Introduction to Panel on

The Sustainability of Non-Renewable Materials

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Roundtable on Science and Technology for Sustainability

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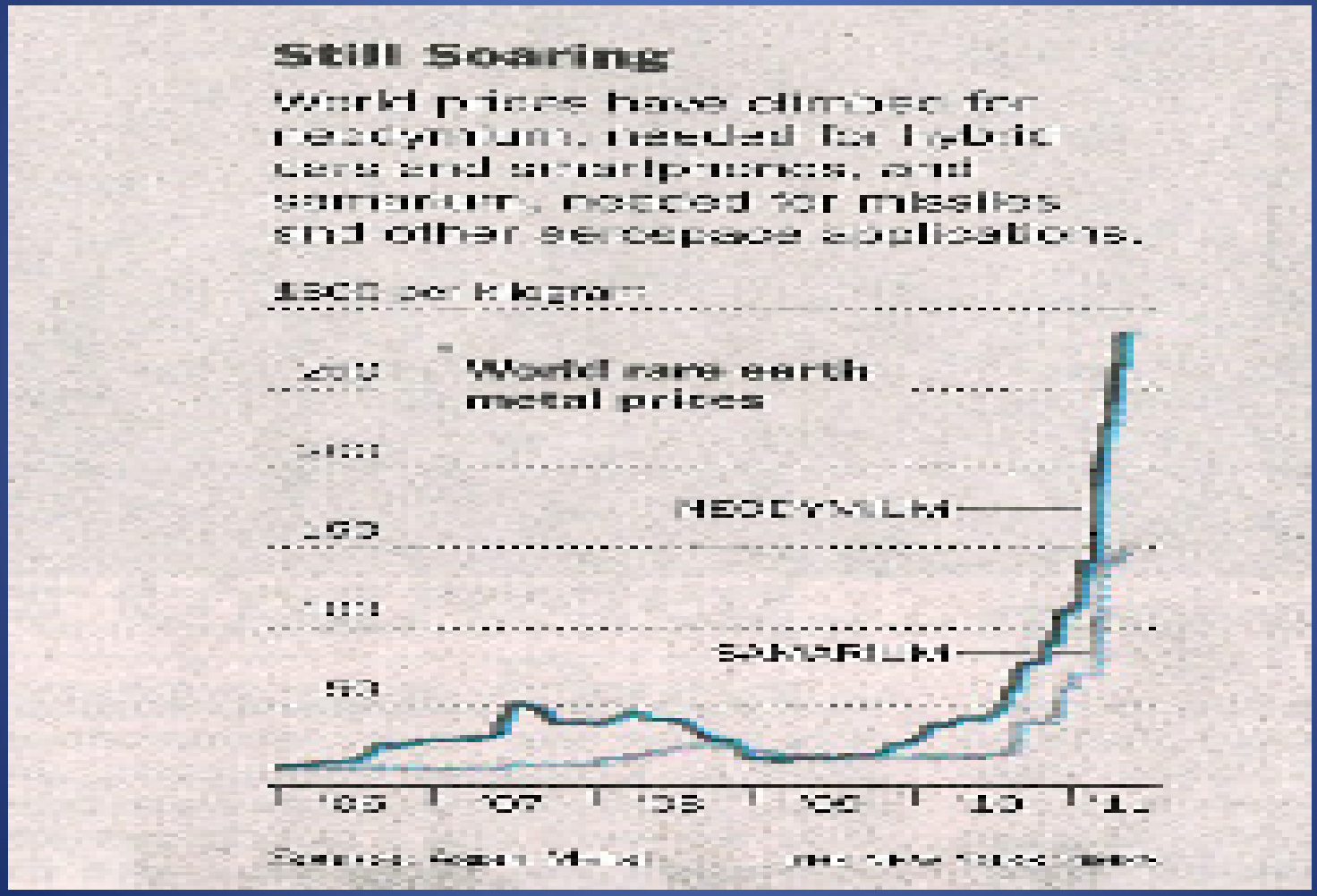
World prices have soared for rare earth elements
Neodymium/Samarium



NY Times, May 3, 2011

Neodymium is a non-renewable metal

- "Rare" earth not so rare – apparently no more rare than cobalt, nickel and copper
- Compare $140/pound to $4.30/pound for Cu
- Average concentration in crust of 38mg/kg
- Numerous uses critical to clean technologies
  - Magnets, wind turbines, hybrid cars
  - Also microphones, laser pointers
- How sustainable is this non-renewable metal?

Club of Rome 1972 Predictions on Resource Depletion were wrong. Why?

- Innovations that reduce use per unit of production
- Market forces expand provable or recoverable reserves
- Technical enhancements to extract metals from more dilute sources
- But are the predictions wrong only in the timing?

Strategies to Increase Material Lifetime

- Technical Strategies
  - Recycling
  - Enhanced discovery/recovery
  - Substitution with renewable materials
  - Technical innovations to reduce use/unit
- Policy Strategies
  - Reduce demand through tax policies
  - Stockpiling to minimize impacts of cartels
  - Cultural change – reducing personal consumption

Presentations for Panel

- ***Sustainability of the Energy Materials (Diana Bauer**, U.S. Department of Energy)*
- ***The Materials-Sustainability Nexus (Martin Green**, National Institute of Standards*and Technology)
- ***Material Stockpiles, Past and Future** (Paula Stead, Defense Logistics Agency)*
- ***The Recycling Potential of Non-Renewable Materials** (Tom Graedel, Yale* University)