Different Perspectives on Sustainability and Timescale

National Academy of Sciences
Sustainability Roundtable
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David Rejeski
Director, Foresight and Governance Project
Woodrow Wilson International Center for Scholars

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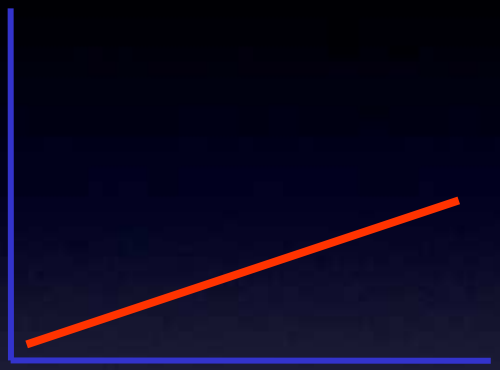
Foresight and Governance Project

Governing in the Ideal World

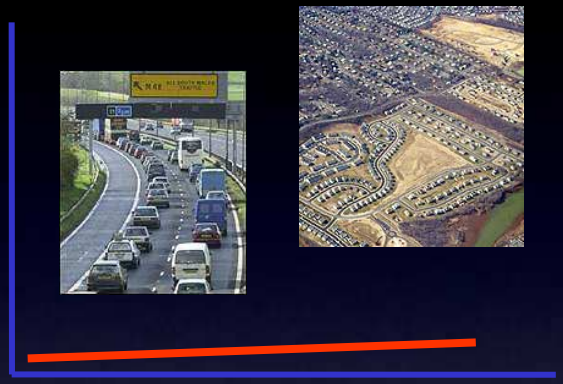


MODERATE CHANGE

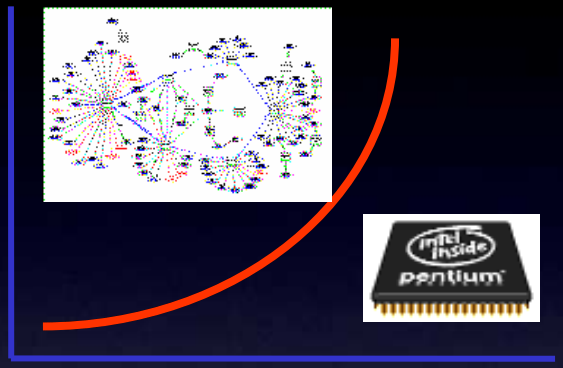
Things work fairly well if:

- Change is predictable, i.e., linear with respect to cause and effect
- The system is bounded
- Unintended consequences are minimal (or such consequences are controllable)
- System feedback is low or negative (damping effects)
- The rate of change in the environment does not exceed the rate at which governing institutions can change and adapt

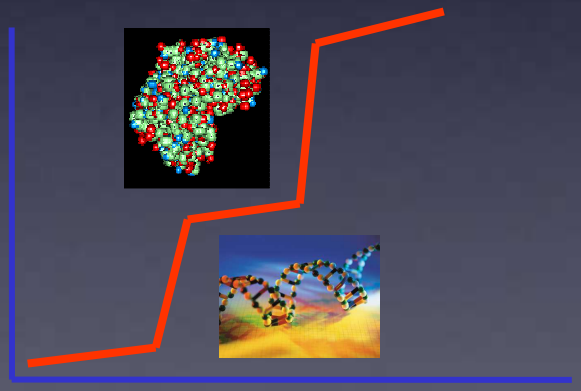
Governing in the Real World



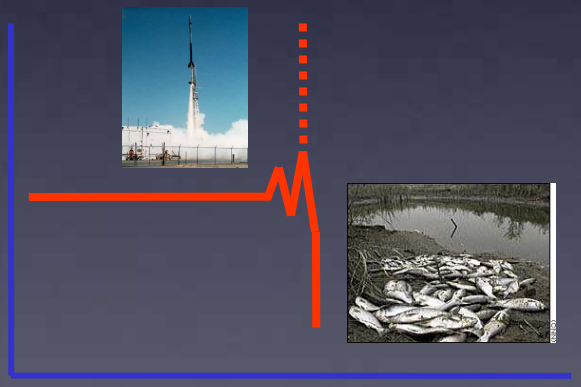
SLOW THREATS



EXPONENTIAL CHANGE

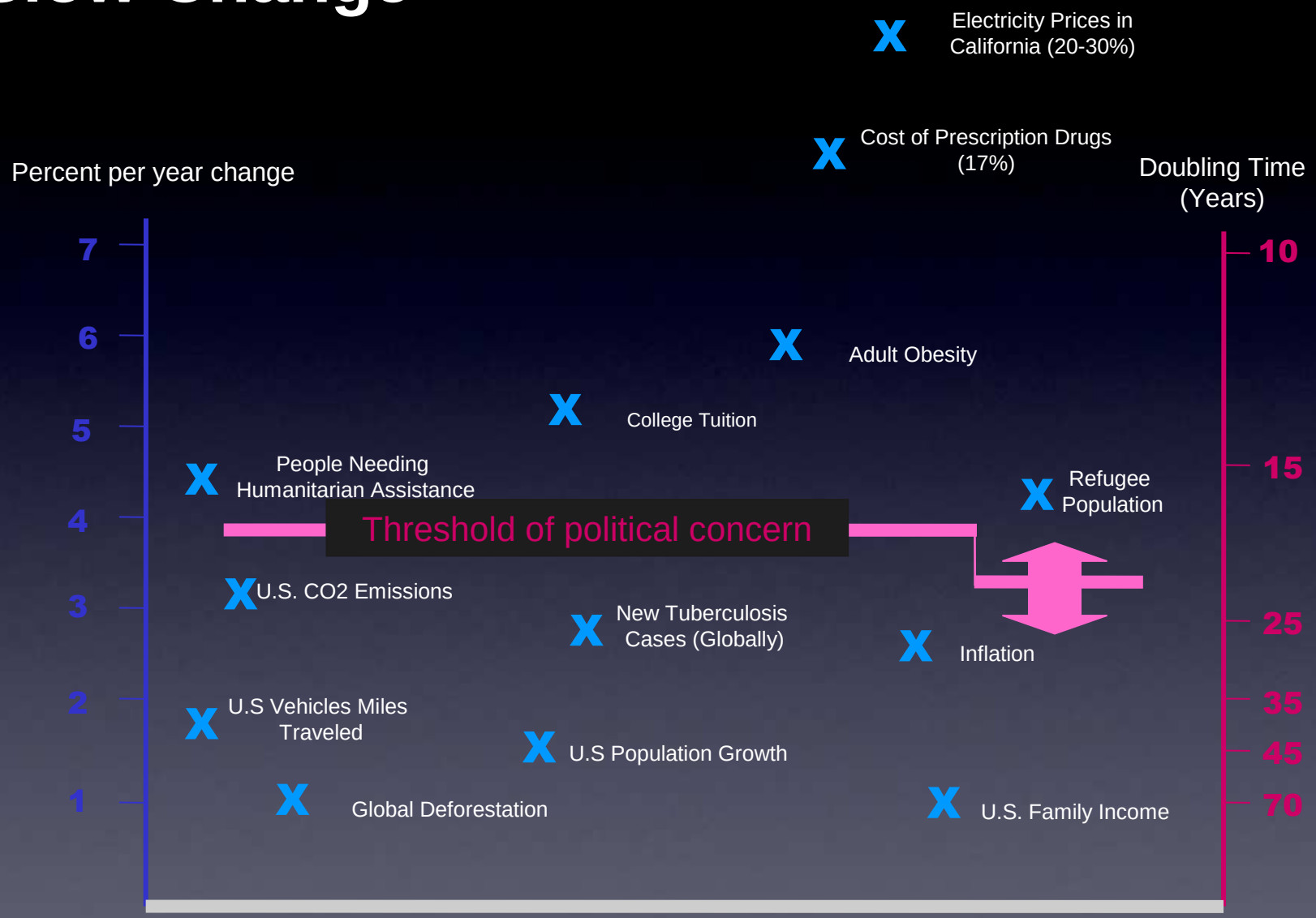


STEP CHANGE



TIPPING POINTS

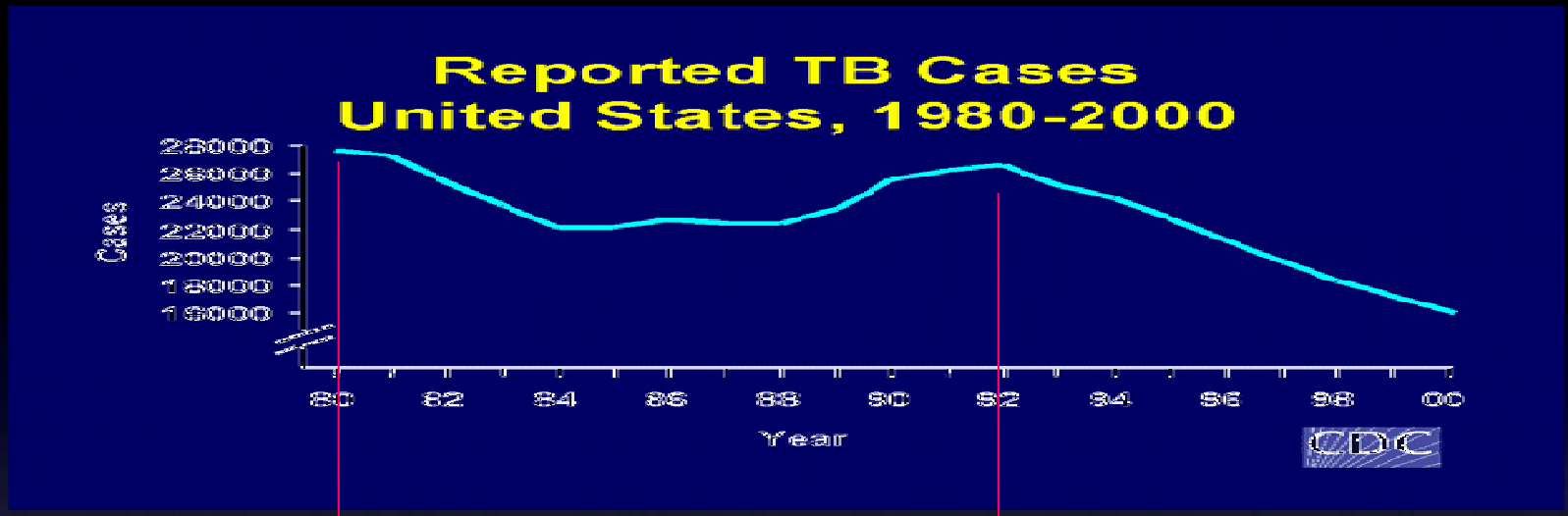
Slow Change

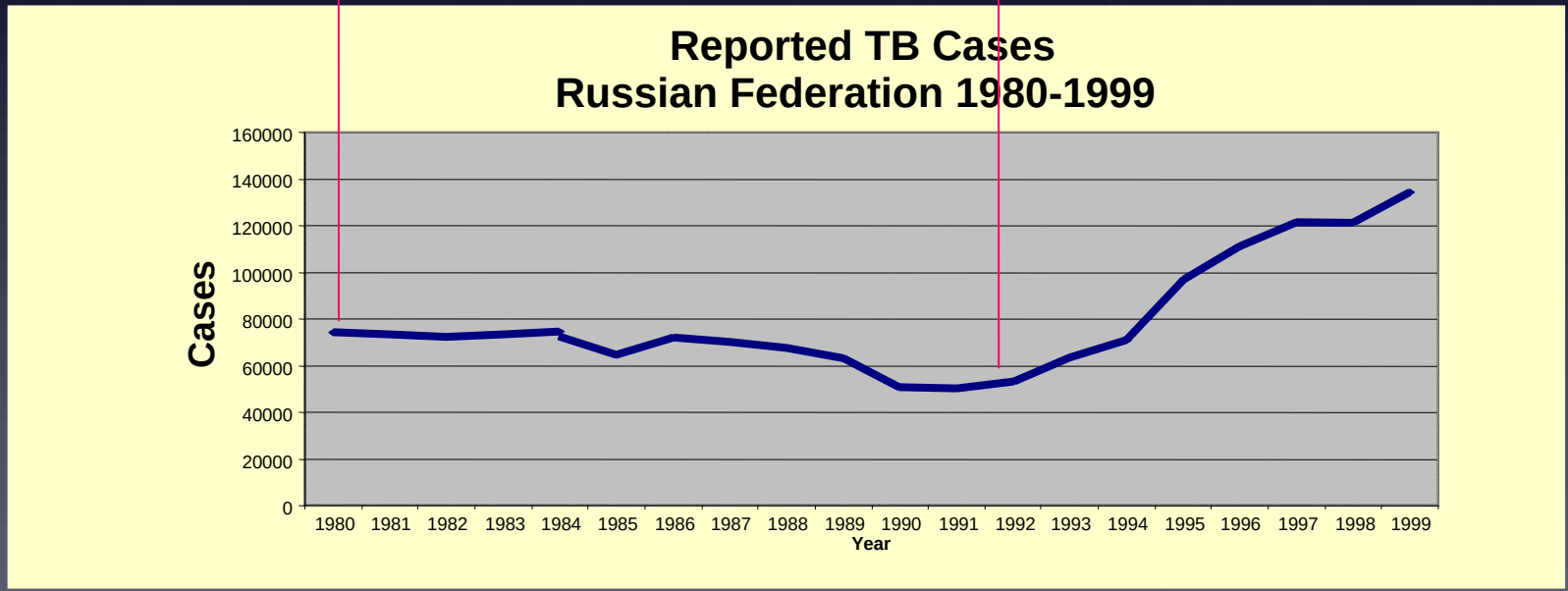

Electricity Prices in California (20-30%)
Cost of Prescription Drugs (17%)
Percent per year change
Doubling Time (Years)
7
6
5
4
3
2
1
10
15
25
35
45
70
Adult Obesity
College Tuition
People Needing Humanitarian Assistance
Refugee Population
Threshold of political concern
U.S. CO2 Emissions
New Tuberculosis Cases (Globally)
Inflation
U.S Vehicles Miles Traveled
U.S Population Growth
Global Deforestation
U.S. Family Income

The World Below the Radar Screen

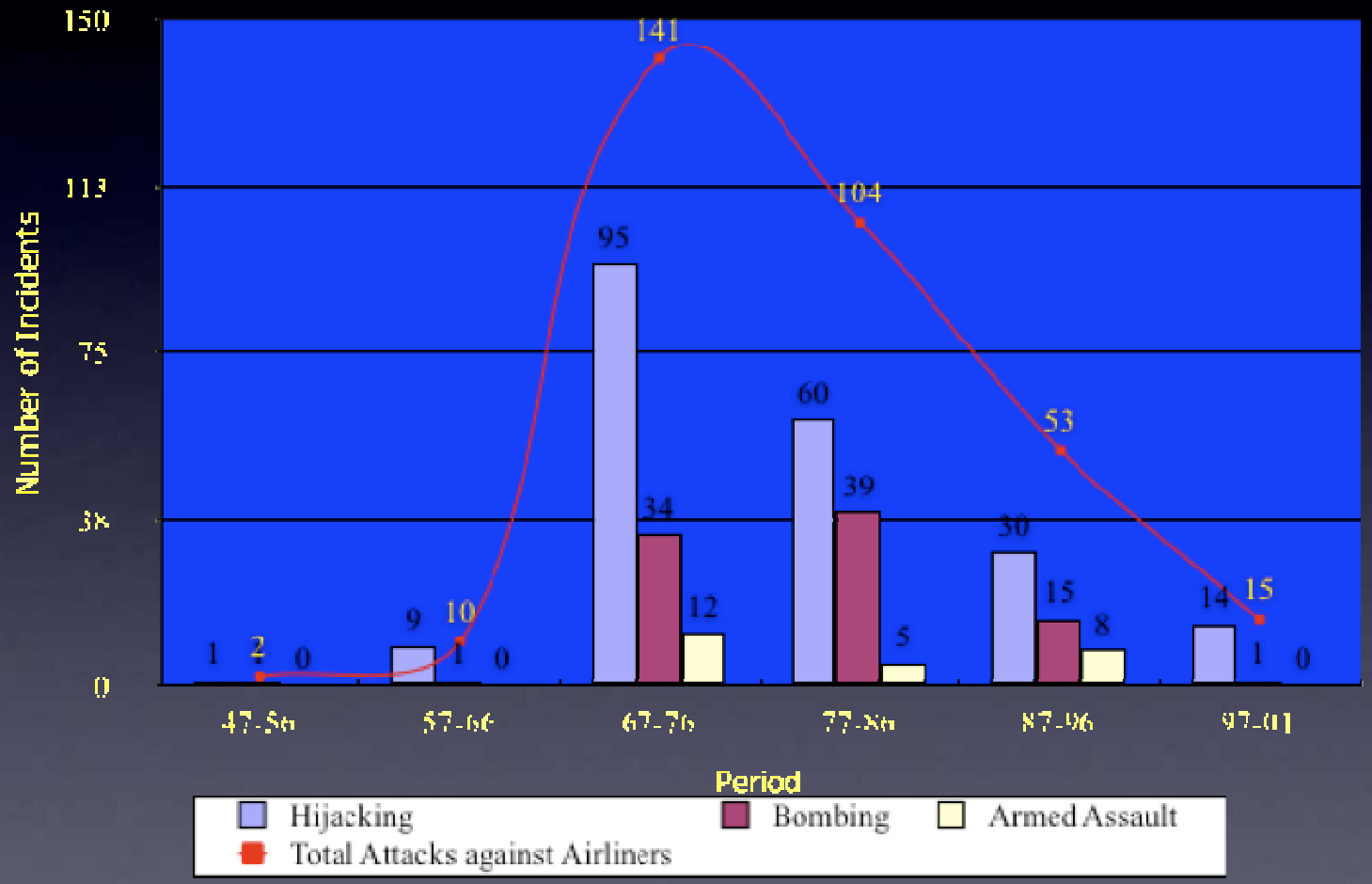
Slow trends often lead policymakers to believe that a problem is solved or has disappeared.

- In most cases, problems simply do not go away and a high degree of vigilance is required.
- Expect surprises, tipping points.
- Look for a re-emergence of problems in other contexts or geographic areas.


Reported TB Cases
United States, 1980-2000
Cases
28000
26000
24000
22000
20000
18000
16000
80
82
84
86
88
90
92
94
96
98
00
Year
CDC


Reported TB Cases
Russian Federation 1980-1999
Cases
160000
140000
120000
100000
80000
60000
40000
20000
0
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
Year

History of Terrorist Attacks Against Airliners
1947 - 2001

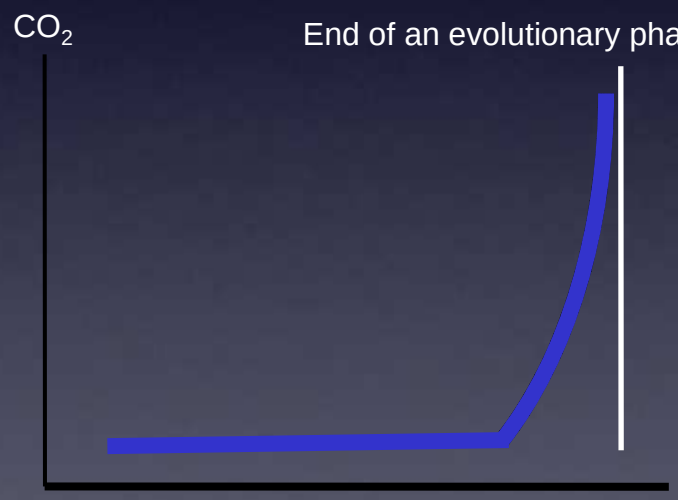


(Data from FAA Office of Civil Aviation Security and Ariel Merari, “Attacks on Civil Aviation: Trends and Lessons”)

Slow Threats Meet Political Realities

“Tell Me Again Why I Should Do Something About This”

What the Scientist Sees

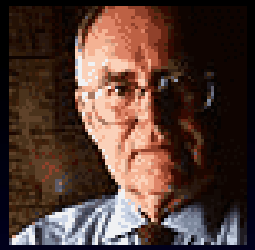


One Million Years

What Most Politicians See

18 - 24 Months

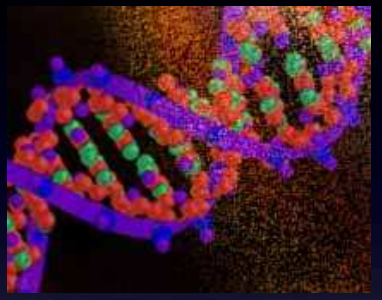
Speed and Discontinuities



Moore's Law

The logic density of silicon integrated circuits doubles every 18 months

Displays = Moore's Law
Storage = 1.5X's Moore's Law
Bandwidth = 2X's Moore's Law
GPU's = 2-3X's Moore's Law



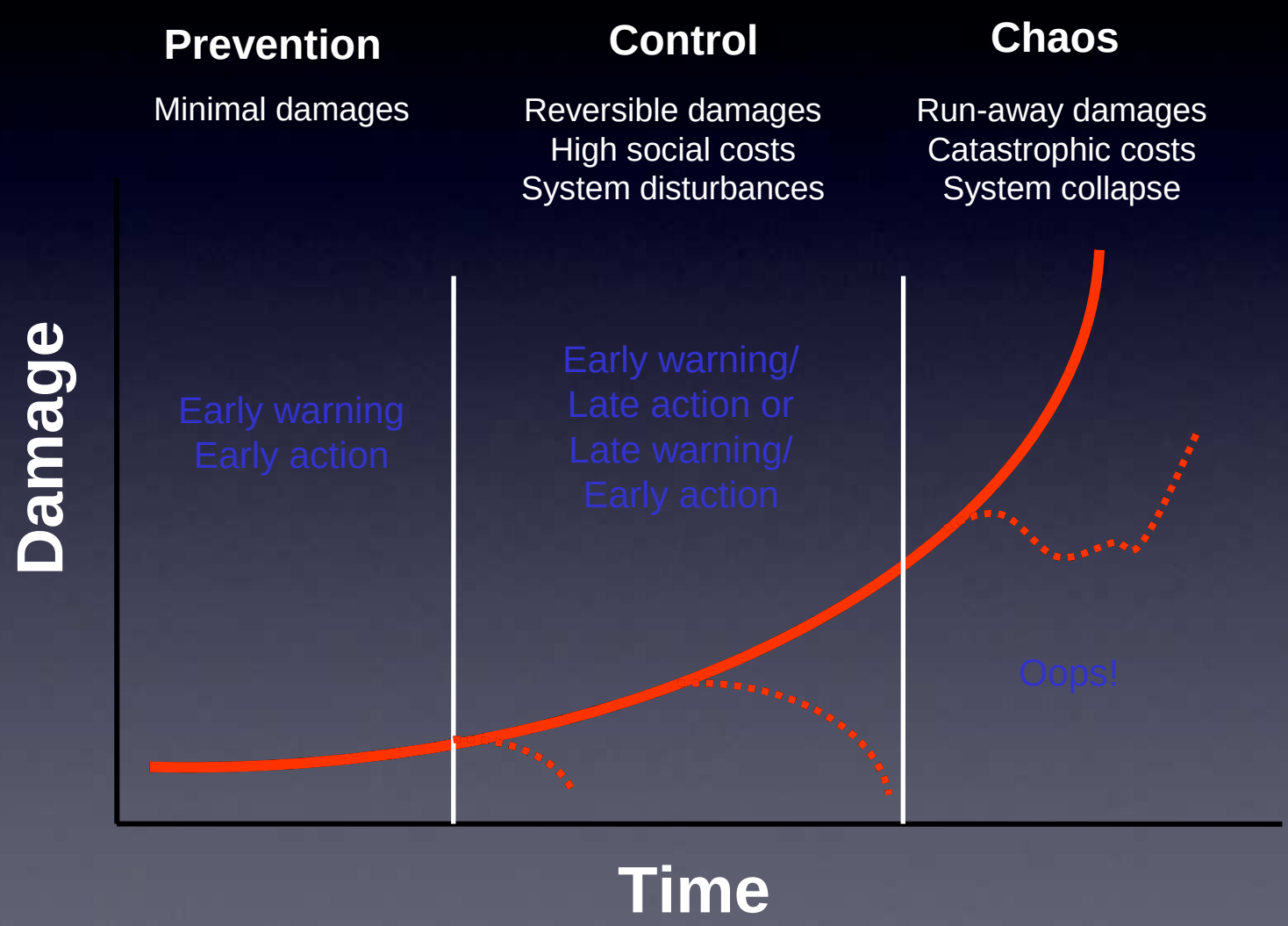
Monsanto's Law

The amount of useful genetic information doubles every 18-24 months.

Metcalfe's Law

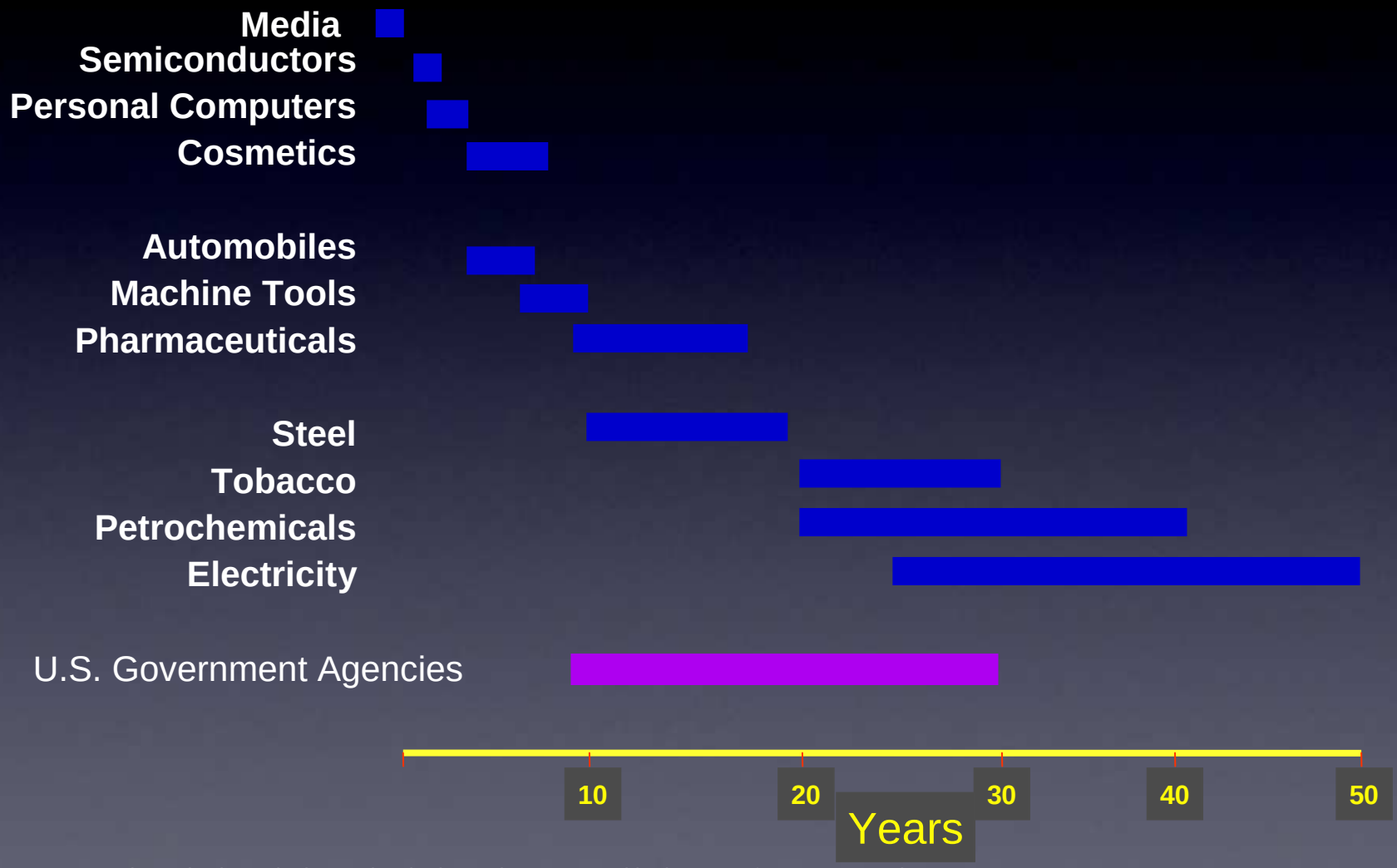
Connect any number "n"of machines - whether computers, phones or even cars - and you get "n" squared potential value.

Fast Threats



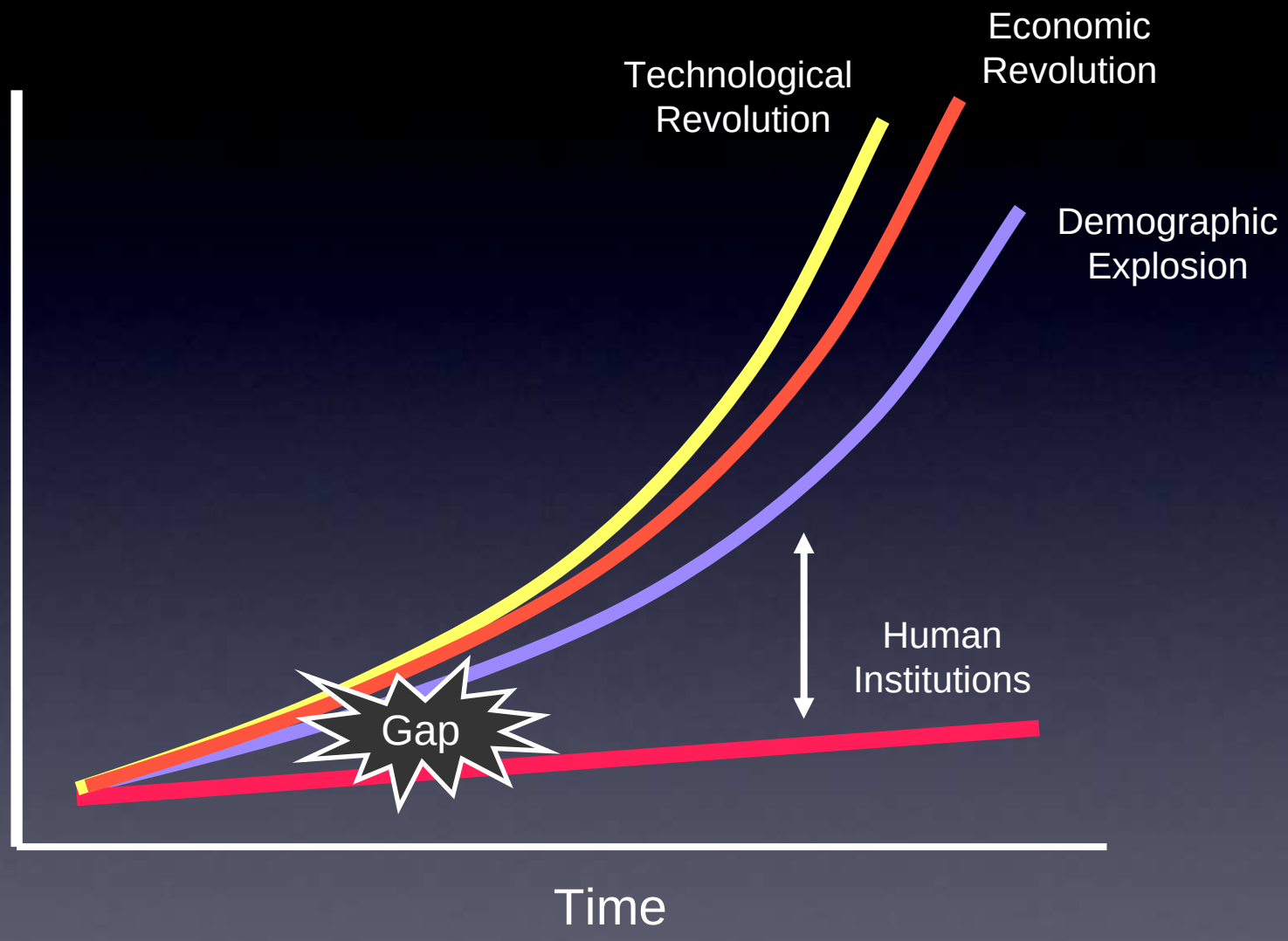
Clockspeeds Matter

Organizational Clockspeeds



See: Fine, Charles: Clockspeed: Winning Industry Control in the Age of Temporary Advantage

The Gap



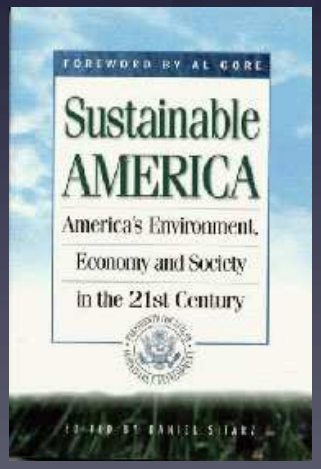
Adapted from: Rischard, J.F. 2002. *High Noon: 20 Global Problems, 20 Years to Solve Them*

“…the federal structure has changed little since the first burst of innovation in the aftermath of World War II and the onset of the Cold War. No comparable burst occurred in the 1990’s. It is as though corporate America was managing the modern economy with the structures of Ford Motor Company, the Bell System, and United Fruit.”

In: Carter, Ashton (2001): “The Architecture of Government in the Face of Terrorism,” International Security, Winter.

No Federal Sustainable Development Policy

No sustained commitment to sustainable development



PRESIDENT'S COUNCIL ON SUSTAINABLE DEVELOPMENT

1993-1999

What Would It Look Like?

Long-term Perspective: “fulfill the responsibilities of each generation as trustee of the environment for succeeding generations”

Equity: “assure for all Americans safe, healthful, productive and esthetically and culturally pleasing surroundings.”

Widespread Prosperity: ”achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life’s amenities.”

Resource Management: “enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.”

The Congress authorizes and directs that, to the fullest extent possible:

“The policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with [these policies].”

Section 102(1) National Environmental Policy Act (NEPA),1969

“All agencies of the Federal Government shall....[take enumerated actions, including, but not limited to, preparation of environmental impact statements in certain circumstances].”

Section 102(2) National Environmental Policy Act (NEPA),1969

Planning beyond 5 Years

DOE: Stockpile Stewardship Program, Waste Disposal

DOT: Intermodal Surface Transportation Efficiency Act (ISTEA)

NASA: Terraforming Mars, Planetary Exploration

EPA/CEQ: Environmental Impact Statements

CBO: Budget

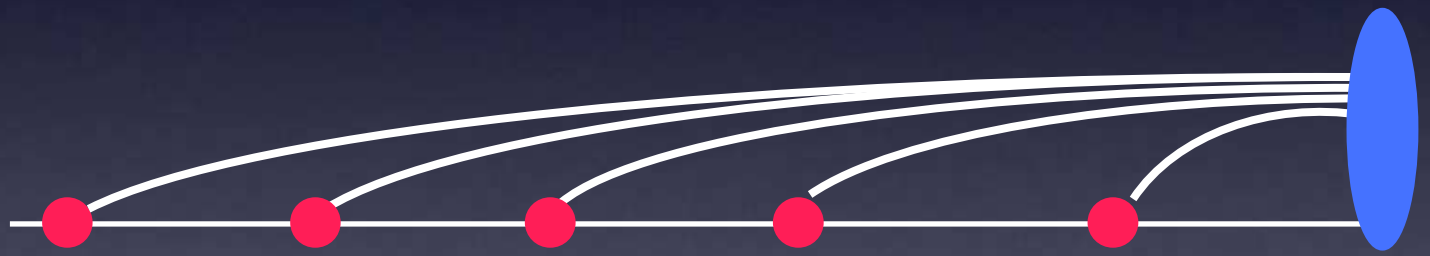
GAO: (Oversight, Insight, Foresight)

DoD: RAMs, Revolutions in Military Affairs

Planning beyond 5 Years - How?

Current Policy: Incremental, ad-hoc, reactive

Also: Non-systemic, chemical-by-chemical, incident-by-incident



Transition Strategy: Backcasting from vision

From: Rotmans, J. et al 2001: “More Evolution than Revolution: Transition Management in Public Policy,” *Foresight*, Volume 3, No. 1.

Needed Shifts

1970 → 2000

Individual technologies → **Systems of technologies**

Key technologies inside your realm of interest → **Key technologies outside your traditional realm of interest**

Reactive responses to serious impacts → **Greater foresight to prevent impacts, seize opportunities**

By-Products of Production → **Products of Production** → **Production (of almost everything)**
- **How we produce**
- **Where we produce**
- **Whether we produce**

- Visionary Leadership will be key
- People (workforce), organizational design, and collaboration will be critical

Contact Information

David Rejeski
Foresight and Governance Project
Woodrow Wilson International Center for Scholars
Washington, DC

Email: david.rejeski@wilsoncenter.org

Phone: 202-691-4255