

# The Practice of Technology in the Anthropocene

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**“We are as gods, and we might as well get good at it.”**

Stewart Brand, 1968, *Whole Earth Catalogue*

**“The future is already here; it’s just unevenly distributed.”**

William Gibson

**“Now I am become Death, destroyer of worlds.”**

Vishnu, Bhagavad Gita, Robert Oppenheimer at Trinity Test, 1945, White Sands, New Mexico

# What is History Laughing at Now?

- Then: smoking stacks in huge brick factories on postcards, the pride of New England
- Now: Sierra Club calendars with no people in the pictures
- Twenty years from now?

# What are We Thinking?!

- Plug in cars (Nissan, GM, others roll out by 2010): we can do one of three things, all wrong
  - Collapse the grid (most already operating close to the edge)
  - Build coal fired plants as fast as our little paws can get them in, or
  - The intelligent grid – but the cycle times between the infrastructure, and the “sustainable technology,” are not being considered at all.
- Google in University: most professors are obsolete
  - So is education: batch processing will be replaced by personalized education

# What are We Thinking?!

- Cognitive enhancement workshop: what we can enhance, we can de-enhance
  - Estonia, Georgia, and the Russian cyberspace corps
  - MyBase – the synthetic reality brain of the USAF
  - Back doors in chips: why did Syria's radar fail?
- Life span extension – computer and electrical engineering plus biotechnology equals lifespans of 120-150 with good quality of life.
  - Pensions and social security? DOA
  - What about consumption, sustainability, energy systems?

# The Rise of the Cognitive City

- Information capabilities are increasingly being integrated into every level of urban systems:
  - Smart materials
  - Smart assemblies
  - Smart buildings
  - Smart infrastructure
  - Smart global systems (e.g. finance, culture, transport, infosphere, with cities as nodes in global networks)

# Autonomic Computing and the City

- Computing systems that self-define virtual structure, self-monitor, self-diagnose, self-cure, and learn.
- Implemented at chip level by Intel and others; at artifact level by IBM and others; at network level by AT&T and others.
- As such system structure becomes ubiquitous in information systems at all scales, and as urban systems are increasingly information dense within and among different levels, it will be impossible to determine what the city “knows” or how it will choose to react to changing conditions or threat.
- Remember October 19, 1987 – “Black Monday” – Dow Jones dropped 22% in one day. Main reason: internal systems dynamics (which were not understood or appreciated), not major changes in market fundamentals.

# Information Infrastructure Boundary Issues

<u>Level</u>	<u>Method of Study</u>	<u>Main Impact</u> (Physical v. Cultural)	<u>Typical IE Design Issues</u>
Artifact manufacture	Traditional environment and safety compliance (end-of-pipe)	Physical	Energy consumption in manufacture; toxics in manufacturing processes; industrial hygiene issues
Artifact over lifecycle	DfE, LCA	Physical	Understanding conditions of use; energy consumption in use; end-of-life management; toxic in product
Construction and maintenance of networks	Systems engineering	Physical	Evolution of technology (from telephony to internet protocol, wireless); interactions of systems components; efficiency per unit service; systems boundary
Services (e.g., broadband to home)	N/A	Physical/Cultural	Definition of “service”; relationship of service to physical network and social practices
Social practices based on services (e.g., teleworking)	N/A	Cultural	Both short and long term impacts important (and may not align); difficult to predict because of cultural component; triple bottom line implications, especially social (“digital divide”)
Knowledge economy/ infosphere	N/A	Cultural	Impact on social constructs (“wilderness”, “environment”). Enable postmodernist fragmenting of values? Enable world as artifact (real time comprehensive monitoring systems)? Substitution of information for energy/materials? End of “natural history” w/ human contingency built into natural system?

# IEEE Efforts to Respond

- Many “ground up” efforts
- The International Symposium on Electronics and the Environment has been working on DFE since 1993
- It has just been renamed the International Symposium on Sustainable Systems and Technology, and will be co-located with the IEEE Society for Social Implications of Technology conference in Phoenix, May 09
- Just finished workshop on September 8 to identify path forward on sustainability – both current president and incoming president attending; white paper being produced.