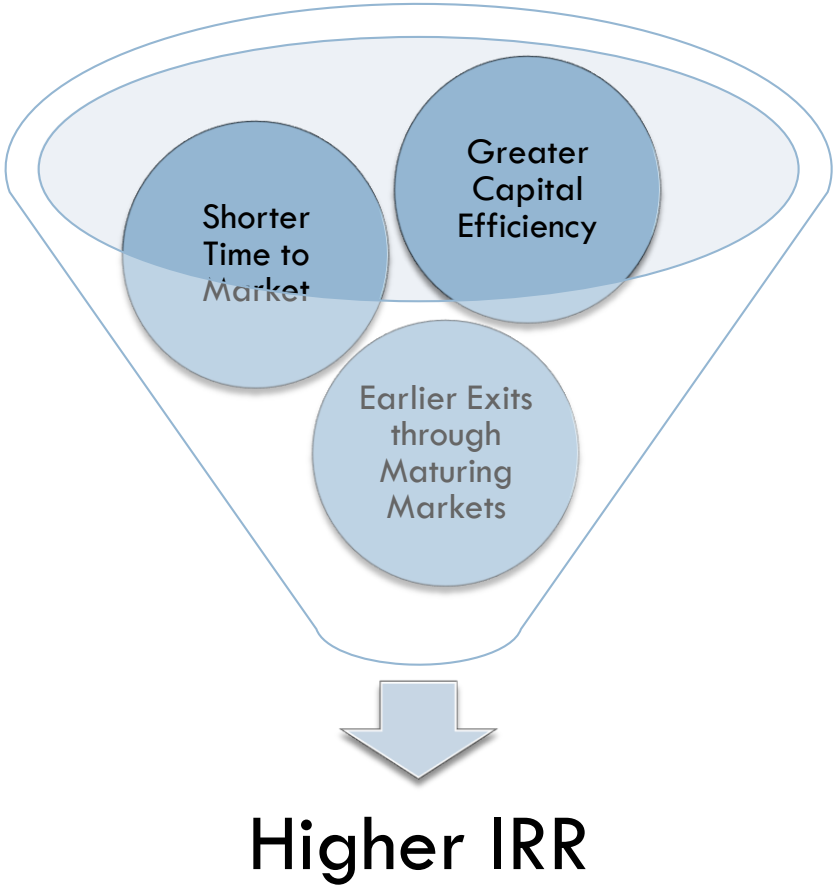
- Development Partners
- Diverse Exit Opportunities
- Tech Savvy Energy Investors

Market-Driven Investment Thesis

- Maturation Partners
- Incremental/Tipping Point Solns
- Components + Integrated Solns
- Open Innovation
- Innovation Everywhere
- Global Market Access
- Government Partnership

Stealth vs. Open Innovation

Cleantech 2.0 Results



Can we Apply Cleantech 2.0 to Nanotech?

- Ionic liquids – capacitors/batteries, CO_2 separation
- Silicon quantum wires
- Nanoantenna – solar rectification
- Atomic layer deposition
- Silicon clathrates – H_2 and CH_4 storage
- Quantum dots – PV, MEG, SSL
- Nanocatalysts
- NEMS / Nanoelectronics – power conversion / harvesting
- Nanocrystal structures / alignment

Conclusions

- We are moving to a more mature and capital efficient cleantech market
- New start-up and investment approaches need to be taken to help accelerate innovations to market
- Materials science innovation needs to follow-suit
- More computational materials science, open innovation, and collaborative design need to take place
- Sustained commitment to basic and applied research, shared resource facilities, test/integration centers

Thanks + Questions

Joel Serface

joel@cleanrange.com

@jserface