

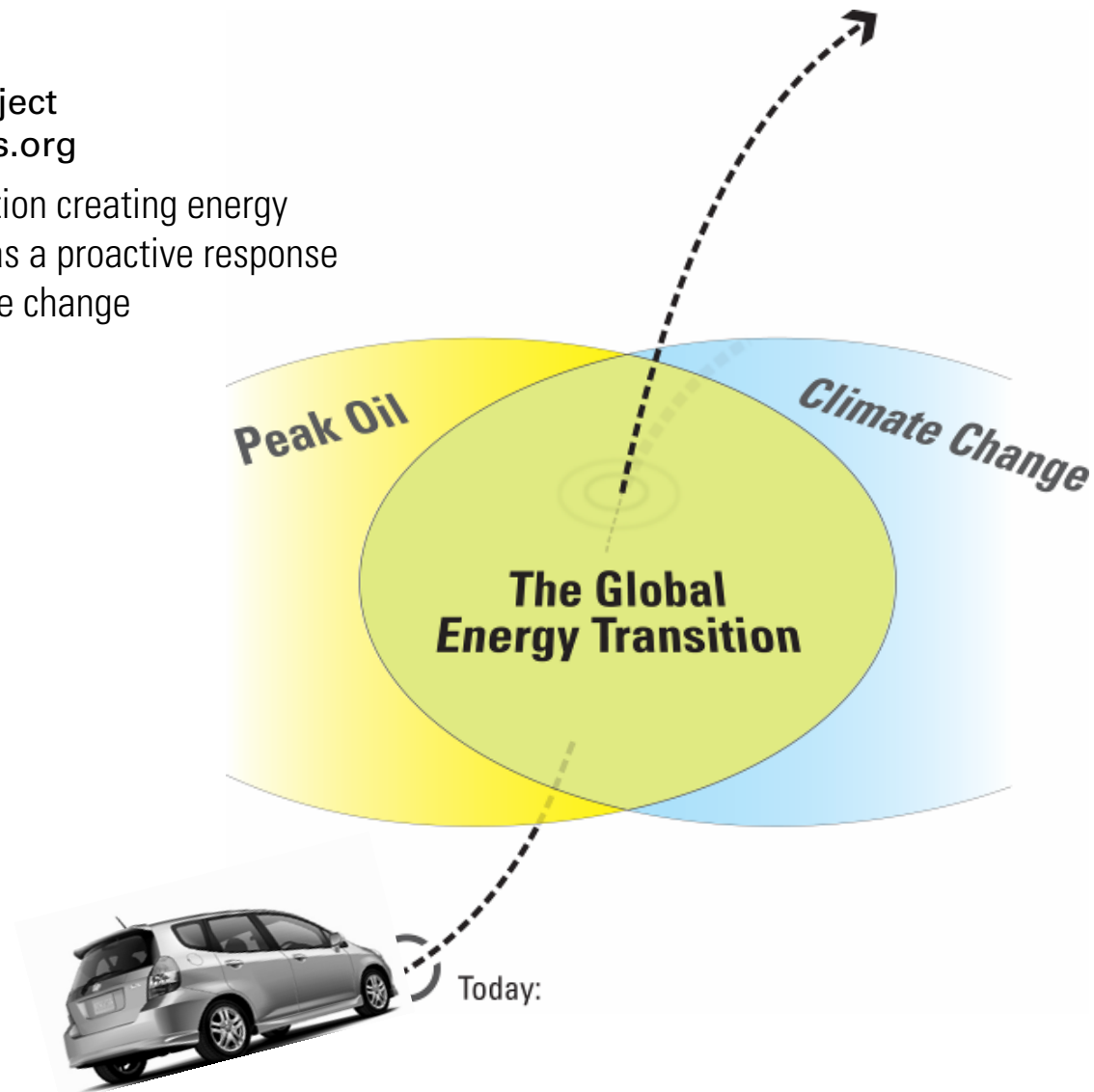
Peak Oil, Climate Change & Transportation

Seattle Friday June 13, 2008

Bryn Davidson

Dynamic Cities Project
www.dynamiccities.org

A non-profit organization creating energy transition strategies as a proactive response to peak oil and climate change



1. Energy Transition = Peak Oil + Climate Change

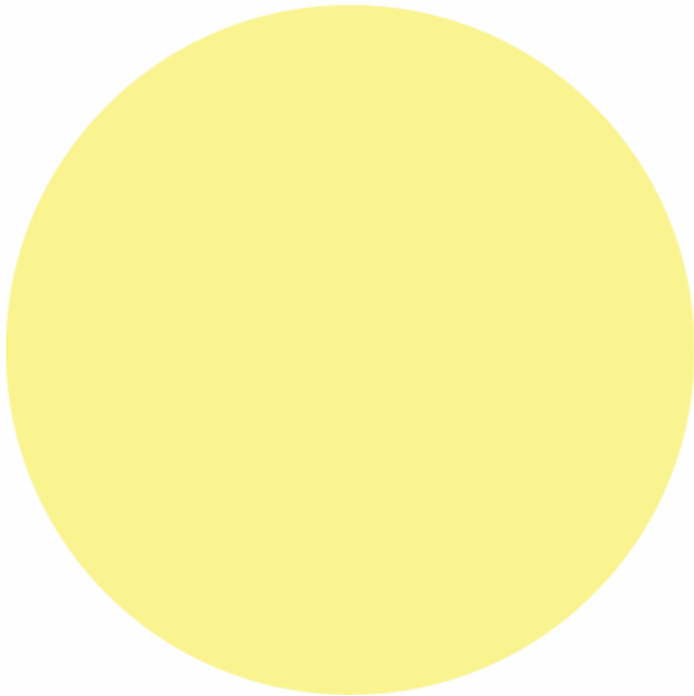
2. Thinking outside the extrapolation
(using scenarios to plan)

3. Next Steps...



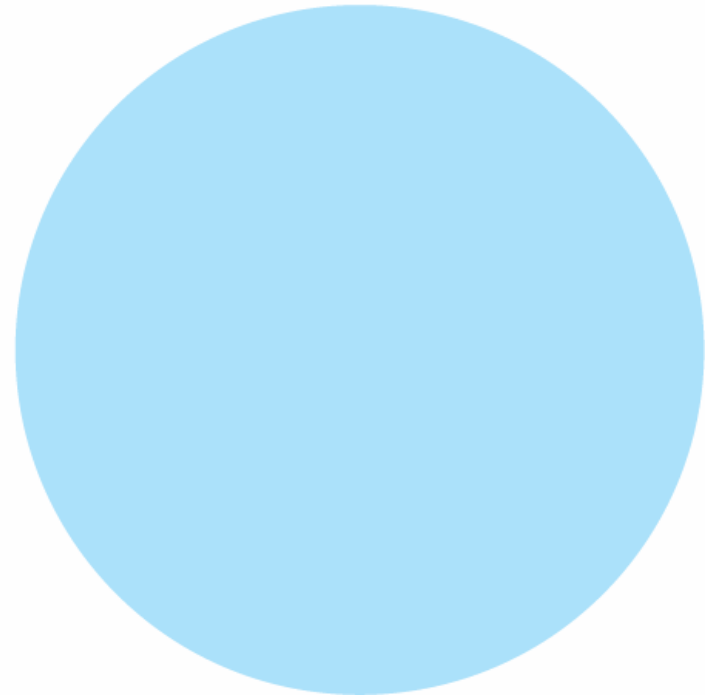
1. Energy Transition > Emerging Challenges...

Peak Oil



Vs.

Climate Change



1. Energy Transition > Emerging Challenges...

Peak Oil

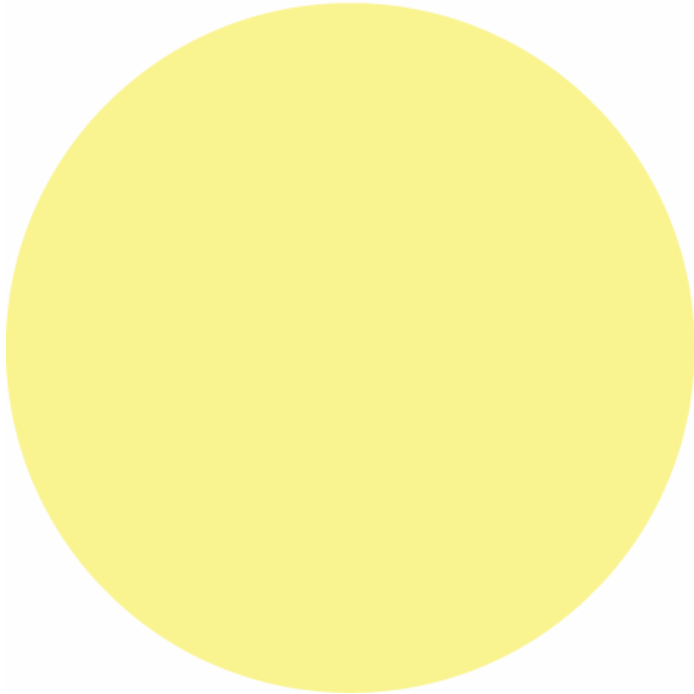
**Global
crisis for capitalism
and economic growth**

...potentially causing global
humanitarian crises

Climate Change

1. Energy Transition > Emerging Challenges...

Peak Oil



Climate Change

**Global
ecological and
humanitarian crisis**


..potentially causing
global economic crises

1. Energy Transition > Emerging Challenges...

Peak Oil

+

Climate Change

- 
- A Venn diagram with two overlapping circles. The left circle is yellow and labeled 'Peak Oil'. The right circle is light blue and labeled 'Climate Change'. The intersection of the two circles is shaded green and contains a list of five items, each preceded by an asterisk.
- * Food production and prices
 - * Economy / Inflation / Jobs
 - * Immigration / Refugees
 - * Livability of our homes & cities
 - * Political Stability & Safety

There are many potential impacts on cities that will be exacerbated by *both* peak oil *and* climate change.

1. Energy Transition > Emerging Challenges...

For a long time now we've known how to create sustainable cities...

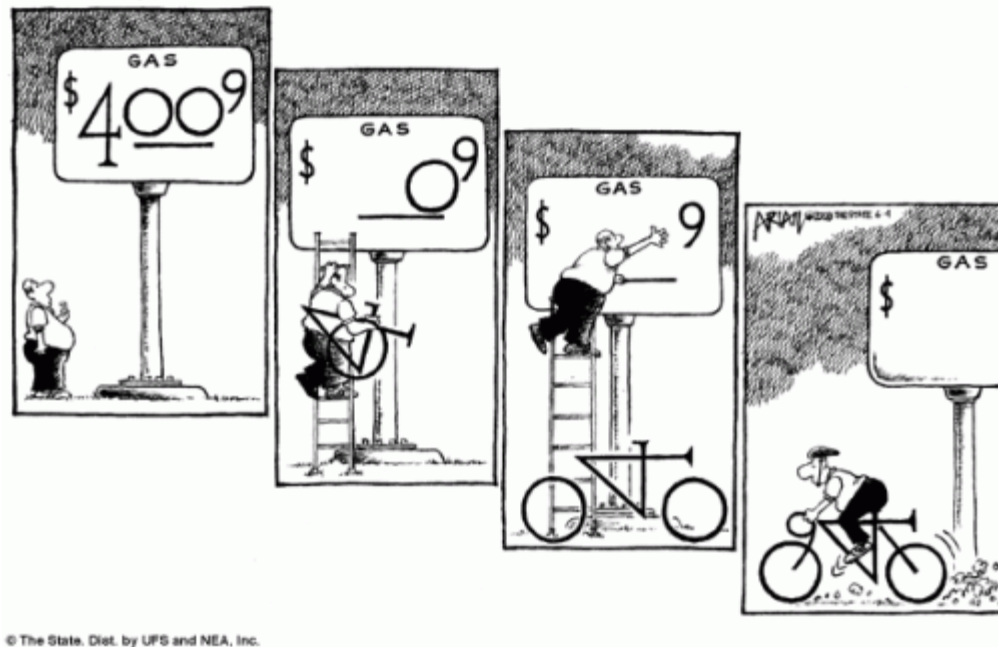
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For a long time now we've known how to create sustainable cities...
...but the motivation to scale-up these solutions has been lacking.



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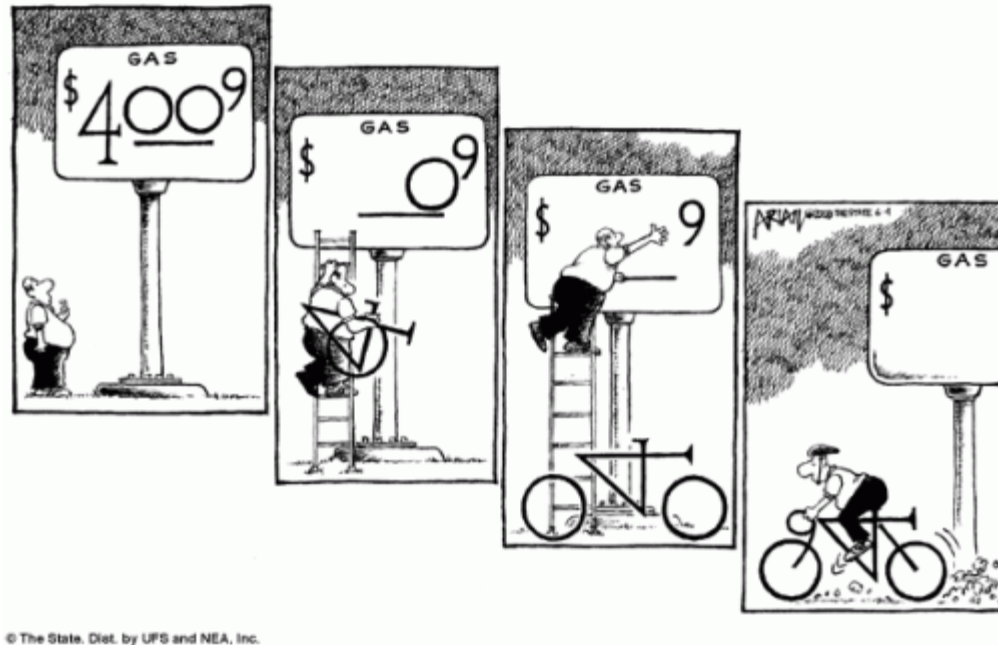
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Peak oil and climate change will create tipping points
that will change what we're willing to do...

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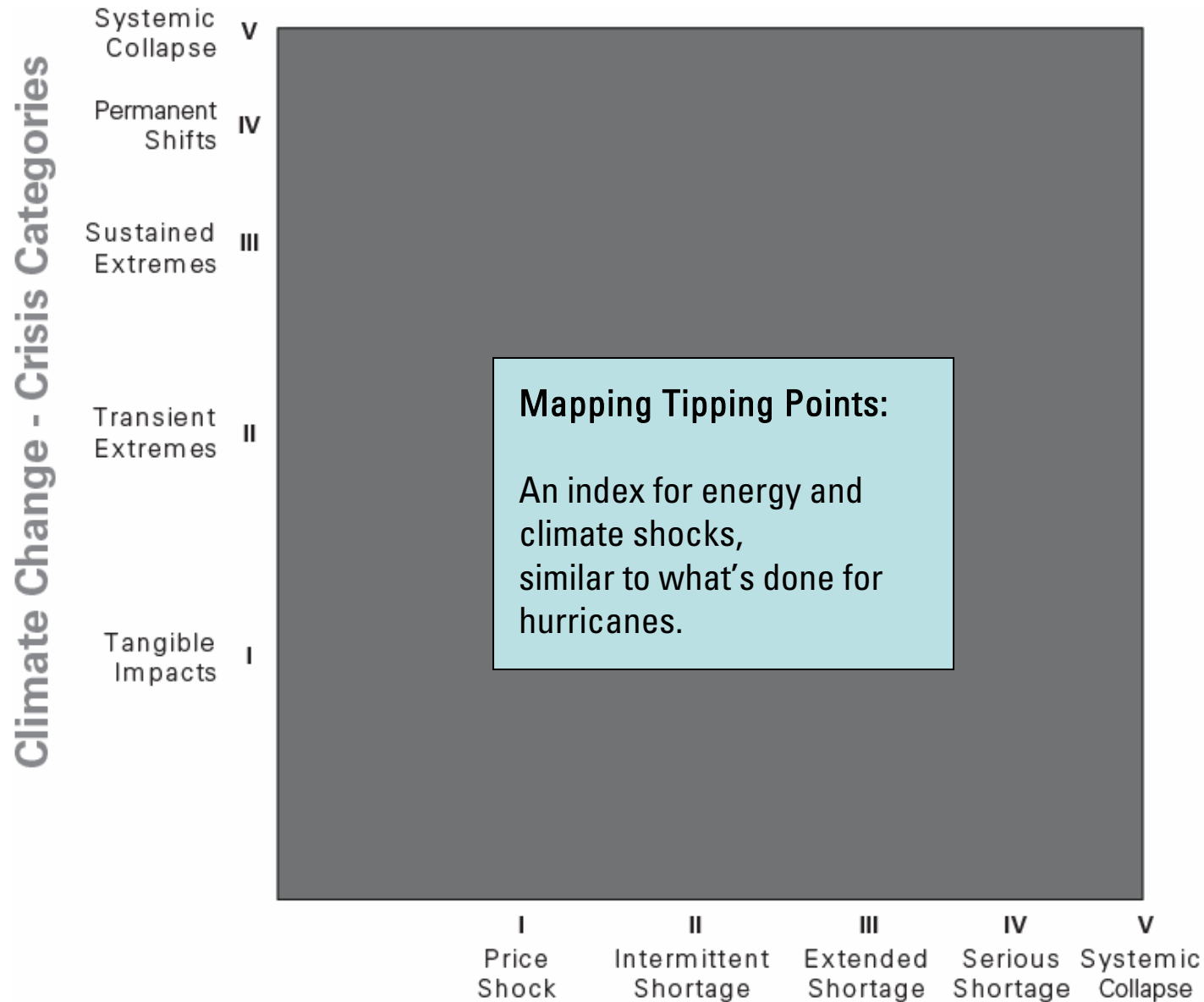
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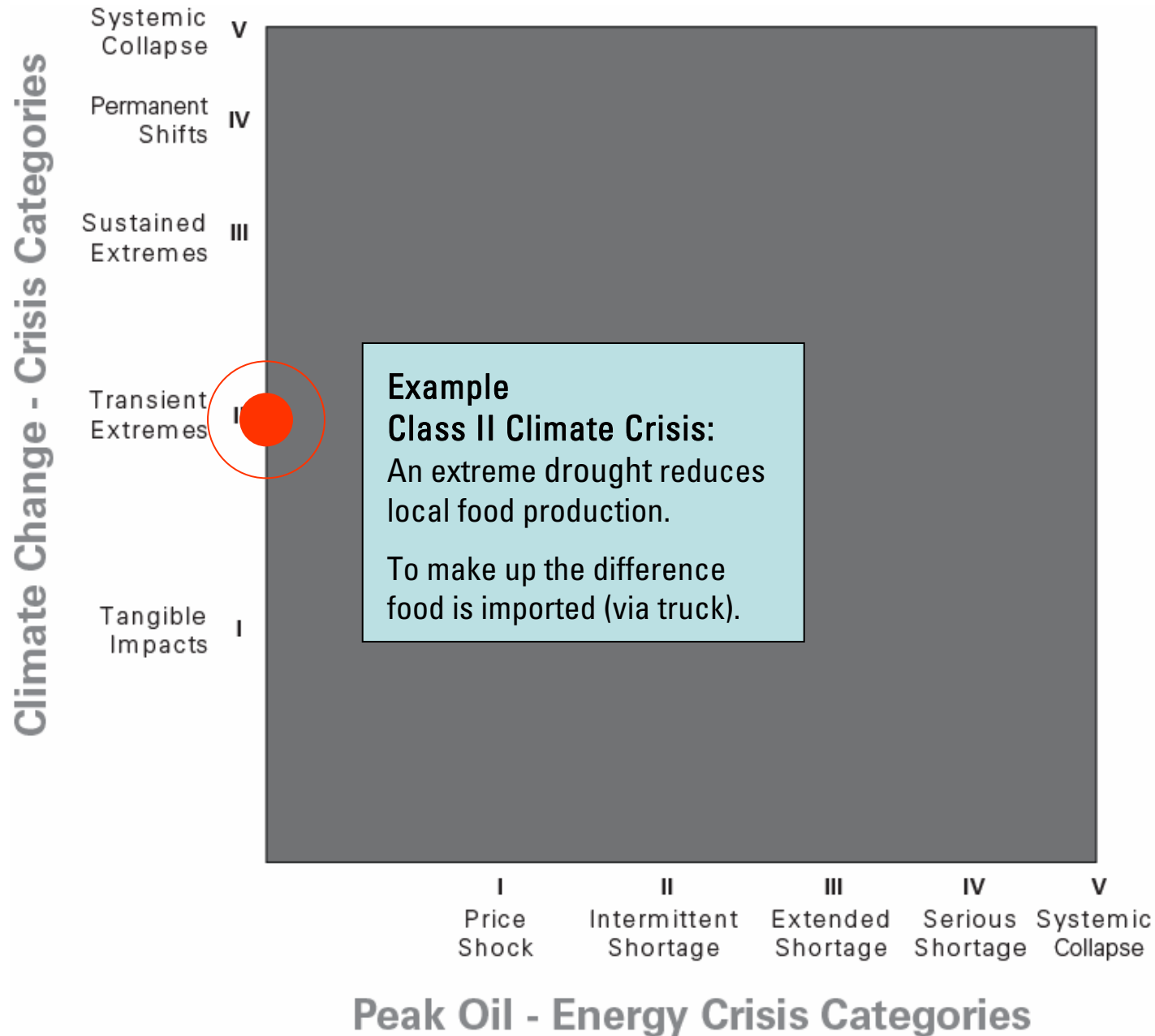
How well we transition to a sustainable future will be determined
by how we react to these energy and climate tipping points.

1. Energy Transition > Emerging Challenges...

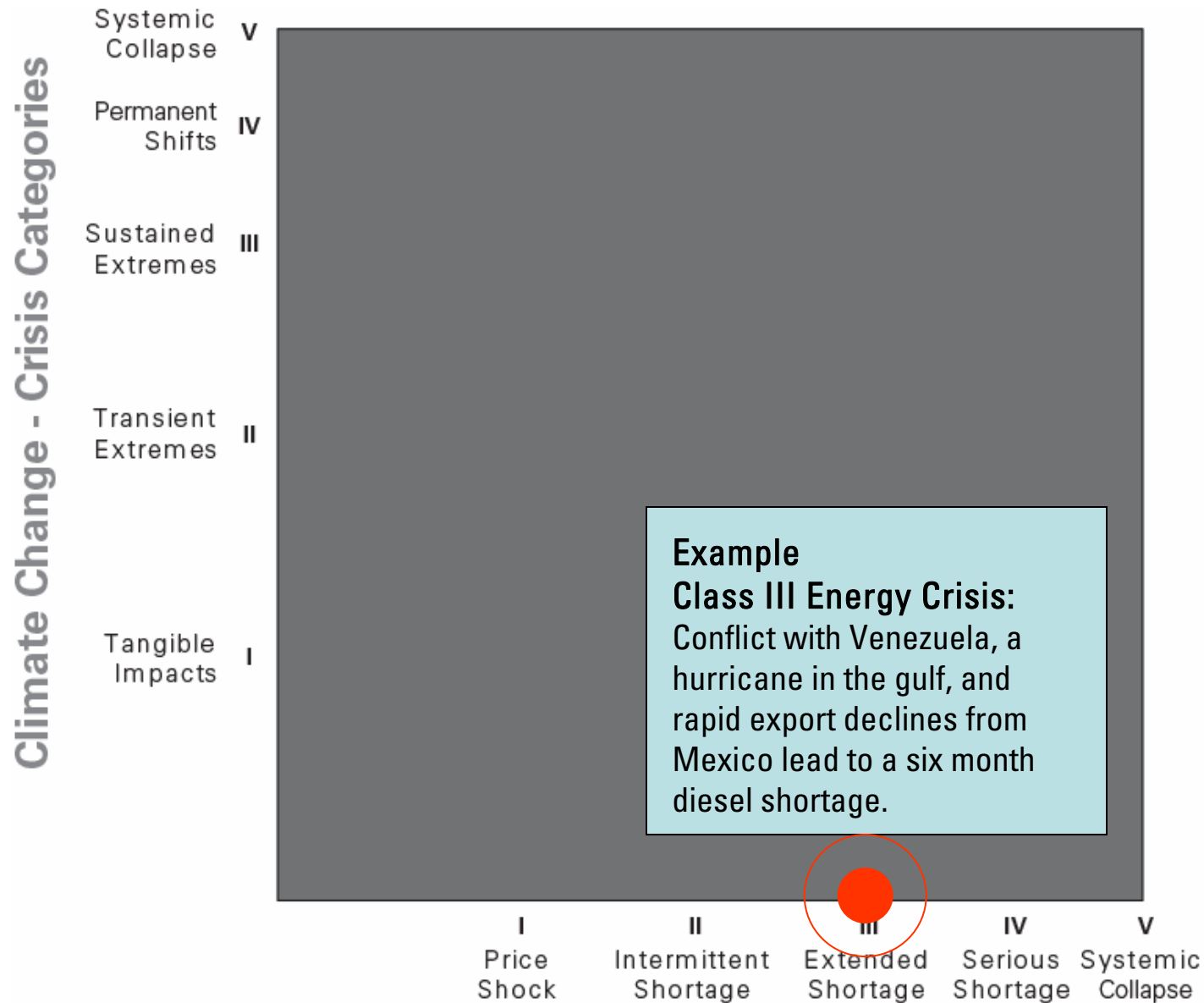


Peak Oil - Energy Crisis Categories

1. Energy Transition > Emerging Challenges...

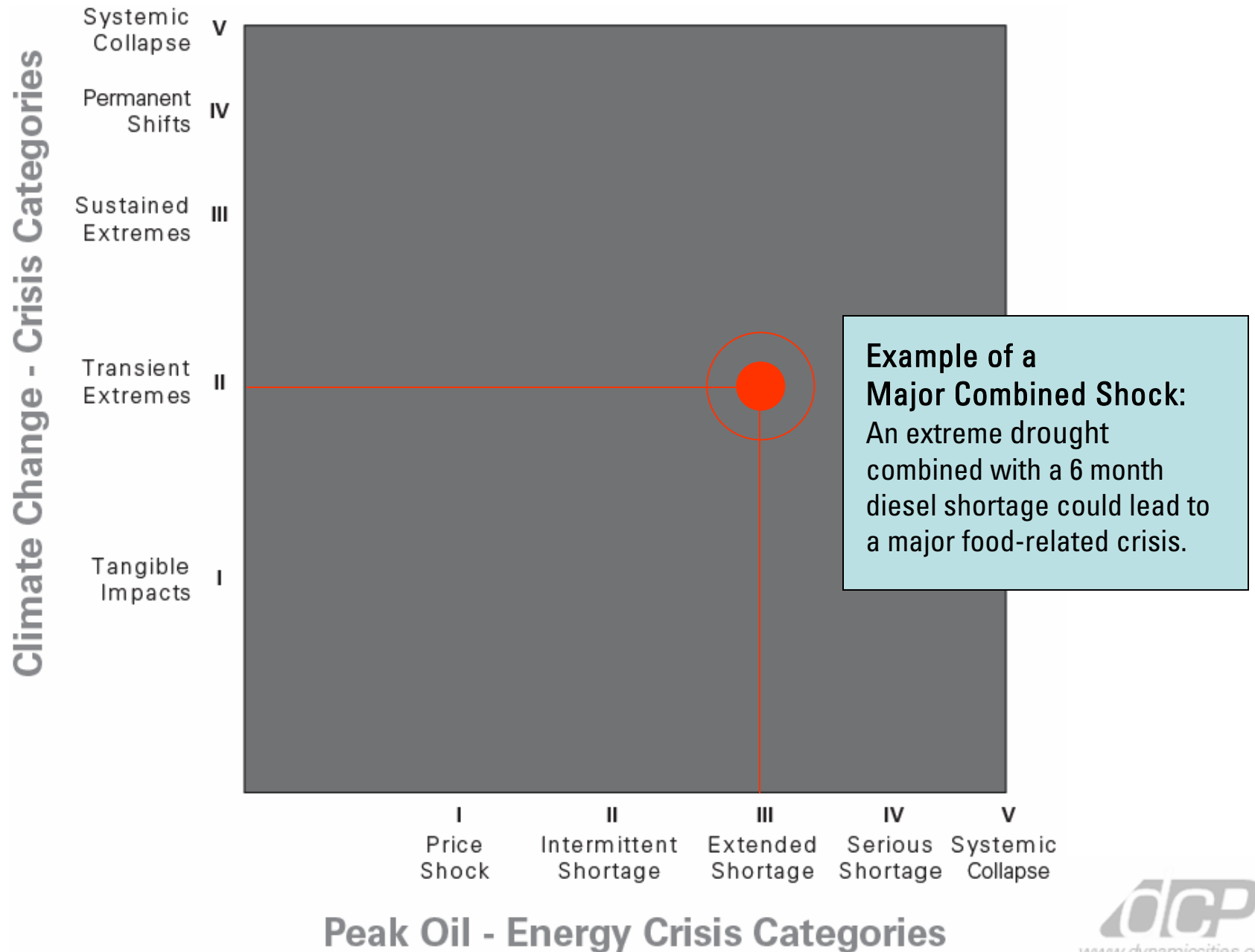


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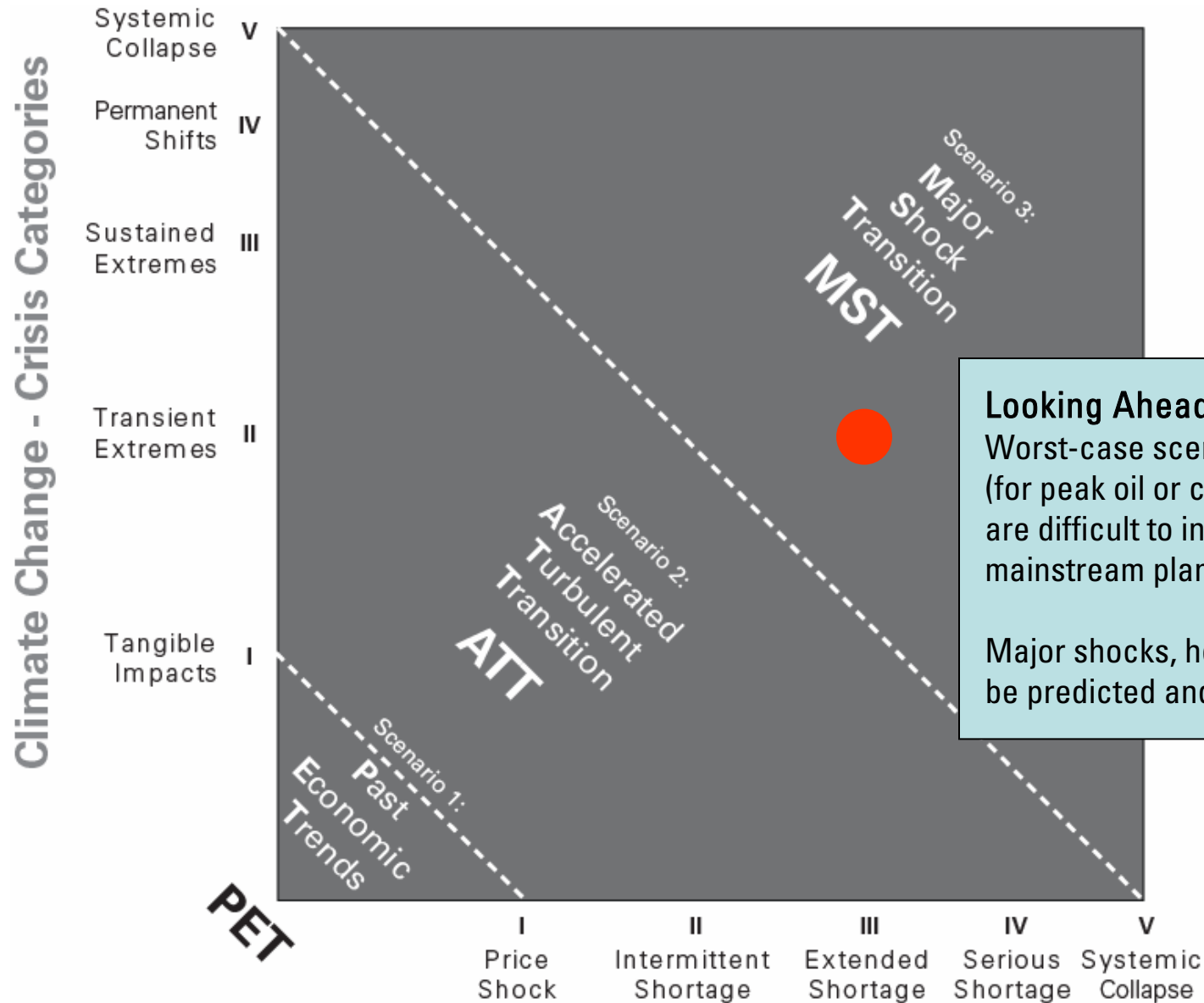


Peak Oil - Energy Crisis Categories

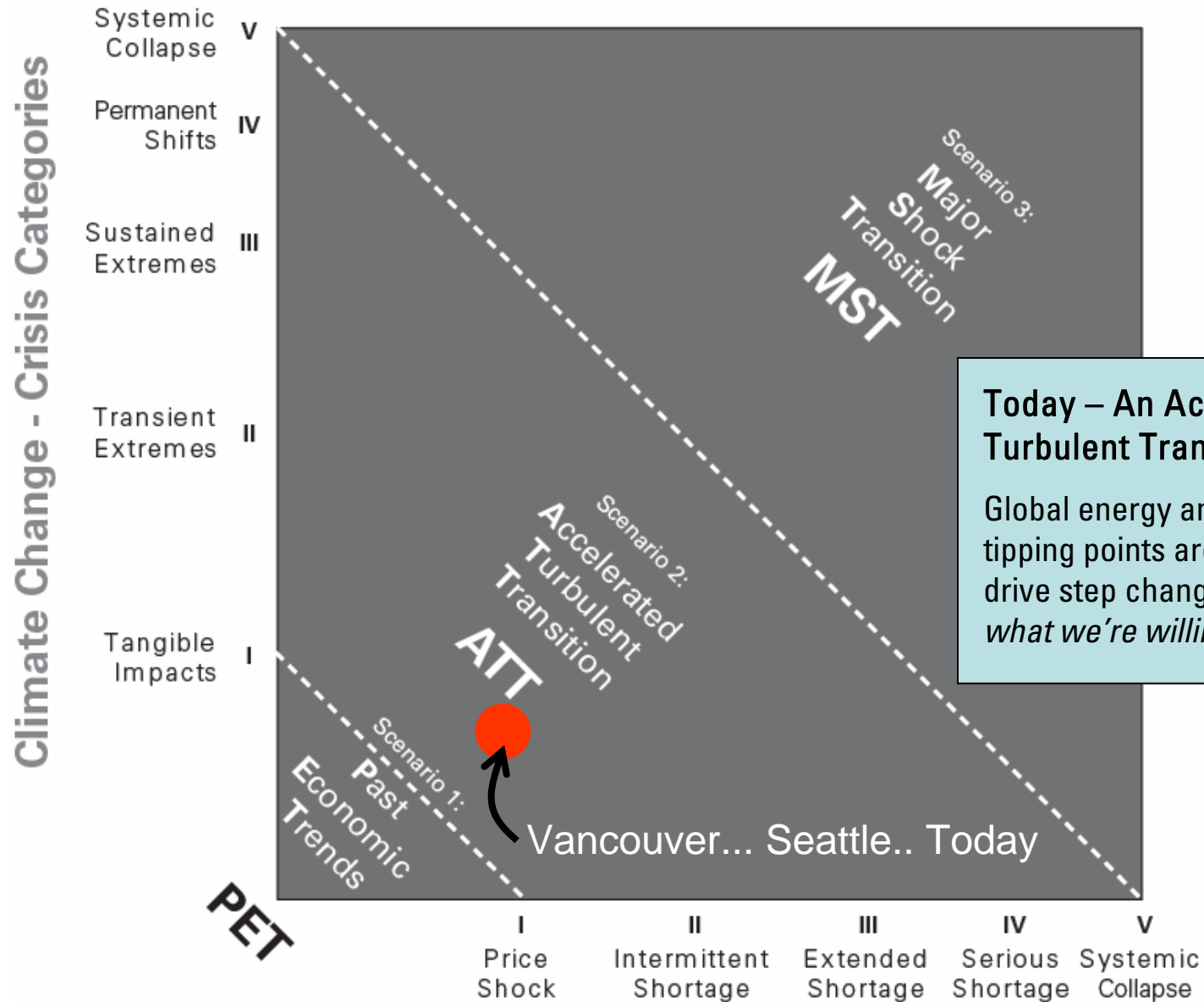
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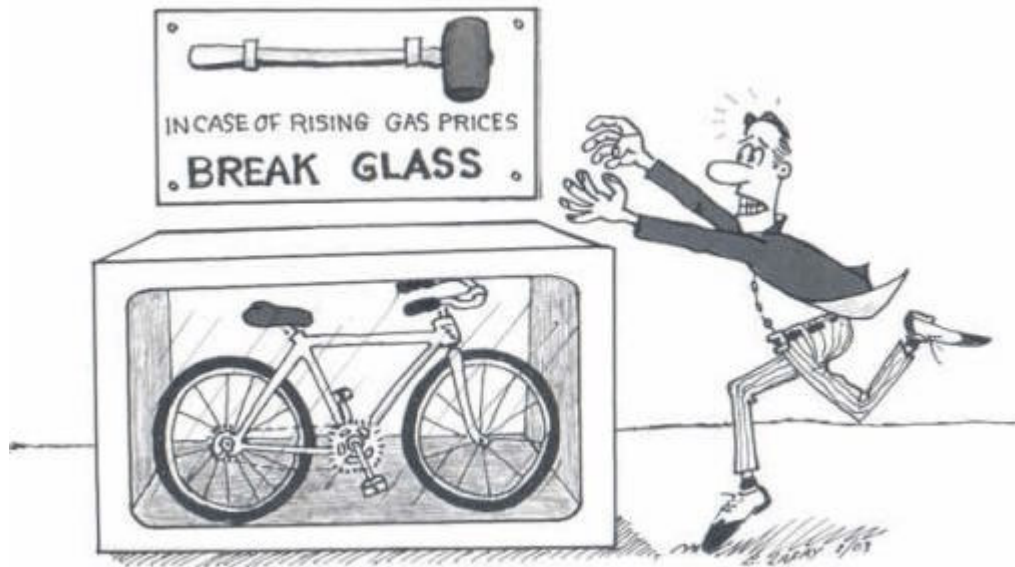
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Today – An Accelerating Turbulent Transition:
 Global energy and climate tipping points are starting to drive step changes in *what we're willing to do.*

Peak Oil - Energy Crisis Categories

1. Energy Transition > Emerging Challenges...



**Today – An Accelerating
Turbulent Transition:**

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1. Energy Transition > Emerging Challenges...



Desperate times: Ford will retool truck plants to build cars



Today – An Accelerating Turbulent Transition:

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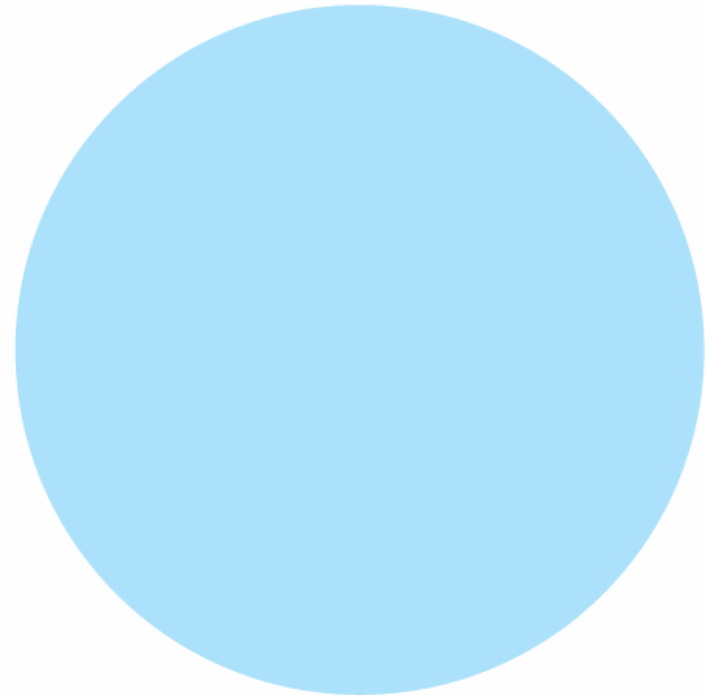
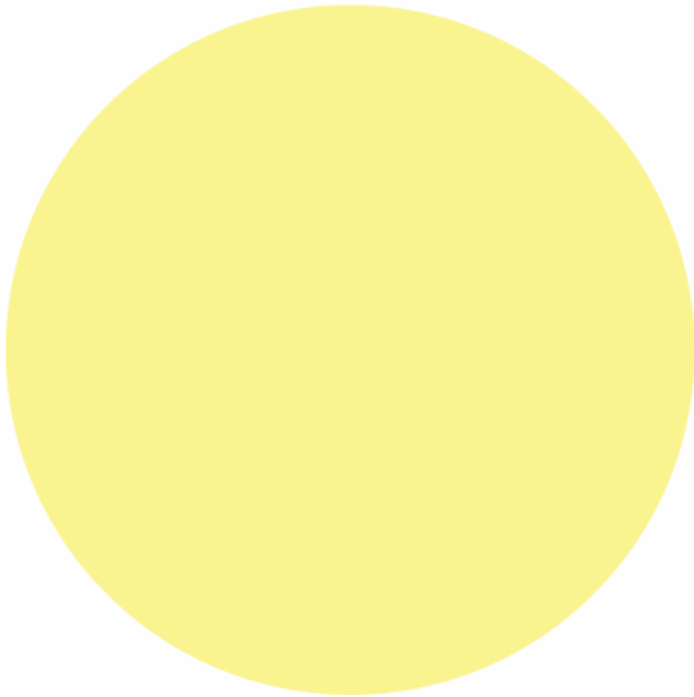
Download a short compilation of articles on the various economic and travel impacts of higher gas prices:
http://dynamiccities.squarespace.com/files-documents/shocks-crisis/GasPriceImpacts_June2008.pdf

1. Energy Transition > What to do?

Peak Oil

Vs.

Climate Change



1. Energy Transition > What to do?

Peak Oil

Many potential responses to peak oil could lead to a *disastrous acceleration of climate change*

Vs.

Climate Change

1. Energy Transition > What to do?

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Many potential responses to peak oil could lead to a *disastrous acceleration of climate change*

- * **Gas to Coal Switching**
- * **Coal to Liquids**
- * **Tar Sands and Shale**
- * **Forest Removal for Biofuels**



1. Energy Transition > What to do?

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Many potential responses to peak oil could lead to a *disastrous acceleration of climate change*

Many strategies for addressing climate change *do nothing to reduce oil dependence*

- * Gas to Coal Switching
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1. Energy Transition > What to do?

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- * Gas to Coal Switching
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- * **Emissions Trading**
- * **Forestry Based Offsets**
- * **Atmospheric Carbon Capture**




1. Energy Transition > What to do?

Peak Oil

+

Climate Change



We need to prioritize strategies that reduce *both* emissions *and* oil dependence

=

Energy Transition Strategies

1. Energy Transition > What to do?

Peak Oil

+

Climate Change

We need to make
resilient investments
that will retain their value...

...both in today's world...
and in a future defined by
the impacts of peak oil and
climate change

1. Energy Transition > What to do?



Airlines Desert Small Towns, Despite Costly Investments in Infrastructure

If you build it, will they come? Not in Hagerstown, Maryland, where airlines have left town despite a brand new runway.

"Earlier this decade, city officials in Hagerstown, Md., started making the case to build a longer runway at their airport to lure service by regional jets, instead of the turboprop planes that provided its only flights.

Several years and \$61.4 million later, the city opened its concrete welcome mat, a new 7,000 foot runway, last November — two months after the airport lost scheduled air service altogether.

Despite its costly investment, a dogged marketing effort by local officials and even help from Congress, the airport has had no luck attracting a new carrier, as the industry struggles under soaring fuel prices.

"Could we pick a worse time to go out and get commercial service? Probably not,"

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"Could we pick a worse time to go out and get commercial service? Probably not,"

This city spent \$61m on a *stranded asset*.

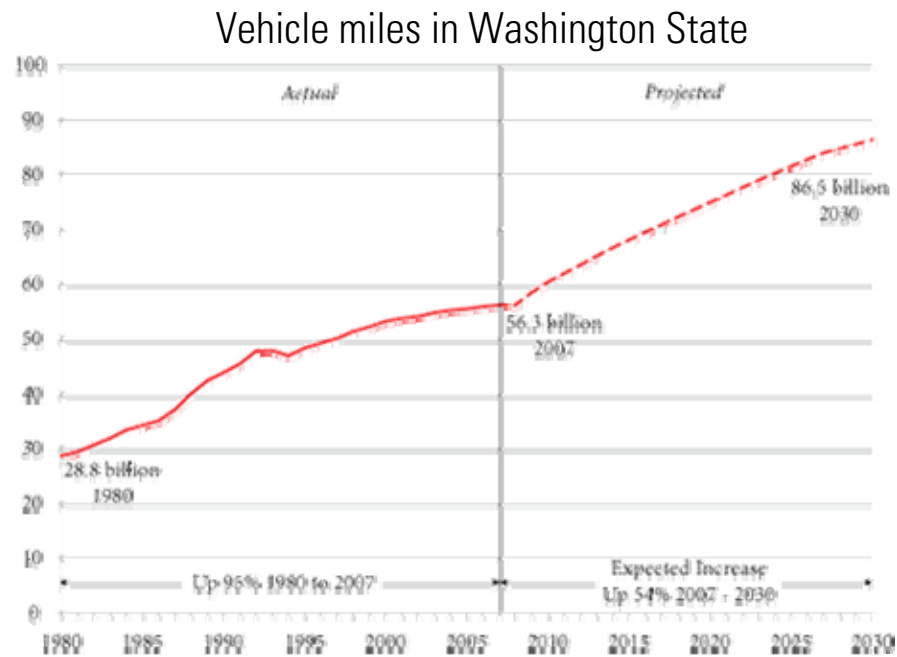
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2. Thinking outside the extrapolation
(using scenarios to plan)

3. Next Steps...

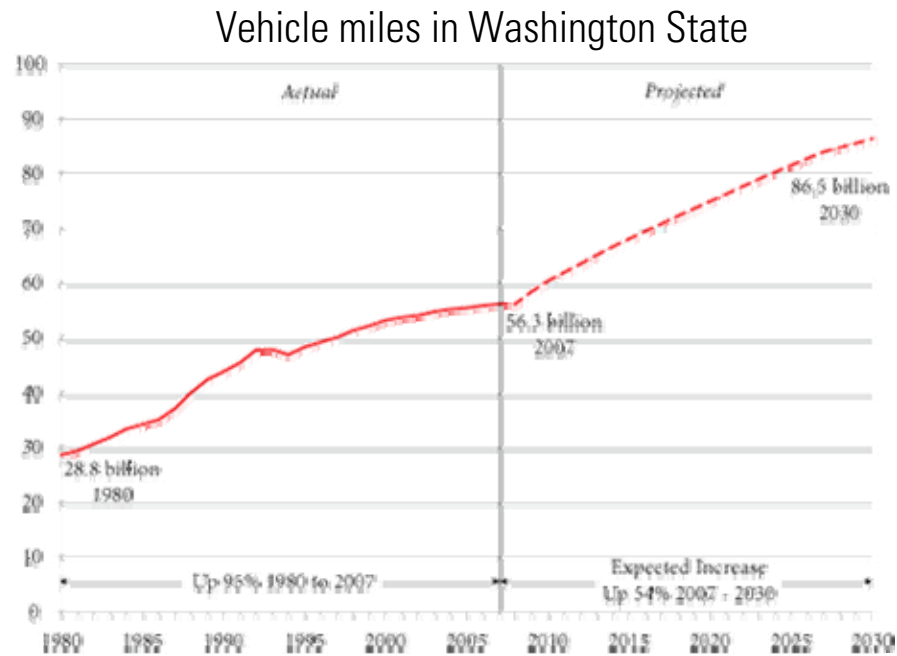


2. Thinking outside the extrapolation



Buried within every infrastructure planning organization are charts like this one....

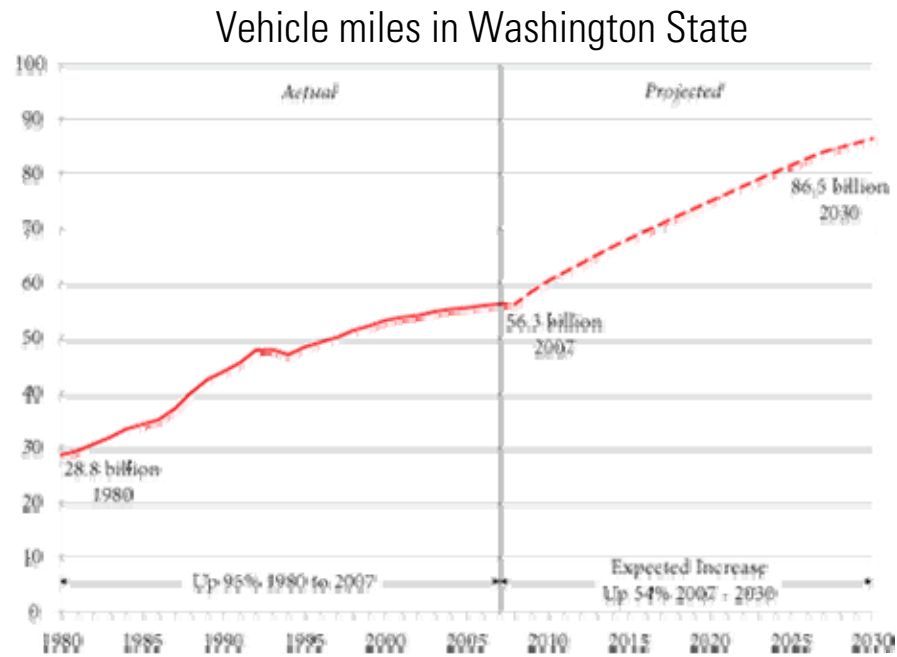
2. Thinking outside the extrapolation



Buried within every infrastructure planning organization are charts like this one...

...they are developed by economists to predict the future demand for infrastructure such as highways

2. Thinking outside the extrapolation



The Past - 1980 to 2007:

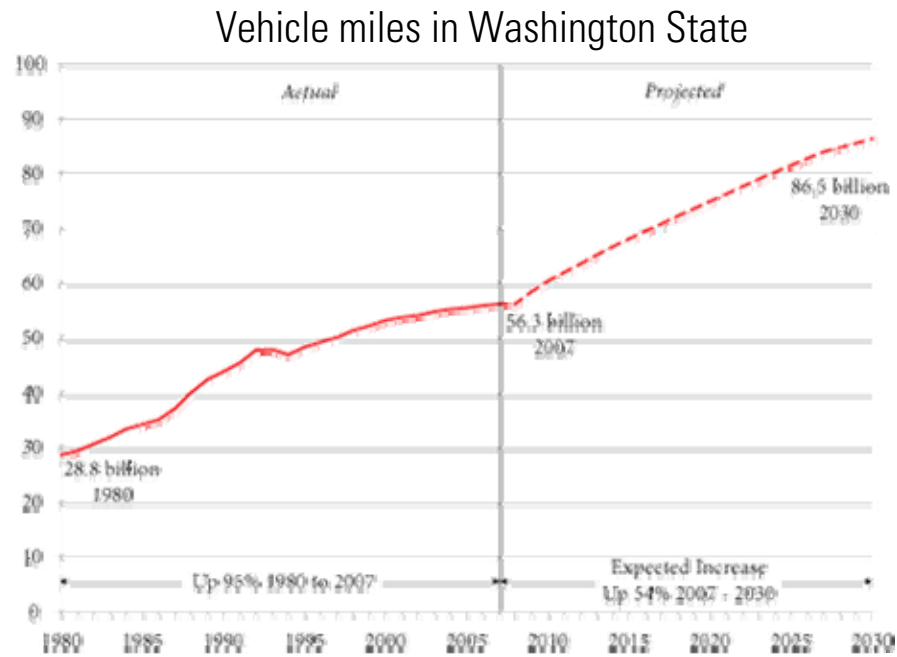
Up 95%

The Future - 2007 to 2030:

Up 54%

These projections are typically *extrapolations* of past trends...

2. Thinking outside the extrapolation



=

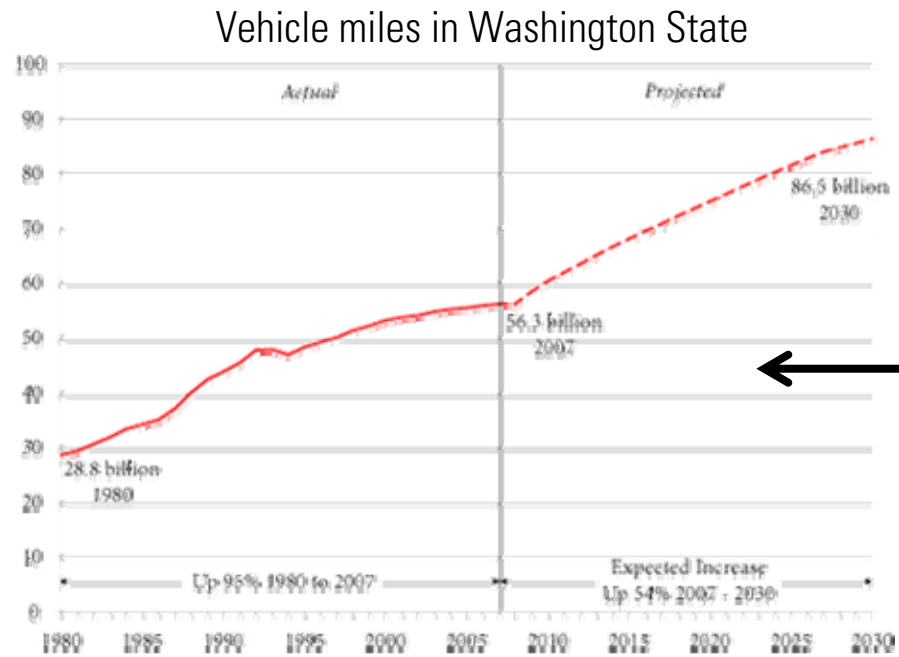


These projections are typically *extrapolations* of past trends...

**...and inevitably lead to
'more of the same'**

chart source = sightline.org

2. Thinking outside the extrapolation



Posted by Stacey W-H
04/22/2008 04:14 PM

“This model was used in Olympia when locals tried to convert a section of Old 99 from 4 lanes to 2, adding a center turn lane, bike lanes and pedestrian amenities.

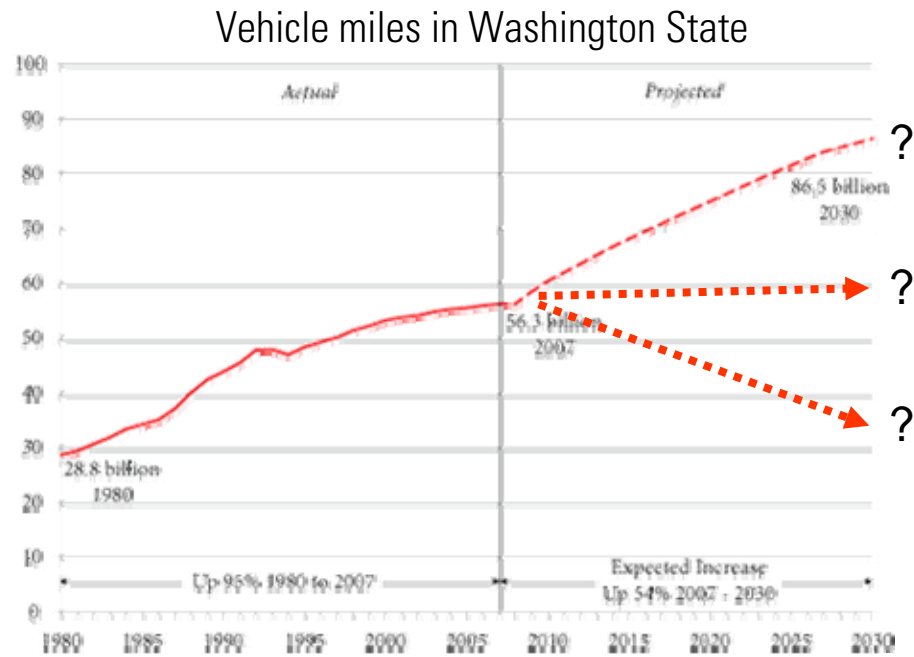
... the traffic engineers rejected the plan because the projections showed the road would eventually exceed capacity.”

These projections are typically *extrapolations* of past trends...

**...and are
very difficult to question**

chart source = sightline.org

2. Thinking outside the extrapolation



What if the future is different than the past?

2. Thinking outside the extrapolation

Gas Prices Surge, Transit Ridership Jumps, VMT Drops

3 June 2008 - 2:00pm

As gas prices inch beyond \$4 a gallon, transit trips increase by 3.3% for the first quarter of the year and vehicle miles traveled drop 4.3% in March.

"There's no doubt that the high gas prices are motivating people to change their travel behavior," says William Millar, APTA president.

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Globally, rising fuel prices are causing significant changes in travel behaviour...

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... how do we plan for an uncertain future that might be very different from what we've experienced in the past?

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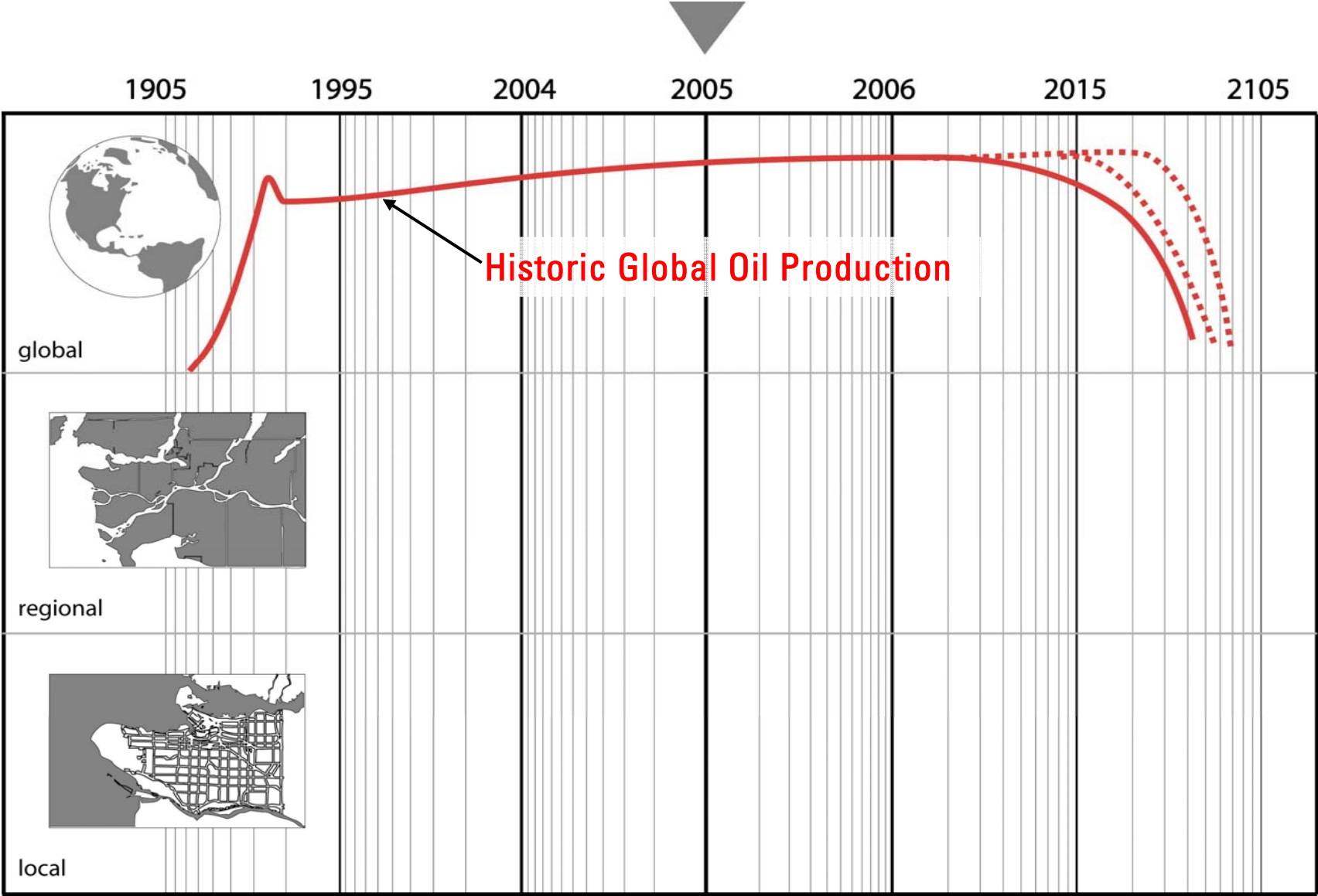
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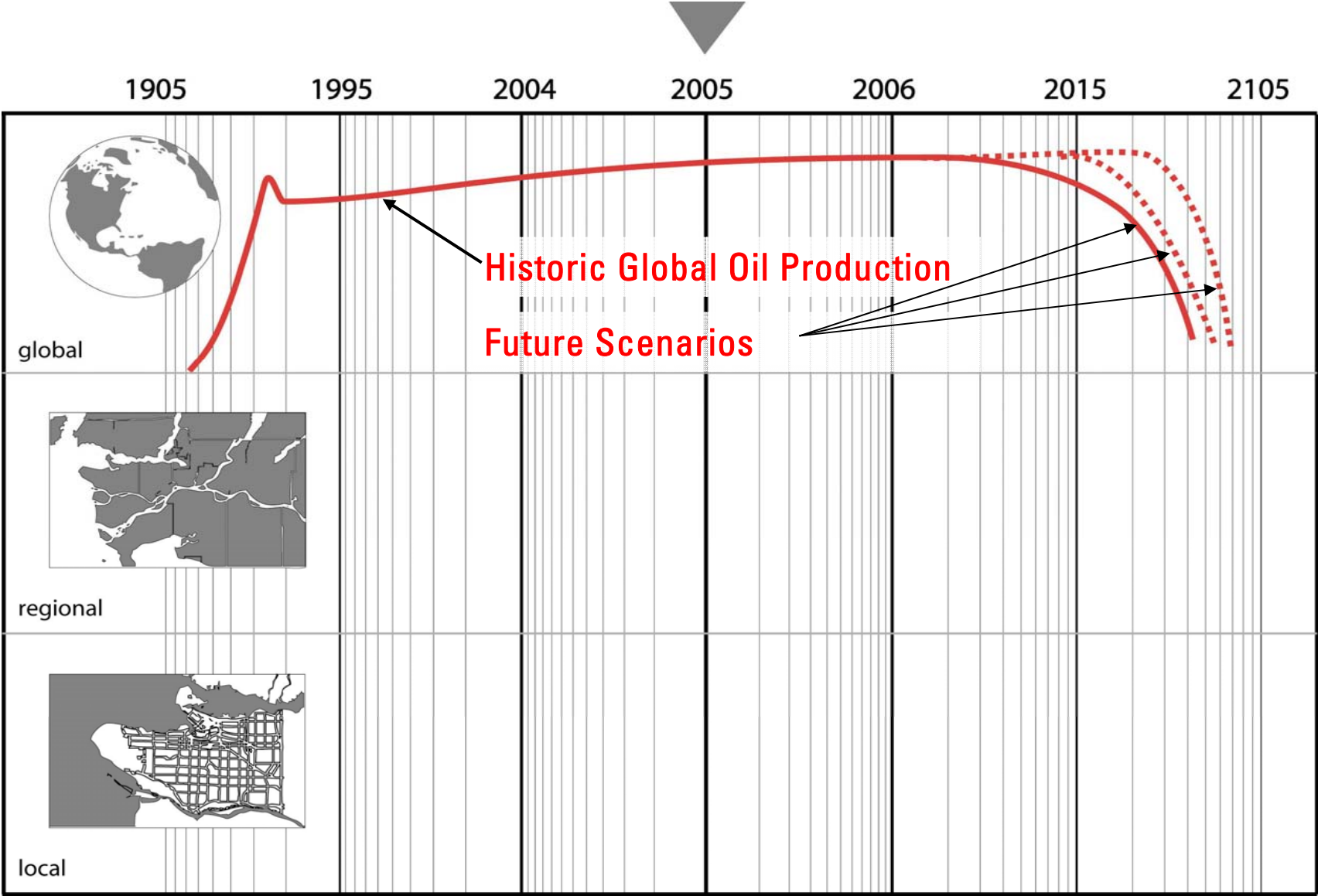
... how do we plan for an uncertain future that might be very different from what we've experienced in the past?

>> Use Scenarios to Plan

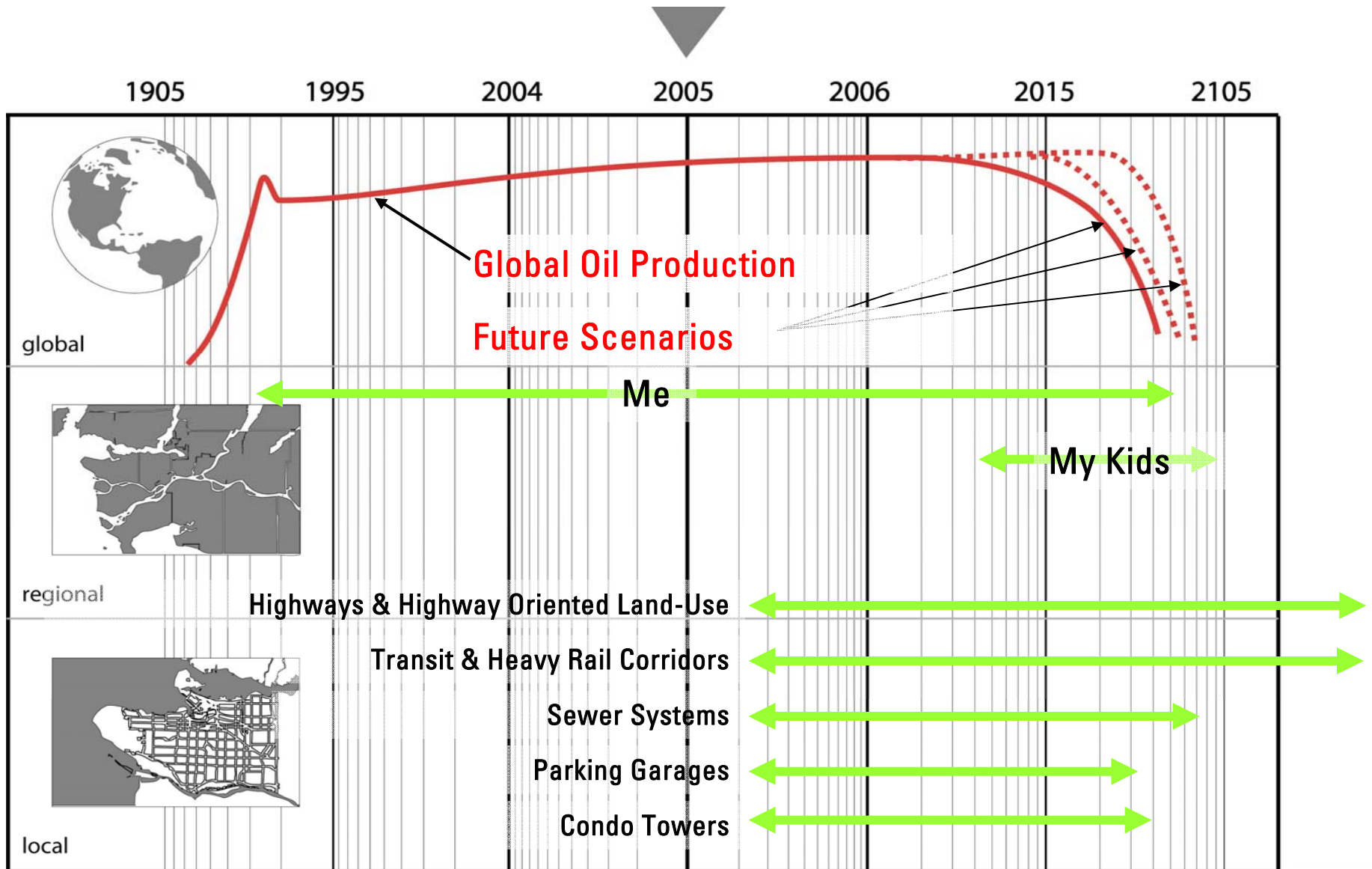
2. Thinking outside the extrapolation



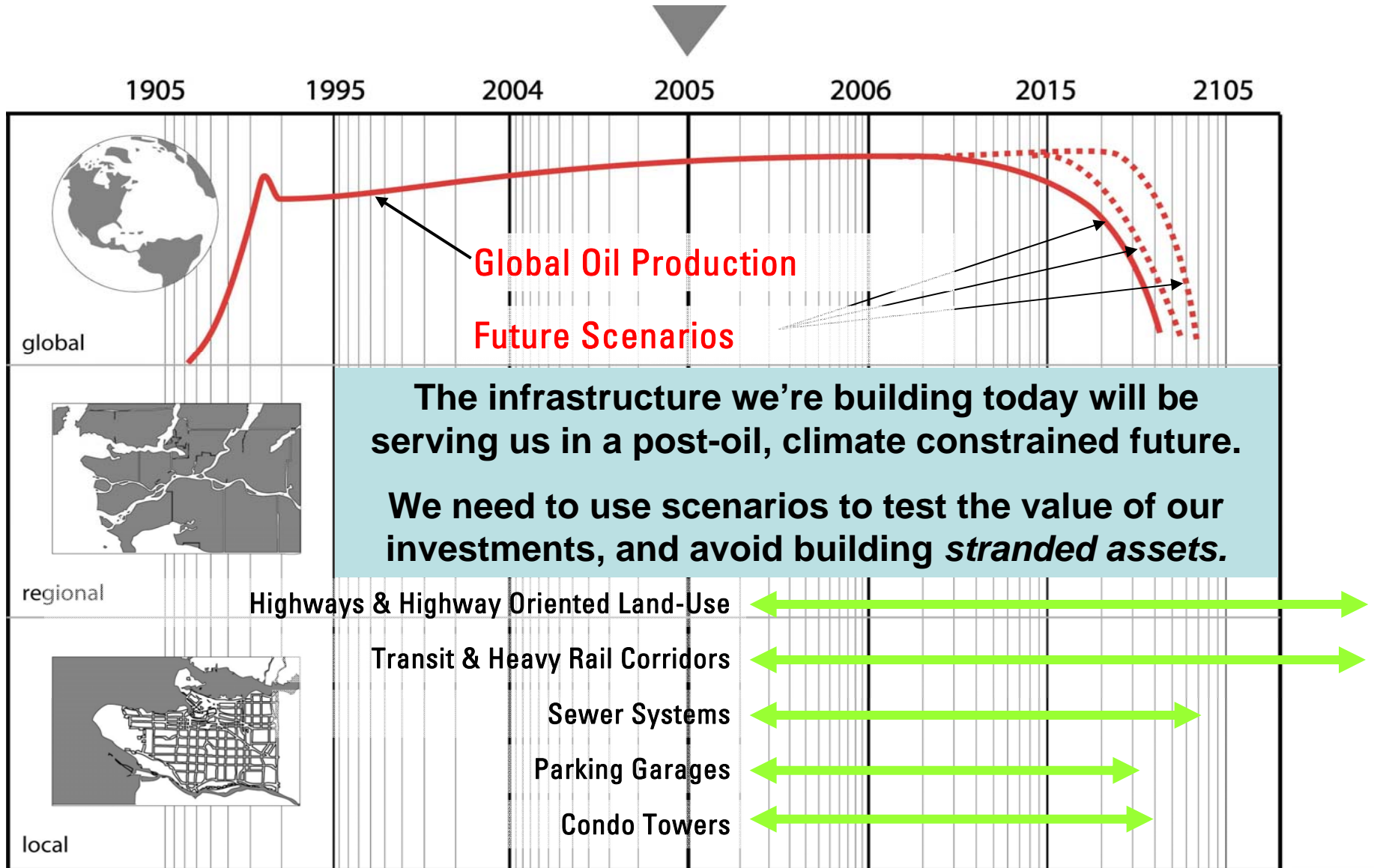
2. Thinking outside the extrapolation



2. Thinking outside the extrapolation



2. Thinking outside the extrapolation



2. Thinking outside the extrapolation (using 3 scenarios to plan)

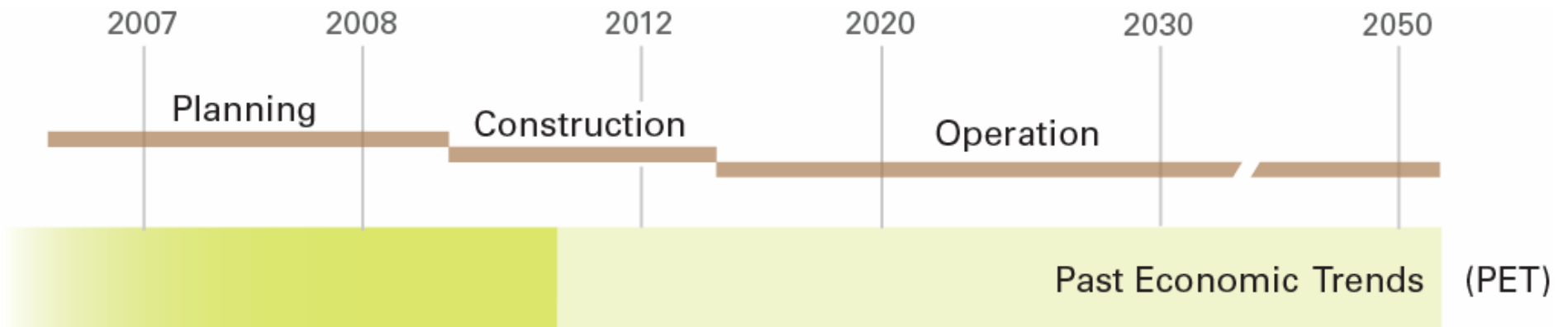


Will your project serve you past 2012?

> Use scenario based planning to test your investment


2. Thinking outside the extrapolation

(using 3 scenarios to plan)



This economic projection is being used as a justification for a major highway expansion project in British Columbia.

We'll label this the PET scenario.

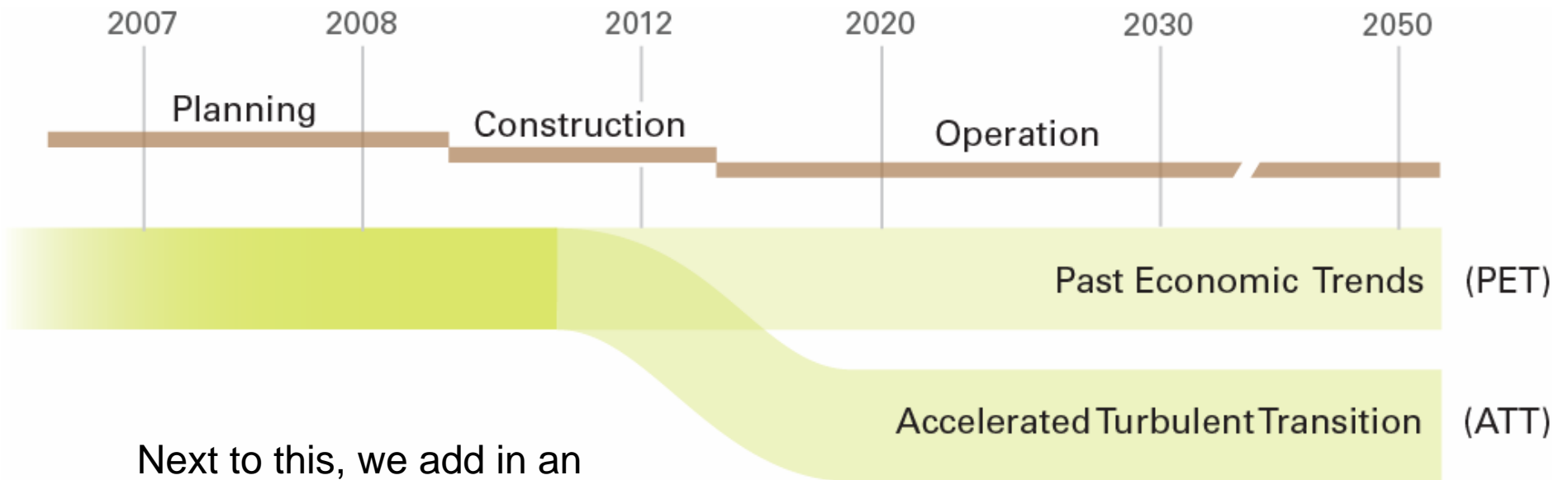


Fast Fact The BC Trucking Association estimates trucks are stopped or slowed in the Lower Mainland 75% of the time – and truck traffic is expected to rise by 50% by 2021

www.th.gov.bc.ca/gateway

2. Thinking outside the extrapolation

(using 3 scenarios to plan)

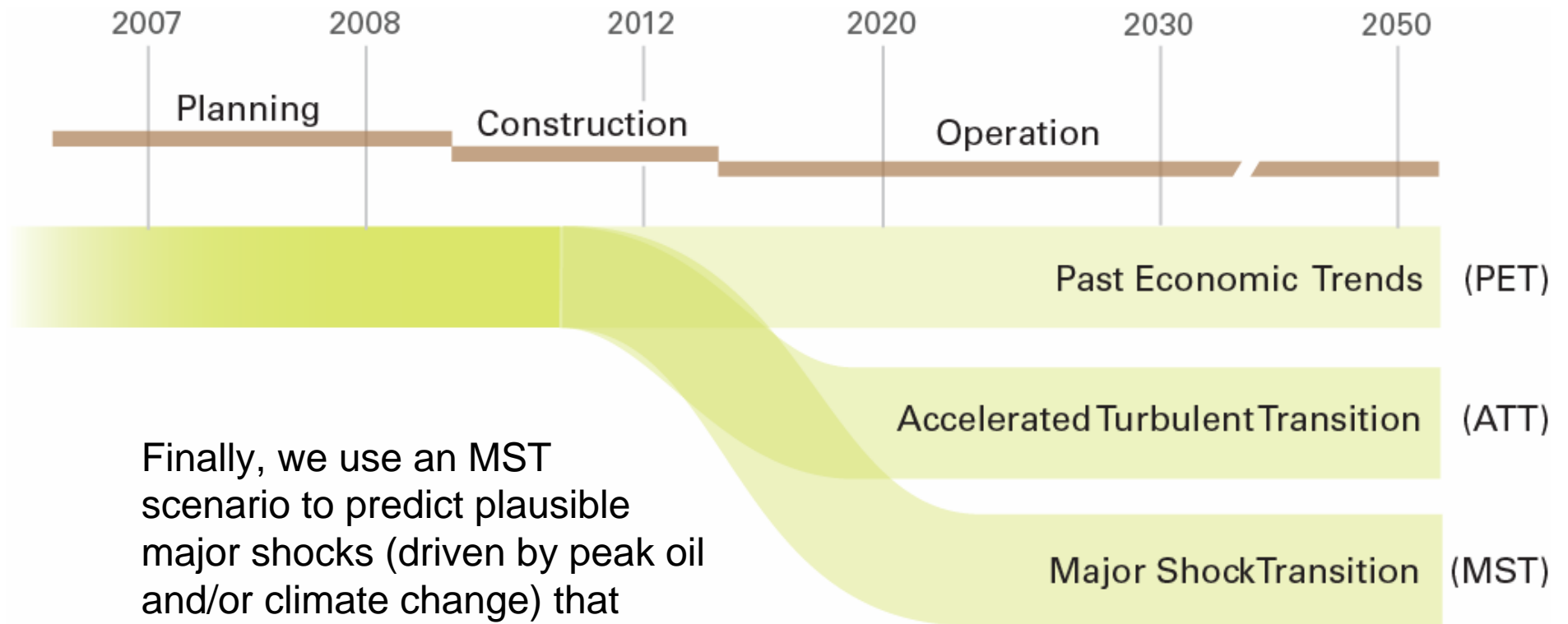


Next to this, we add in an ATT scenario which accounts for the impacts of rising energy prices and future climate legislation.

- Rising fuel and construction costs
- Intermittent fuel and power shortages
- Rapidly Expanding 'Green Collar' Sector
- Turbulent Stock Market
- Weird Weather

2. Thinking outside the extrapolation

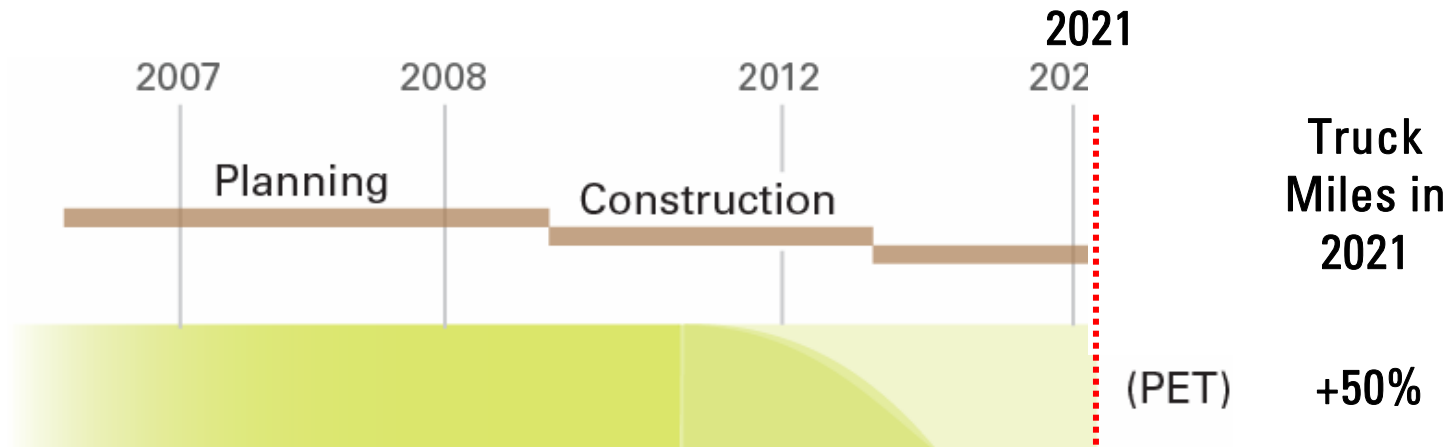
(using 3 scenarios to plan)



Finally, we use an MST scenario to predict plausible major shocks (driven by peak oil and/or climate change) that could significantly impact *what we're willing to do...*

- Carbon / Fuel Rationing
- Massive Refugee Influx
- Undulating Recessions
- Aging Infrastructure Breakdown
- Rising Sea Levels

2. Thinking outside the extrapolation (using 3 scenarios to plan)



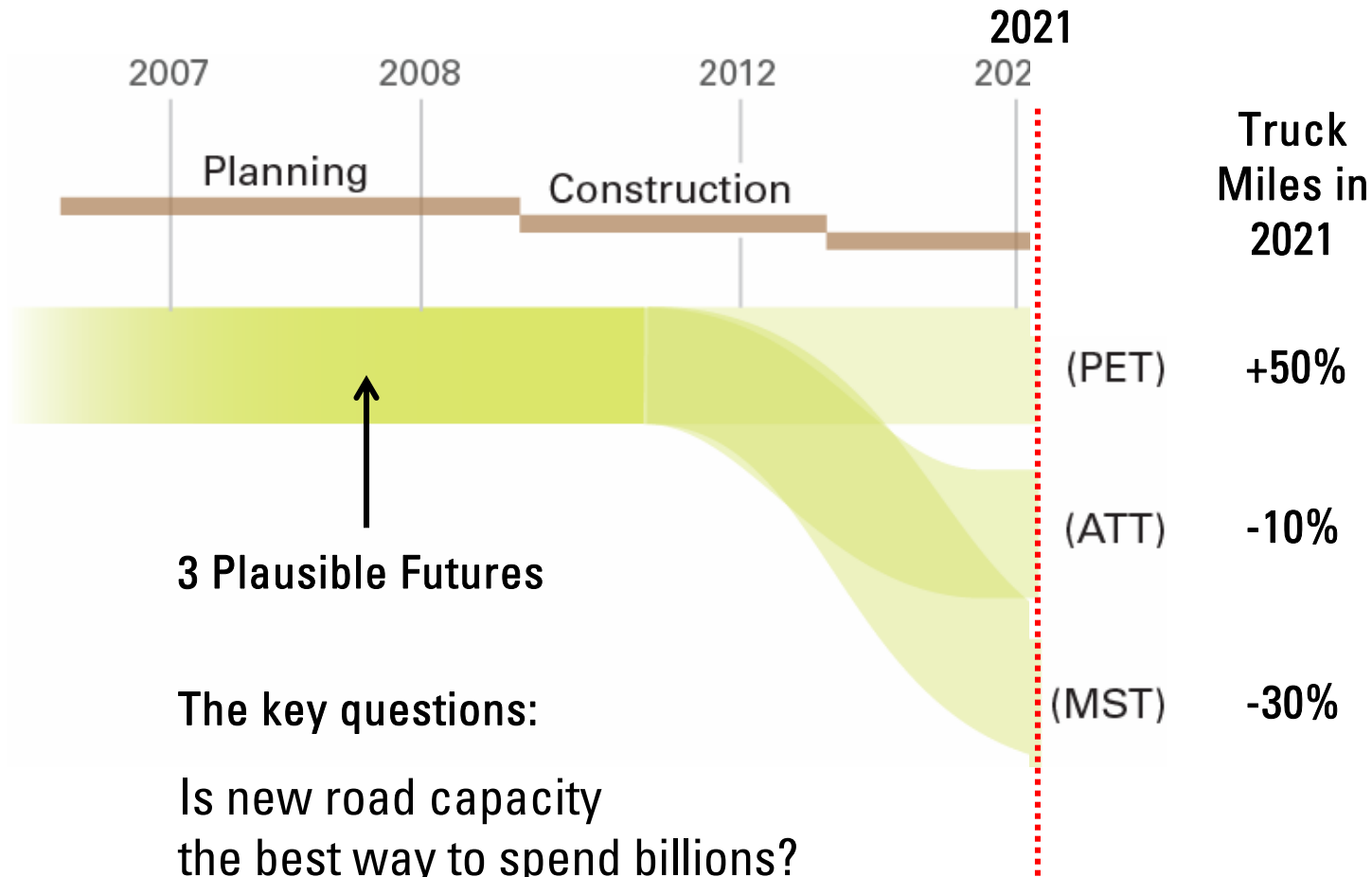
Now we can put these 3 projections side-by-side to test the resilience of our investment.



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2. Thinking outside the extrapolation (using 3 scenarios to plan)



The key questions:

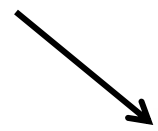
Is new road capacity
the best way to spend billions?

Could we spend that money on
something else that pays us back in
all futures?

2. Thinking outside the extrapolation

(using 3 scenarios to plan)

We know where this number came from...

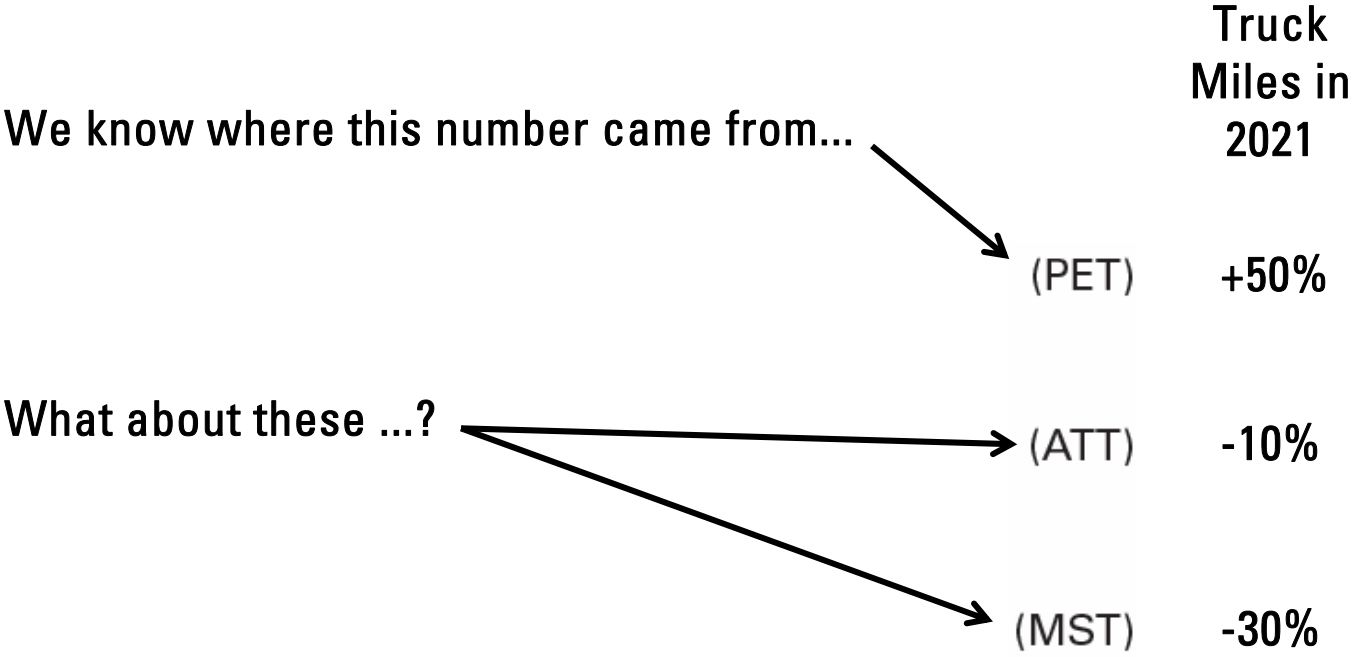


| | Truck Miles in 2021 |
|-------|---------------------|
| (PET) | +50% |
| (ATT) | -10% |
| (MST) | -30% |



2. Thinking outside the extrapolation

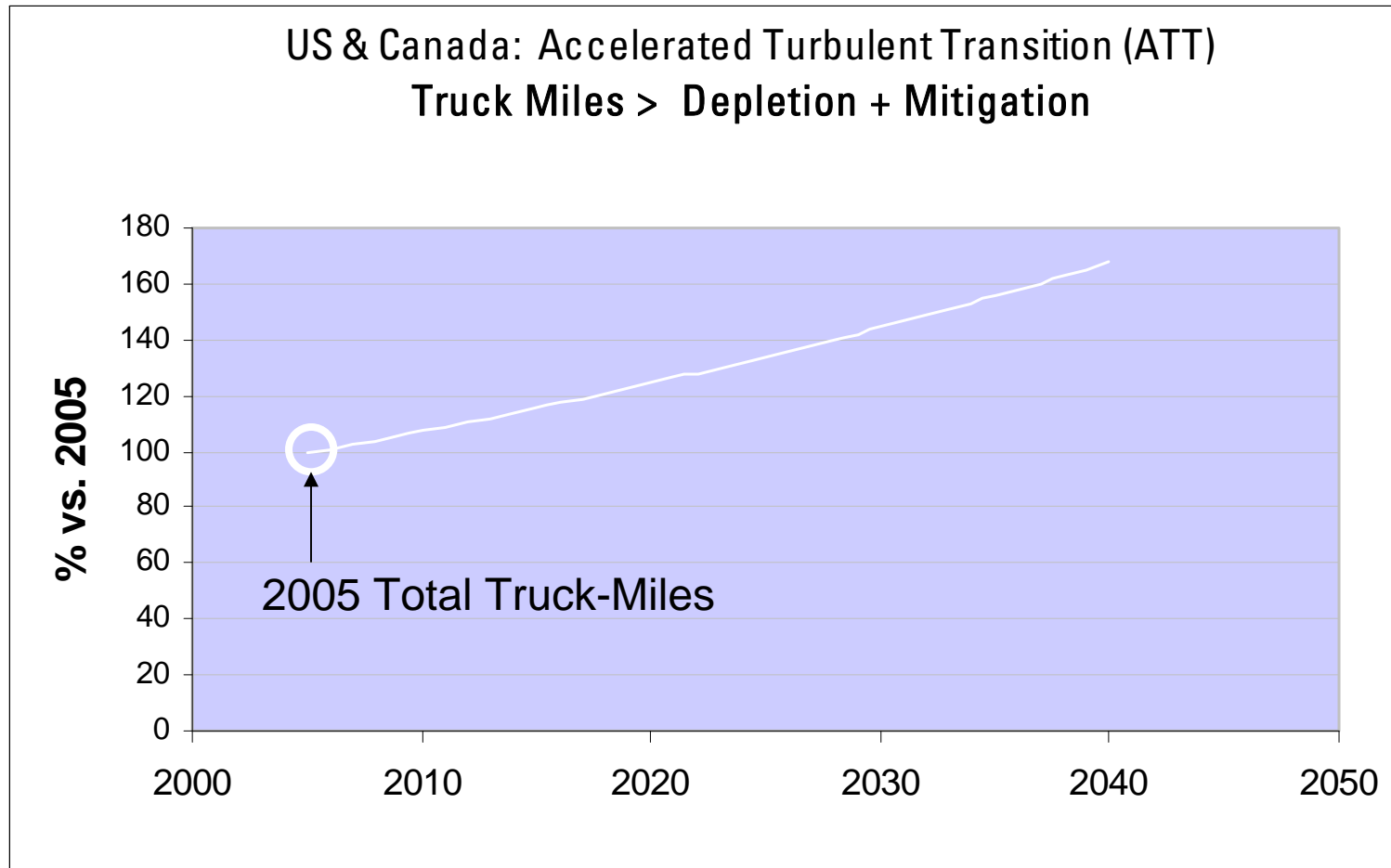
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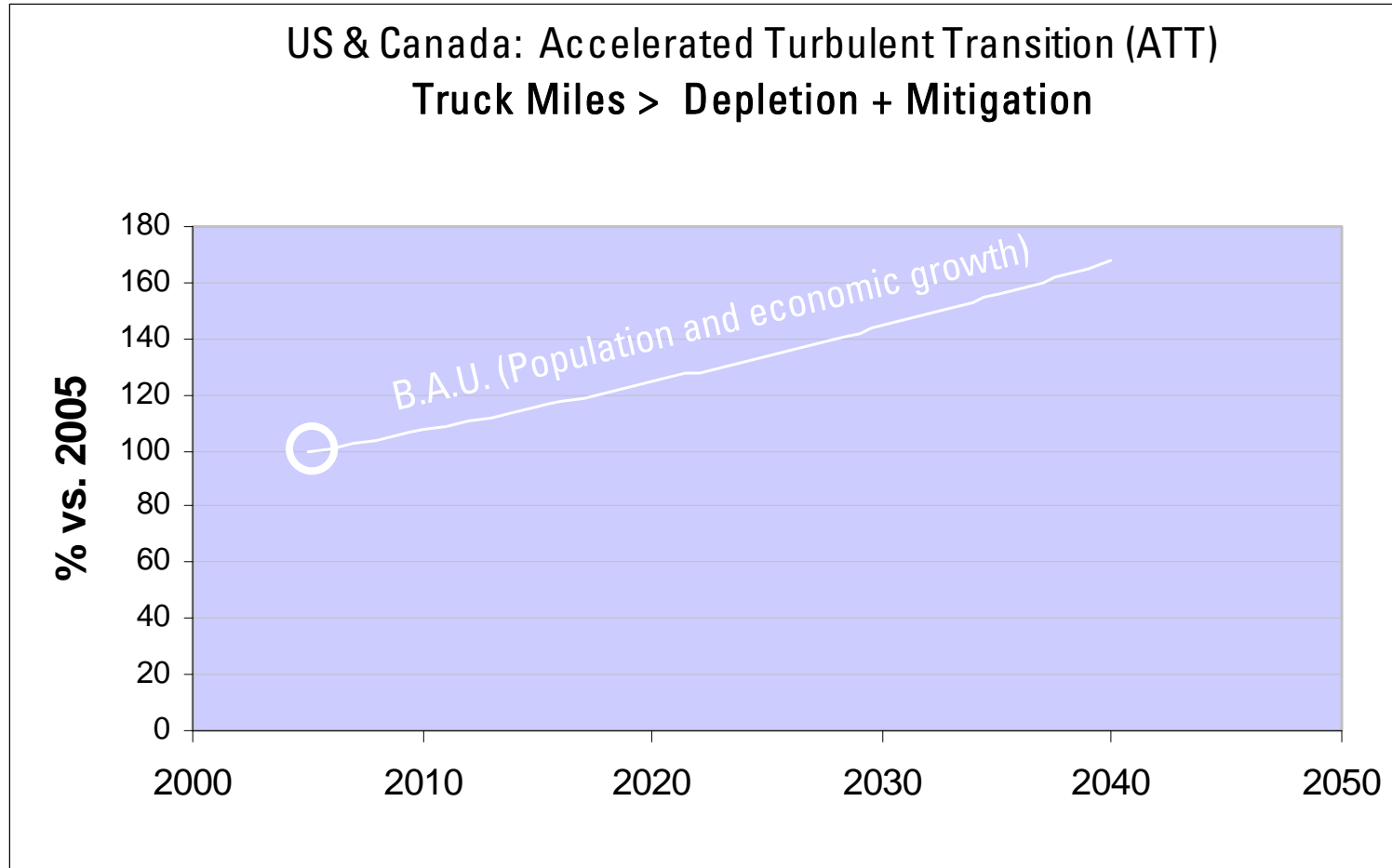
2. Thinking outside the extrapolation (modeling goods-movement scenarios)



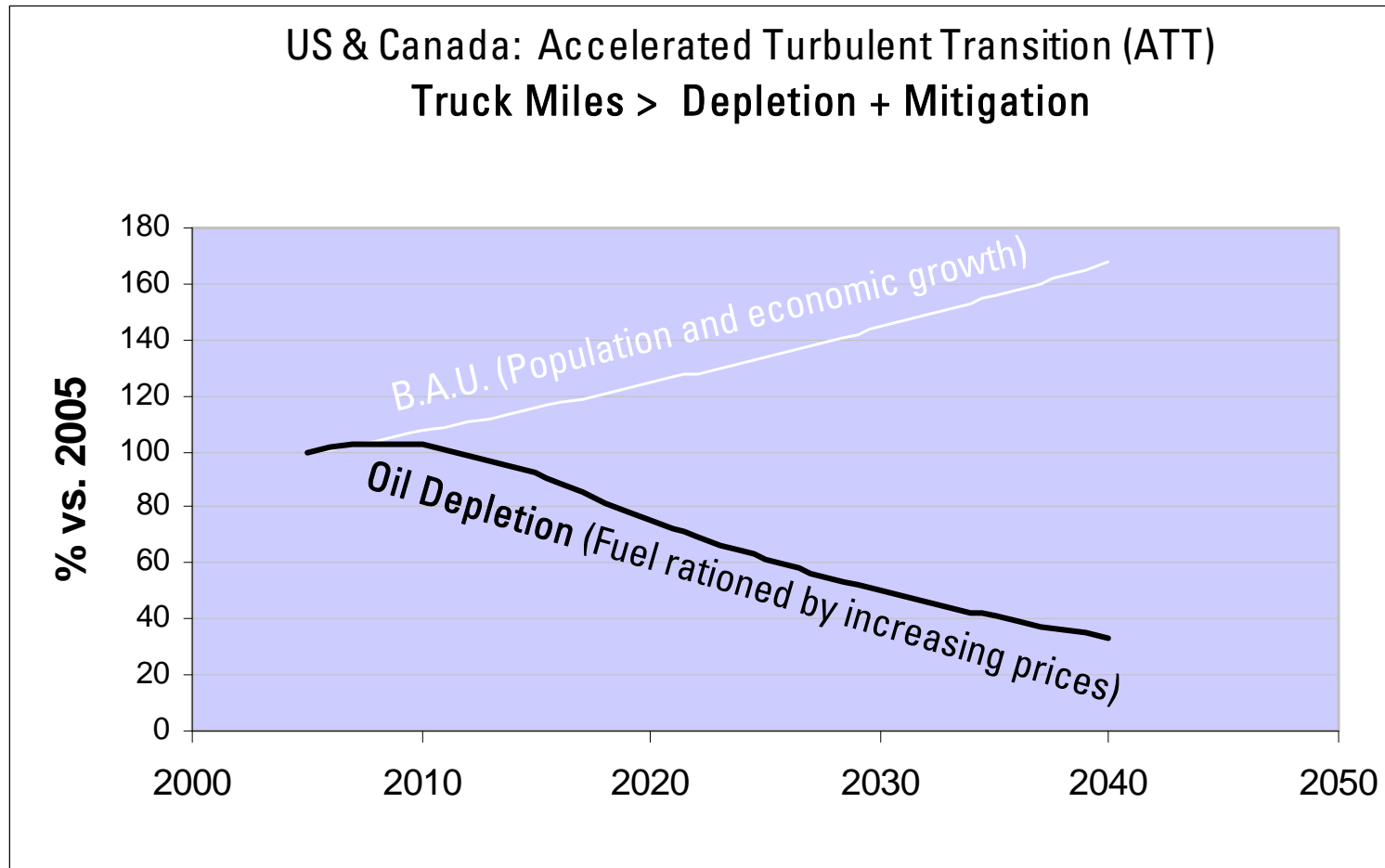
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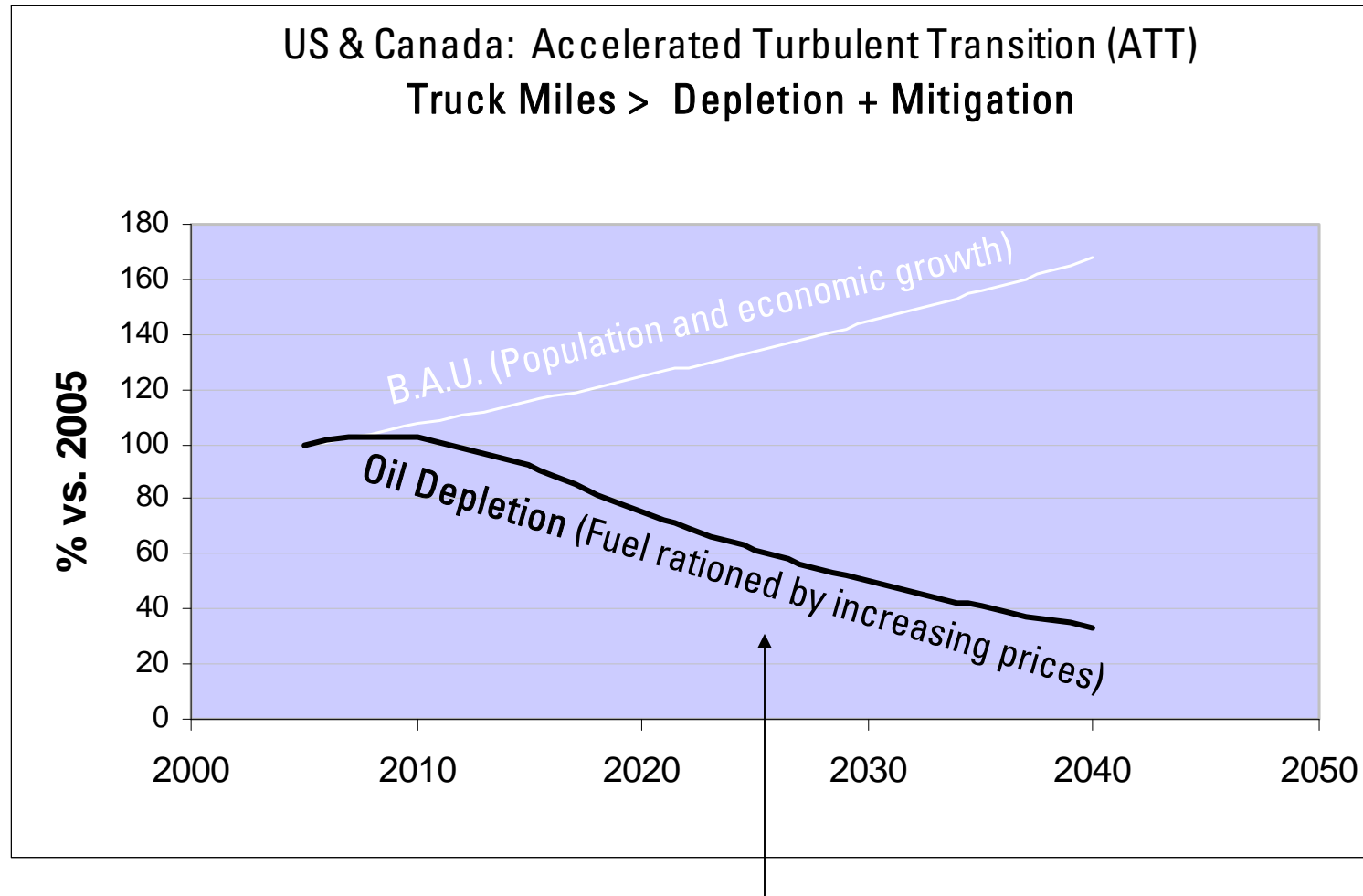
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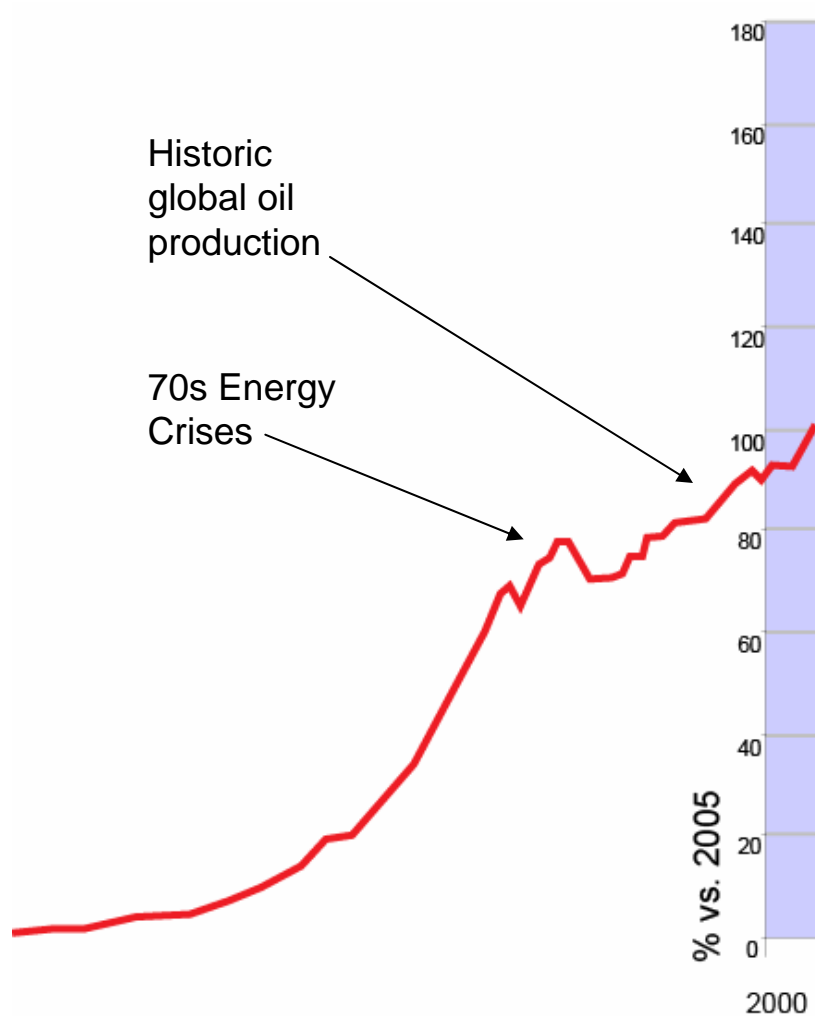


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Where does this depletion curve come from?

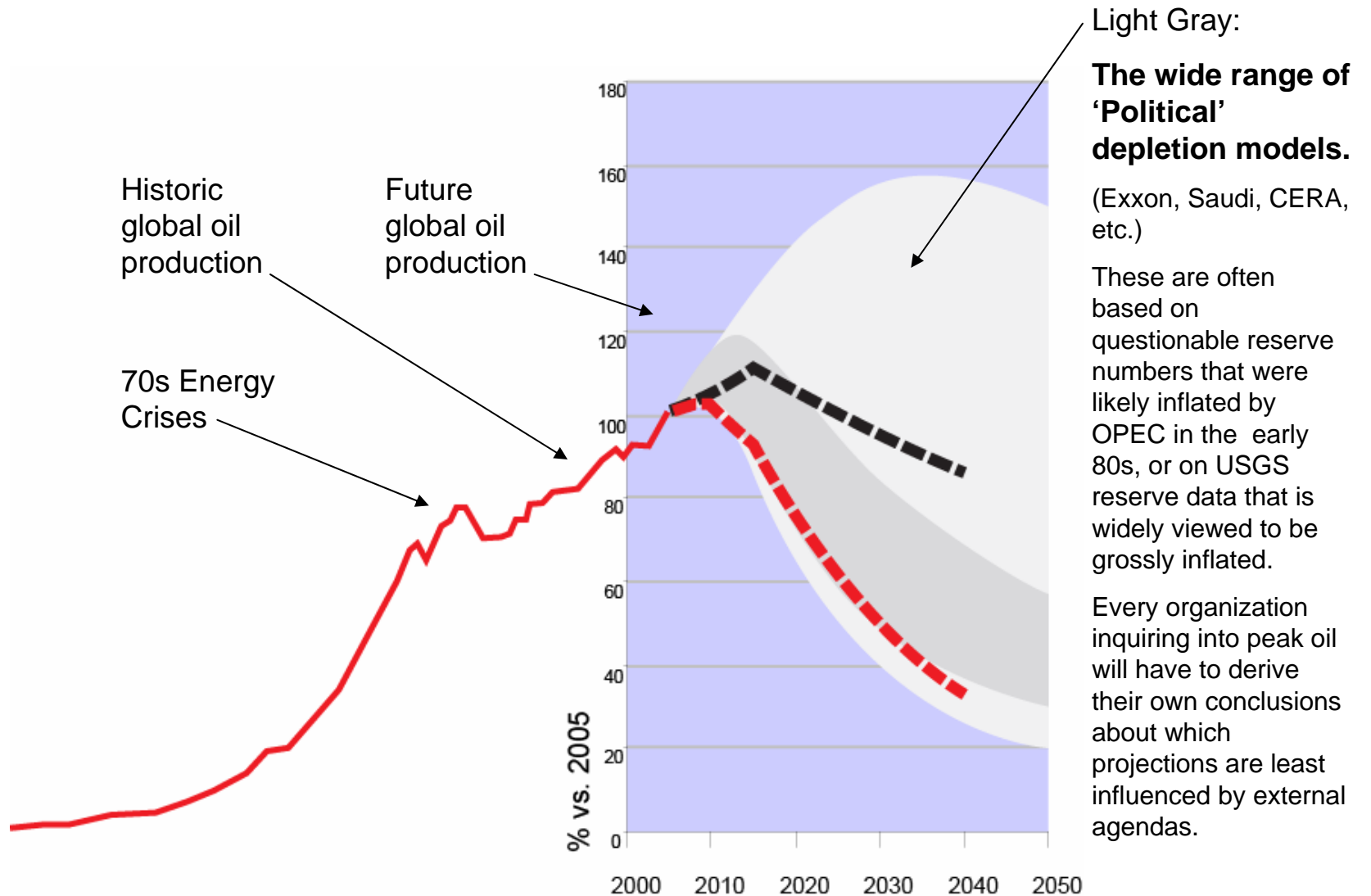
DCP Oil Depletion Models



Peak Oil Analysis Papers:

<http://dynamiccities.squarespace.com/files-documents/peak-oil-papers/>

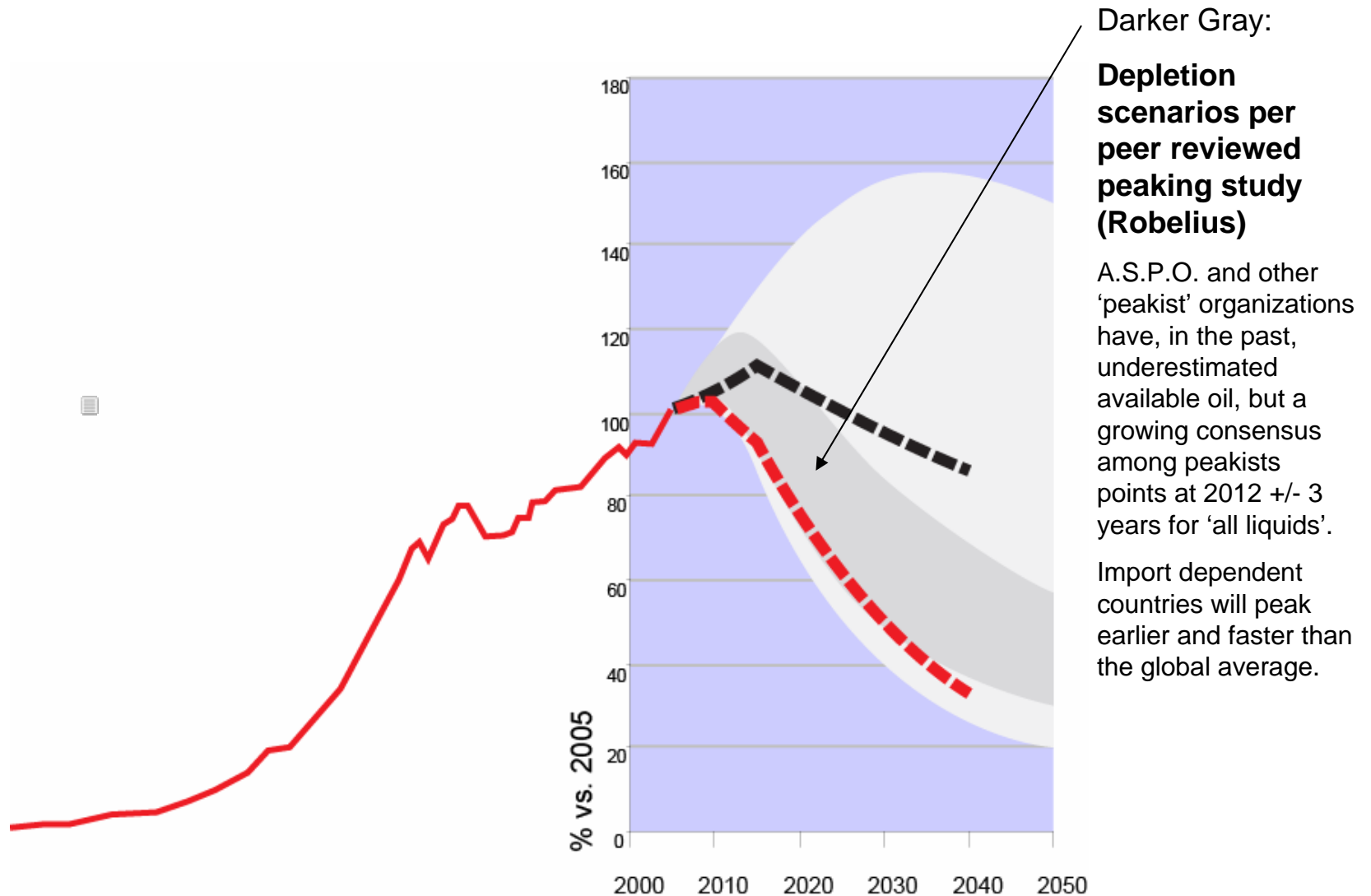
DCP Oil Depletion Models



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DCP Oil Depletion Models



["Giant Oilfields and Future Production"](#)

(3.3M) [2007] Frederik Robelius. PhD Thesis, University of Uppsala.

http://dynamiccities.squarespace.com/files-documents/peak-oil-papers/GiantOilfields_and_Future_Production.pdf



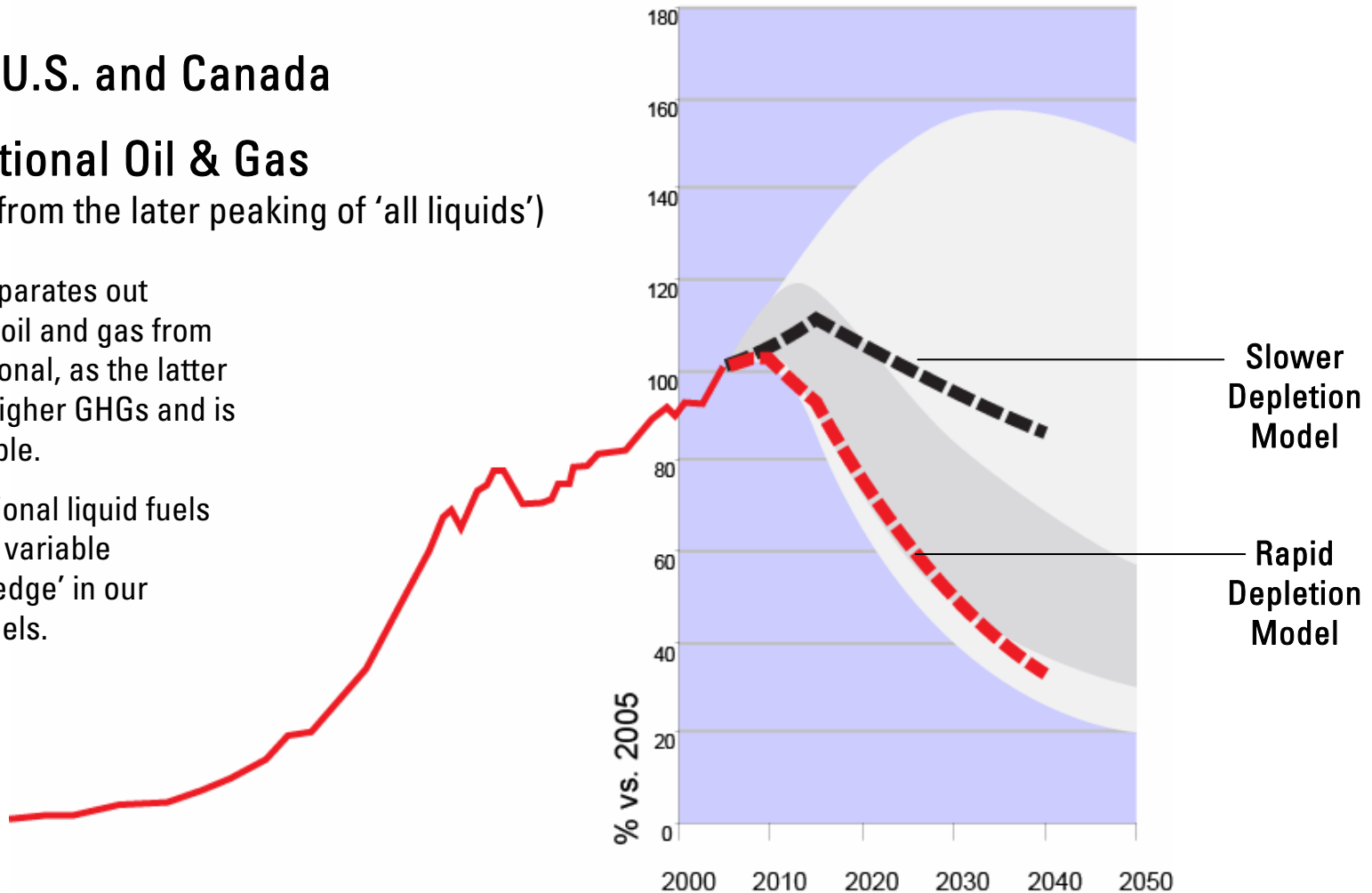
www.dynamiccities.org

DCP Oil Depletion Models

- For the U.S. and Canada
- Conventional Oil & Gas
(as distinct from the later peaking of 'all liquids')

Our model separates out conventional oil and gas from non-conventional, as the latter emits much higher GHGs and is less predictable.

Non-conventional liquid fuels show up as a variable 'mitigation wedge' in our scenario models.

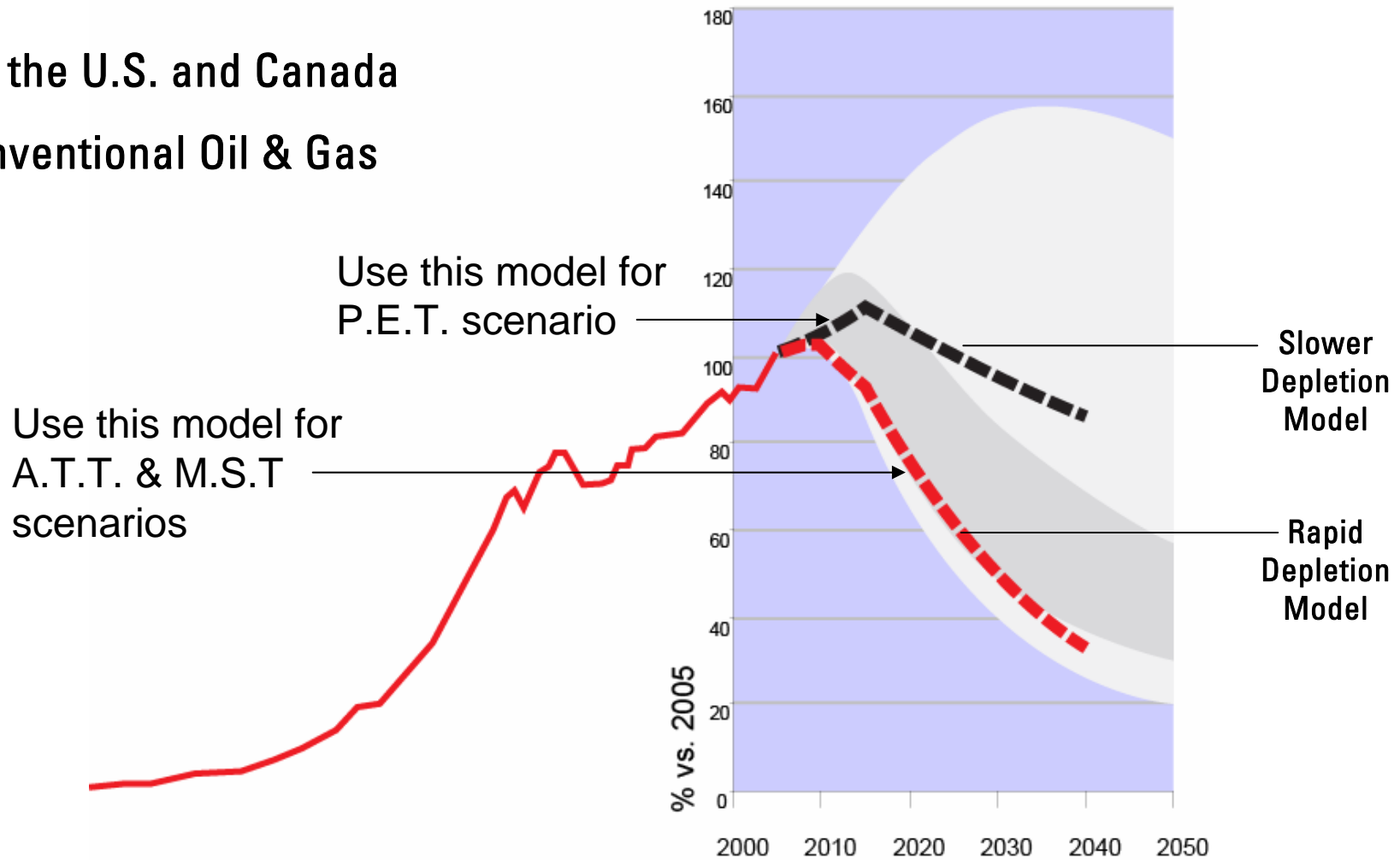


Further description of the DCP depletion models:

<http://dynamiccities.squarespace.com/depletion-model/>

DCP Oil Depletion Models

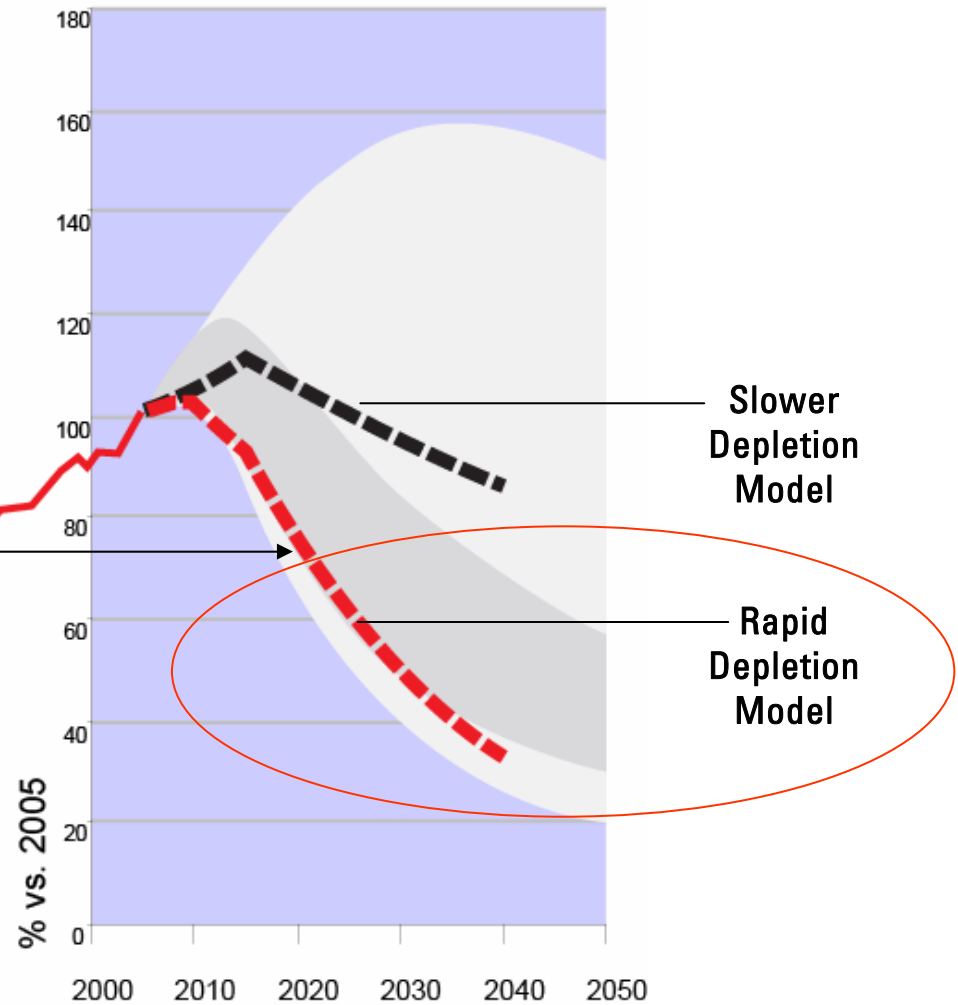
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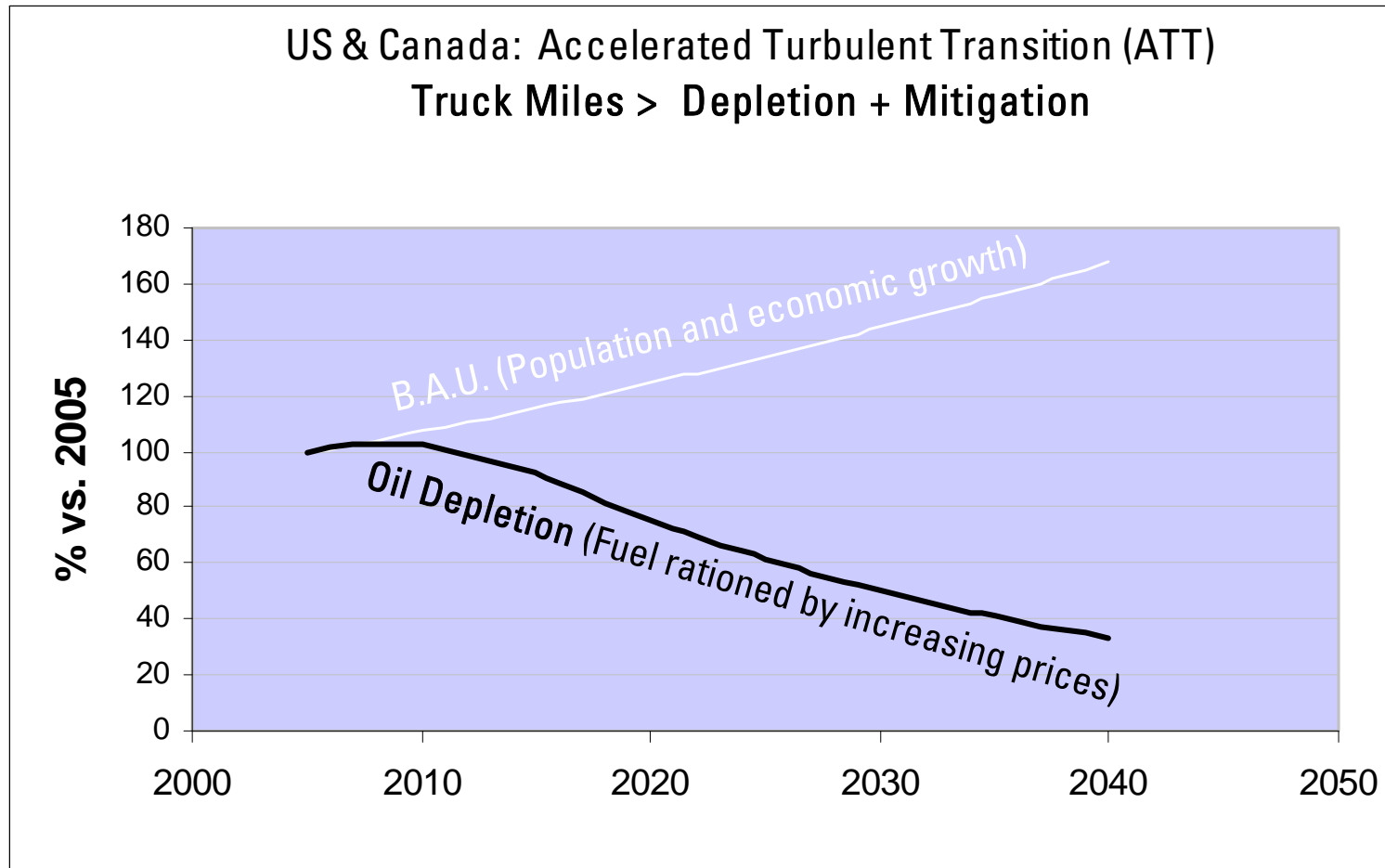
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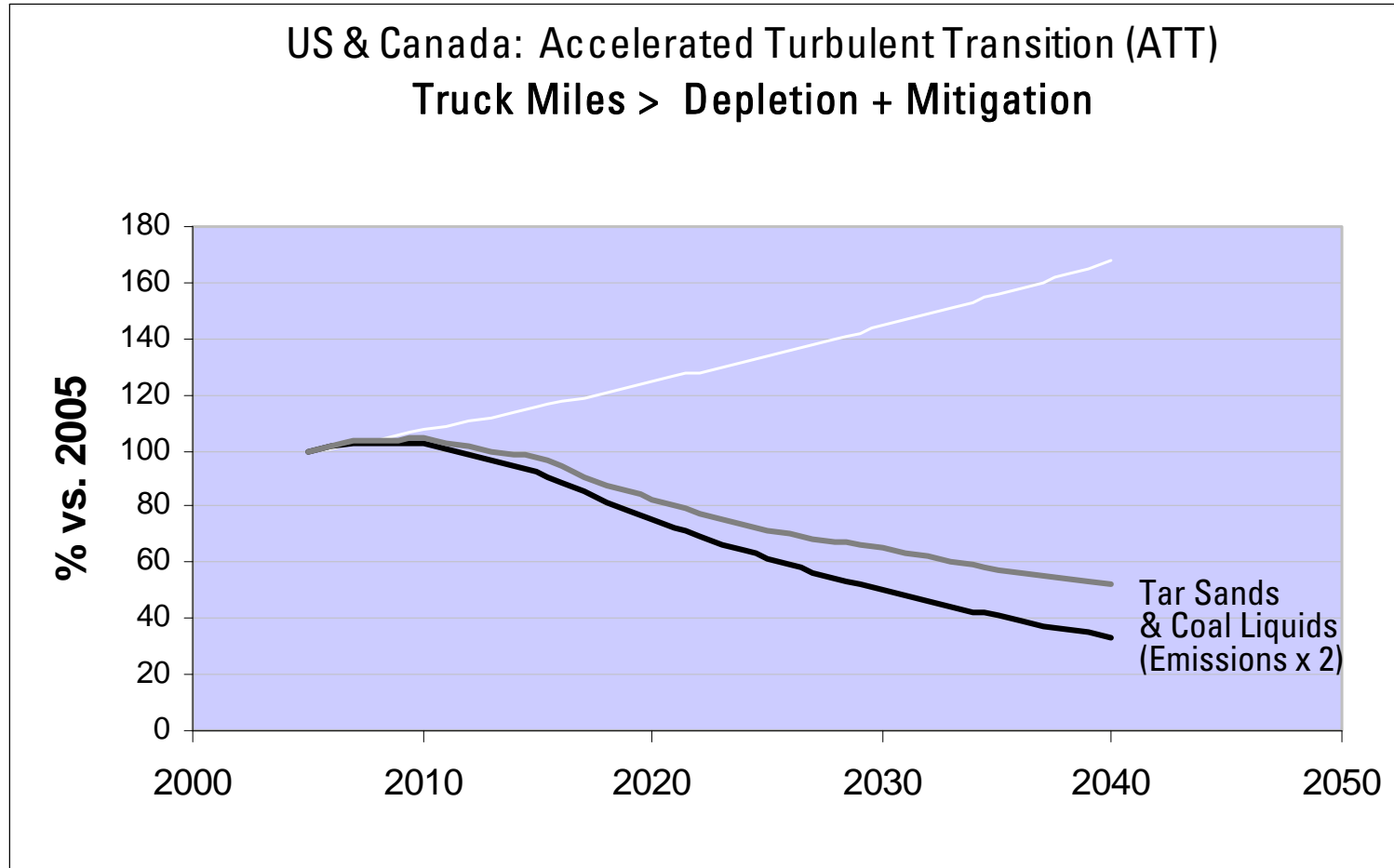
Use this model to look at an A.T.T. scenario for future Truck-Miles.



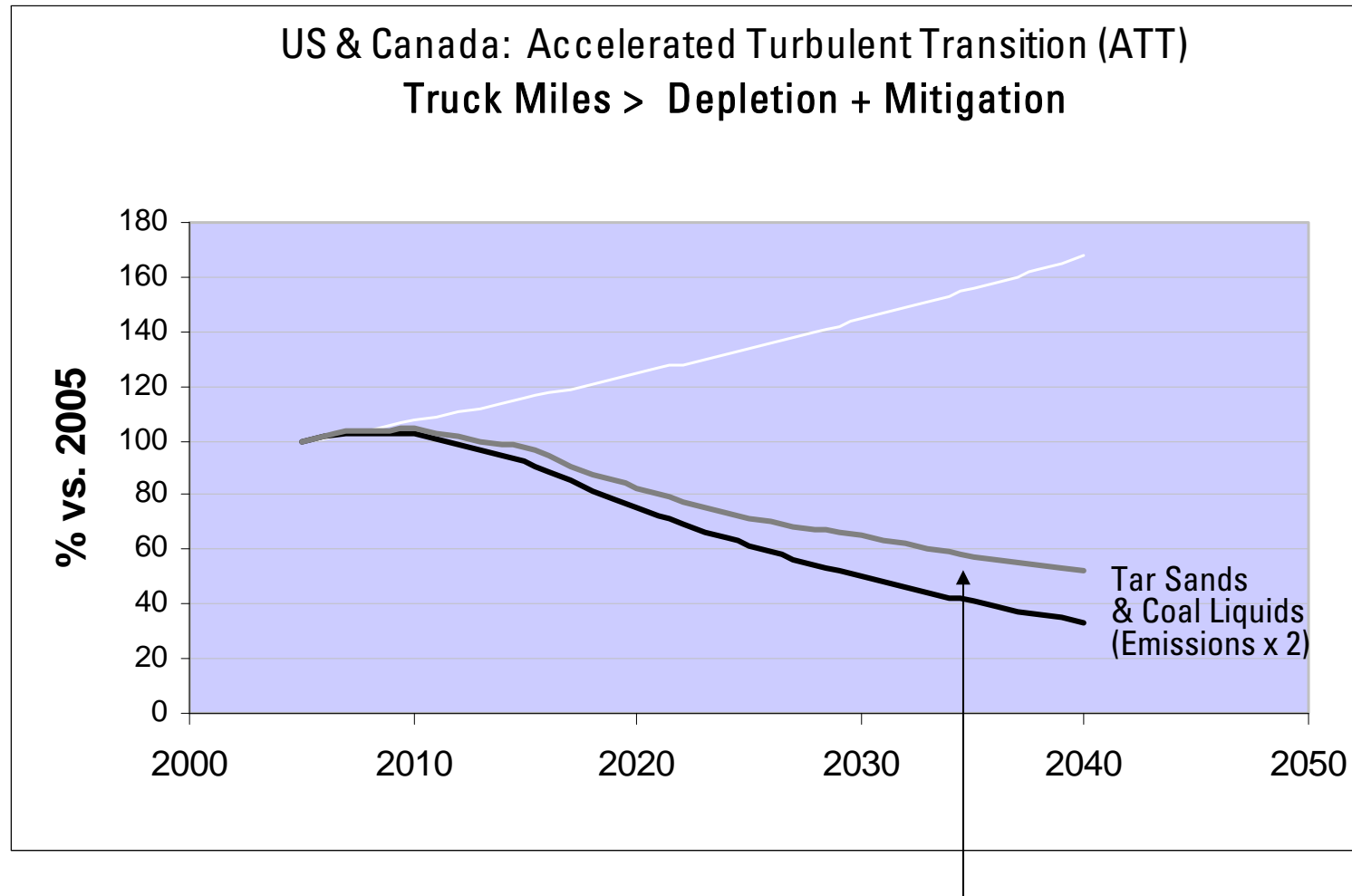
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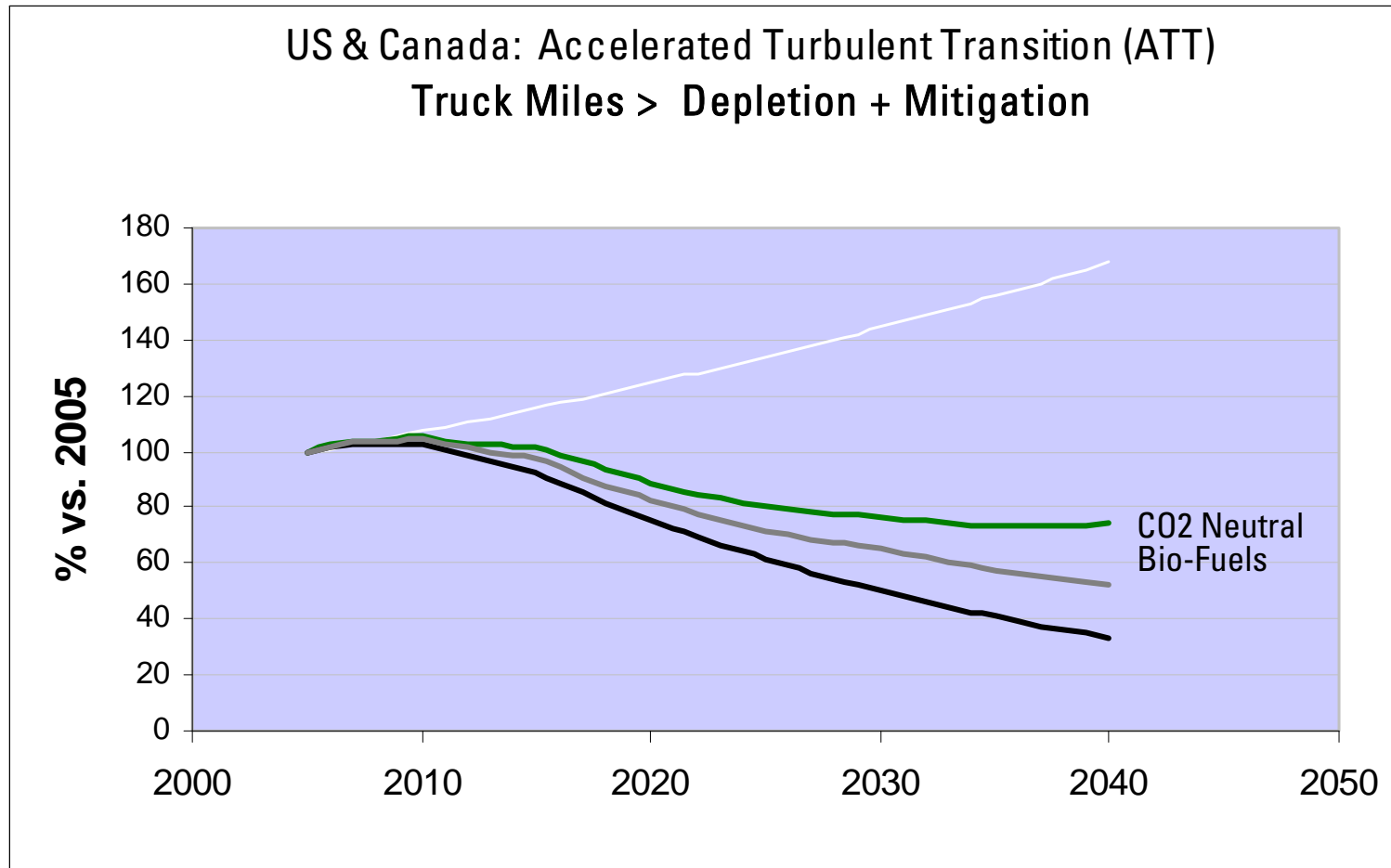


2. Thinking outside the extrapolation (modeling goods-movement scenarios)

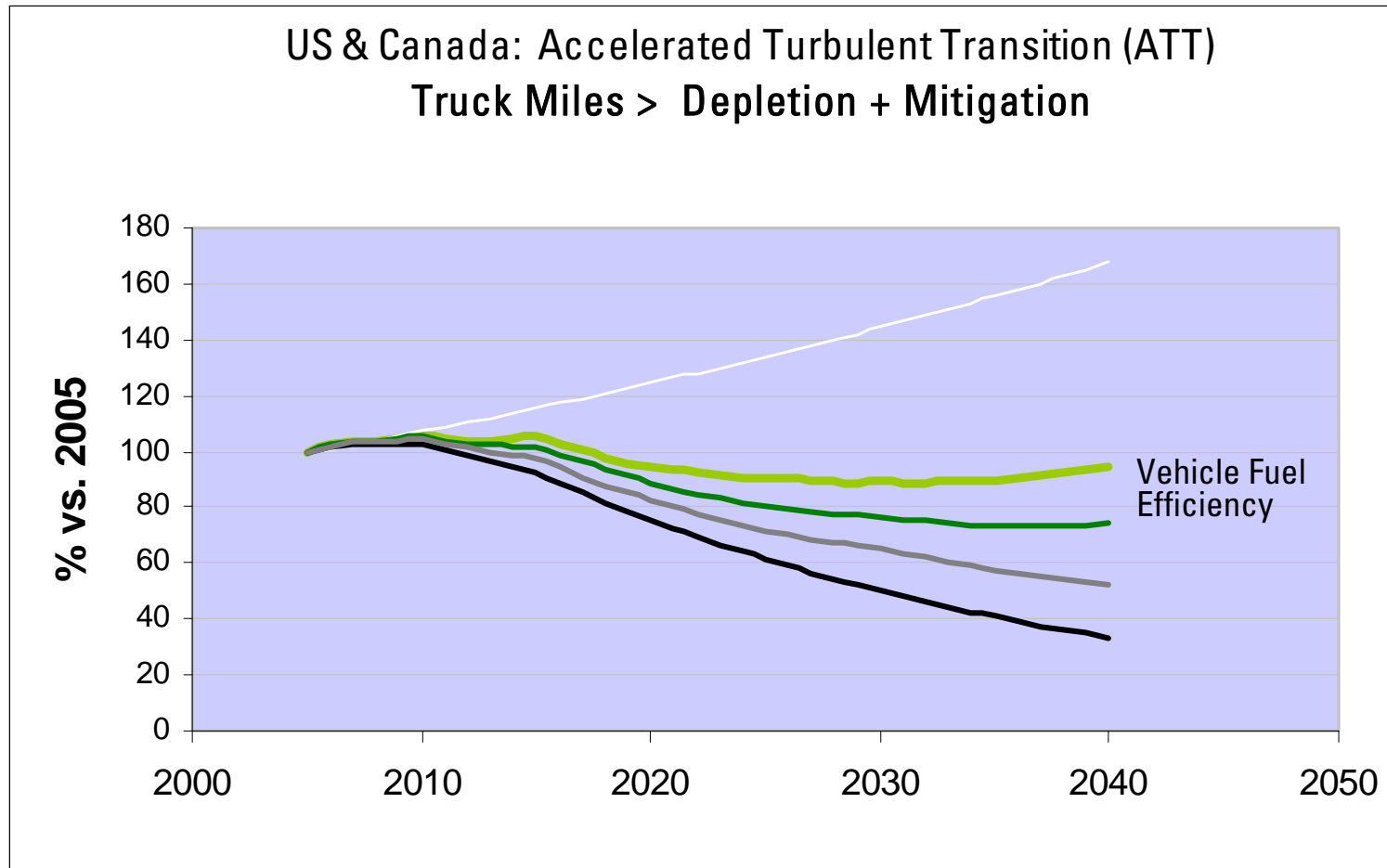


This is a mitigation 'wedge' showing how quickly a strategy or technology can scale-up.

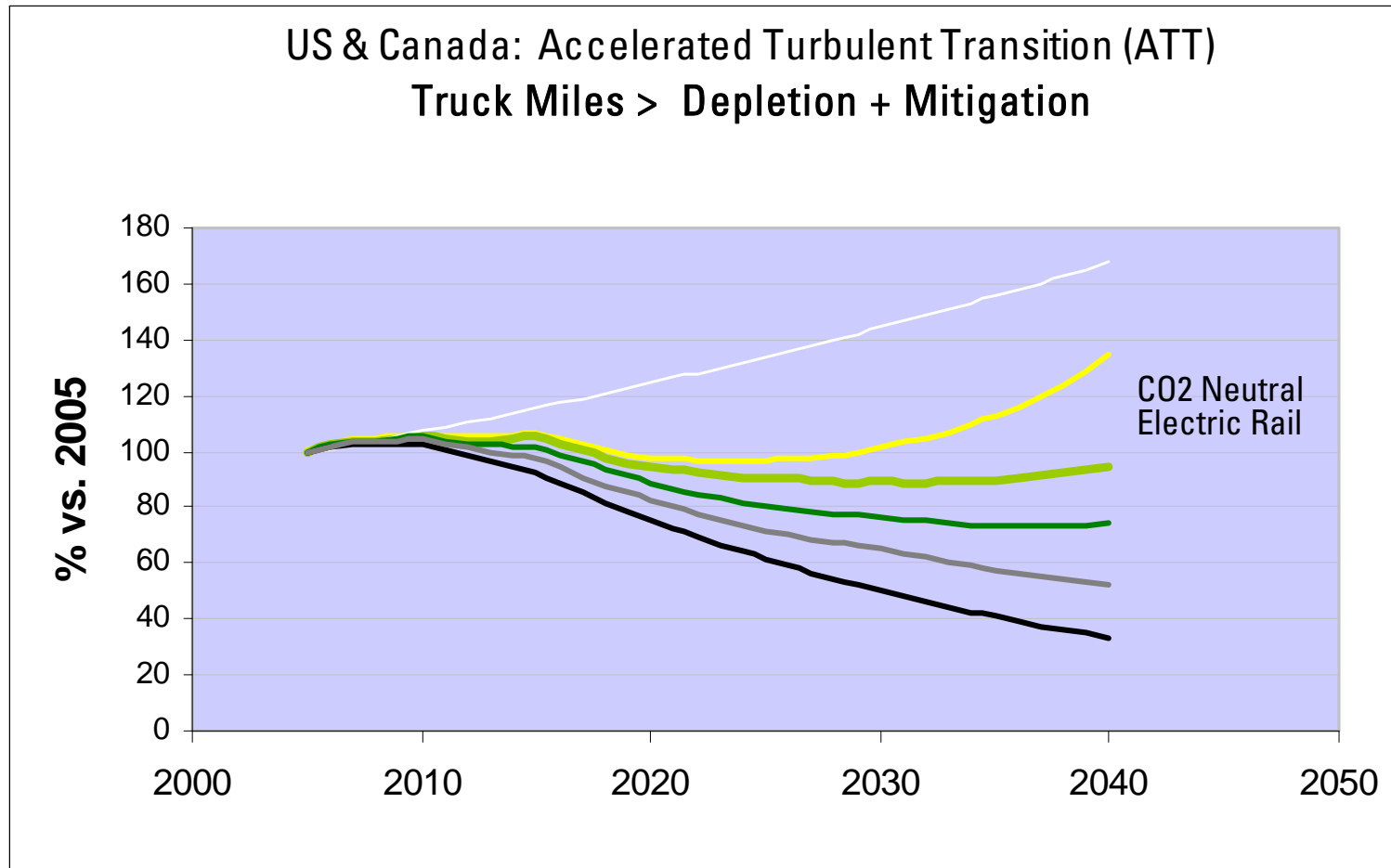
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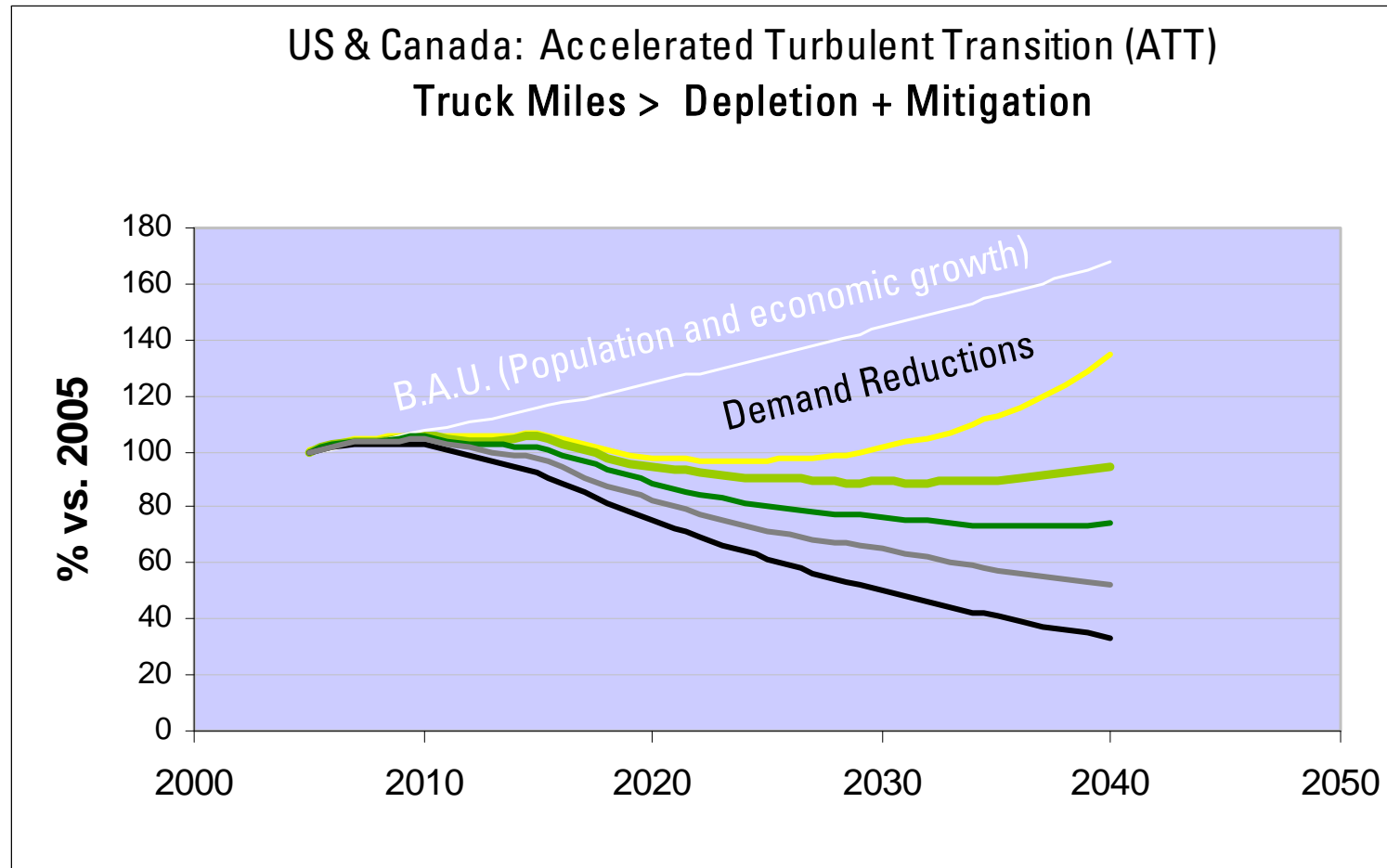
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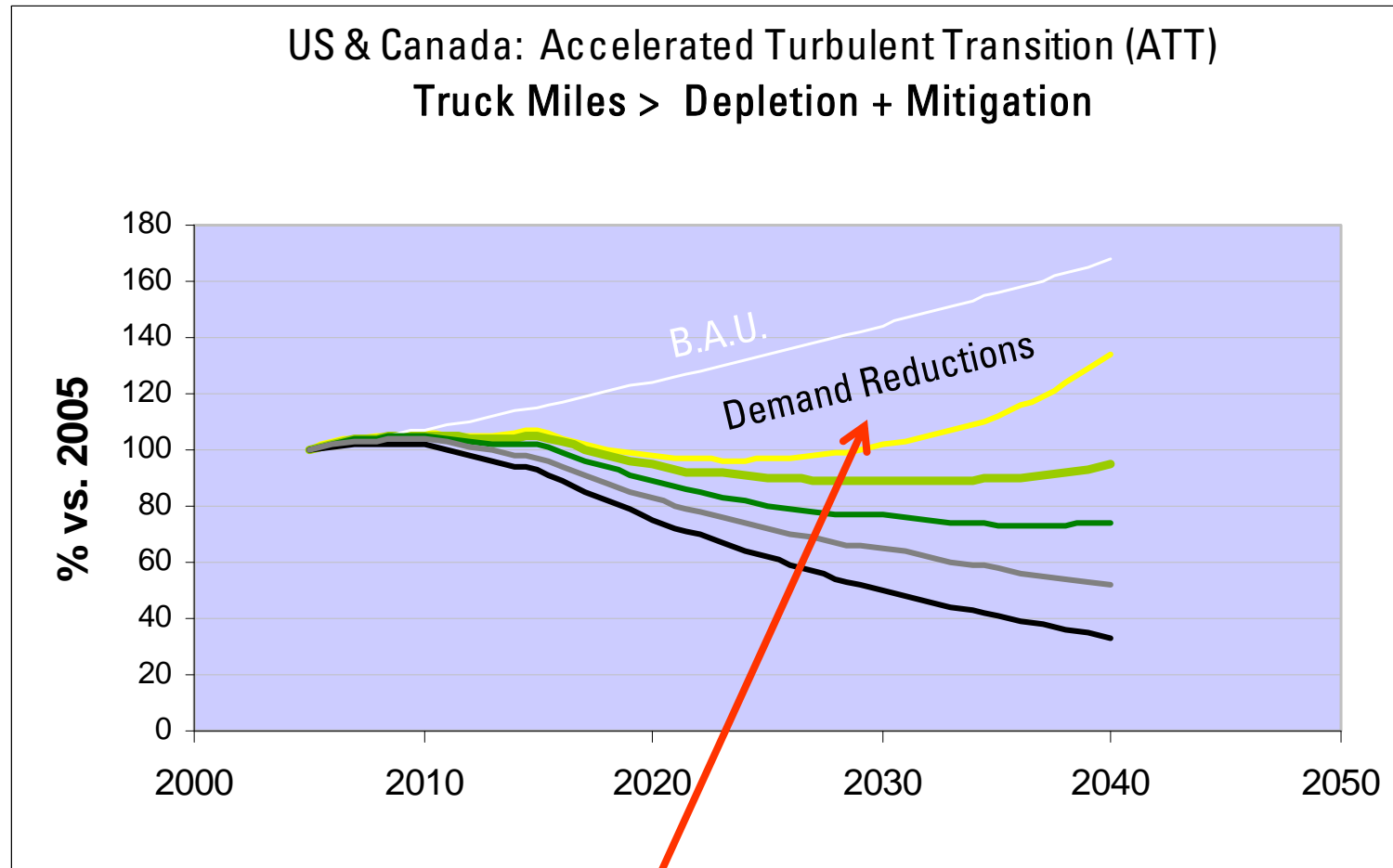
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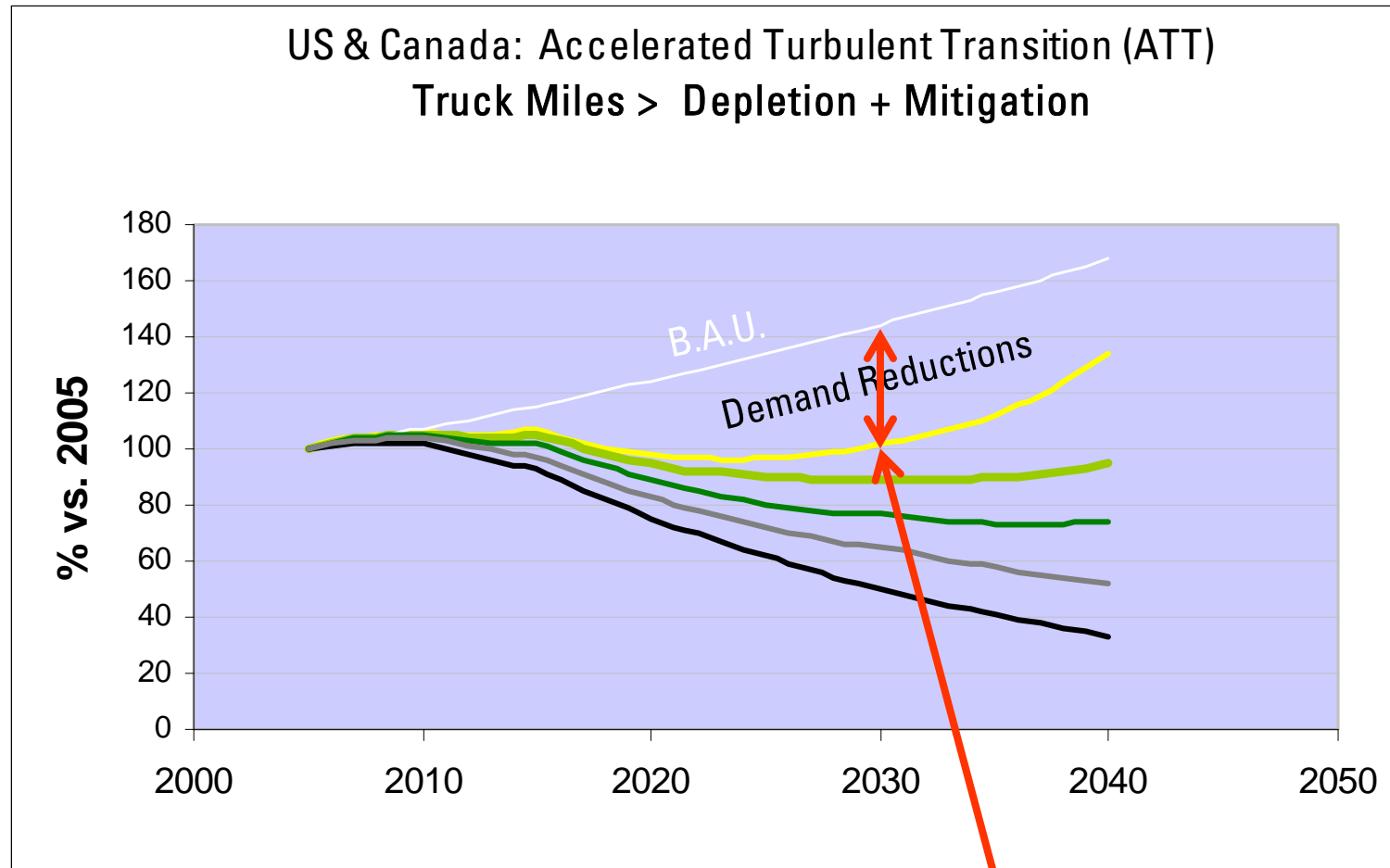


2. Thinking outside the extrapolation (municipal & regional impact)



Buy Local, Build Local or Do Without...

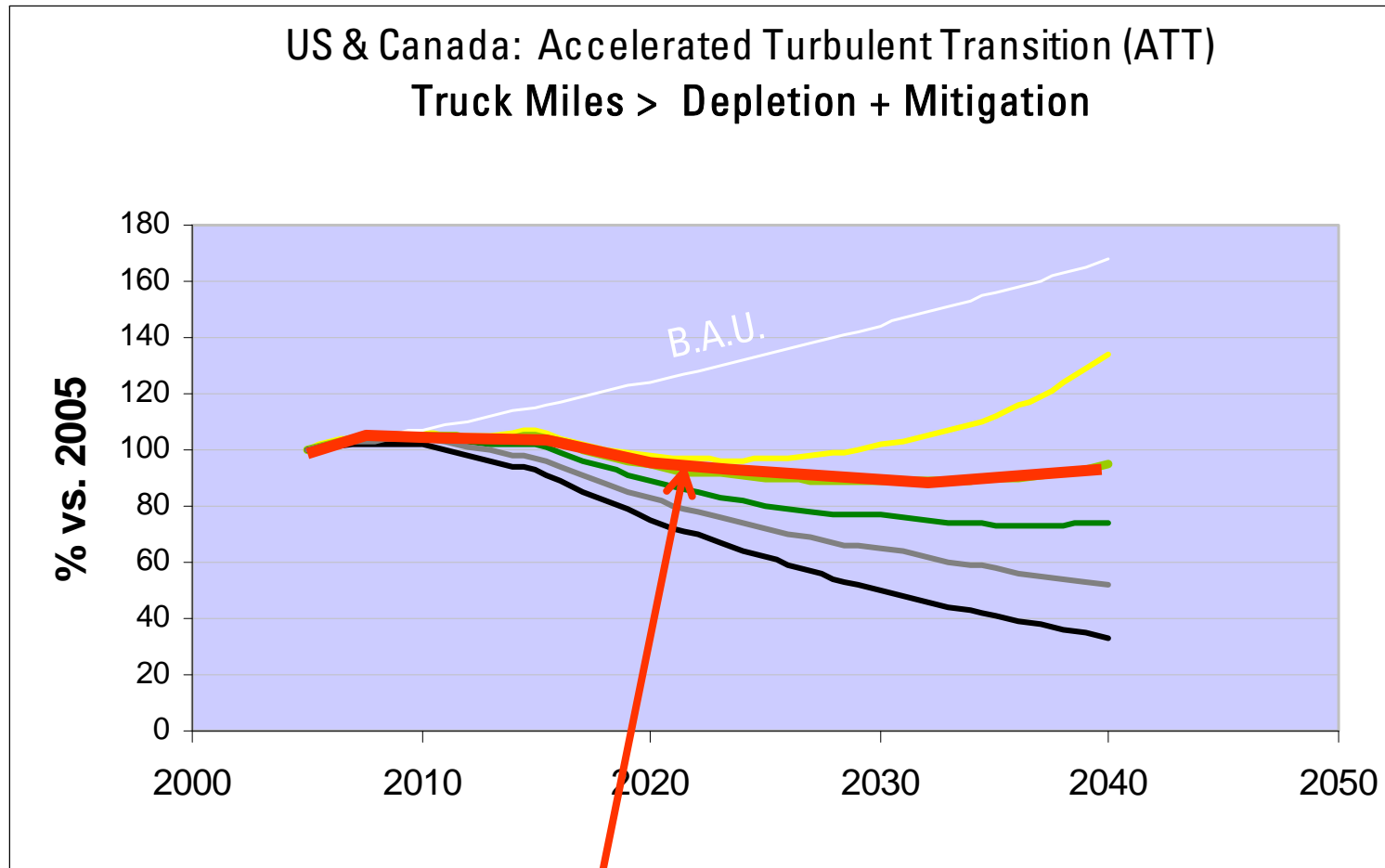
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Buy Local, Build Local or Do Without...

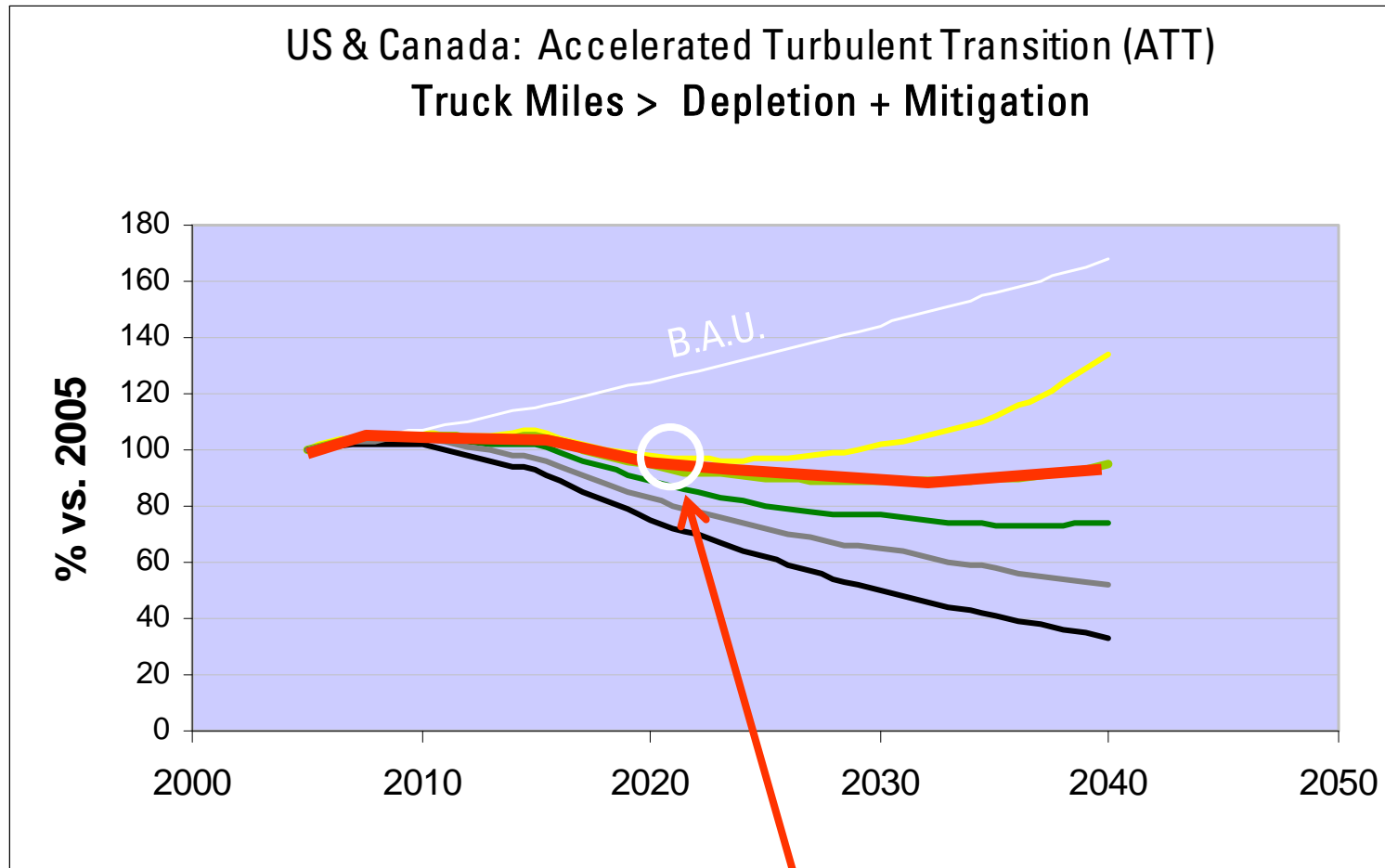
2020-2030 = 'peak local'
local food, products etc...

2. Thinking outside the extrapolation (municipal & regional impact)



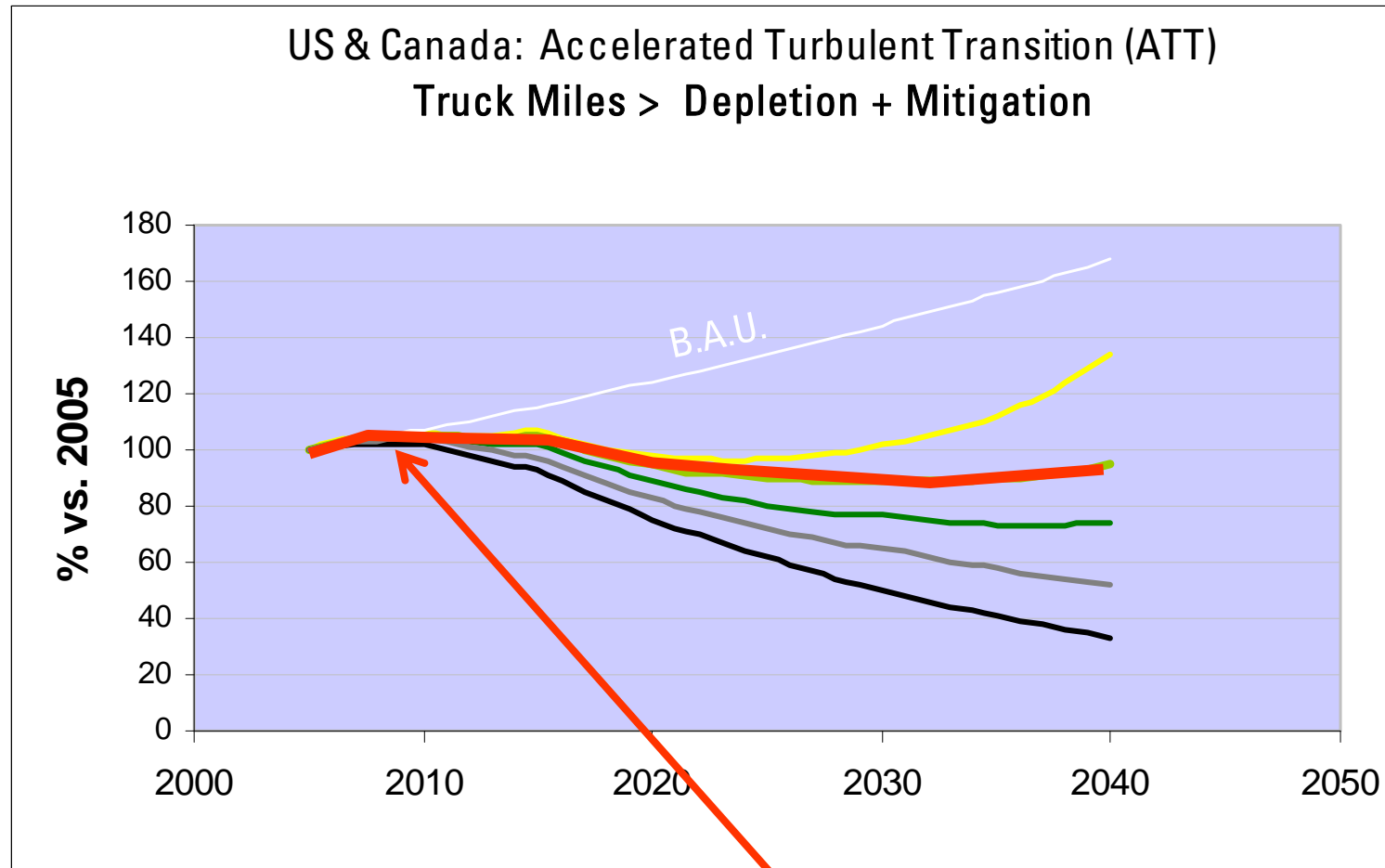
Road Capacity Required for Trucks:

2. Thinking outside the extrapolation (municipal & regional impact)



Road Capacity Required for Trucks: -10% in 2021

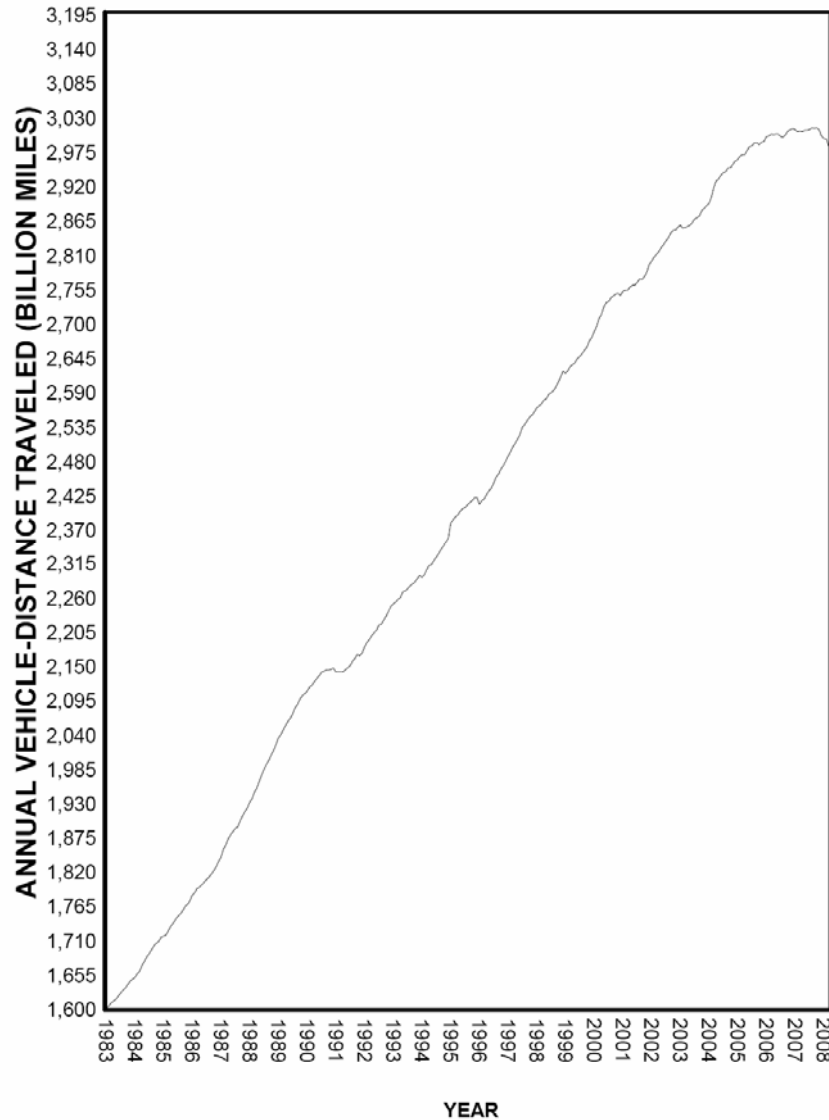
2. Thinking outside the extrapolation (municipal & regional impact)



Road Capacity Required for Trucks: Are we nearing 'Peak Roads'?

Figure - 1. Moving 12-Month Total on ALL Roads

Pag



TRAFFIC VOLUME TRENDS

March 2008



U. S. Department
of Transportation

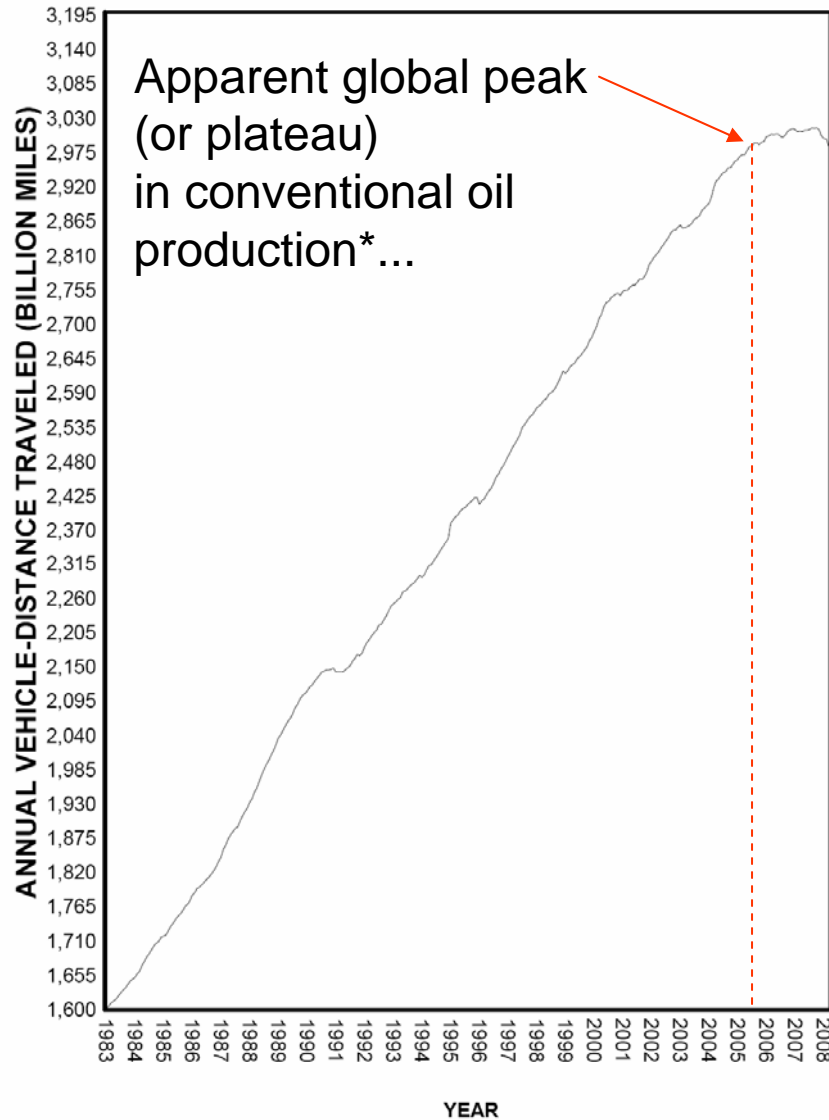
**Federal Highway
Administration**

Office of Highway
Policy Information

Road Capacity Required for Trucks: Are we nearing 'Peak Roads'?

Figure - 1. Moving 12-Month Total on ALL Roads

Pag



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**Federal Highway
Administration**

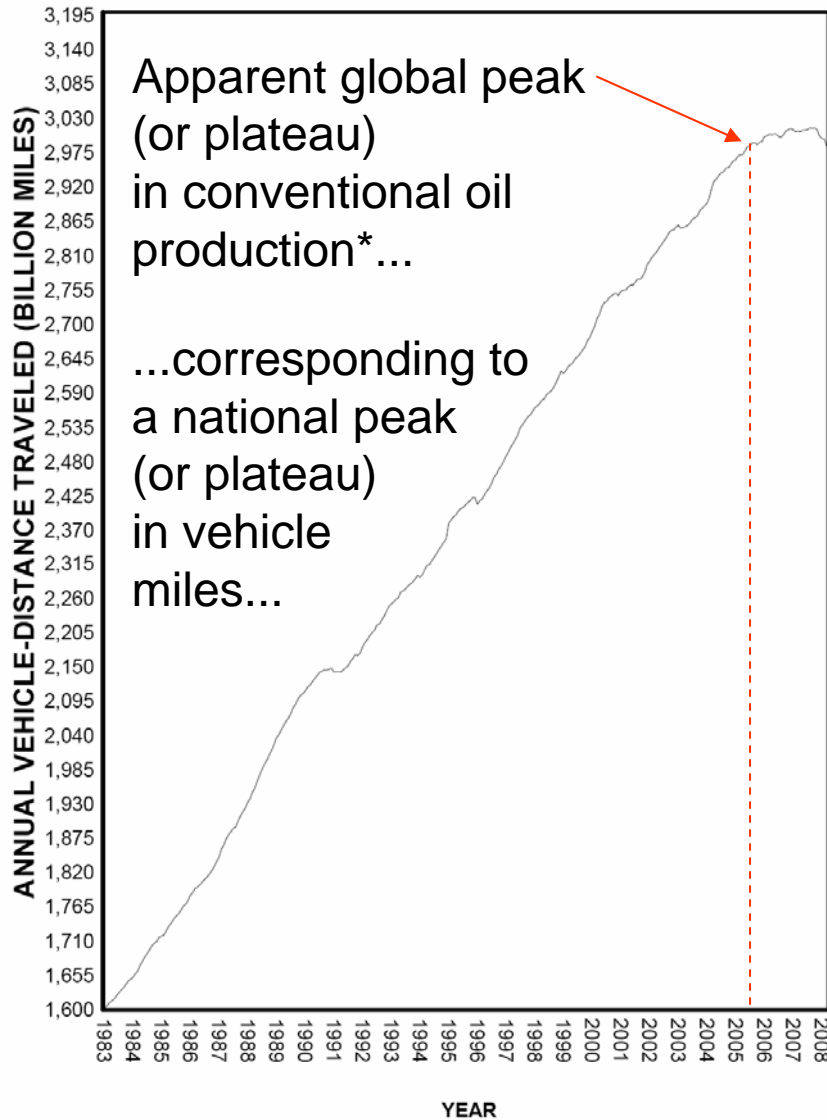
Office of Highway
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[*http://www.theoil drum.com/node/3439](http://www.theoil drum.com/node/3439)

Figure - 1. Moving 12-Month Total on ALL Roads

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**Federal Highway
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Road Capacity Required for Trucks: Are we nearing 'Peak Roads'?

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1. Energy Transition = Peak Oil + Climate Change

2. Thinking outside the extrapolation
(using scenarios to plan)

3. Next Steps...



Energy Transition > Mapping a path forward (Lessons learned climbing 'El Cap.')



Energy Transition > Mapping a path forward (Lessons learned climbing 'El Cap.')



Get a decent map..

...so you can plan ahead,
& tell if you're off course.



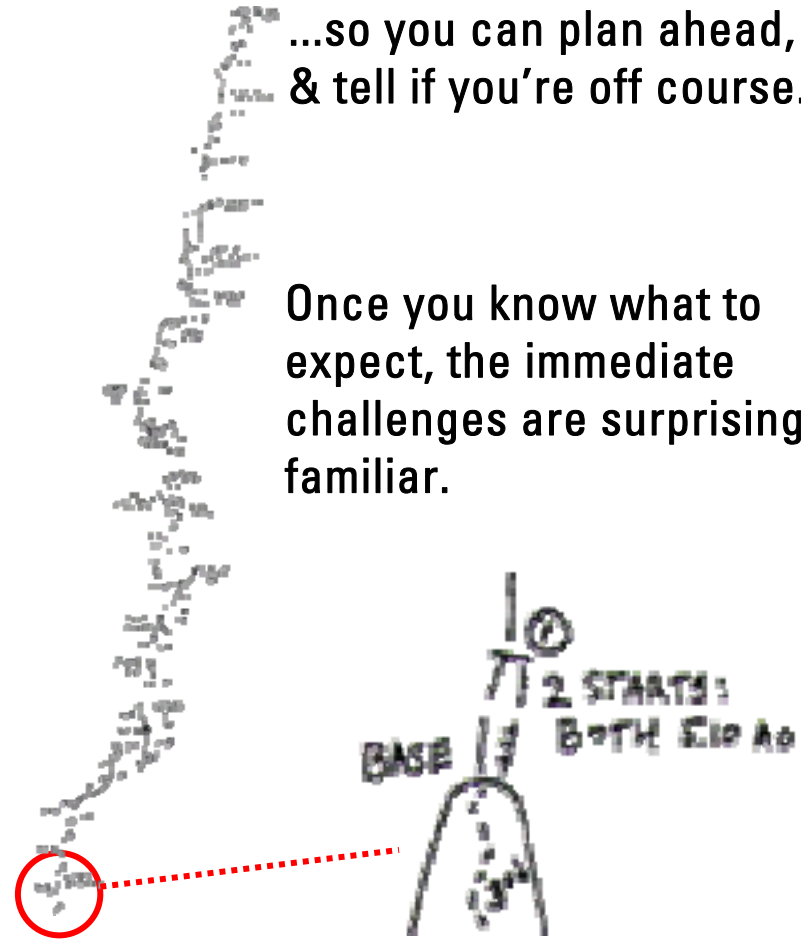
Energy Transition > Mapping a path forward (Lessons learned climbing 'El Cap.')



Get a decent map..

...so you can plan ahead,
& tell if you're off course.

Once you know what to
expect, the immediate
challenges are surprisingly
familiar.



A Road Map for Transition-Savvy Transport Planning

- Officially acknowledge the Peak Oil + Climate nexus as a significant driver of future transport demand*



Meeting 2006 Jan 11

COMMITTEE REPORT

TO: CHAIR AND MEMBERS
TRANSPORTATION COMMITTEE

DATE: 2006 January 4

FROM: DIRECTOR PLANNING AND BUILDING

FILE: 94000 – 20
Ref: Environmental Impacts

SUBJECT: GLOBAL PEAK IN OIL PRODUCTION: THE MUNICIPAL CONTEXT

PURPOSE: To provide the Committee and Council with a requested overview of the peaking of global oil production

* Municipal Peak Oil Documents:

<http://dynamiccities.squarespace.com/files-documents/municipal-and-regional-planning/>

A Road Map for Transition-Savvy Transport Planning

- Officially acknowledge the Peak Oil + Climate nexus as a significant driver of future transport demand
- Use demand scenarios to plan investments serving us beyond 2012
- Initiate a Future Fuels Dialogue:
Peak oil will drive tar-sands and coal as well as solar and transit.
Lowering CO2 requires *massive* scaling of efficiency, demand-side strategies & electrification.
- Infrastructure Triage:
 - Our roads and bridges are getting old
(and construction is getting expensive..)
 - Prioritize Upkeep for Multi-Modal Corridors
- Funding: De-couple revenues from oil consumption

1. Energy Transition = Peak Oil + Climate Change

2. Think outside the extrapolation
(use scenarios to plan)

3. Take the Next Step...



Peak Oil, Climate Change & Transportation

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bryn@dynamiccities.org
604.728.0606

