

# Sustainable and Resilient Supply Chains

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## Both Sustainability and Resilience are SUPPLY CHAIN Issues

### Sustainability



- 2/3 carbon emission of most companies is in their upstream supply chain
- For some products, most of the emissions are in the use phase (downstream)
- So looking just at a company's environmental impacts is misleading.

### Resilience



- A manufacturing company needs material, parts, transportation, warehousing...
- Dependence on suppliers: modern products require significant specialization
- So looking just at the assembly stage ("made in the US") is close to meaningless.

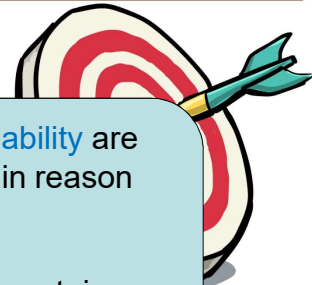
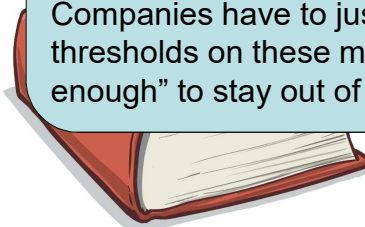
## Corporate Goals

- Objectives:
  - Maximize revenue
  - Minimize costs
- Subject to:
  - Comply with regulations
  - Build resilience
  - Be sustainable
  - Empathy
    - Employees
    - Communities
    - Charity
  - 
  -



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Neither **resilience** nor **sustainability** are part of most corporations' main reason for being.

Companies have to just meet certain thresholds on these metrics; do "just enough" to stay out of trouble

## Achieving Resilience and Sustainability

	Sustainability	Resilience
Market forces	Carbon tax (or Cap & Trade)	Continued disruptions (?)
Changing attitudes	Educating consumers	Millennials (?)
Government regulation	Ex: Biden's executive orders	Required inventory levels; manufacturing location

**The problem:** these are either “feel good” ideas and wishful thinking, or involve negative “side effects.”

## The Issues with Resilience

### “Solutions”:

- Extra inventory
- Multiple suppliers
- Cross training
- Re-shoring



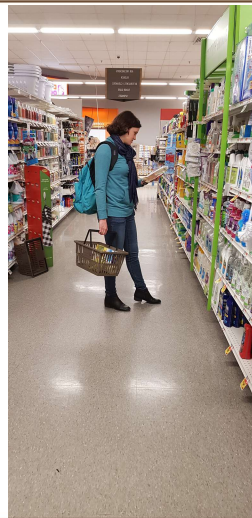
### Reality:

- Higher costs
- Loss of scale
- Reduced revenue
- Reduced quality

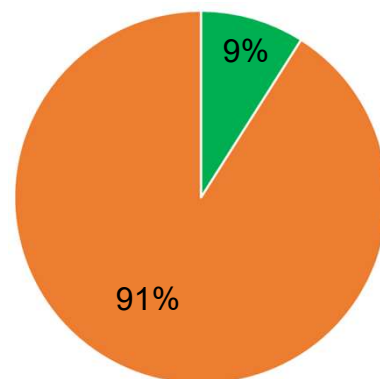
## The Issues with Sustainability - Consumers



## Really ???



Percent Choosing Green



## The "Pretend" Sustainability (Companies)



### McDonald's Is Phasing Out Straws

The replacement is way more environme



by MADISON FLAGER APR 4, 2018



NATHAN O'NIANS/CREATIVE COMMONS

Forbes

### Scientists Underesti How Bad Cow Farts ,



Sam Lemonick Contributor @ Science

TWEET THIS

Farts are funny. Global warming is not.

Animal farts and poop are major contributors warming. It turns out we might have been un just how much.



### Sustainability & Innovation

We are dedicated to making sustainability an engineering reality.



### Eco-Advantage

As innovators, Niagara is always looking for new ways to reduce our carbon footprint and improve our environmental performance. We are committed to making every drop of water we use a drop that makes a difference.



### The Economist

EVENTS

In a move to show our commitment to the reduction of plastic pollution, The Economist Events will no longer be using plastic straws or bottles at events. Plastic usage will be minimised in all other elements of event production and alternative sustainable sources prioritised. Should you require plastic straws or bottled plastic water, please contact hotel server for assistance.



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## The "Pretend" Sustainability (Companies)

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SUSTAINABILITY IS THE NEW GROWTH.



### PIONEERING GREEN GROWTH SOLUTIONS

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BNP PARIBAS

The bank for a changing world

### VISION 2030

LEAD AND INSPIRE  
POSITIVE IMPACT



### THE POWER OF COMMITMENT

350  
FACILITIES

IN 59  
COUNTRIES

100% RENEWABLE  
ENERGY

BY 2050



GENERAL MOTORS



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## The “Pretend” Sustainability (Companies)

IN A CHANGING WORLD,  
SUSTAINABILITY IS THE NEW GROWTH.

THE POWER OF COMMITMENT

Neither resilience nor sustainability investments are compatible with short term profit maximization beyond:

- Eco-business
- Eco-efficiency
- Eco-risk mitigation
- Eco-hedging



100% RENEWABLE ENERGY

REAL MOTORS

BNP PARIBAS

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## Is Government Interventions the Answer?



**BBC NEWS**

Washington votes no on a carbon tax — again

A New Green Deal goes down

By David Roberts | @drvox | david@vox.com

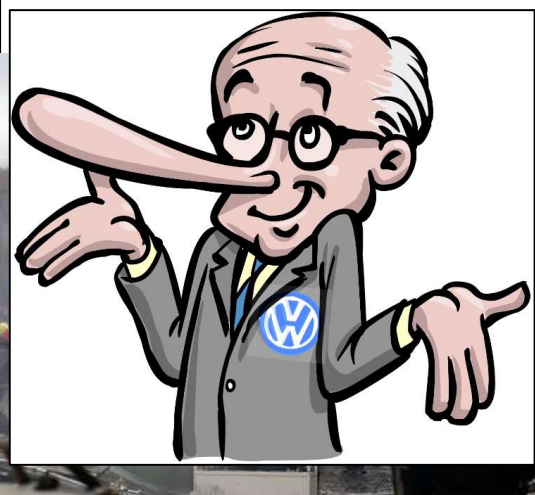
Australia votes to repeal carbon tax

© 17 July 2014

Australia has one of the highest per-capita greenhouse gas emissions in the world

Australia's Senate has voted to repeal carbon tax

Part of The 2018 midterm elections, explained



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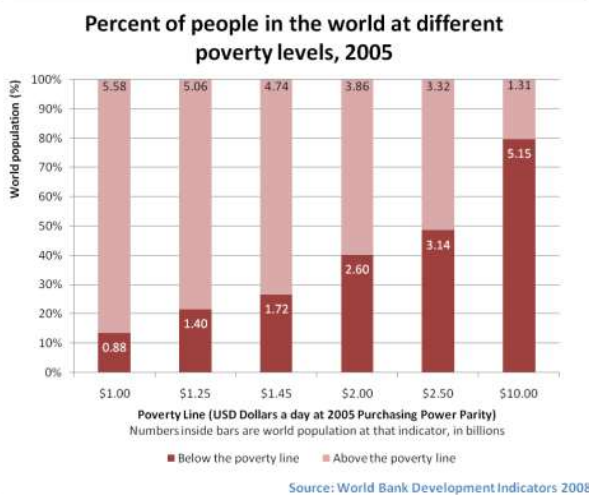
Owing to consumers' attitudes and industry's influence, even governments who legislated carbon tax (or C&T) cannot make the tax or the C&T ceiling high enough to make a difference. (In addition many "discounts" to favorite industries are mitigating the impact.)

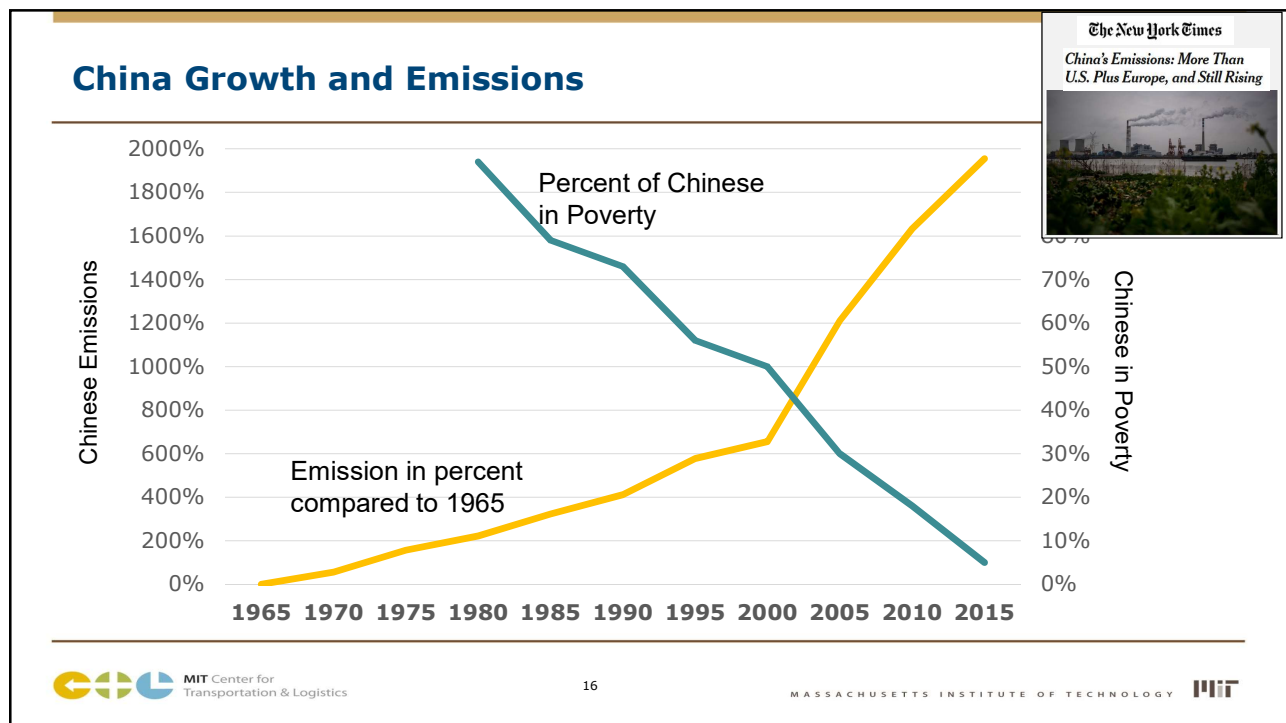
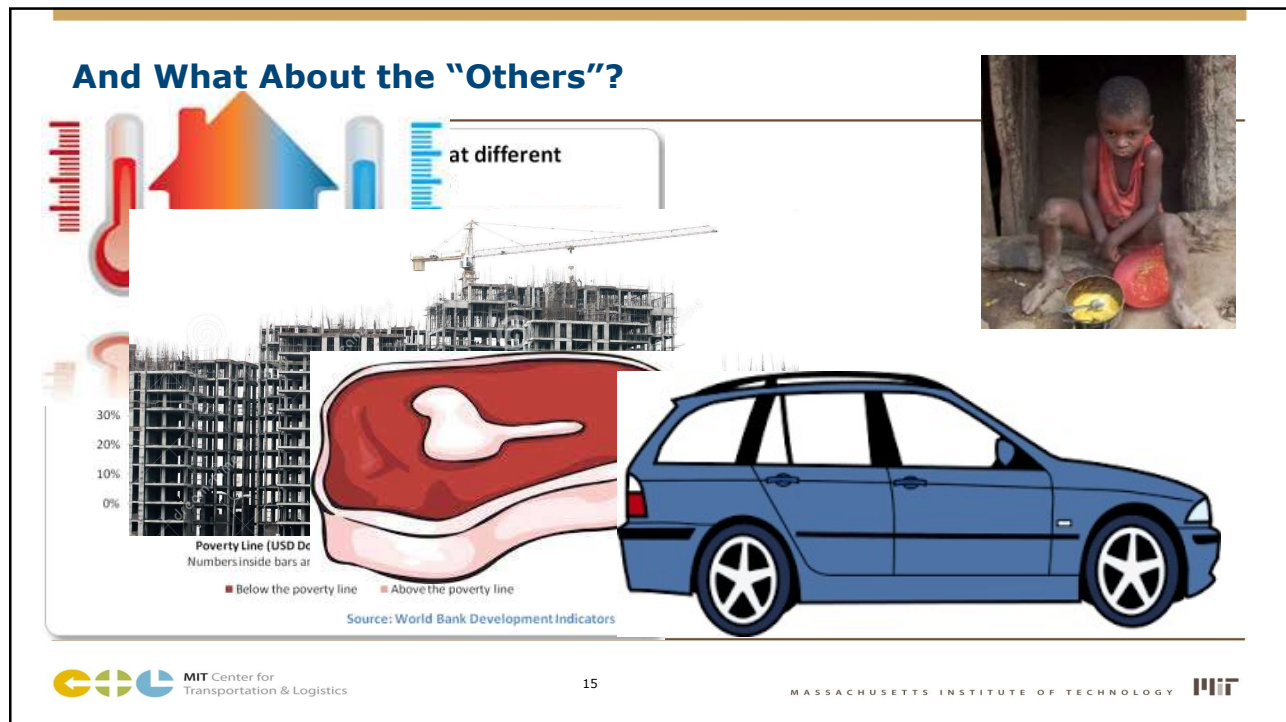
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Part of **The 2018 midterm elections, explained**

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## And What About the "Others"?





## Following the Pandemic

- Many consumers are poorer – cost emphasis
- Companies are even less likely to invest (beyond PR)
- Governments also will have to pay for the Covid-19 fight



## Resilience: Prepare Options for the Responders

- Forecasting
  - #1 rule: always wrong
- Flexibility
  - Cross-training
  - Standardization
  - Collaboration
  - Postponement
  - Culture



C&S  
Wholesale  
Grocers

intel.

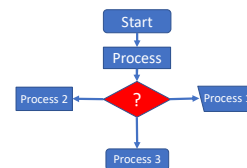
DELL™

ZARA



## Resilience (with Sustainability Bonus): Less long term commitments

- Transportation: Own fleet => contract => spot => gig
- Use of warehouse Air BnB for business fluctuations
- Use hedging and options rather than commitments
- Conditional contract items



## Conclusions from the Pandemic

- Behavior change does not work even in the face of clear and present danger
- The solution: technology



## ICT Advances

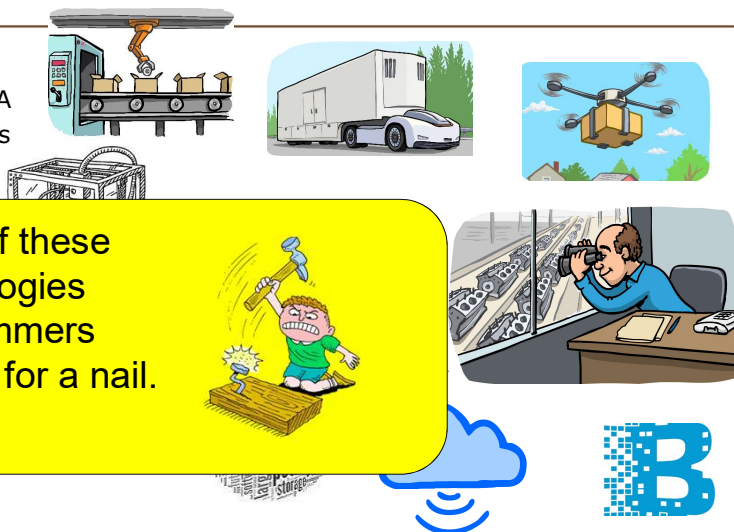
- **Automation**
  - Digital control/Robotics/RPA
  - Autonomous vehicles/trucks
  - Drones
- **3D printing**
- **Automatic input**
  - Sensing
  - IoT - visibility
- **Computing**
  - Artificial intelligence
  - Big data
  - Cloud computing
  - Block chain



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Many of these technologies are hammers looking for a nail.



## Relevant Technological Solutions

- Resilience



- Sustainability



## Note: Black Swans Come in all Colors

- When we talk "resilience" we have in mind the fight against Covid-19
  - WFH
  - E-commerce
  - Reduced travel => reduced emissions
- What if the next disruption is a massive cyber-attack (down Internet; grid)?
  - No WFH
  - No e-commerce
  - Cash economy



## Further Reading



<https://sheffi.mit.edu/>

