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Decarbonizing without Peak Oil

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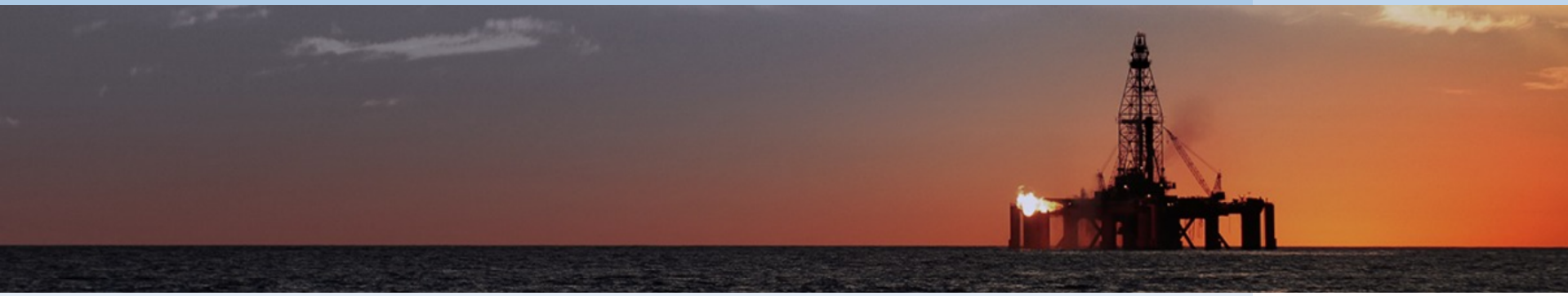
3rd Basel Sustainability Forum



The Convienience of Peak Oil

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- Peak Oil: a good reason to exit a fossil fuel economy
- The situation has drastically changed in the last two years: oil reserves and stocks are huge, prices are low *. Alarming for decarbonization
- Need to better undertand the **resource depletion** or **the atmospheric capacity** perspectives to stay within 2°c.
- Oil is a finite resource, hence the „Limits to Growth“ (Meadows et al., 1972), but....
- Urgency of climate change warrants a paradigm shift towards societal transformation that will keep fossil fuels in the ground, whatever the amount available.

- What paradigm shift?

The size of the „garbage bin“ is increasingly more important than the availibility of resources.

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Outline

- What is Peak Oil?
- Oil supply and demand
- IPCC AR5: an understanding of our carbon budget
- The Brundtland report, the blue marble, and the Mickey Mouse effect
- Solutions to be explored
- Conclusion

What is Peak Oil?

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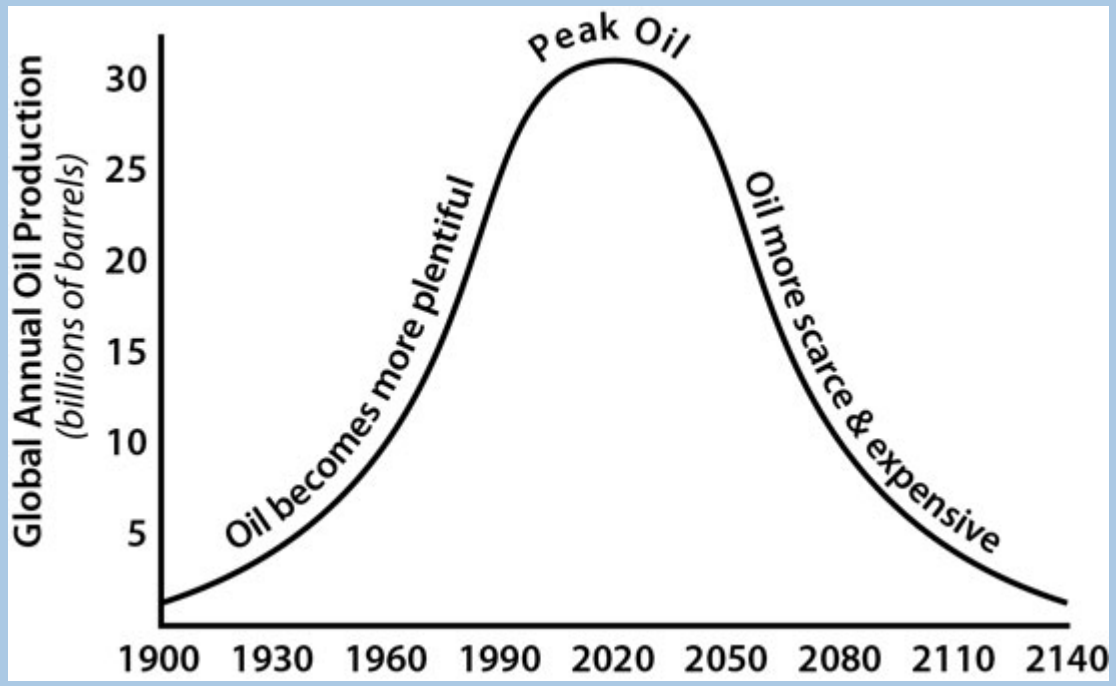
> Peak oil is the theorized point in time when the maximum rate of extraction of petroleum is reached, after which it is expected to enter a terminal decline.



Source: Peakoil.com

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Oil Supply and Demand

- So, are we running out of oil? Not soon!
  - Currently spikes in oil prices result from more stringent production quotas, and diplomatic tensions between US and Iran
- Huge surplus of oil because:
  - Oil is an economic commodity – higher prices resume exploration
  - Advances in technology (deep sea drilling, tar sands) similar to the Malthus theory failure – technology evolves
  - Shale gas
  - Competitive renewable energy technology and wide investments

Oil Supply and Demand

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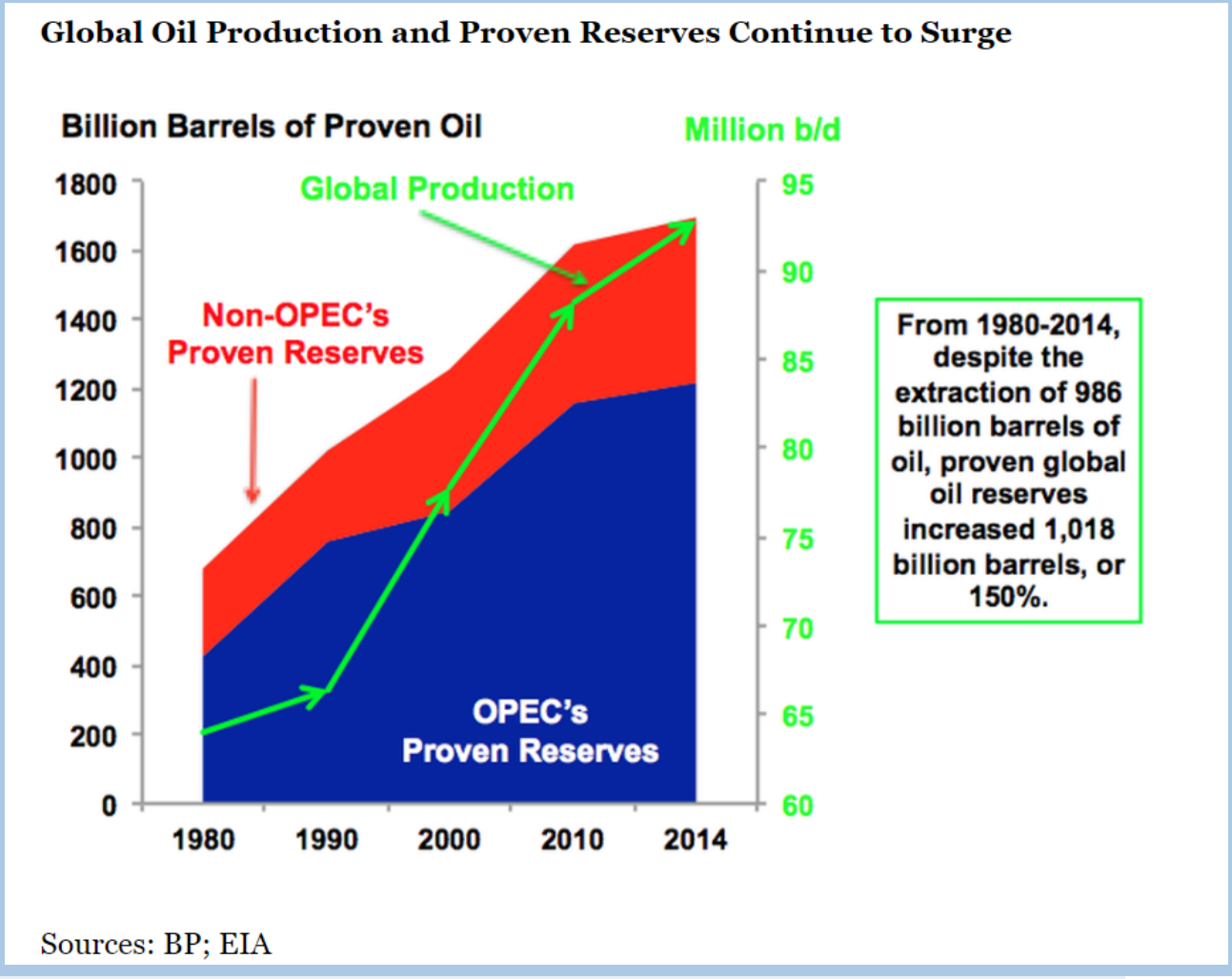

Oil Supply and Demand

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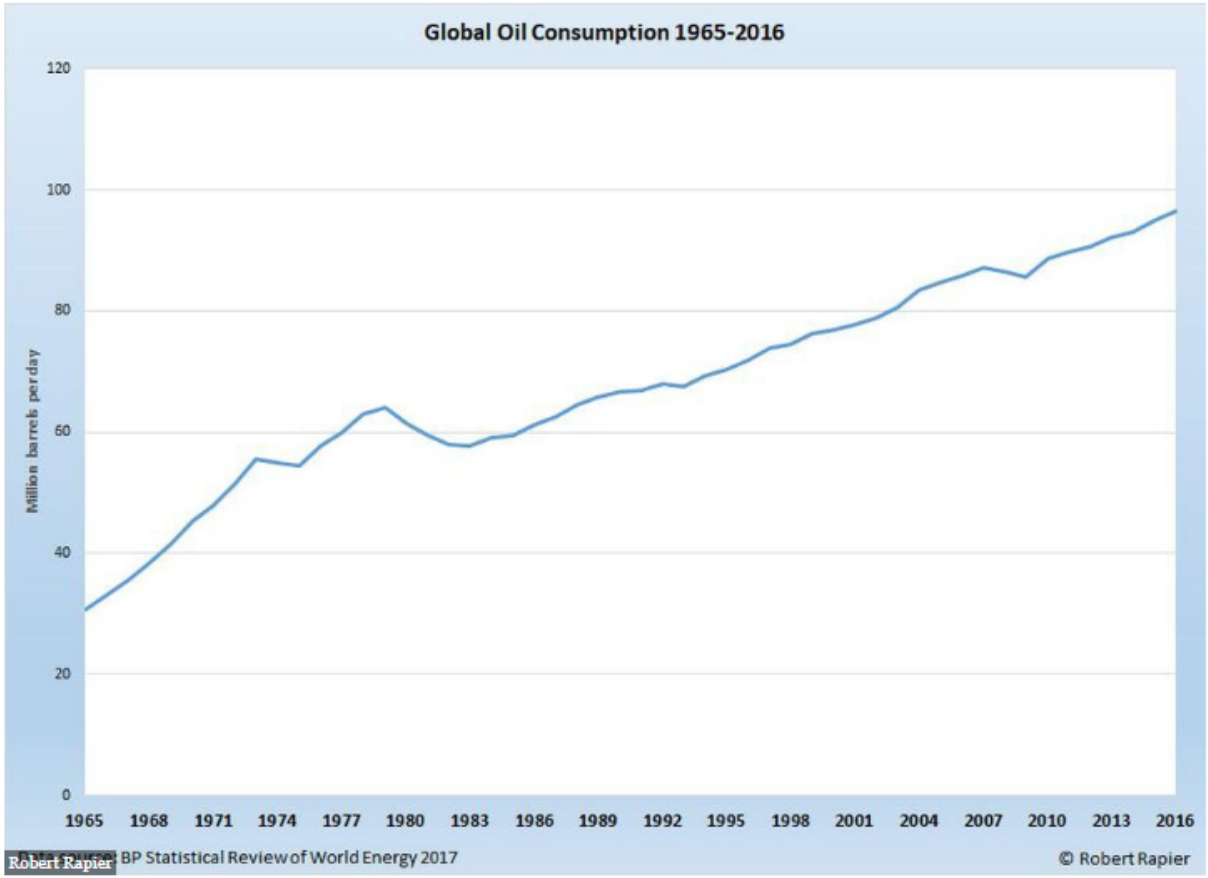

World oil demand 1965-2016.

- Peak demand due to alternative sources of energy?
- With a **growing population**, we are experiencing a constant growing demand for oil globally
- Long-term **oil demand** is expected to increase by 15.8 mb/d, rising from 95.4 mb/d in 2016 to 111.1 mb/d in 2040 (OPEC)

Source: Forbes 2018. https://www.forbes.com/sites/rrapier/2017/06/19/peak-oil-demand-is-millions-of-barrels-away/#34d3d9e16940

IPCC AR5: An Understanding of Our Carbon Budget

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IPCC's latest report provides estimates of the total allowable global emissions in order to limit the temperature rise to 2°C above pre-industrial levels

IPCC AR5: An Understanding of Our Carbon Budget

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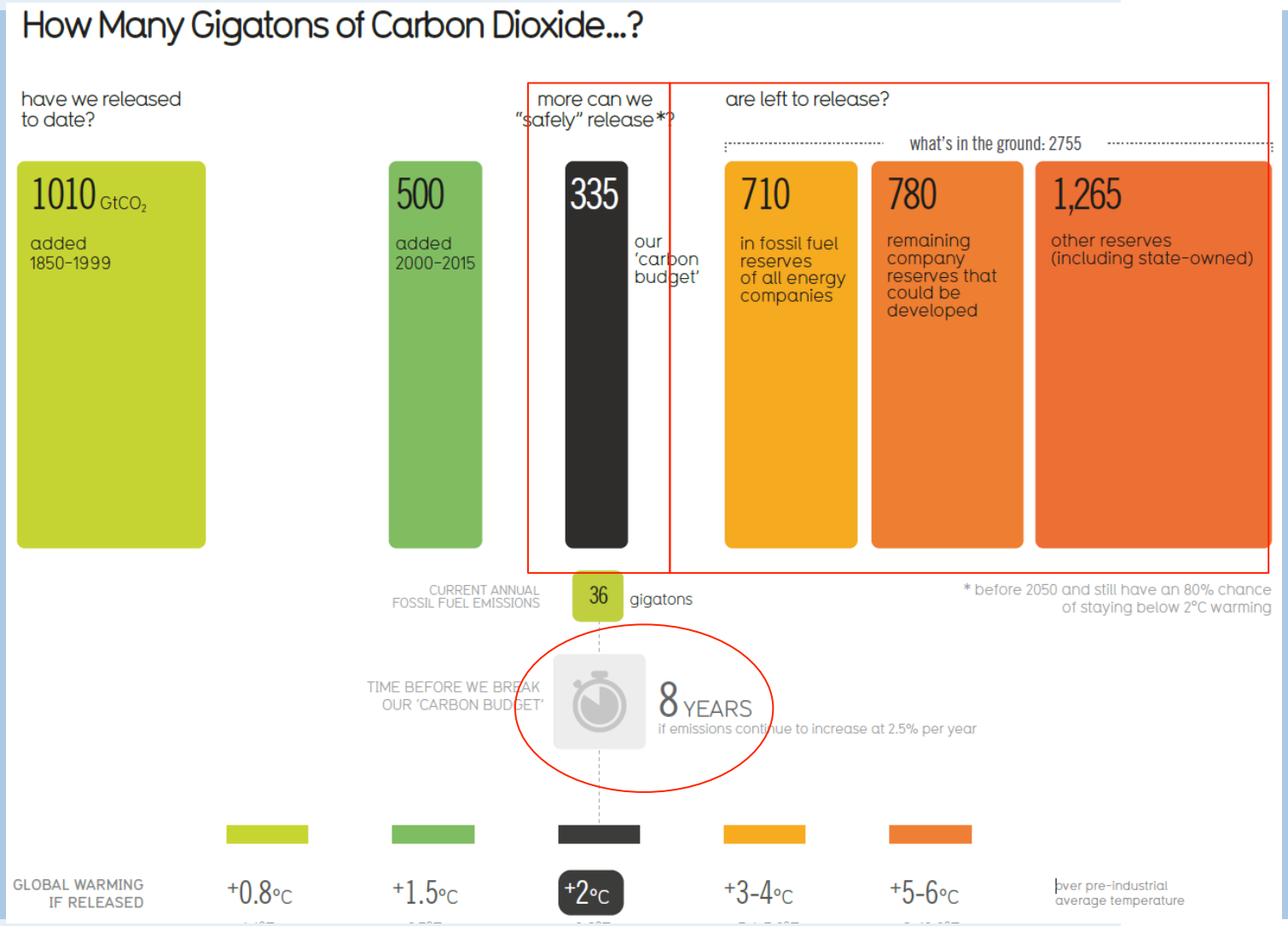

Source: https://informationisbeautiful.net/visualizations/how-many-gigatons-of-co2/

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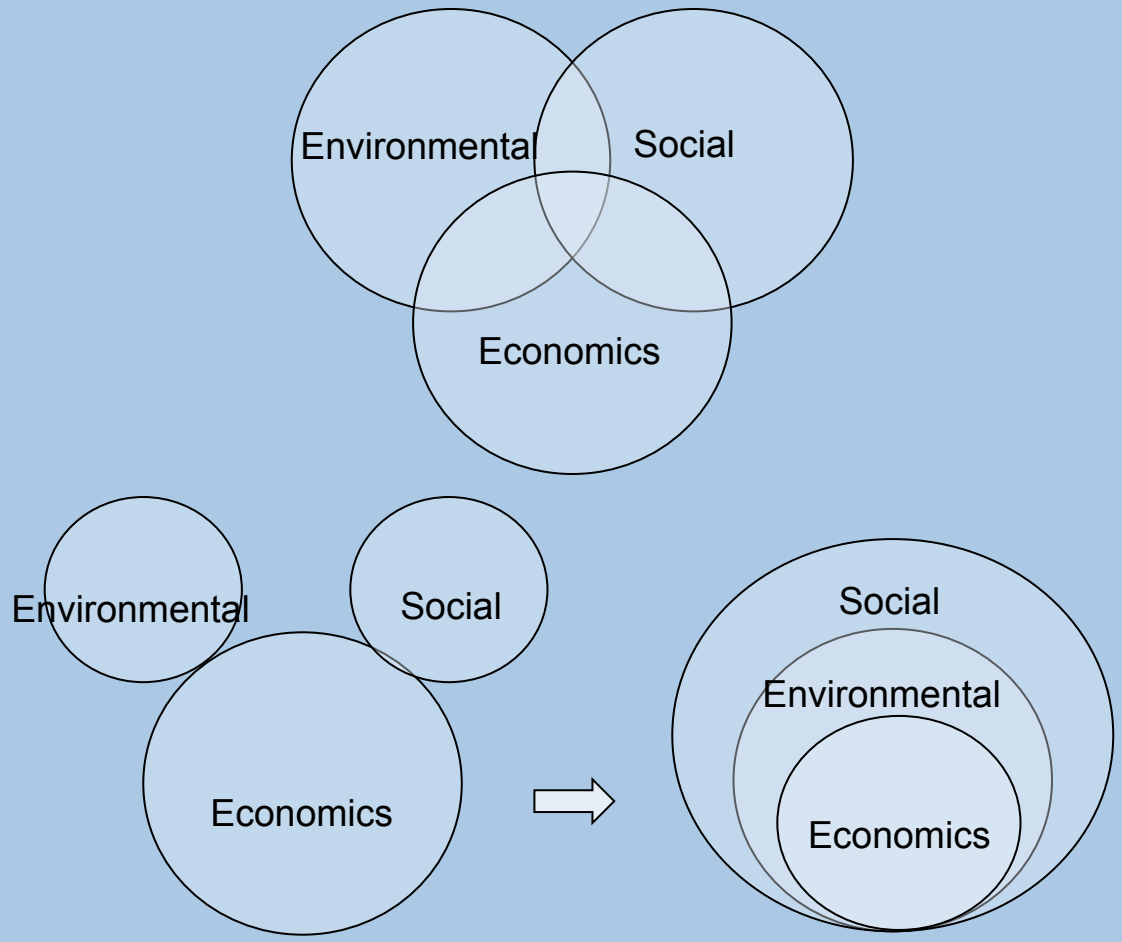
The Brundtland Report, the Blue Marble, and the Mickey Mouse Effect



The focus on finite resources and the «Limits to growth»?

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Solutions to Be Explored

- Design new electricity markets
- Improve efficiency to reduce energy demand
- Progress in behavioral and cognitive change
- Explore green economy opportunities as suggested by green liberals
- Incentivize renewables
- Carbon fee and dividend? Issue of elasticity linked to wealth
- Cap and trade?
- Carbon capture and storage
- Use of more efficient construction material with reduced emissions (Limestone calcined clay cement)

Solutions to Be Explored

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- Rethinking food systems
  - Food waste is 8% of total anthropogenic GhG emissions
  - 30% of food produced is wasted
  - Only 60% of fertilizers reach plants
  - Imports and exports of food displace emissions, i.e., growing meat consumption

Sources:
- http://www.fao.org/3/a-bb144e.pdf
- http://www.fao.org/food-loss-and-food-waste/en/
- https://www.sciencedirect.com/science/article/pii/B0123485304002290

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Solutions to Be Explored

- Anticipate population growth
- Energy facilitates poverty alleviation, but trade off with climate change
- Remove fossil fuel subsidies
- Anticipate other agendas

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Conclusion

- Keeping fossil fuels in the ground is needed, but will be more difficult than initially thought – need to anticipate this.
- Society needs more profound and faster transformations in order to decarbonize
- Looking at environmental issues from the prism of **resource depletion,** i.e., Peak Oil is irrelevant
- Since IPCC AR5, acting according to the **atmospheric capacity** within carbon budget sets the tone, and not **resource depletion**.
- Optimism: Tollefson 2018, *Nature* - investments in renewable, by 2030 solar energy in China will be more cost- effective than coal.