

New Geopolitics of Clean Energy – Emerging Dynamics within the Clean Energy Sector

Douglas J. Arent,
Executive Director
June 2011



Emerging Themes...

Rethinking the role of the state in technology development: DARPA and the case for embedded network governance

Erica R.H. Fuchs*

Department of Engineering and Public Policy, Carnegie Mellon University, 5000 Forbes Avenue, Baker Hall 131E, Pittsburgh, PA 15213, United States

A New Competitive Landscape:
Global Energy and Environmental Policy Trends and Their Implications for America



SecurityAndClimate.cna.org

**NATIONAL SECURITY
AND THE THREAT OF
CLIMATE CHANGE**

BR Business
Roundtable

Trade and
Climate Change

WTO-UNEP Report

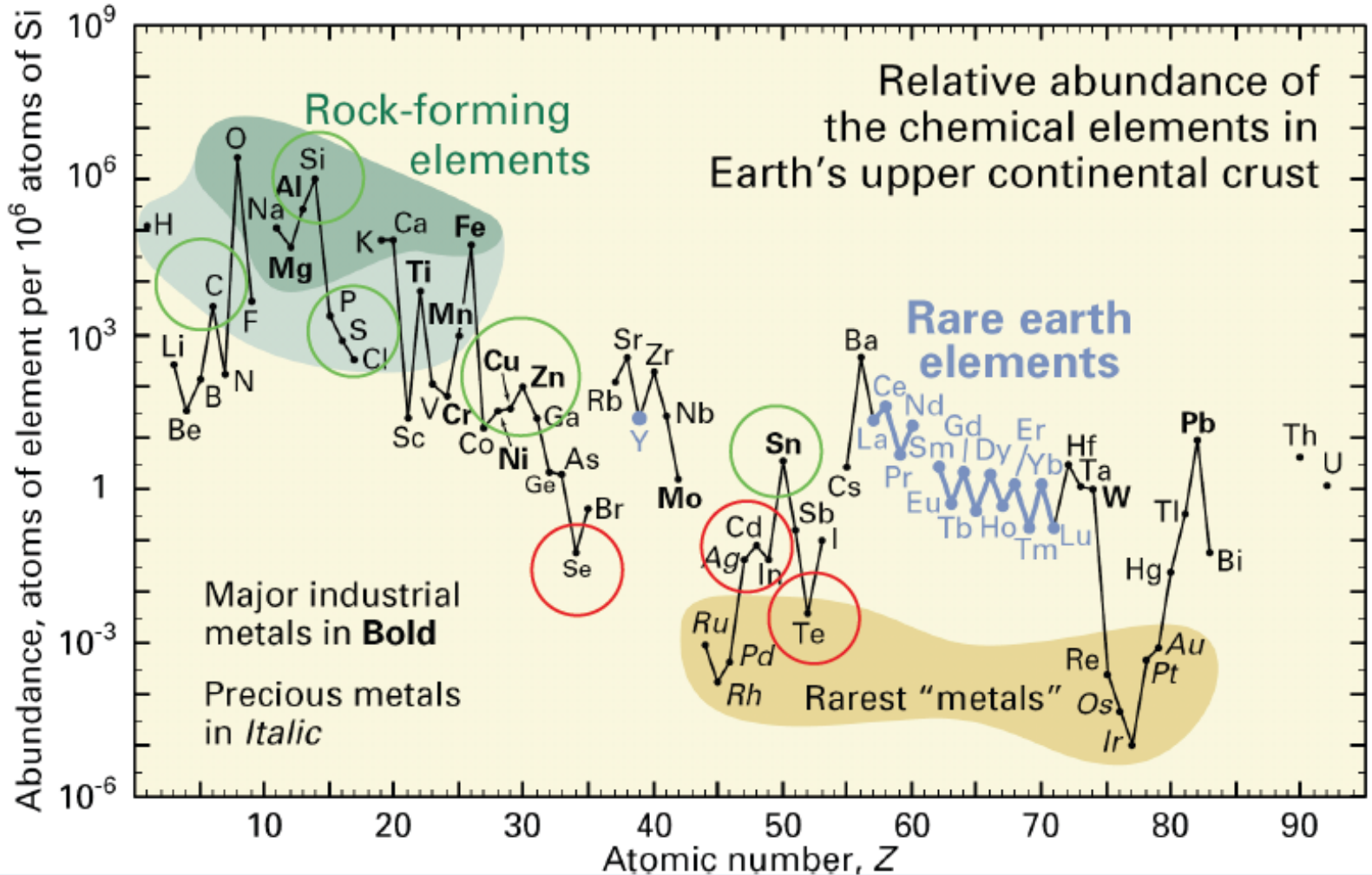
JISEA

Emerging Dynamics

Emerging characteristics of the clean energy economy and challenges to be faced as the sector moves forward.

- **Strategic Minerals**
- **Clean Energy Competition**
- **Local, Regional and Global Environmental Concerns**
- **Infrastructure Challenges**
- **Low-Carbon Trade Issues**
- **Clean Energy for Development**

Strategic Minerals



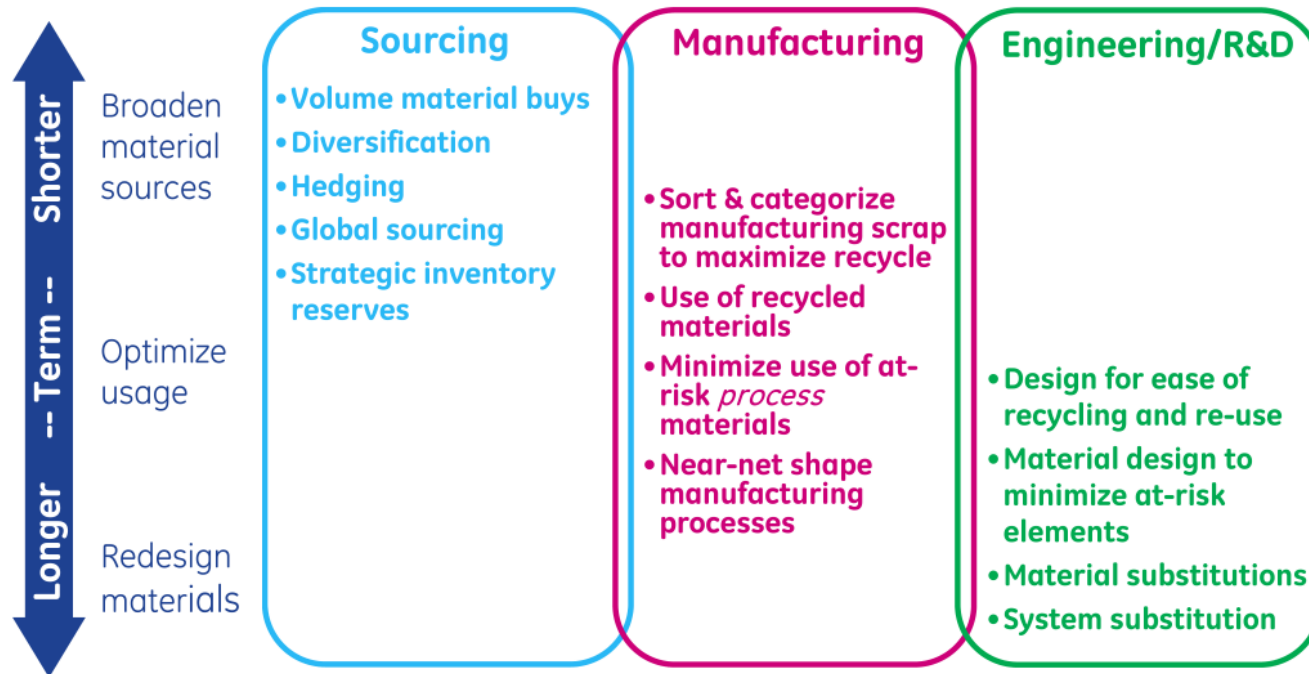
Source: USGS

Strategic Minerals

Applications:

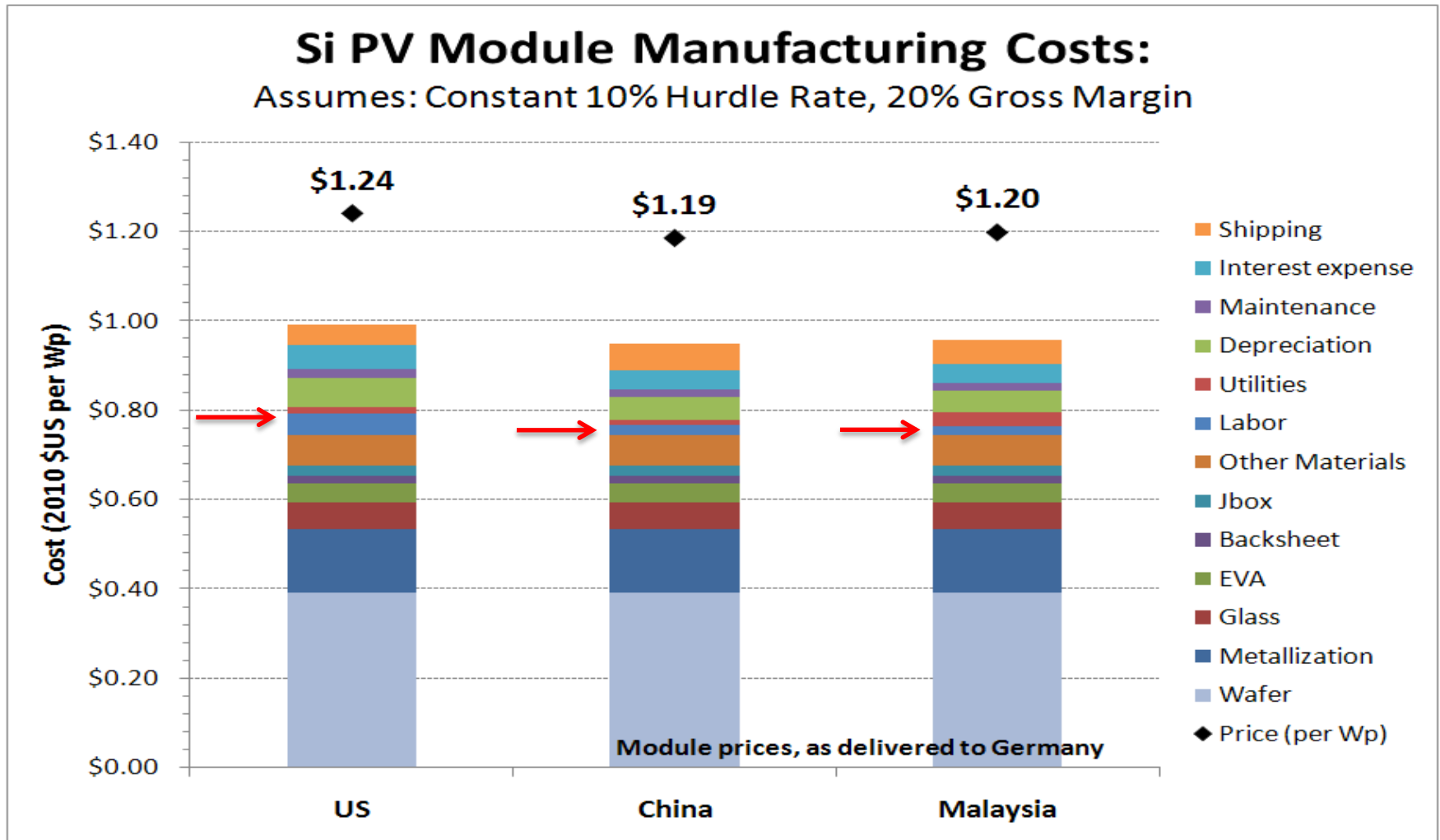
Permanent magnets for wind turbine generators and hybrid vehicles, compact fluorescent lighting, advanced batteries, auto catalysts and fluid cracking catalysts, metal alloys

Solutions to Address Rare Earth Supply Challenges

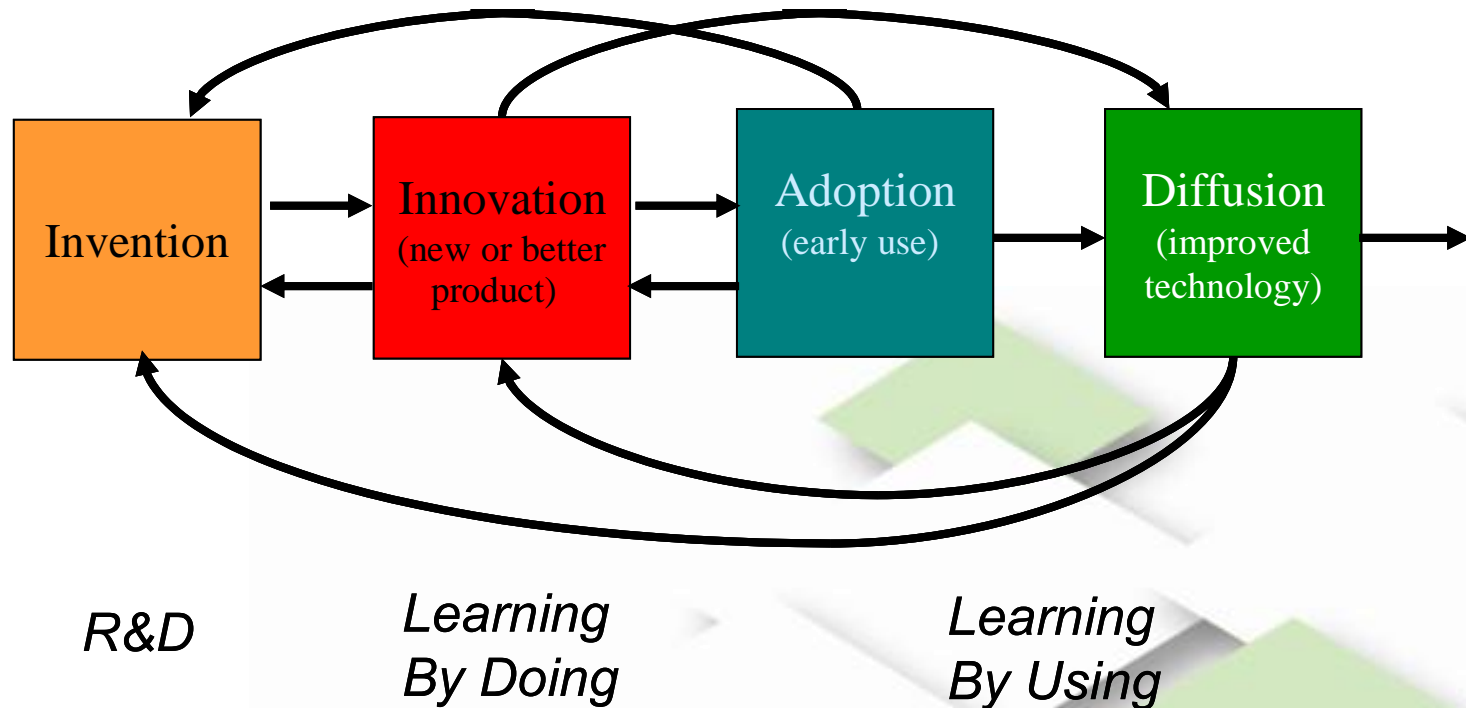


Each element and each application will use a unique mix of options

Is Labor Really a Driver?



Clean Energy: Innovation & Policy Portfolios



Source: Alic, Mowery and Rubin, 2003, NAS America's Climate Choices, 2010

Example Policies

Direct Government Funding of Research and Development (R&D)

- R&D contracts with private firms
- R&D grants and contracts with universities
- Intramural R&D conducted at gov't laboratories
- R&D contracts with consortia (2 or more of the actors above)

Direct or Indirect Support for Commercialization and Production; Indirect Support for Development

- Patent protection
- R&D tax credits
- Production subsidies or tax credits to firms bringing new technologies to market
- Tax credits or rebates for new technology buyers
- Government procurement
- Demonstration projects

Support for Learning and Diffusion of Knowledge and Technology

- Education and training
- Codification and transfer of knowledge
- Technical standard-setting (non-regulatory)
- Technology and/or industrial extension services
- Publicity and consumer information

Energy Challenges



Emerging Energy Challenges

