Greentech Insights from Silicon Valley

National Renewable Energy Lab
November 6, 2007

KPCB

- 500+ investments in 35 years
- $100B+ in annual revenue
- 300,000 jobs
- $500B+ in total market cap

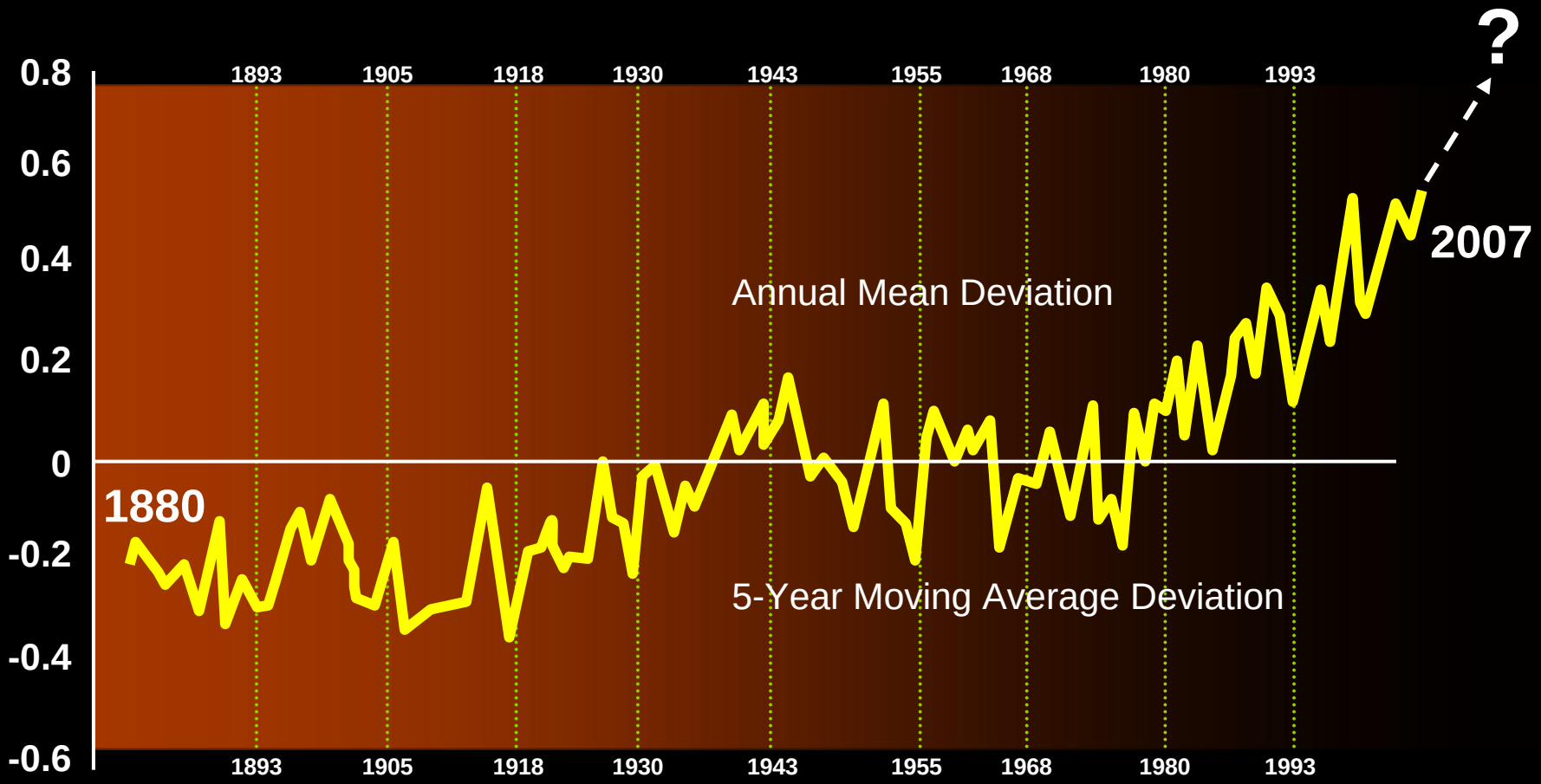
Agenda

Greentech: Why Now?

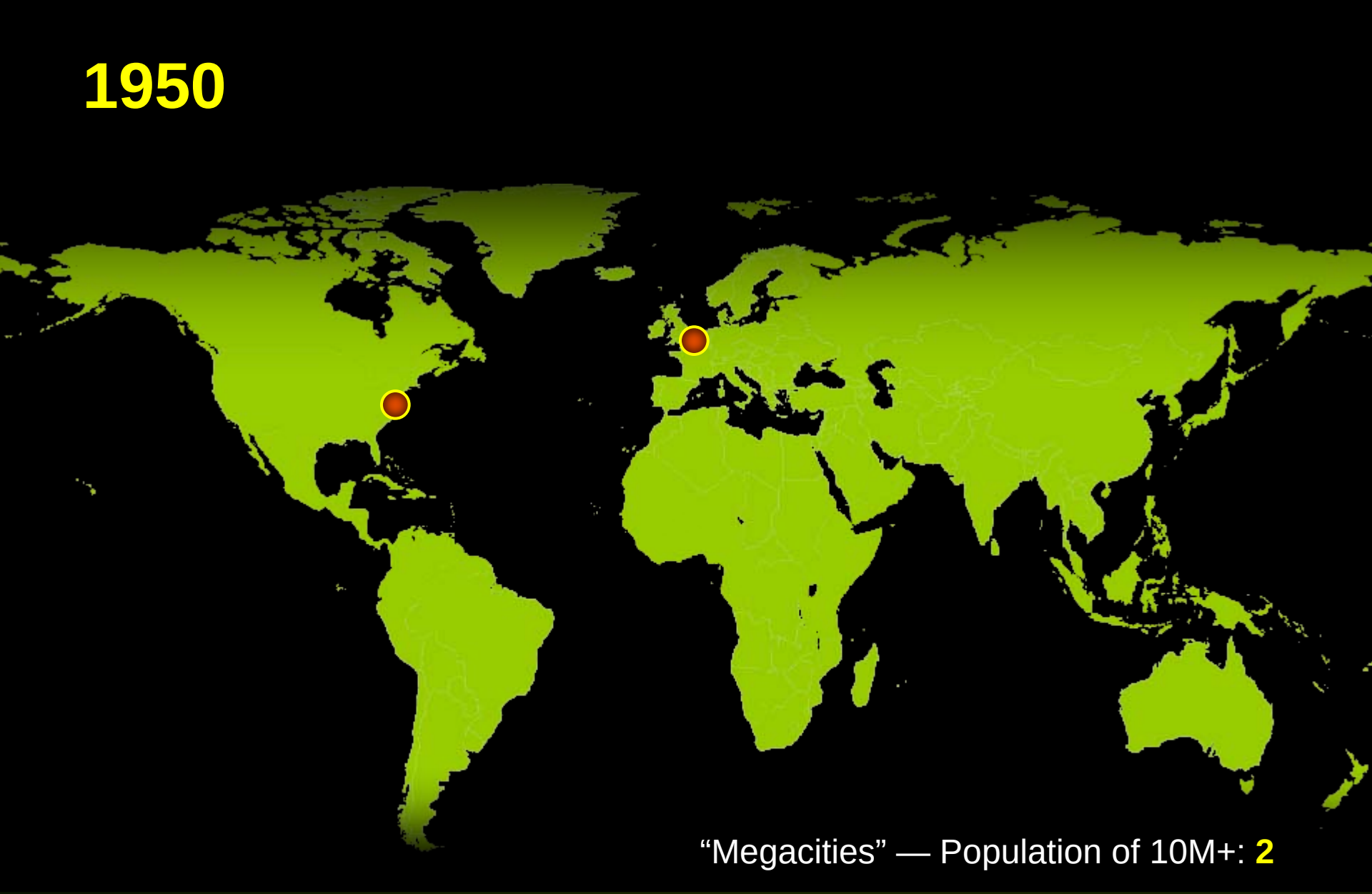
Building a Greentech Cluster in Colorado

Greentech: Why Now?

Growing Sense of Urgency

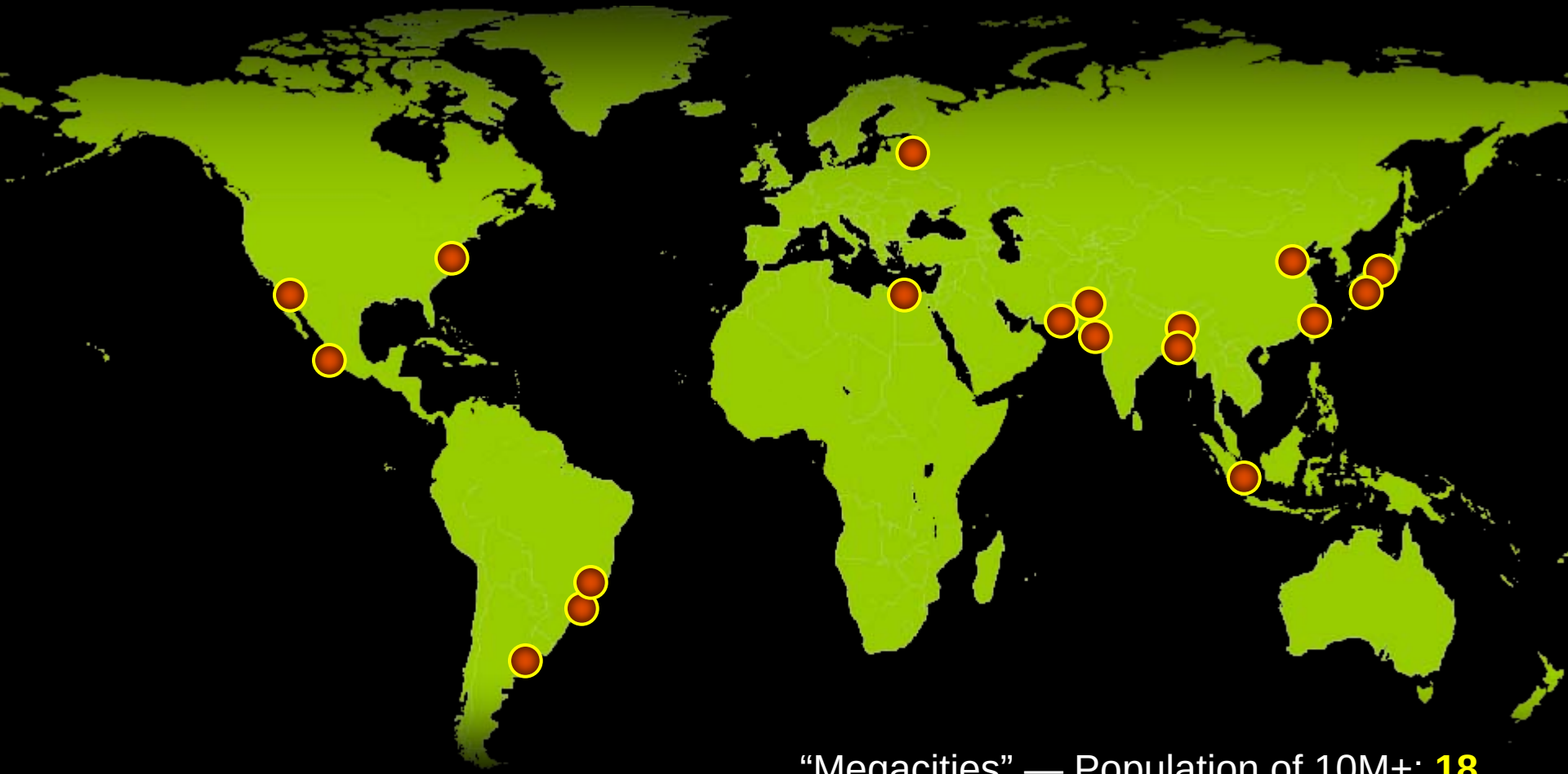

Temperature Deviation
from 125-Year Avg (°C)
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
1893
1905
1918
1930
1943
1955
1968
1980
1993
?
2007
1880
Annual Mean Deviation
5-Year Moving Average Deviation

1950



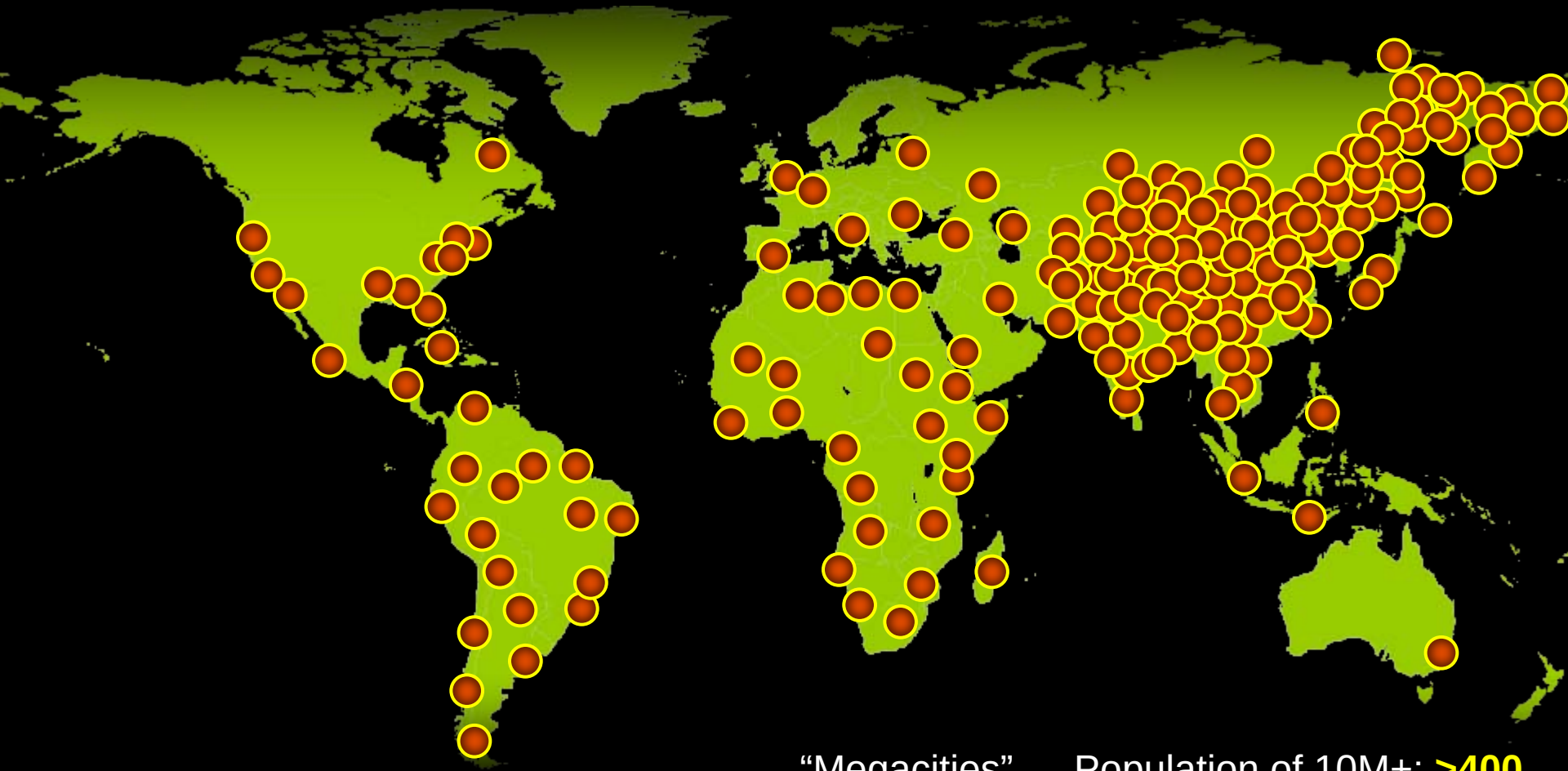
“Megacities” — Population of 10M+: **2**

Today



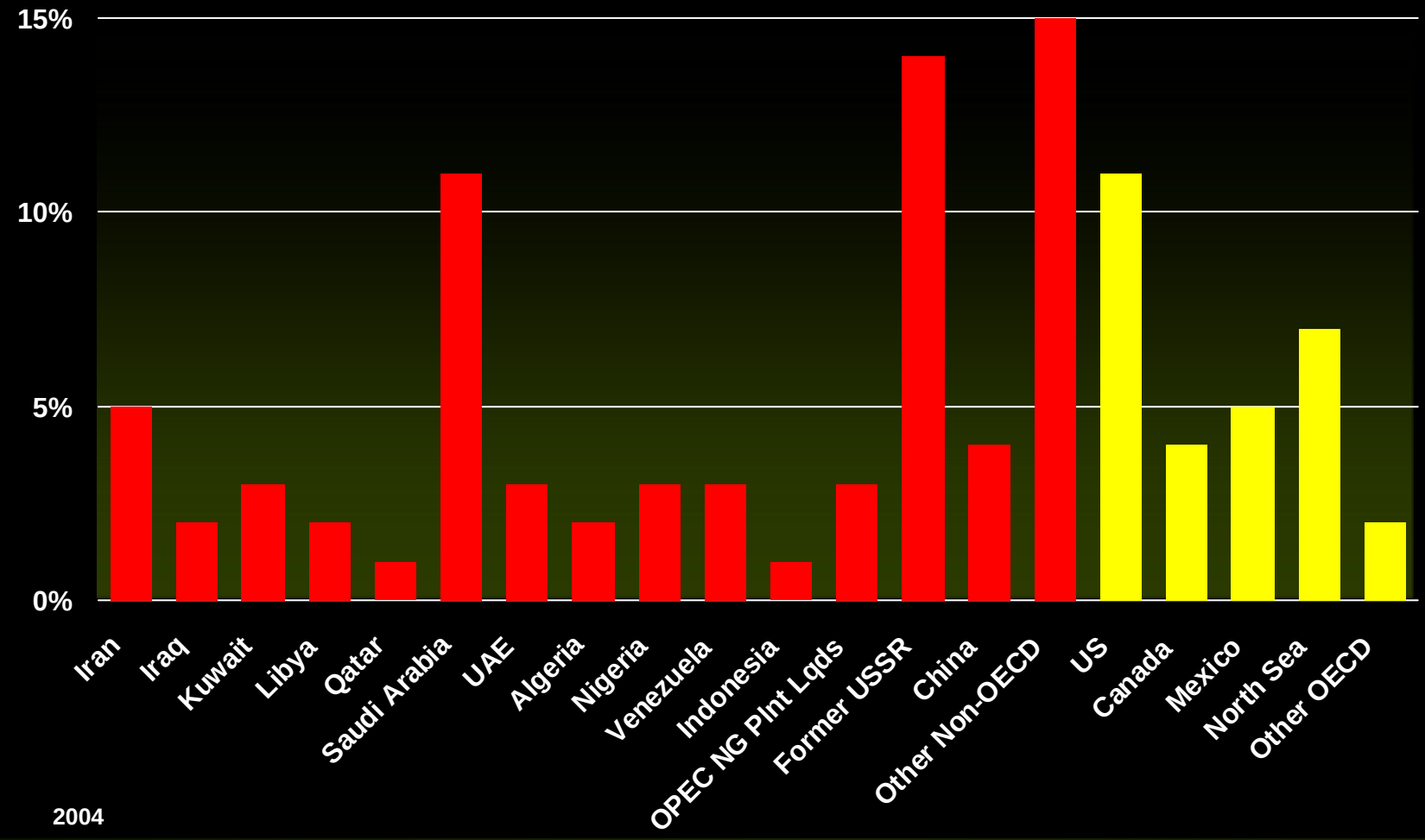
“Megacities” — Population of 10M+: **18**

2050



“Megacities” — Population of 10M+: **>400**

Sources of World Oil Supply



Greentech: Why Now?

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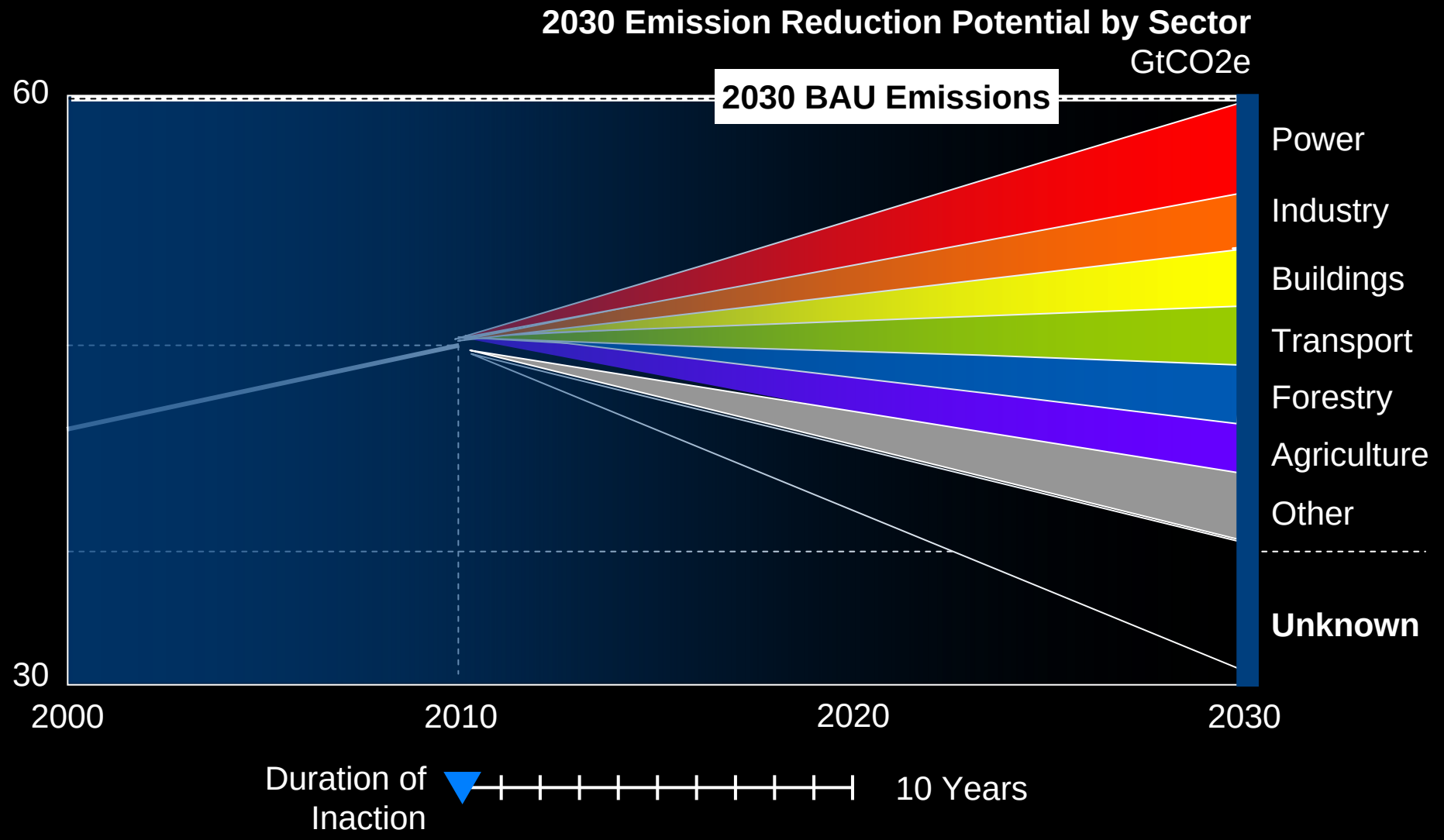
Public Policy

“There is a time when panic is the appropriate response.”

Eugene Kleiner

Sufficient Energy System Reform Is Impossible with Delay



Source: IPCC and USEPA, 2006 (2030 potentials)

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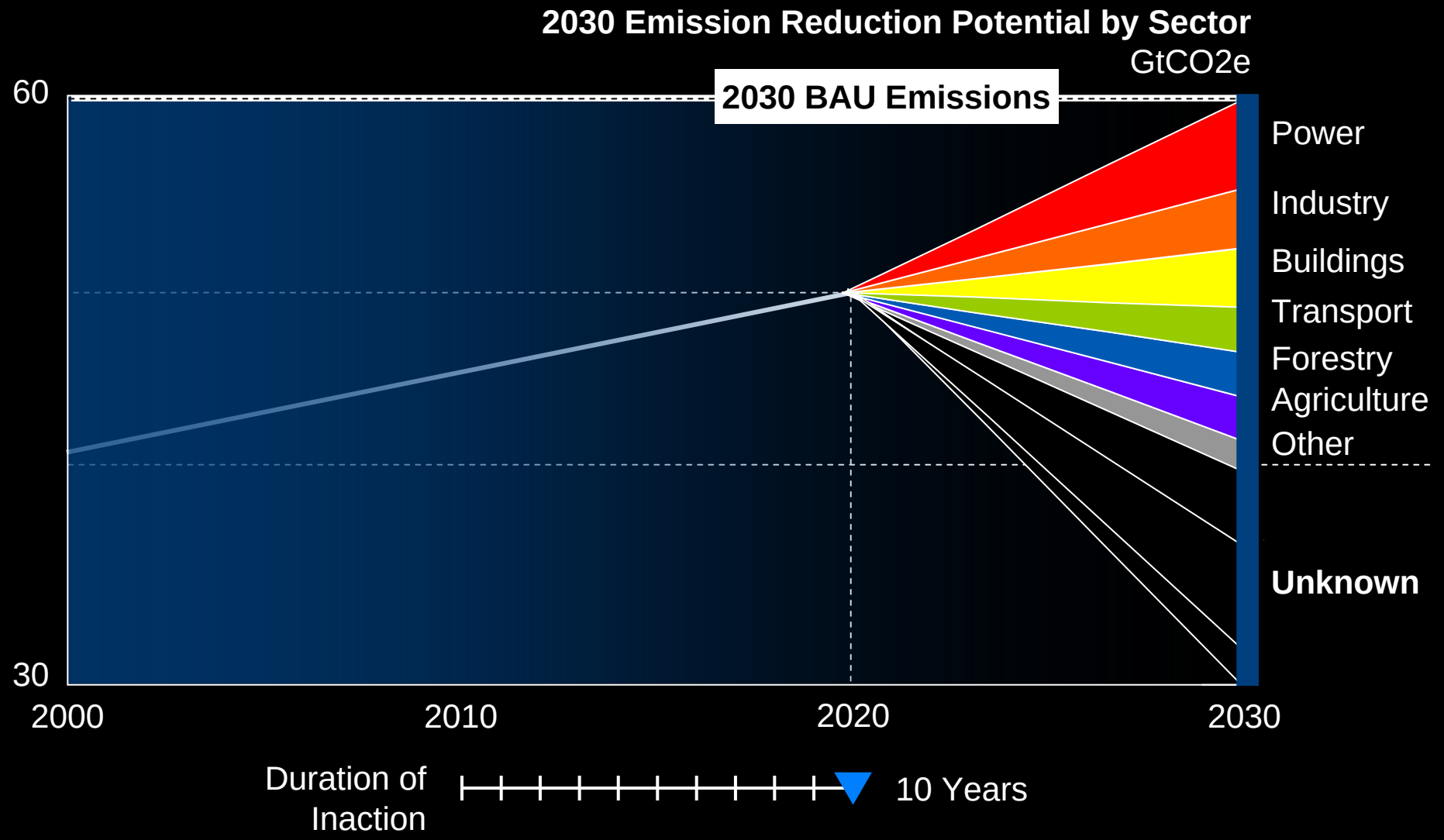

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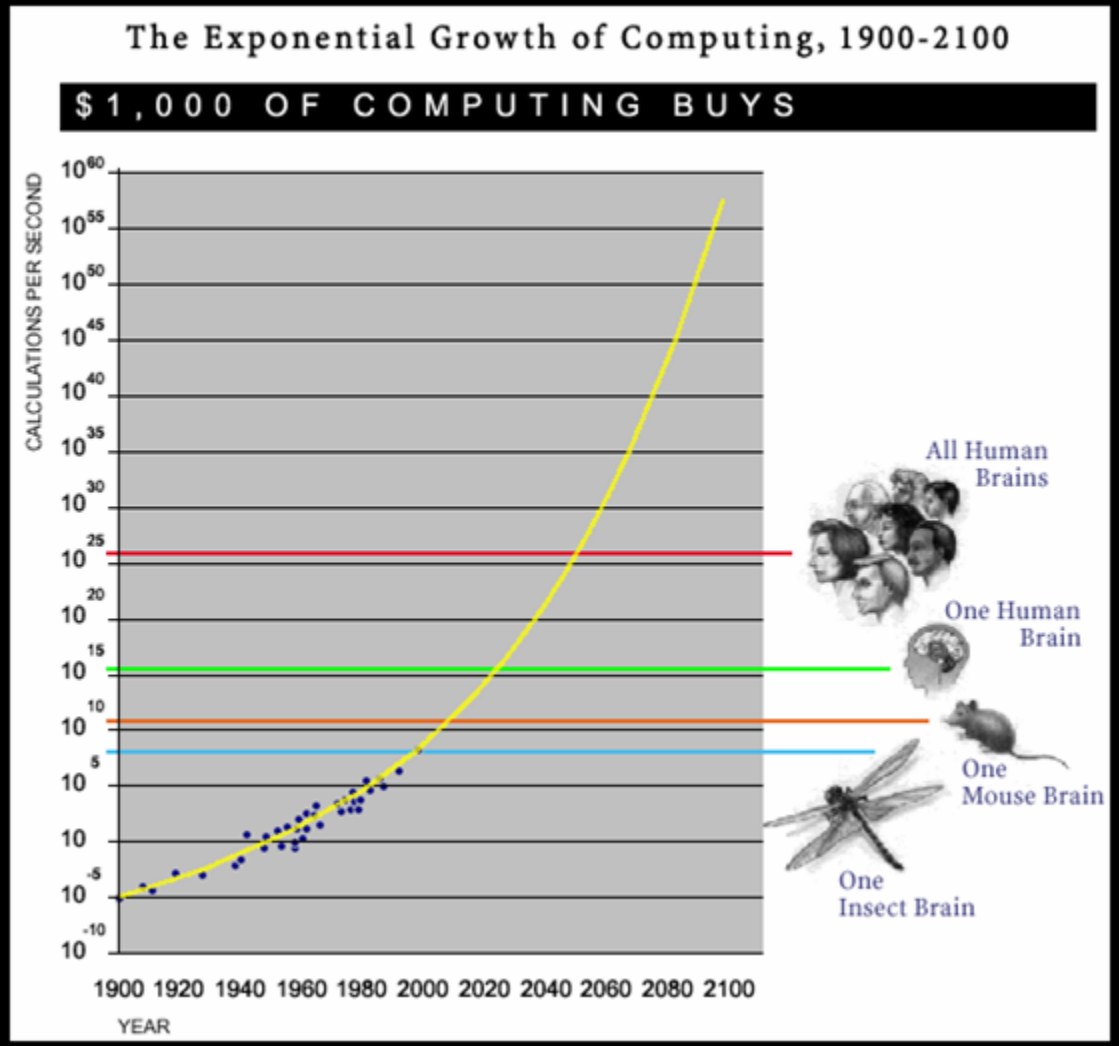
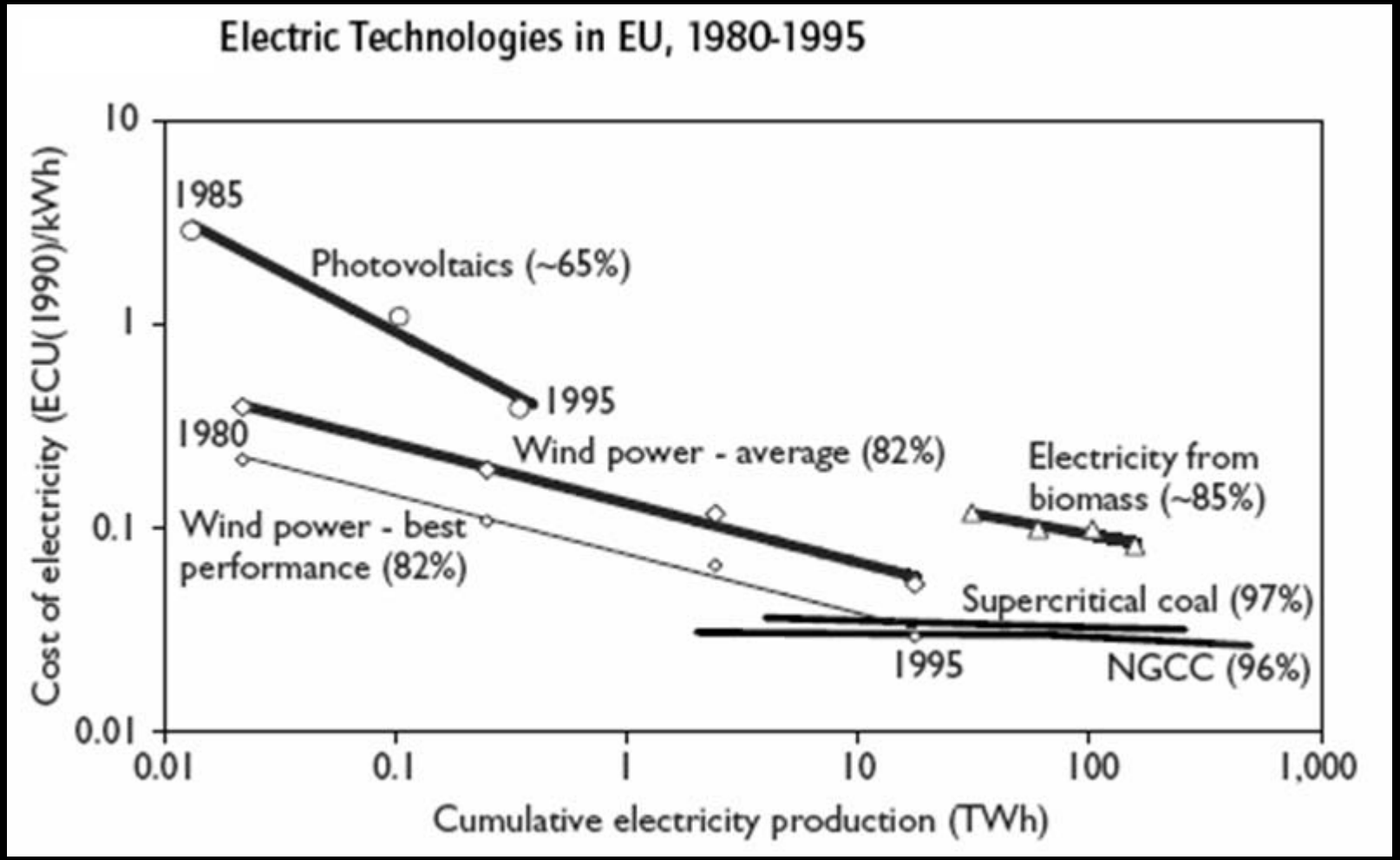
Moore’s Law

Double Exponential Growth through Two Centuries



Exponential Scale

Energy Learning Curves



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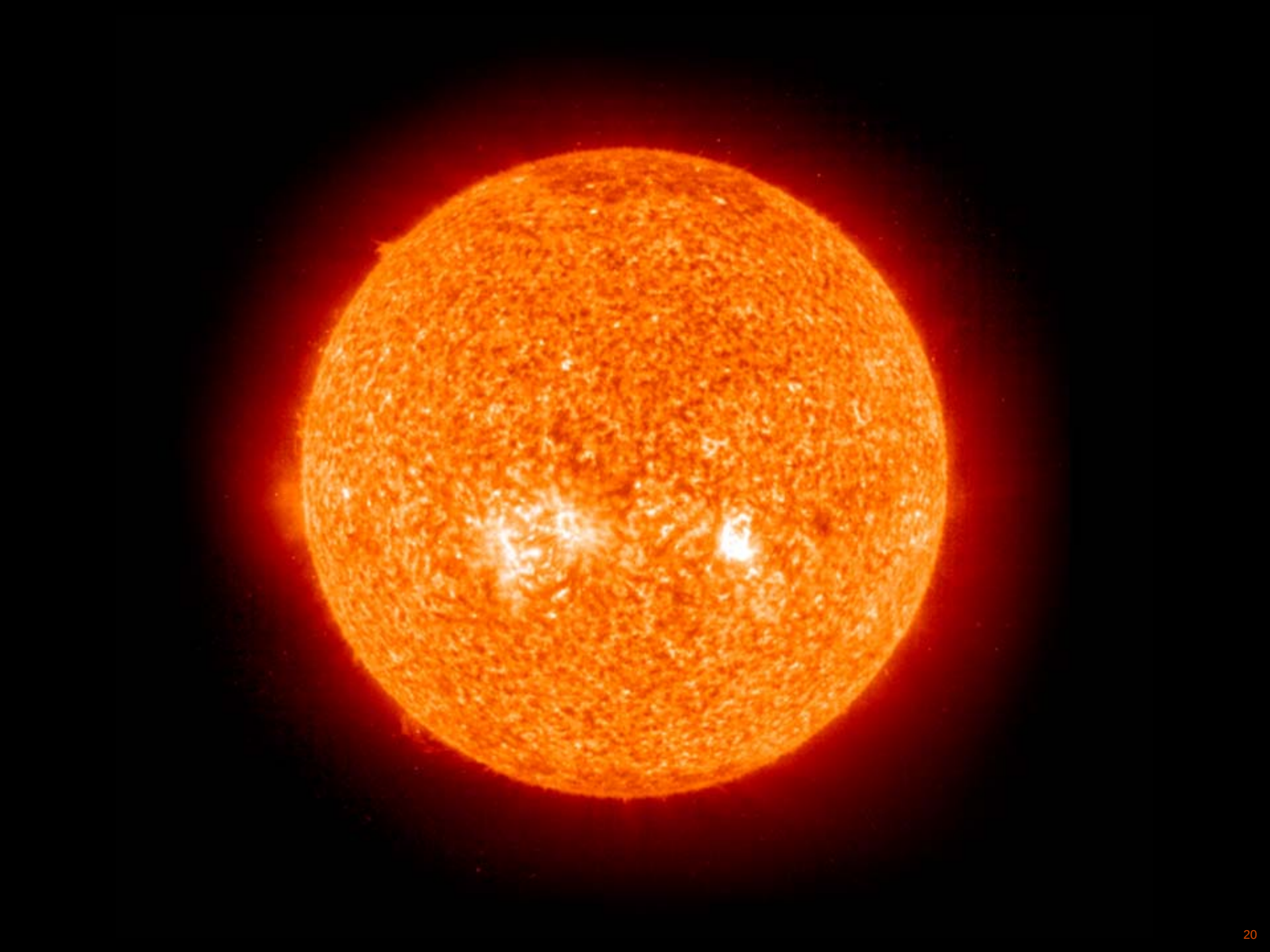
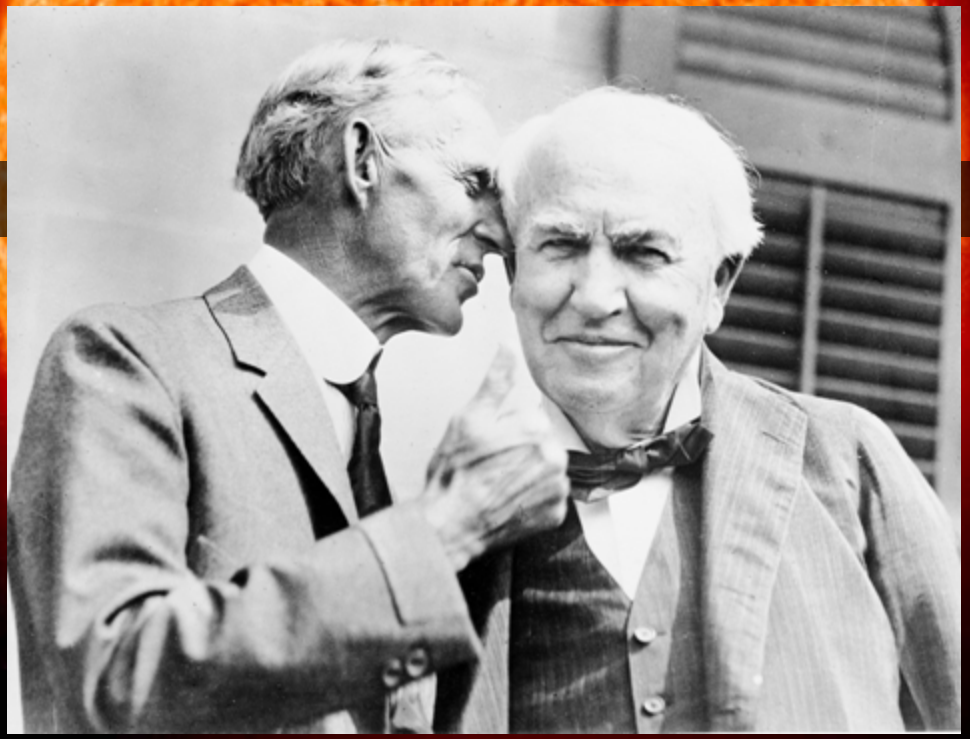
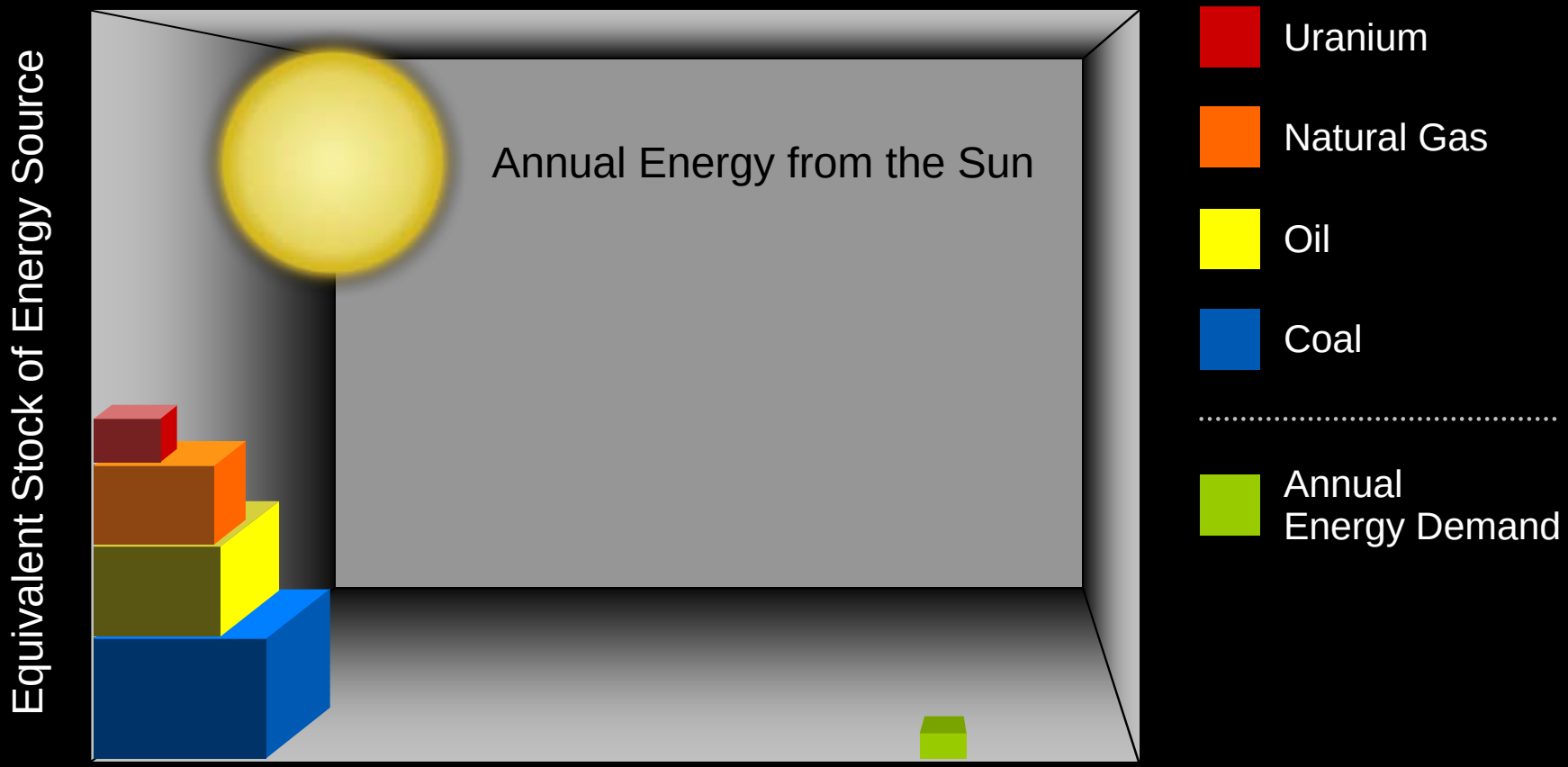
An Example…



“I’d put my money on the sun and solar energy. What a source of power! I hope we don’t have to wait until oil and coal run out before we tackle that.”



Global Energy Situation



Area Requirements to Power the USA

$(150\ km)^2$ of Nevada Covered with 15% Efficient Solar Cells Could Provide the USA with Electricity

J.A. Turner, *Science* **285** 1999, p. 687

Agenda

Greentech: Why Now?

Building a Greentech Cluster in Colorado

Technology-based Economic Development

- The creation of a new economic base by fostering growth of emerging-growth technology companies

Why Is TBED Important?

- State of Colorado
  - Economy: TBED drives jobs, growth
  - Culture: Enriched because of new talent, funding
- Colorado-based Academic Institutions
  - Stature: Relevance of the universities—"a train stop;" faculty and student recruitment and retention
  - Financial: Royalty income, equity value from tech transfer; improved prospects for endowment
- TBED success feeds on itself—virtuous cycle between university, industry and government

TBED: Colorado Balance Sheet

Assets

- World Class Universities
- Growing Number of Start-ups
- Growing Commitment
- Talent Base

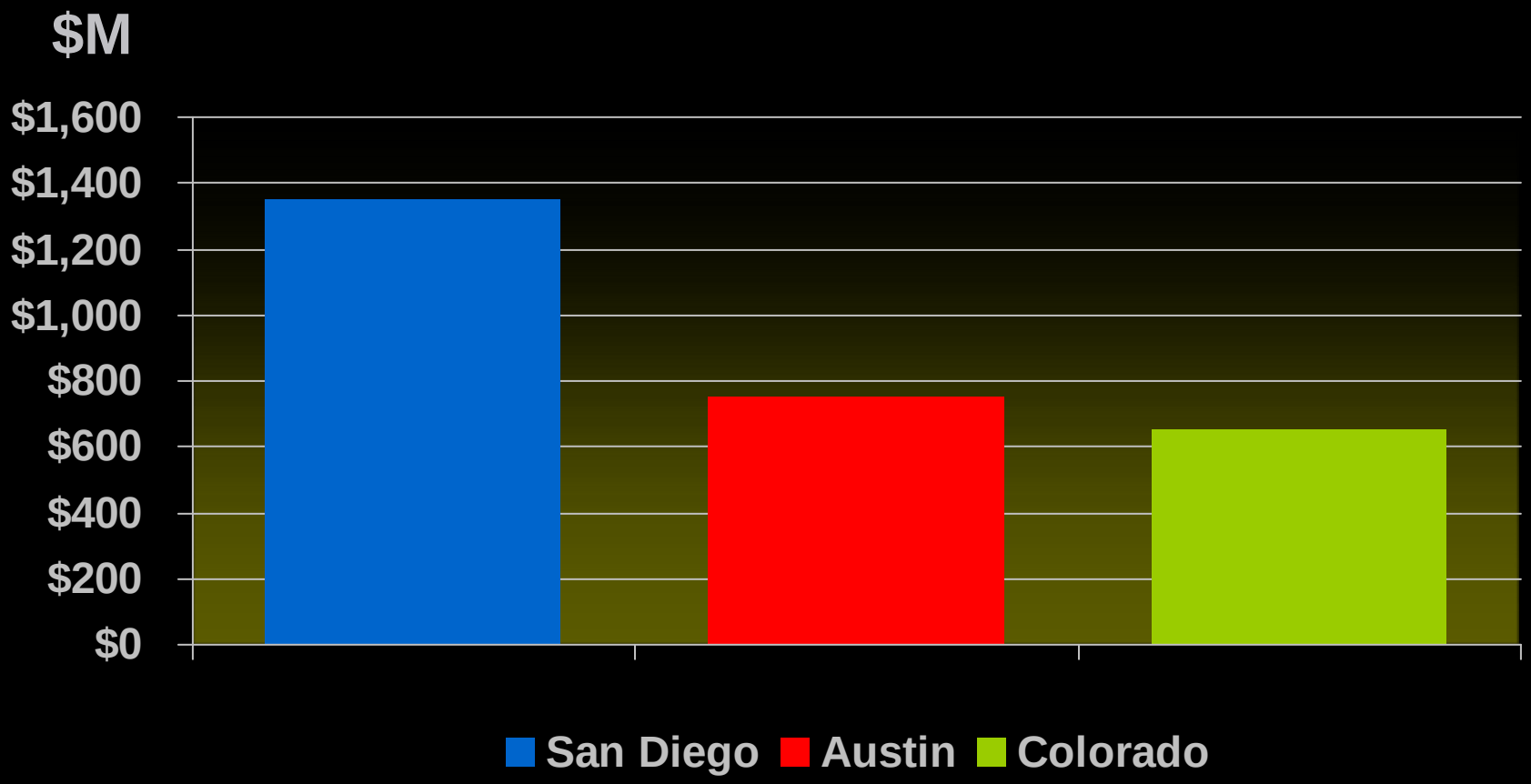
Liabilities

- Culture; Focus
- Human Capital
- Venture Capital
- Anchor Tenant

Many Reasons for Optimism…

- Colorado venture funding up >20% through Q3’07
- More than 180 venture capitalist professionals from 43 firms actively engaged in investing in the Rocky Mountain Region

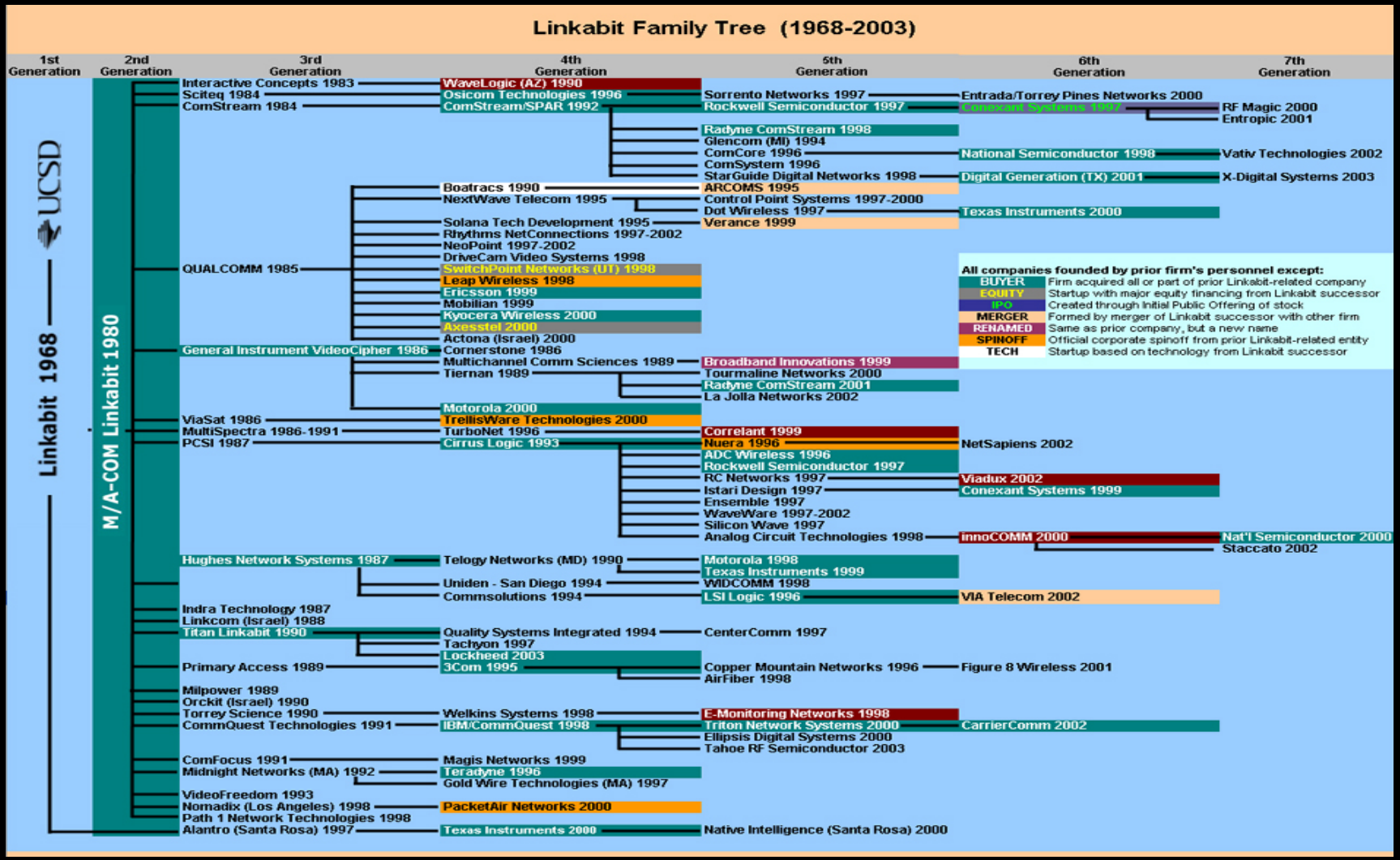
A Tale of Two Cities (and a State…)



San Diego: A TBED Success Story

- Community willed its way to success, converting a once sleepy defense town to a vibrant technology-driven economy
- UCSD Tech Transfer licenses increased 5x from early ’90s; impressive progress in faculty recruitment
- 100+ biotech spinoffs from UCSD; San Diego now considered the “wireless” capital of the country
- UCSD, through its Connect program, played a pivotal role
- Key entrepreneurial support and important contributions from local trade groups

Linkabit Family Tree



San Diego Conclusions

- San Diego had a number of important natural advantages, but was fundamentally a sleepy defense town
- Proactive TBED efforts were a major factor in San Diego's success

Austin Success Factors

- Proactive approach was key to the success in Austin
  - Unified effort of government, university and local business
  - Focus on attracting several large firms in a few high growth markets
  - Local efforts to have these large firms expand their activities
  - Local efforts to attract the venture infrastructure from a major venture capitalist center (Silicon Valley and Boston)
- Got lucky with a few big wins both in large companies and start-ups
- The local venture infrastructure followed

Austin Big Wins

Large Companies

- IBM
- AMD
- Texas Instruments
- Motorola
- Tandem
- Sematech

Start-ups

- Dell
- Vignette
- SMART
- Tivoli
- Dazzle

"Big wins are the trunk, new start-ups are the branches"

Best Practices from Other Regions

- Small set of passionate champions
- University actively market the region, and otherwise promote TBED
- High energy, high impact trade groups
- Tech Transfer user friendly
- Promote local venture capital and encourage out-of-area venture capitalists to invest locally
- University research excellence: UCSD—life sciences; UT—communications; UW—energy and power
- Help generate start-ups
- Big wins—attract big companies and successful start-ups that create progeny
- Public/private partnership
- Pro-growth business climate
- There is a correlation between TBED and Tech Transfer success

Success Factor Matrix

	Austin	San Diego	Colorado
Technology	5	7	
Capital	4	6	
Champions	9	10	
Big Companies	8	5	
Start-ups	5	8	
Culture	7	7	
Talent	5	6	
Score	43	49	?

Great Inventions of the 20th Century

1. Computers

3. Refrigerators

4. Medical Advances

7. Space Flight

6. Airplanes

2. Television

5. The Internet

Source: Harris Corporation


E85
E85
E85

Greentech Is Our Generation's Moonshot