

Dynamic Design, Dynamic Cities

First hand lessons learned from wrestling
with design, peak oil, and climate change

May 2009

Architecture for Humanity
Living Density Forum

Vancouver, BC

Bryn Davidson

B.Eng. M.Arch. MRAIC LEED-AP

How to approach design?



**As a researcher,
urban planner,
author, and activist**



**As a professional
designer
& sustainability
consultant**



**As a builder
and entrepreneur**

How to approach design?

RAO / DAVIDSON DESIGN & PLANNING

RAO/D CITYWORKS
urban ideas for a rowdy future

**As a professional
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dcp *Dynamic Cities Project*
www.dynamiccities.org

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How to approach design?

Part I

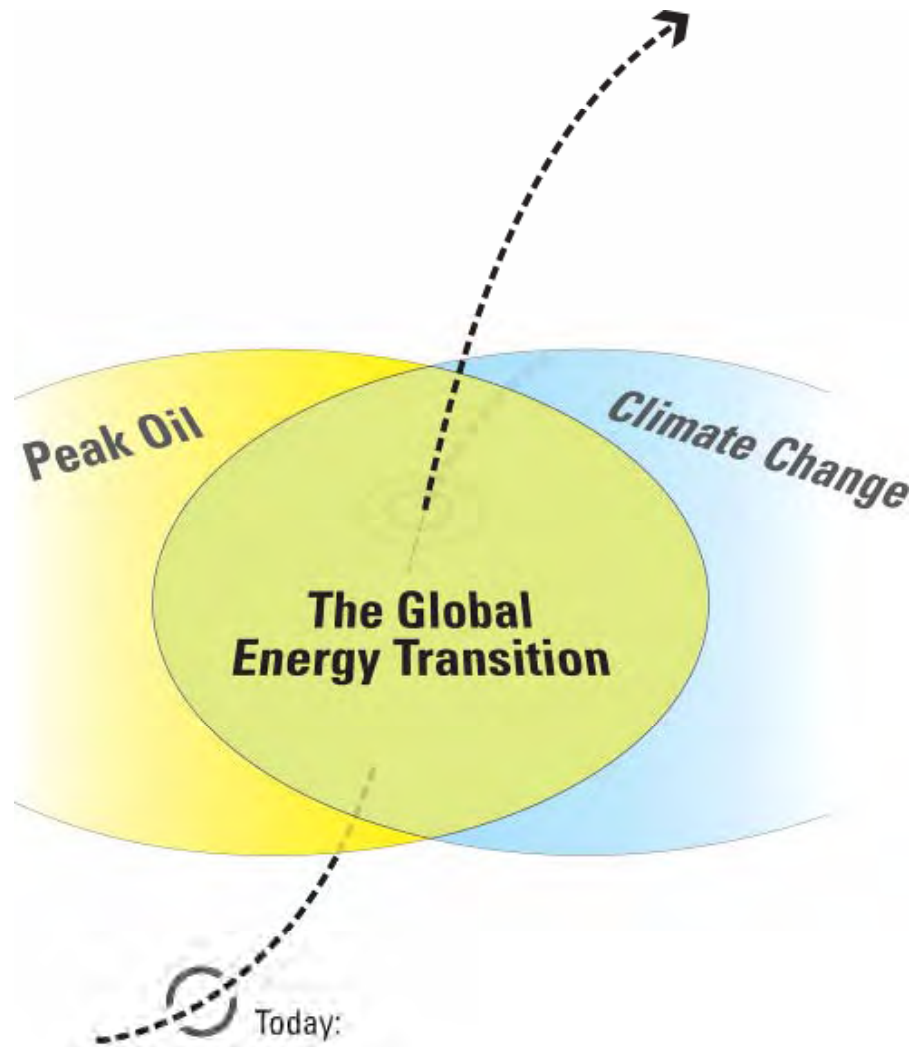
Understanding Peak Oil

Part II

Dynamic Design, Dynamic Cities:

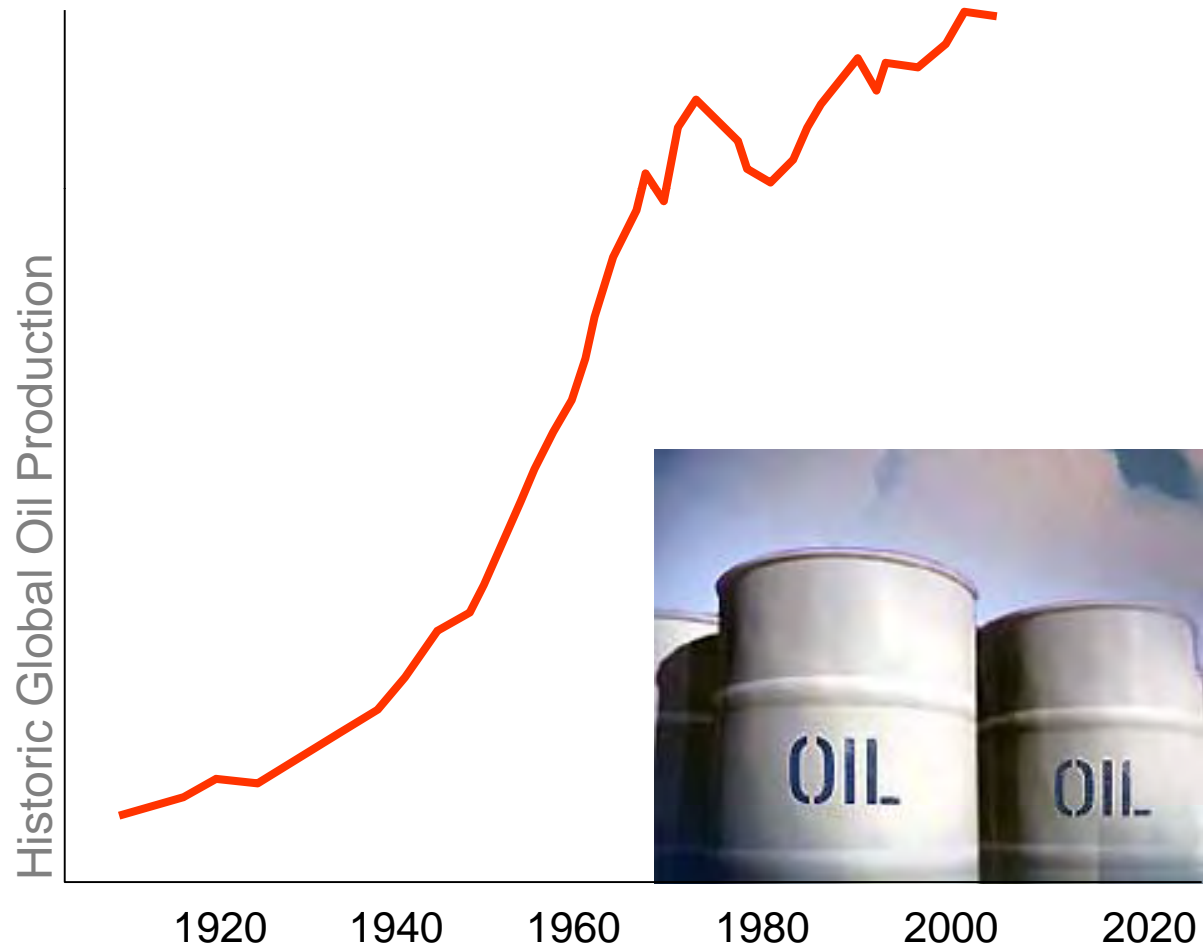


How to approach design?



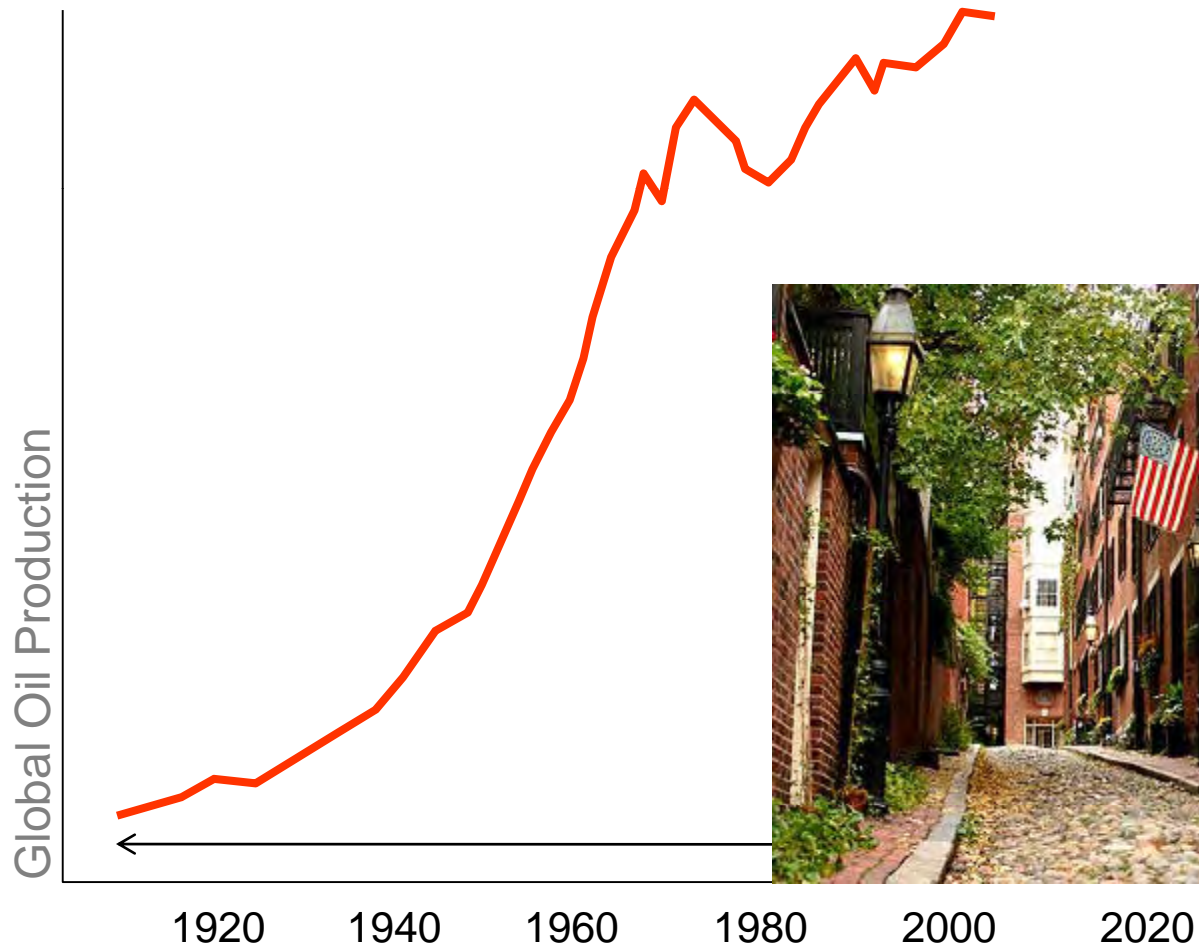


What future are you planning for?



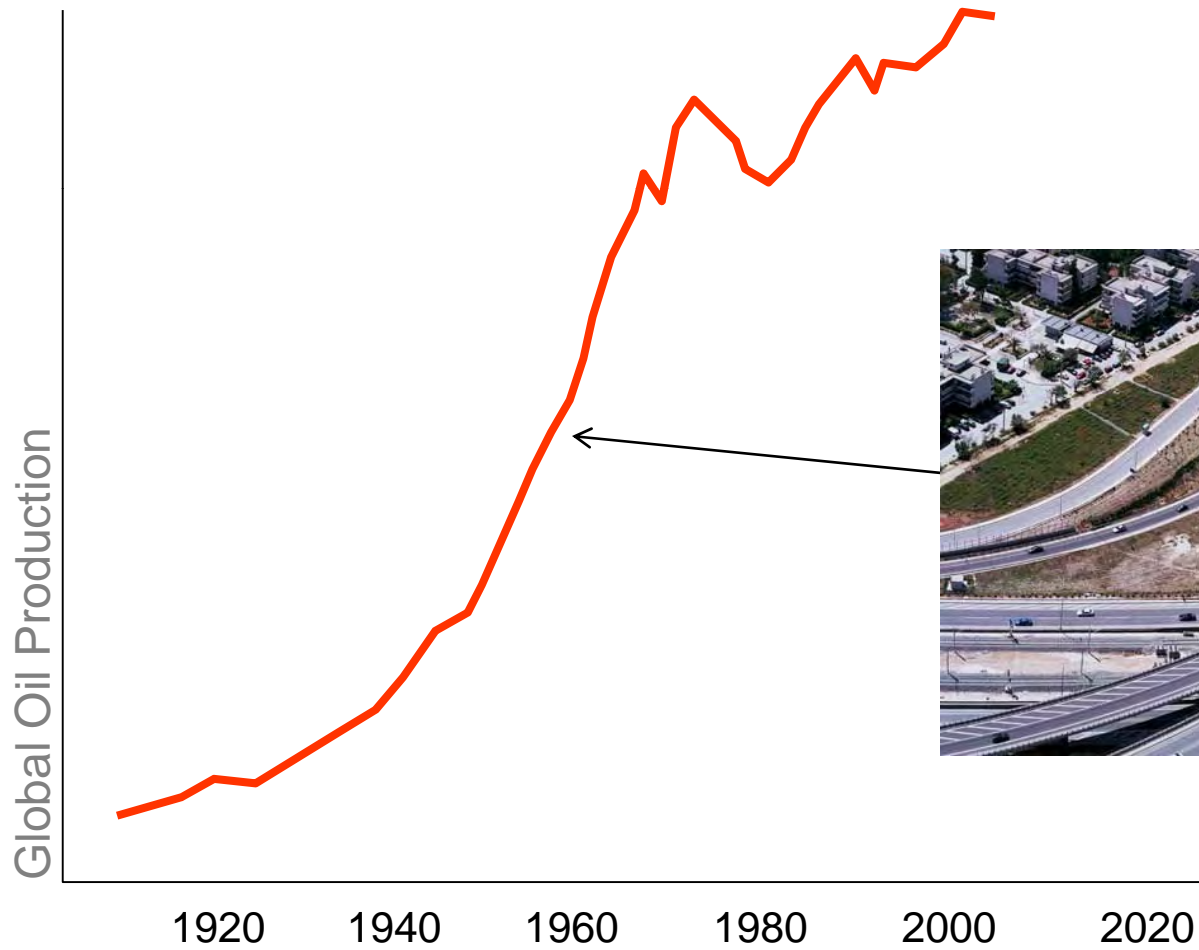


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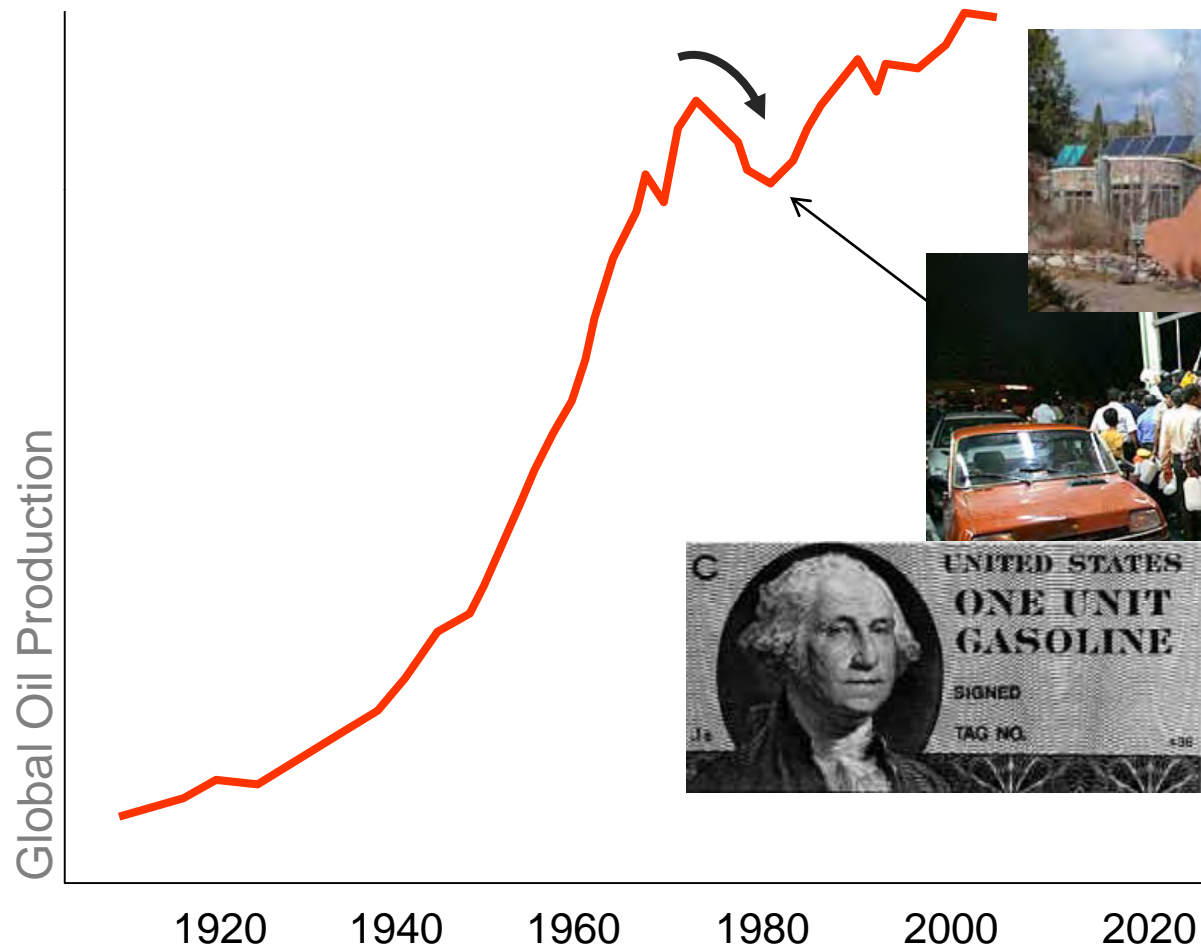


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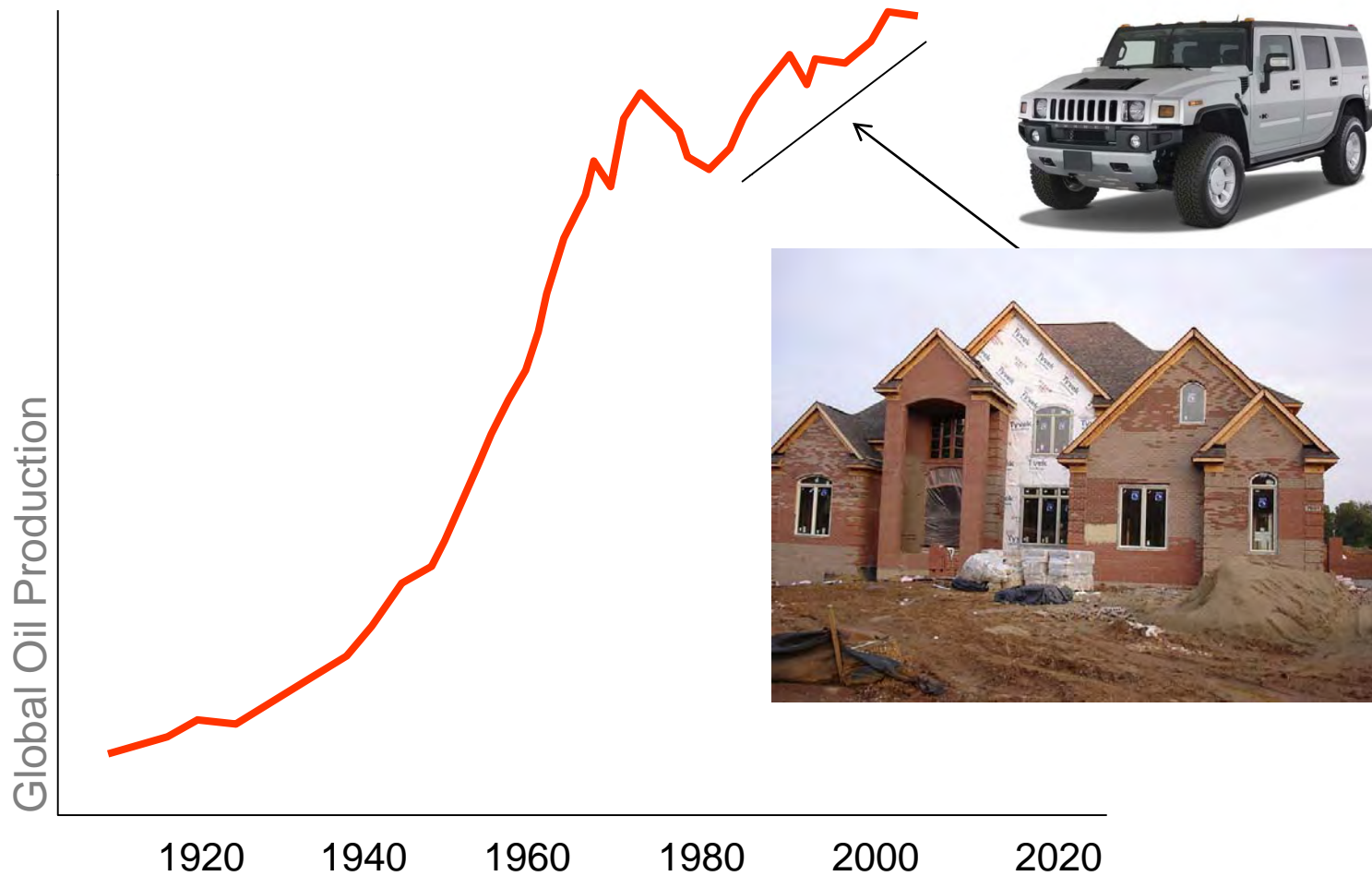


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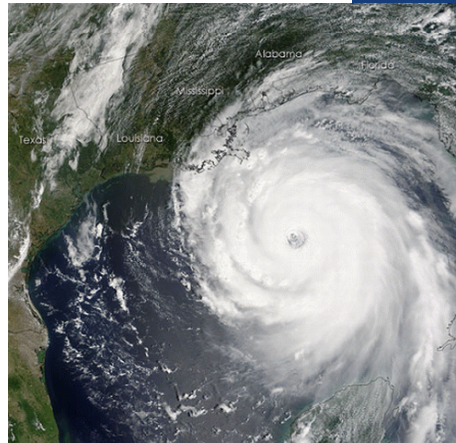
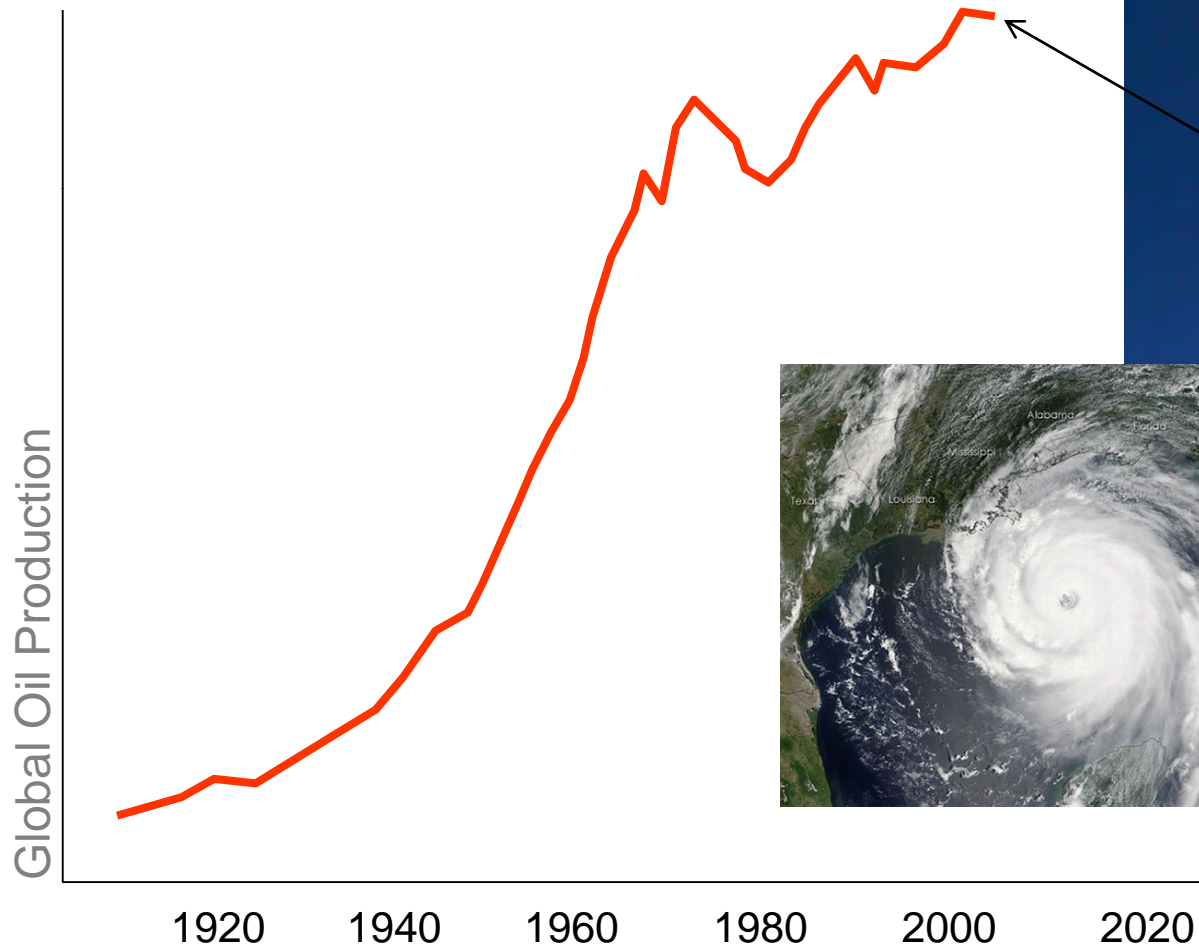


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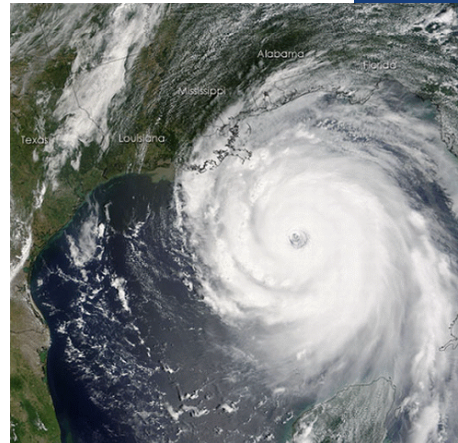
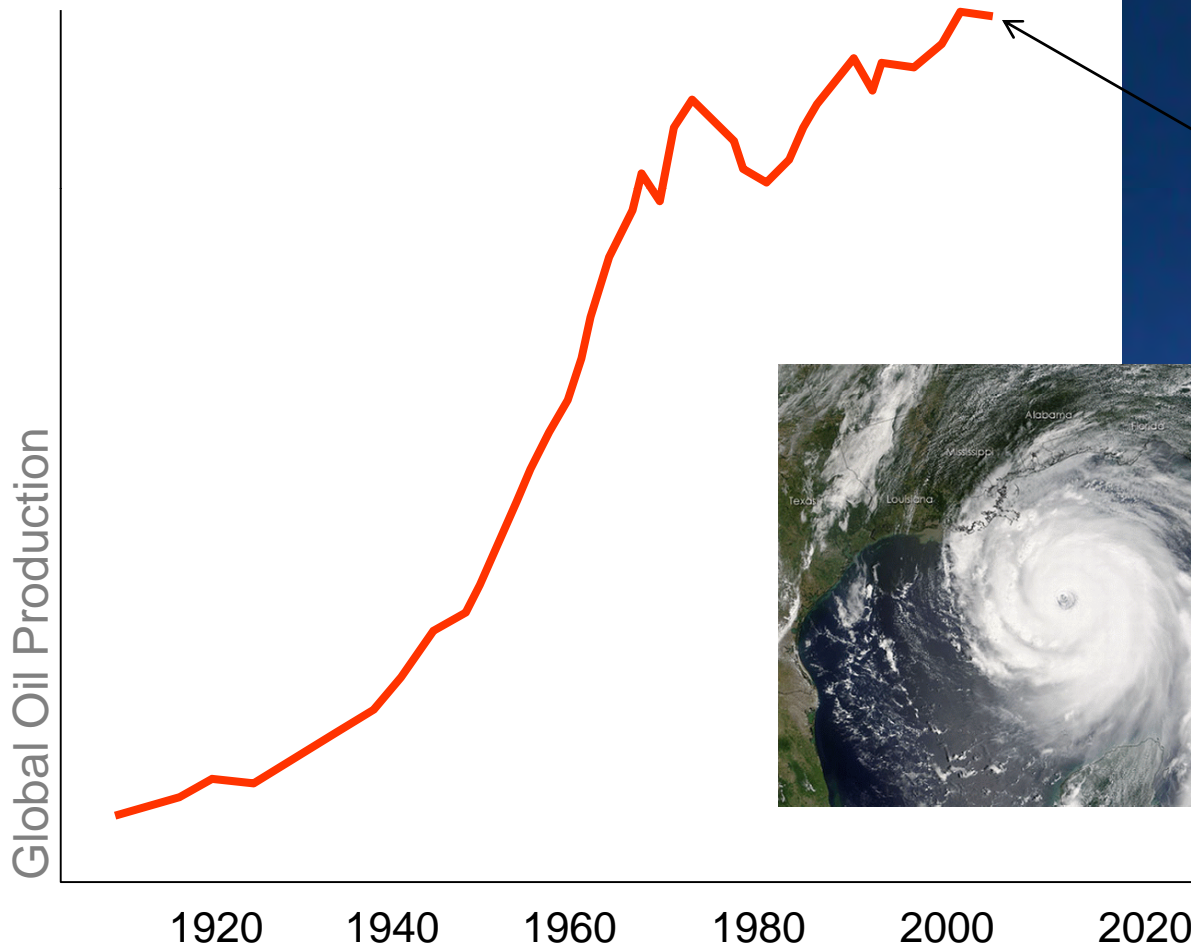


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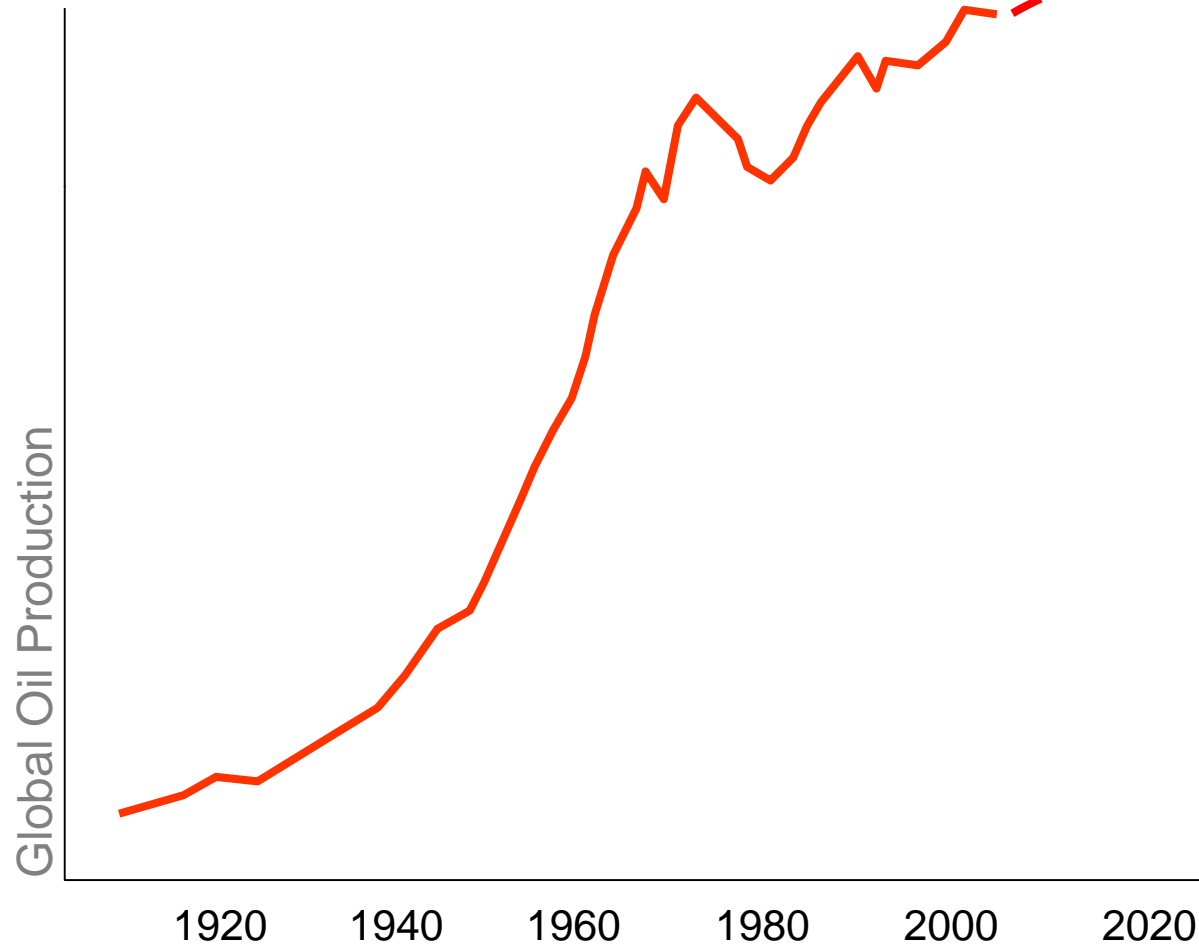
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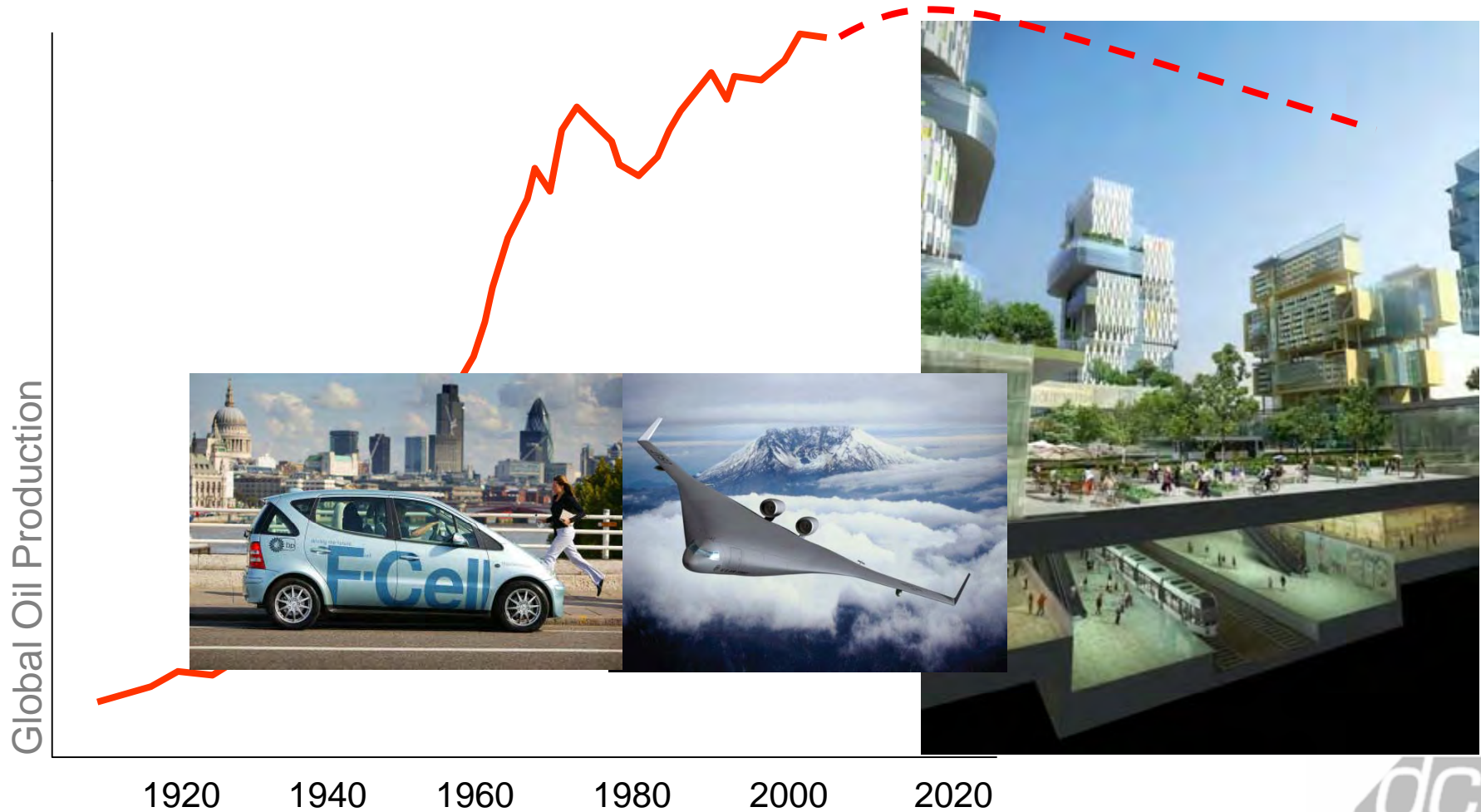
Future 1:
Slower Oil Depletion +
Carbon Policy + Steady Money





What future are you planning for?

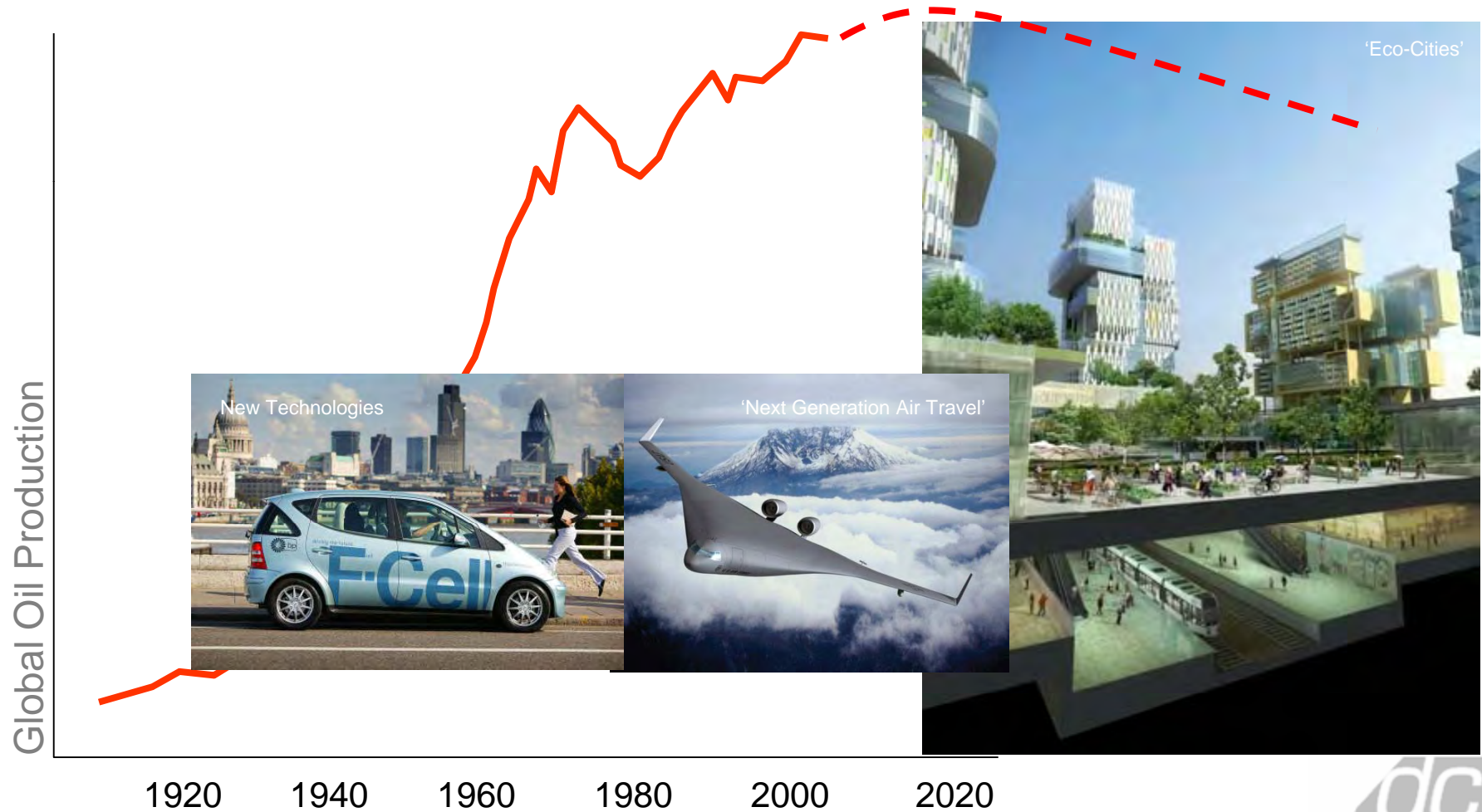
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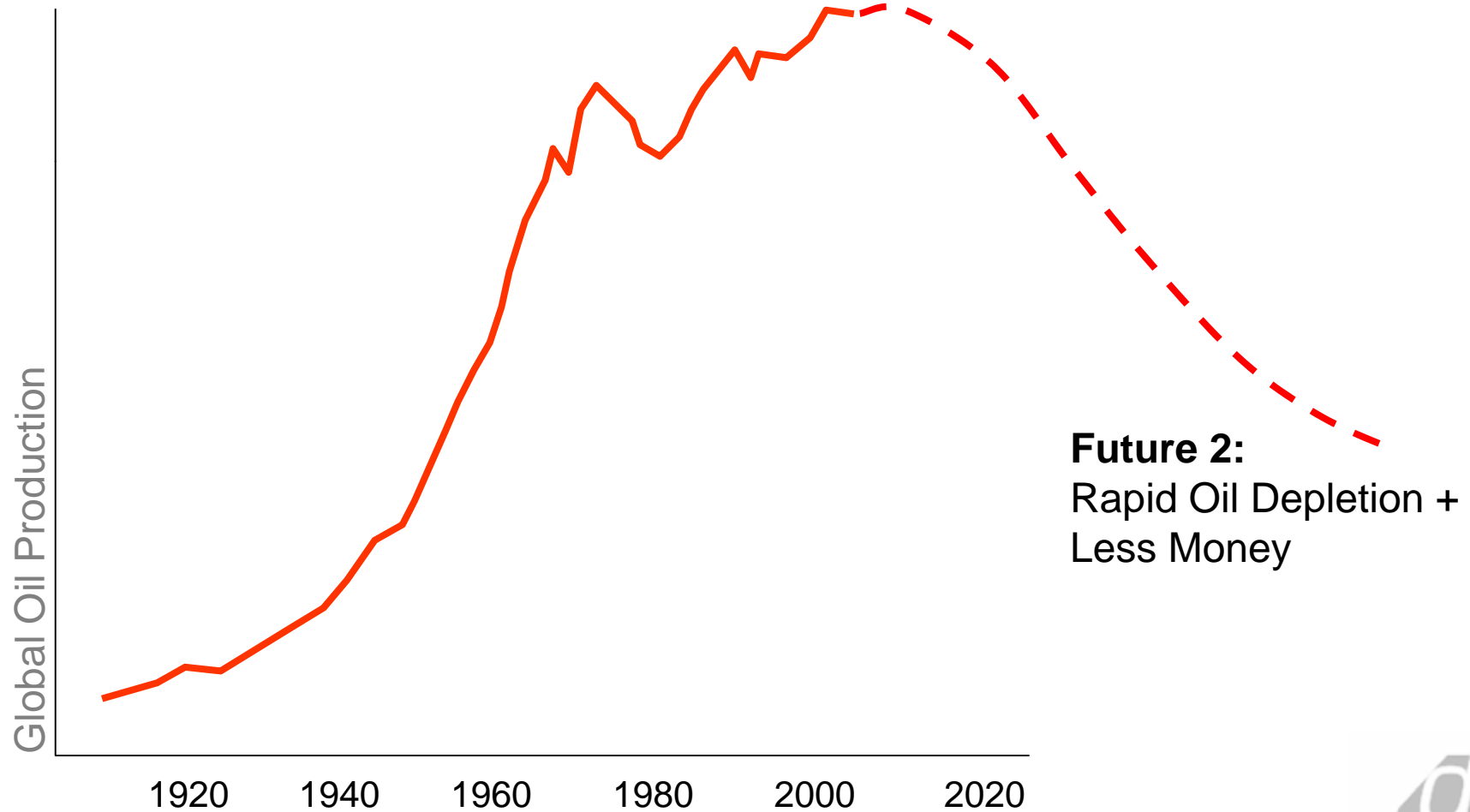
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Future 1: 'Techno-Markets'





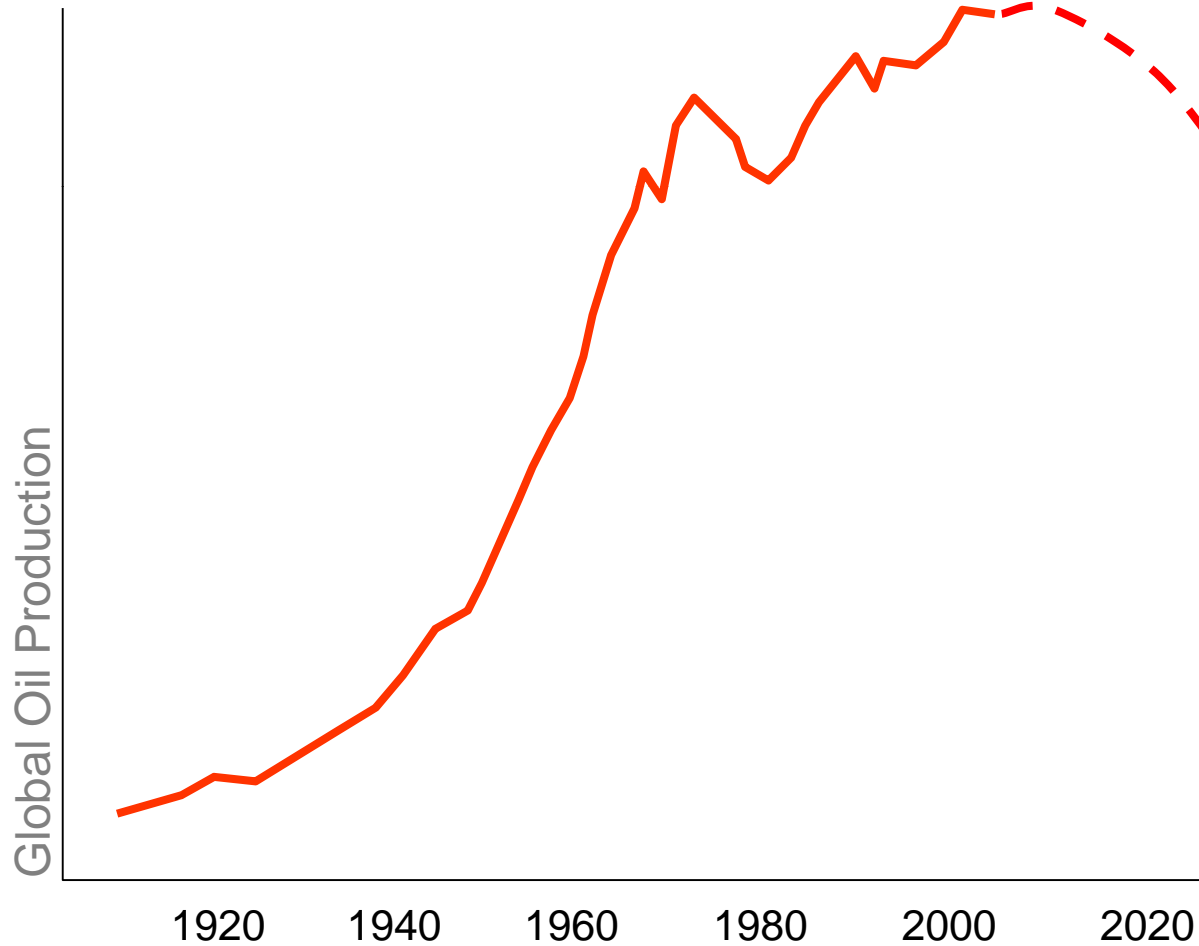
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Future 2:
Rapid Oil Depletion +
Less Money



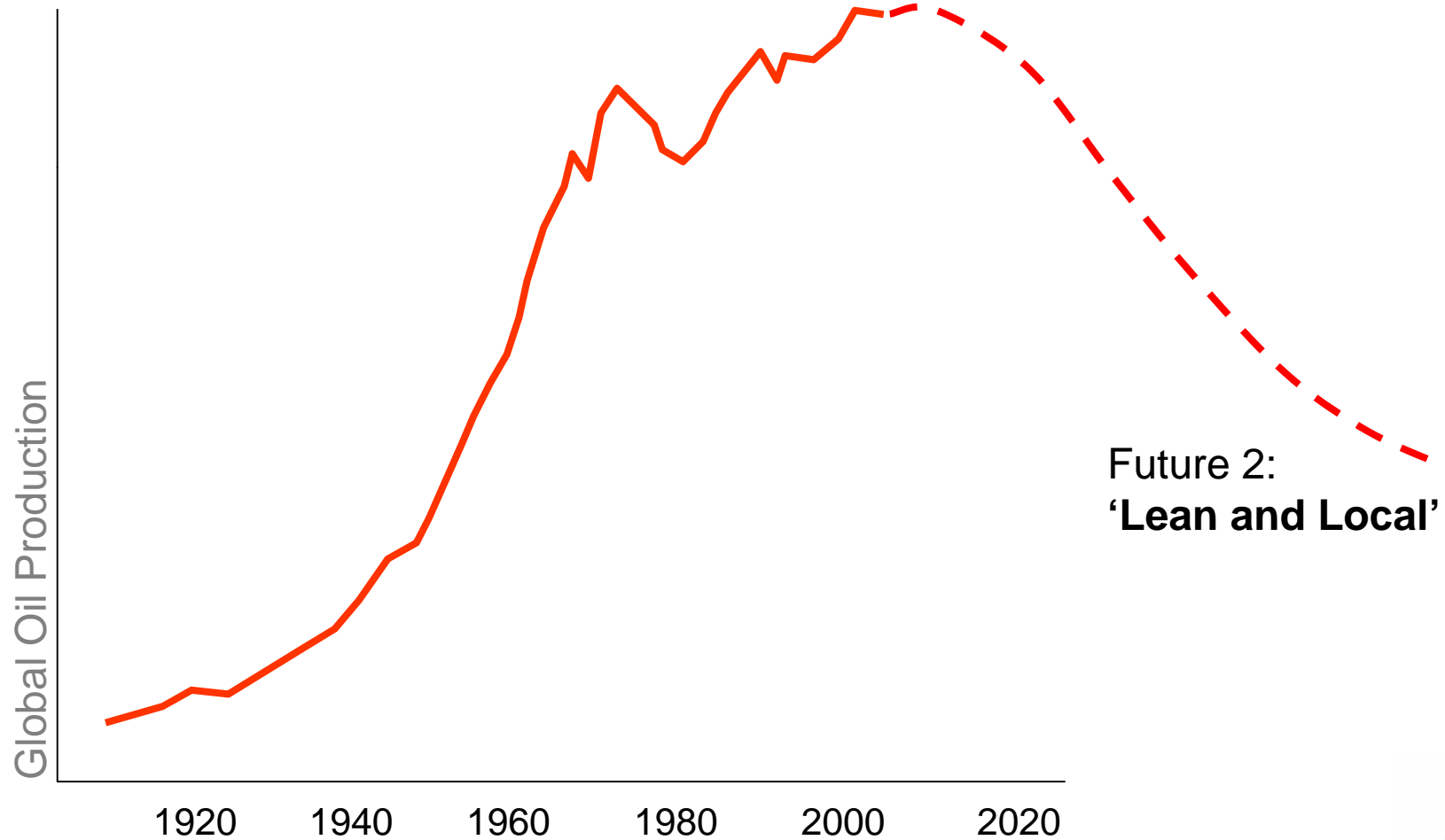
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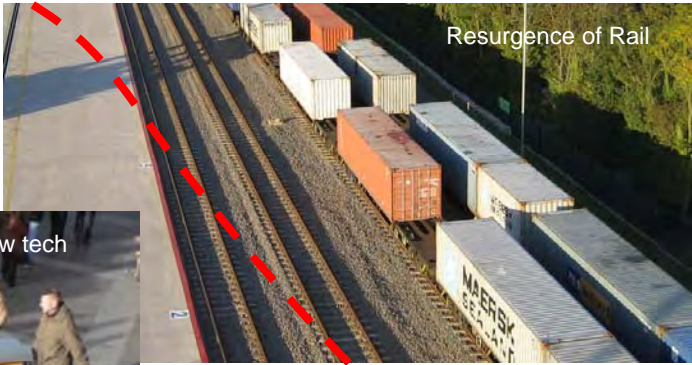
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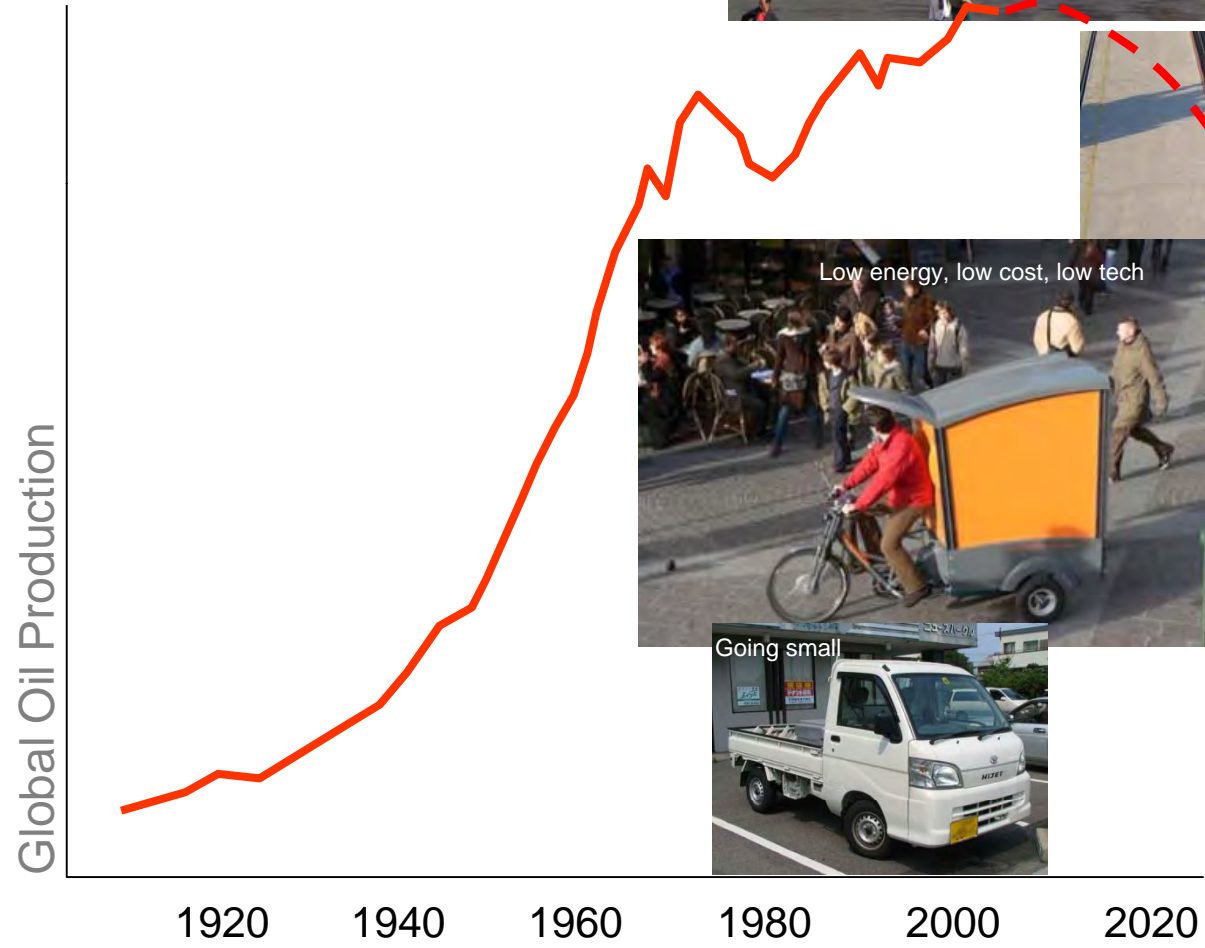
Future 2:
'Lean and Local'



What future are you planning for?



Future 2:
'Lean and Local'





What future are you planning for?

Global Oil Production

1920 1940 1960 1980 2000 2020



Breakdown of aging infrastructure

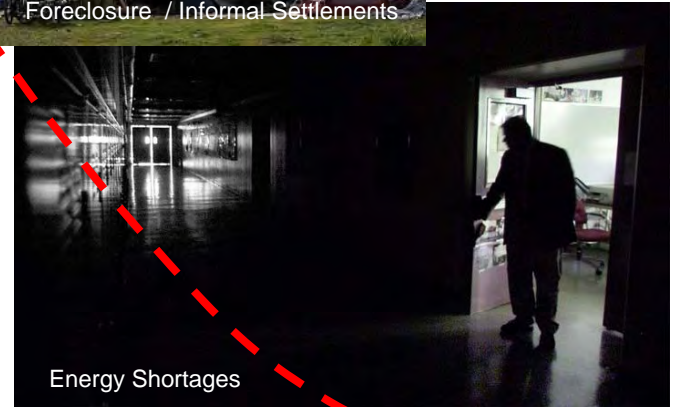


Foreclosure / Informal Settlements



Protests and social upheaval

Contracting Air Travel

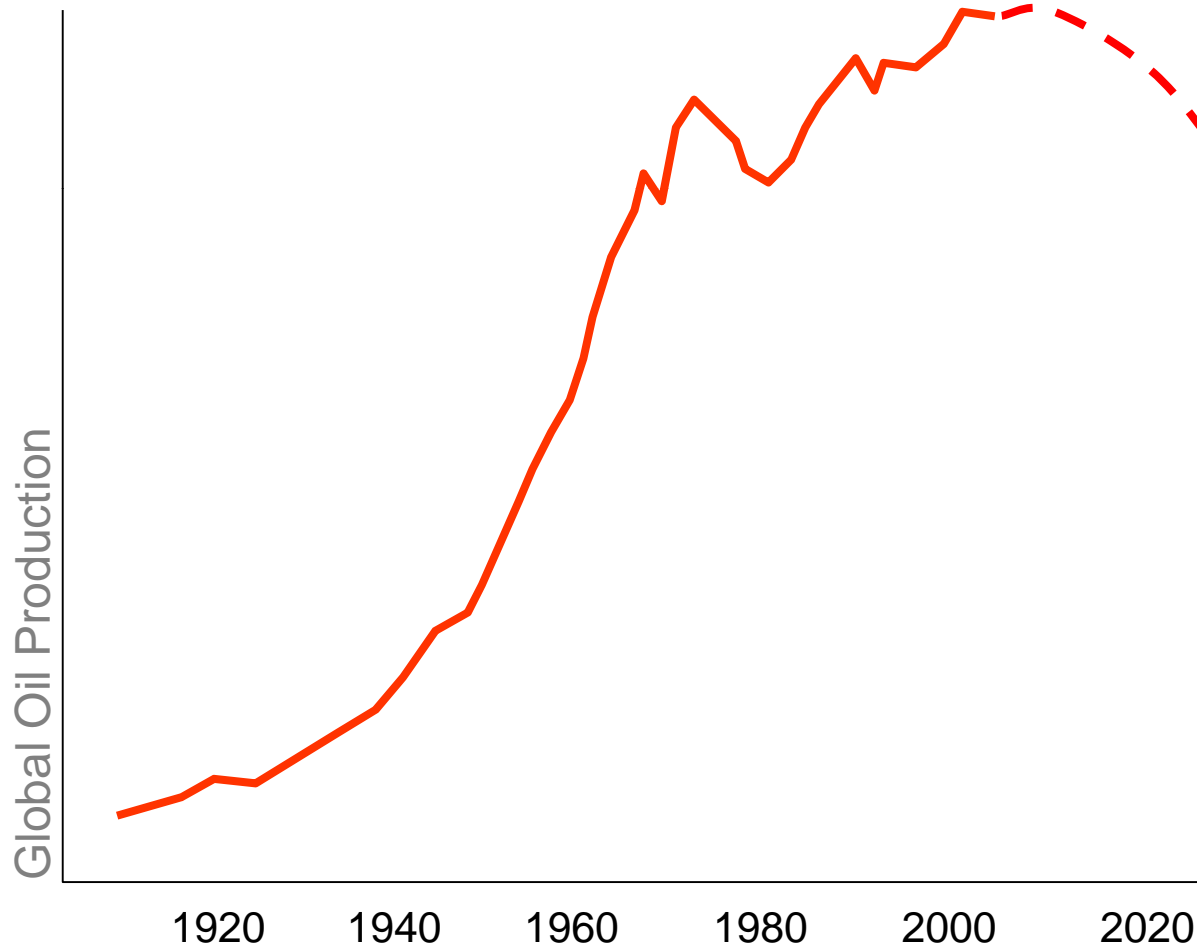


Energy Shortages

Future 2:
'Lean and Local'



What future are you planning for?



Future 2:
'Lean and Local'

**Can this happen?
Is it likely?**

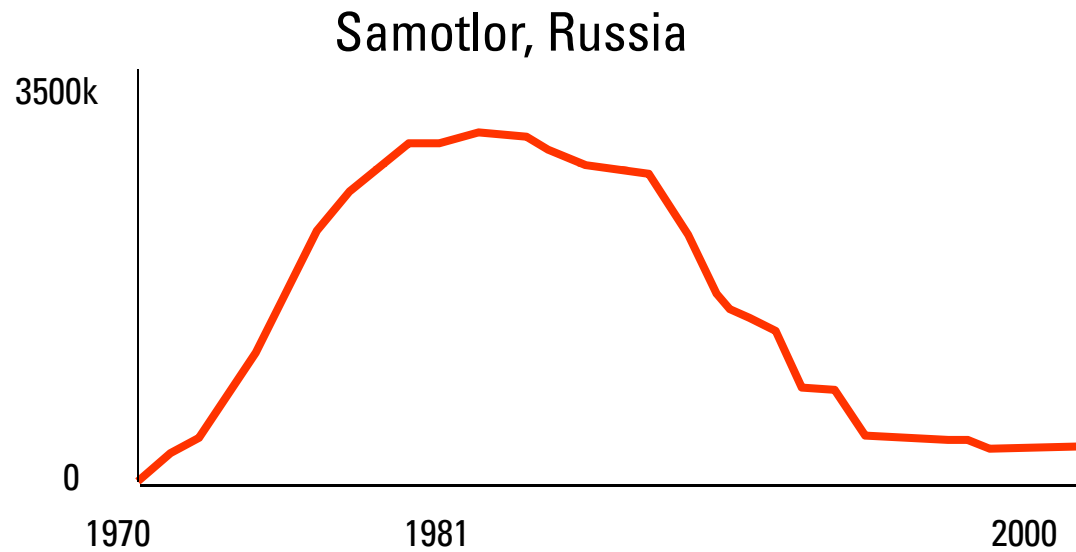
Understanding Peak Oil:

Giant Oil Fields Peak and Decline



Understanding Peak Oil:

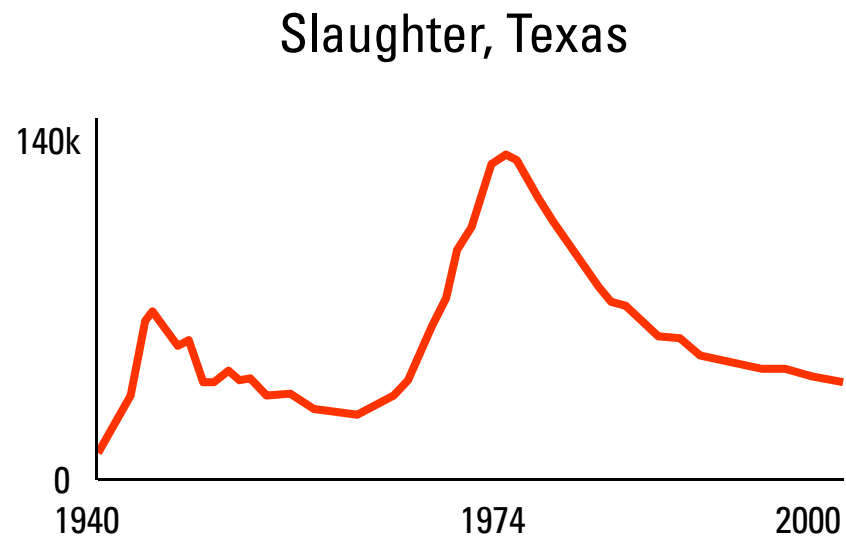
- Giant Fields Peak and Decline



* production curves excerpted from a presentation by Matt Simmons

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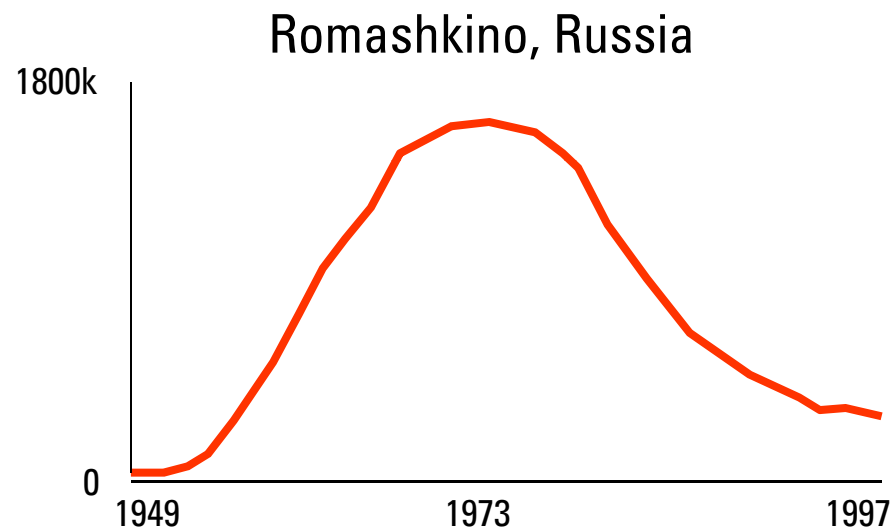
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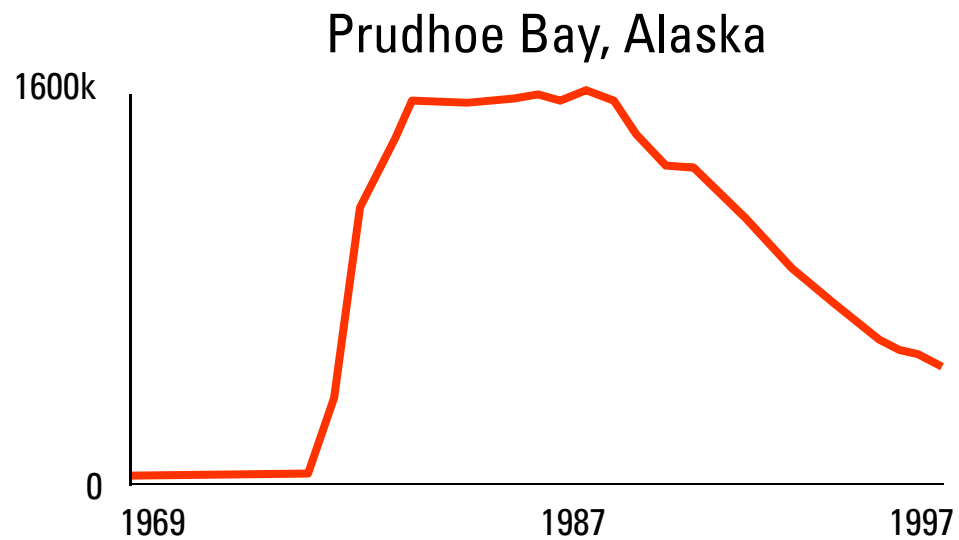
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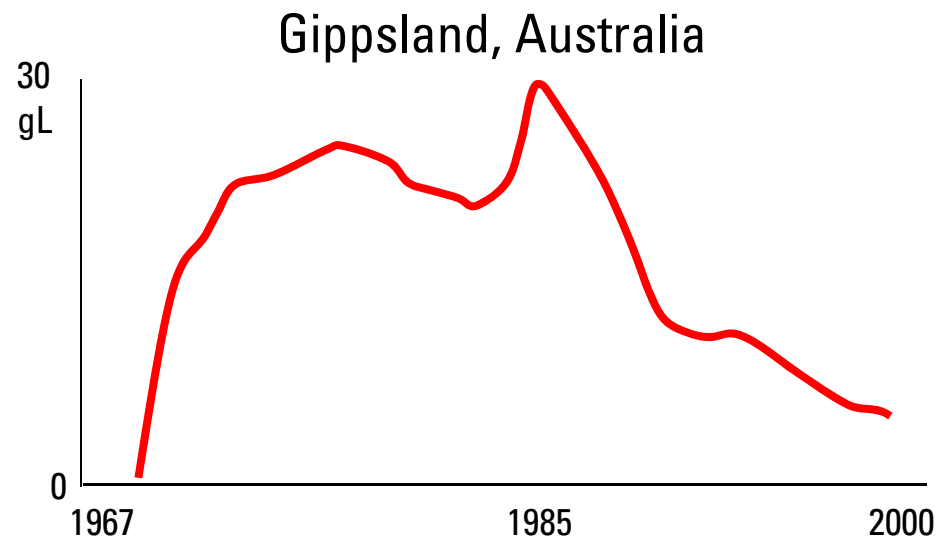
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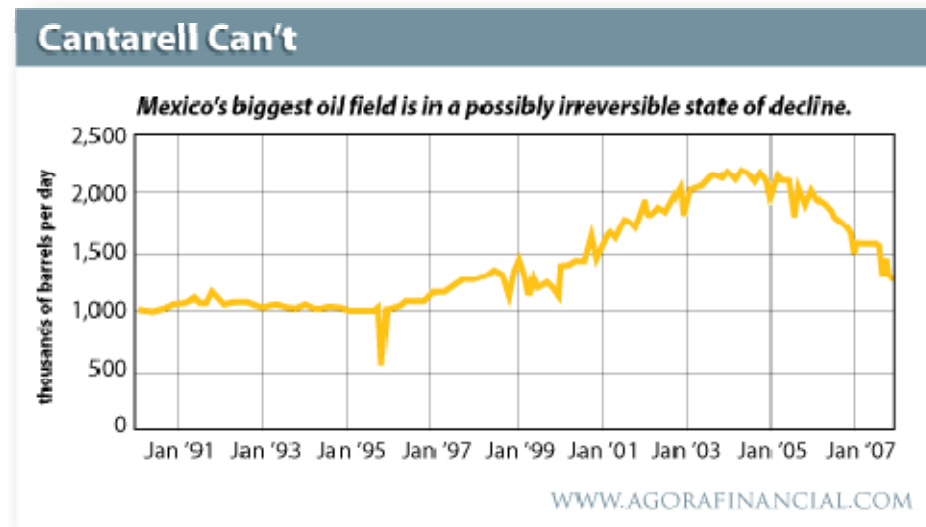
Gippsland field profile adapted from ASPO-Australia.

Understanding Peak Oil:

- Giant Fields Peak and Decline

Cantarell, Mexico

World's 3rd Largest Oil Field

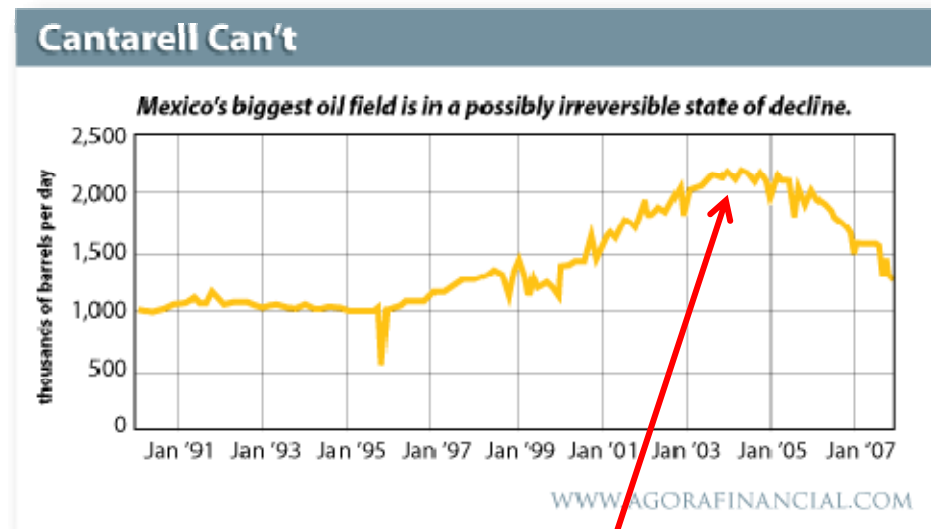


Understanding Peak Oil:

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Cantarell, Mexico

World's 3rd Largest Oil Field



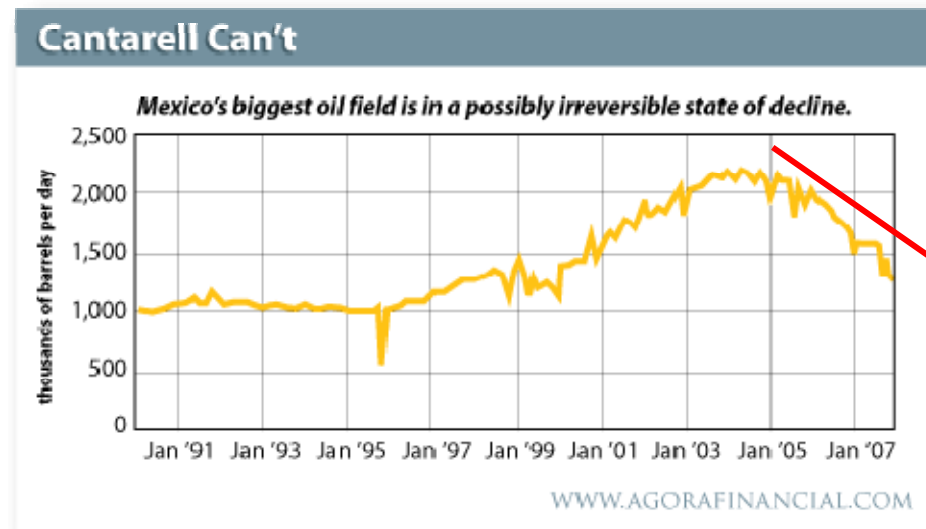
Peaked in 2004

Understanding Peak Oil:

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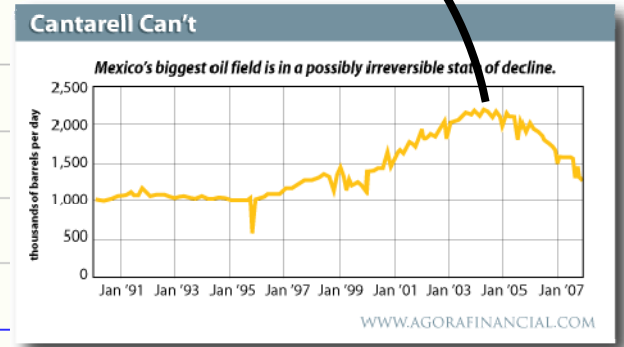
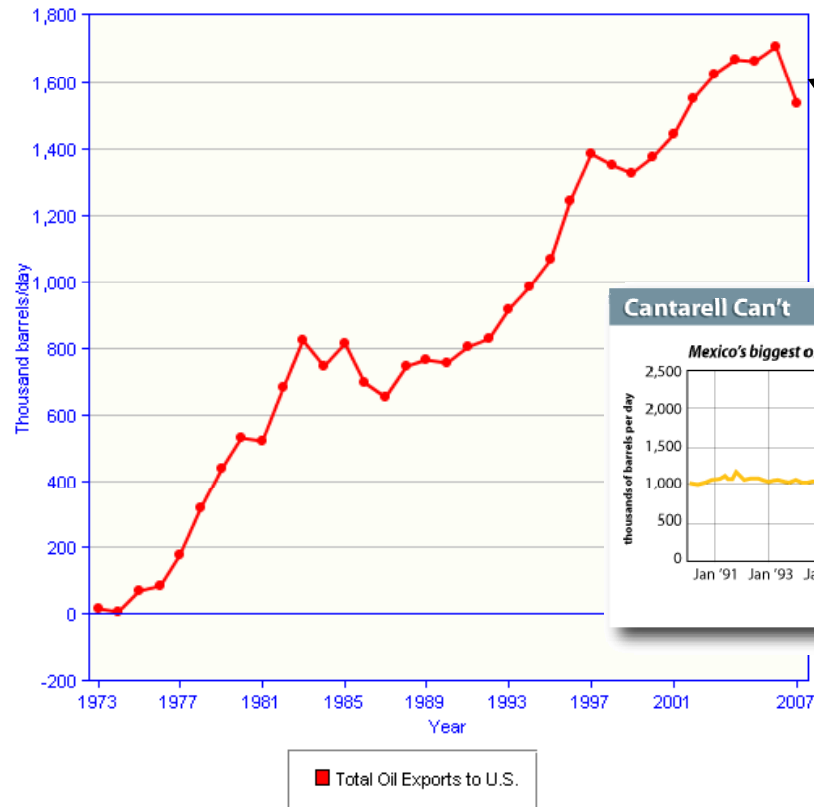


Rapid Annual Rate of Depletion
(along the 'worst case scenario' path)

Understanding Peak Oil:

- Giant Fields Peak and Decline

Mexico Oil Exports to the U.S.



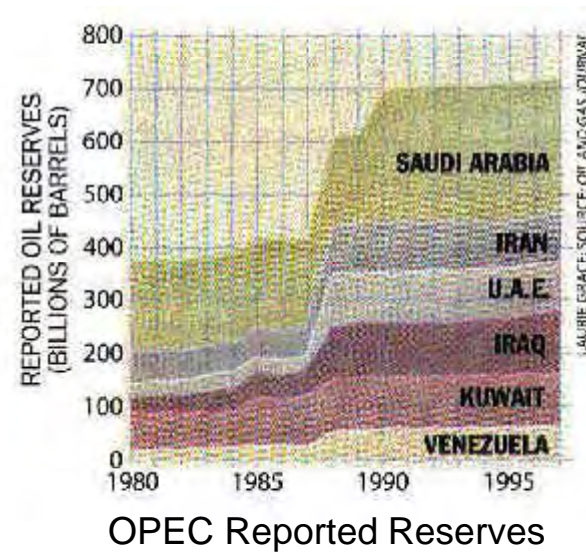
Understanding Peak Oil:

The data is poor, or intentionally manipulated



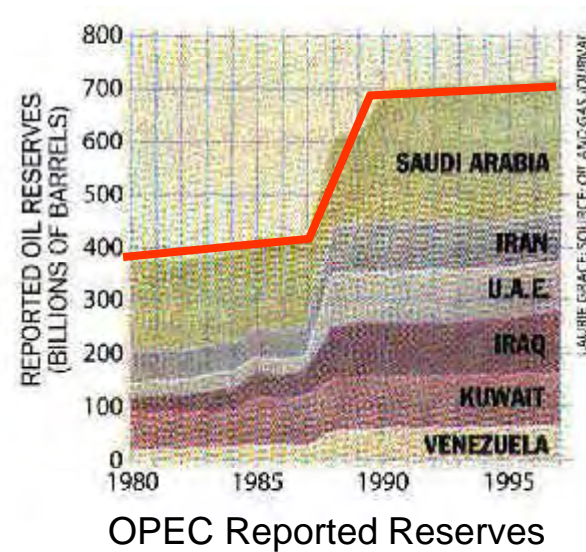
Understanding Peak Oil:

- Giant Fields Peak and Decline
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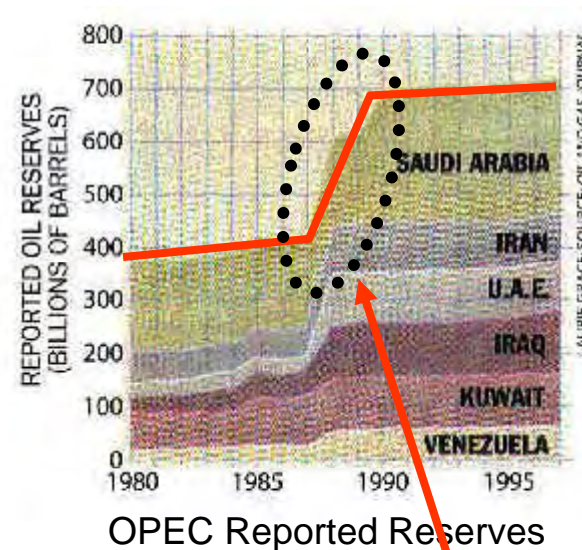
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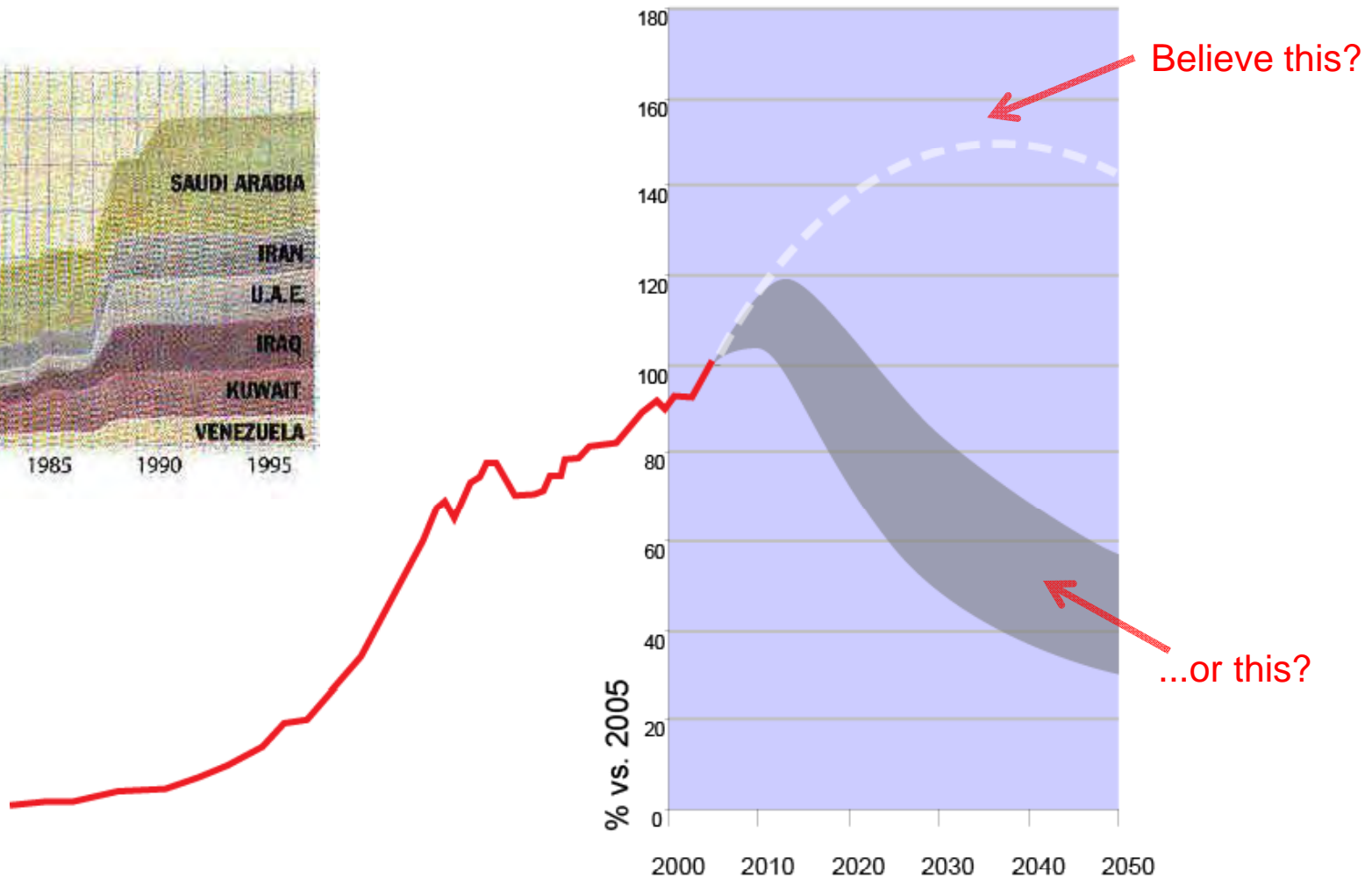
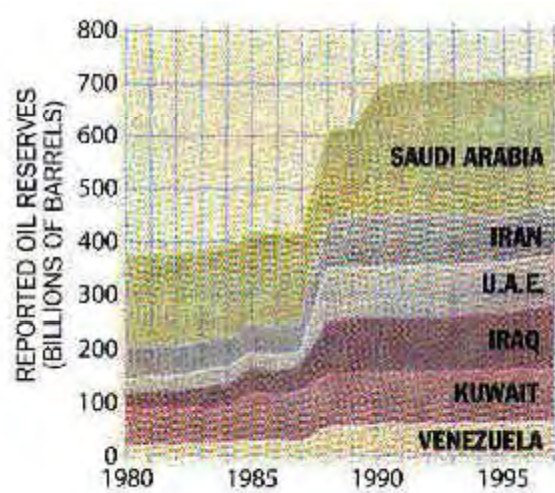


In the late 80s OPEC Rules Changed :

The More Reserves You Have

> > More Pumping Allowed = More \$\$\$

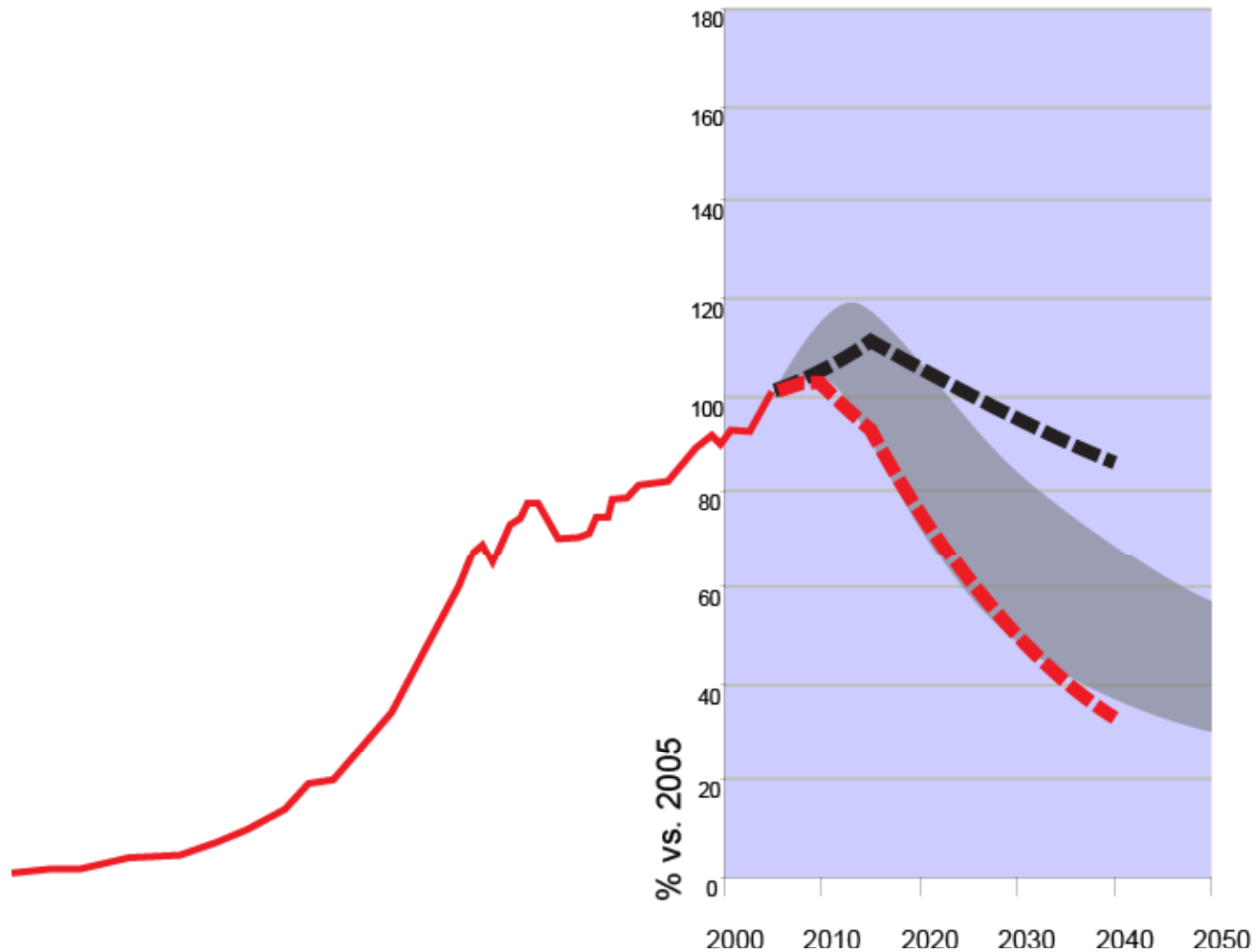
Future Availability of Oil-Based Fuels



Gray: Scenario range per peer reviewed study by Fredrik Robelius, University of Uppsala

Our Future(s): Two Scenarios

The future of transportation and land-use



Dynamic Cities Depletion Models:

- For the U.S. and Canada
- Conventional Oil

'Techno Markets'

Slower Depletion (-1% per year)

'Lean and Local'

More Rapid Depletion (-4% per year)

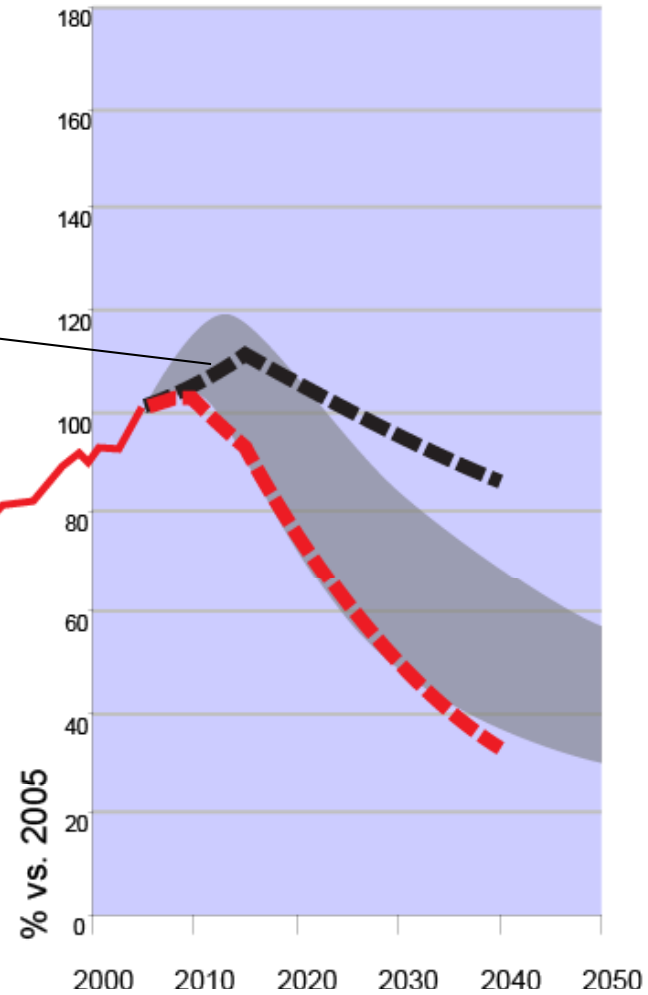


Our Future(s): Two Scenarios



'Techno Markets'

- Current BC Climate Action Plan
- LEED, Smart Growth Etc.

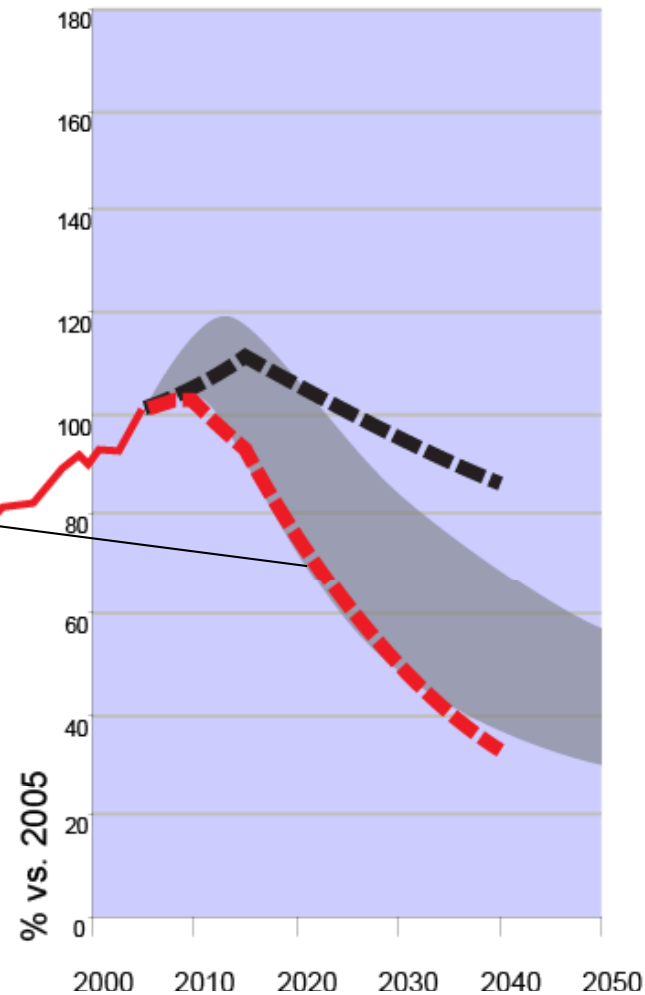


Our Future(s): Two Scenarios



'Lean and Local'

- Less money and less mobility
- Rising prices
- Transient shortages
- Immigration Flux



Part I

Understanding Peak Oil

Part II

Dynamic Design, Dynamic Cities:

Green

+ Net Positive

+ Resilient



Dynamic Design, Dynamic Cities

Project 1 – Green Vacation Home



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urban ideas for a rowdy future

Green Materials, energy and water systems?



Dynamic Design, Dynamic Cities

Project 1 – Green Vacation Home



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✓ Green Materials, energy and water systems... **yes.**



Dynamic Design, Dynamic Cities

Project 1 – Green Vacation Home



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- ✓ Green Materials, energy and water systems... **yes.**
- ‘Net Positive’ Impact on emissions and oil dependence?



Dynamic Design, Dynamic Cities

Project 1 – Green Vacation Home



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urban ideas for a rowdy future



✓ Green Materials, energy and water systems... yes.
‘Net Positive’ Impact on emissions and oil dependence?

...no.

- ‘green field’ project
- no renovation component
- remote site (travel intensive)

Dynamic Design, Dynamic Cities

Project 2 – Addition and Renovation



- ✓ Green Materials, energy and water systems.
- 'Net Positive' Impact on emissions?

Dynamic Design, Dynamic Cities

Project 2 – Addition and Renovation



- ✓ Green Materials, energy and water systems.
- ✓ 'Net Positive' Impact on emissions...**yes.**

By combining renovation with addition, the overall project emits less GHGs, even while adding floor space.

Dynamic Design, Dynamic Cities

Project 2 – Addition and Renovation



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- ✓ Green Materials, energy and water systems.
- ✓ 'Net Positive' Impact on emissions...**yes.**

But is it resilient?

- Valuable across all futures?
- Copes well with shortages of power or transport fuel?

Dynamic Design, Dynamic Cities

Project 2 – Addition and Renovation



- ✓ Green Materials, energy and water systems.
- ✓ 'Net Positive' Impact on emissions...**yes.**

But is it resilient?

... no
(but better than before)

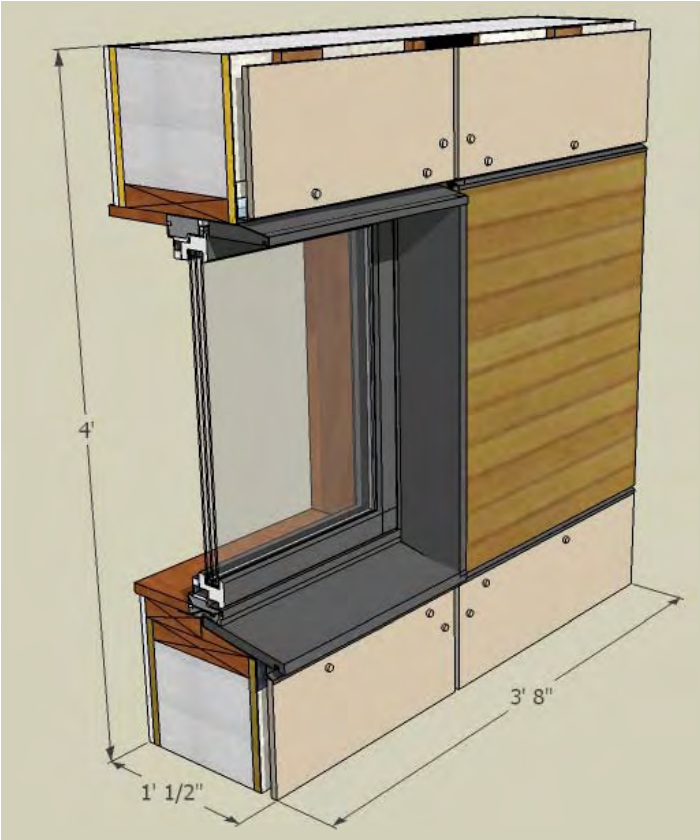
Dynamic Design, Dynamic Cities

Project 3 – Lanefab Laneway Housing



Dynamic Design, Dynamic Cities

Project 3 – Lanefab Laneway Housing



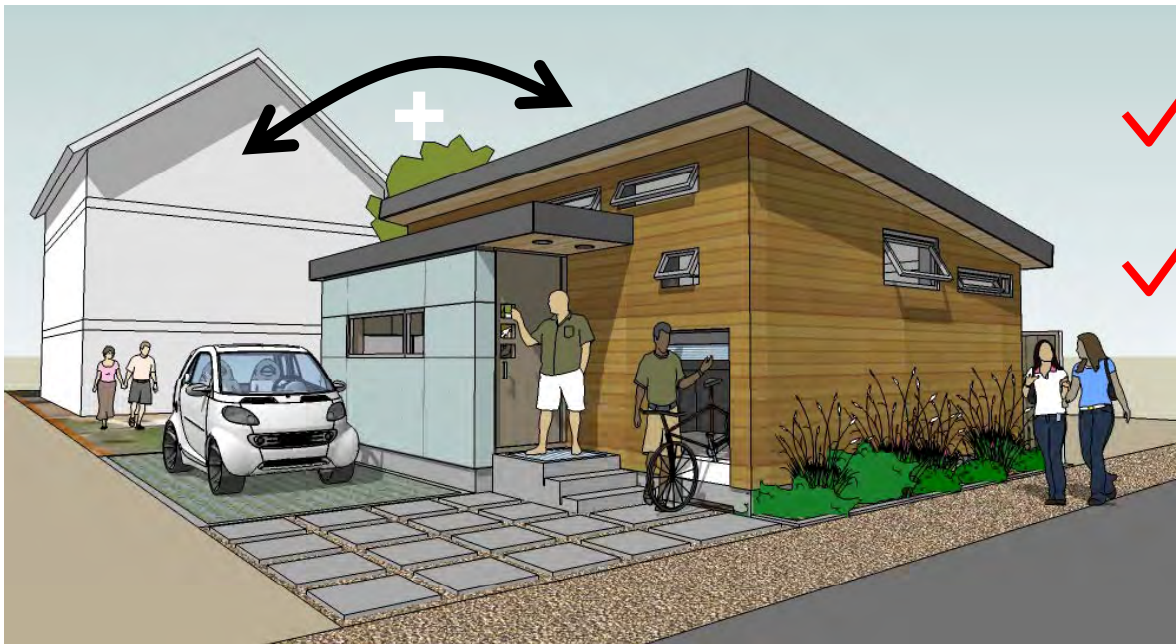
Typical R-40 Wall Section

✓ Green Materials, energy and water systems.



Dynamic Design, Dynamic Cities

Project 3 – Lanefab Laneway Housing



- ✓ Green Materials, energy and water systems.
- ✓ 'Net Positive' Impact on emissions, oil dependence and other sustainability metrics.

Net Positive = Energy efficient design + main house energy efficiency upgrades.



Dynamic Design, Dynamic Cities

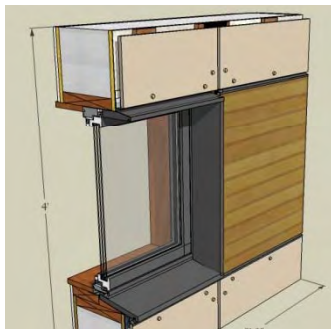
Project 3 – Lanefab Laneway Housing



Bike-centric



Urban infill



Near 'Passivehaus'
low energy standard

✓ Green Materials, energy and water systems.

✓ 'Net Positive' Impact on emissions.

✓ Resilient
- Valuable across all futures
- Copes well with shortages



Dynamic Design, Dynamic Cities

= Green
+ Net Positive
+ Resilient

Dynamic Design, Dynamic Cities

= Green
+ Net Positive
+ Resilient

*Is your project contributing
to a Dynamic City?*



Bryn Davidson
604.728.0606

www.dynamiccities.org

www.rao-d.com

www.lanefab.com

