

# The Coming Ecological Transformation

**The Problem:** 3 to 5-fold increase of industrialization by 2030-2040

**The Challenge:** Transforming economic and technological systems

**The Solution:**

Business: Profit from sustainability

Government: Develop sustainable development principles; incentives for sustainable practices and green investment

- Private global investment currently exceeding \$1 trillion

**TechCast: Green Industry could reach \$10-20 T/yr by 2020**



# Going Green = \$\$\$

## Public strongly supports a clean environment

Corporate leaders: Europe, Wal-Mart, DuPont, 3M, Dow Corning, Johnson & Johnson, Ford, Fed Ex, GE, Dell, etc.

- Caution ahead! – “Greenwashing”
- Industrial Ecology
- Ecosystem Design – plants & animals helping restore eco-balance
- Building industry finding gold in going green



**TechCast: 30% of business by 2015**

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# Alternative Energy

- Geothermal, wind, biomass competitive now
- Clean coal technologies/sequester CO<sub>2</sub>
- Vast gas discoveries in North America
- Concentrated solar/photovoltaic
- Nuclear
- Deregulation/distributed energy
- Growth rates of 30-50%/year; similar to Moore's Law



**TechCast: Up to 30% of global energy usage by about 2022**

# Water Purification

## Will wars of the 21<sup>st</sup> century be fought over water?

- Half of the world currently lacks clean water
- Shift from public to private management
- New technologies: Forward osmosis, capacitive de-ionization, nanotech, rapid spray evaporation, solar, etc.
- IBM/Saudi Arabia building the world's largest solar-powered plant
- 140% growth by 2015 in Mid-East, Asia, US
- Desalination cost \$20/gallon in '50, down to \$6/gal. in '60, now approaching 1 cent/gal.

**TechCast: Clean water available to 70% of global population by 2025**



# Food Scarcity

## How will we feed 9B by 2050?

- Climate change repercussions
- Worldwide food prices soar
- Land grabs on rise
- Clearing land depletes CO<sub>2</sub> fighting plants
- Competition between food and fuel
- Geopolitical conflicts





# A Greener Revolution

- Genetically modified crops
- Precision farming
- Aquaculture
- Vertical farming
- “Growing” meat
- Organic foods

