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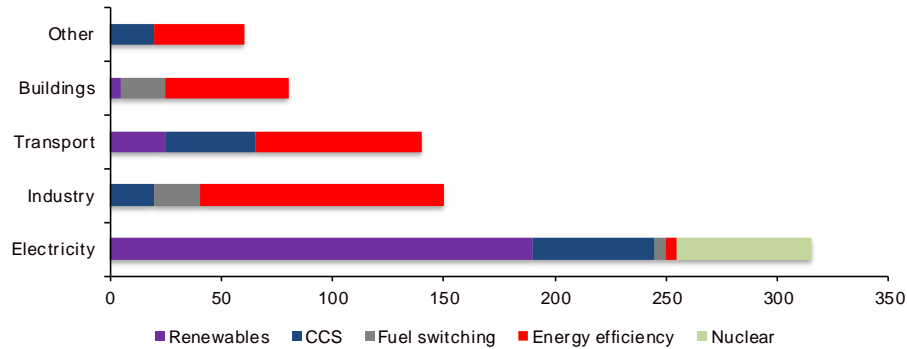
The new energy revolution

From morality to market

Kingsmill Bond
March 2017

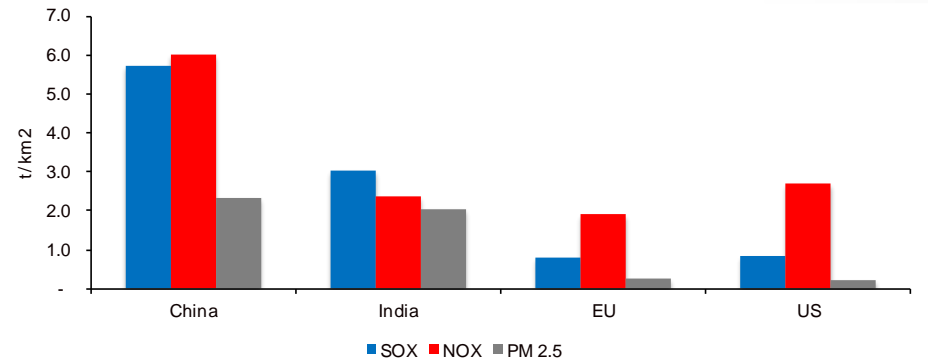
The moral case for new energy is very clear

Required CO2 reductions (Gt) to 2050 for 2 degrees



Source: IEA

Pollution per km2 2015

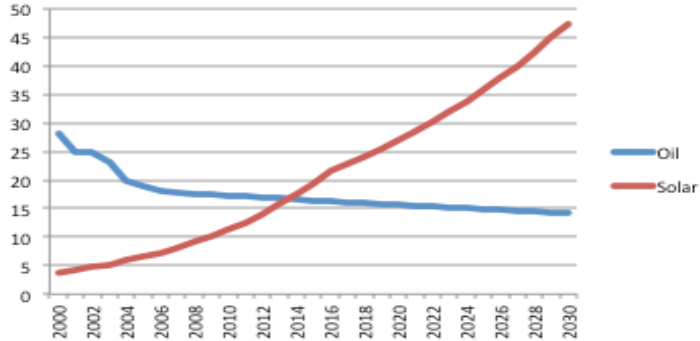


Sources: IEA, WHO, TSRP estimates.

- Carbon dioxide.
- Pollution.
- Deaths.
- Global inequality.
- Petrostate policies.

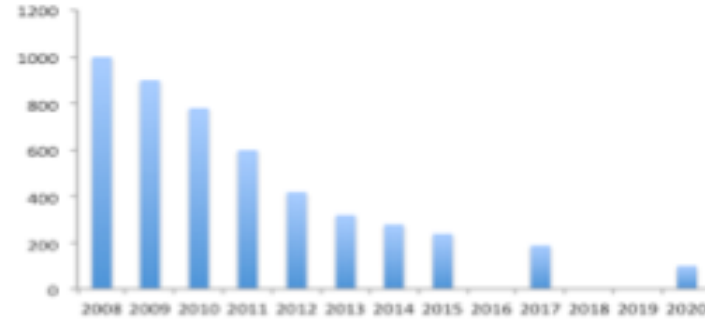
The business case has become clear

EROI



Source: Gagnon, Louwen, TSRP estimates

Battery costs \$/ KWh

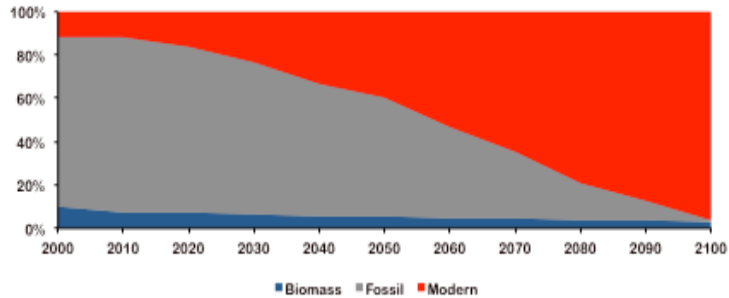


Source: US Department of Energy actual and targets, Tesla

- Energy return on energy (EROI) invested is the foundation.
- Electricity costs.
- Transport costs.

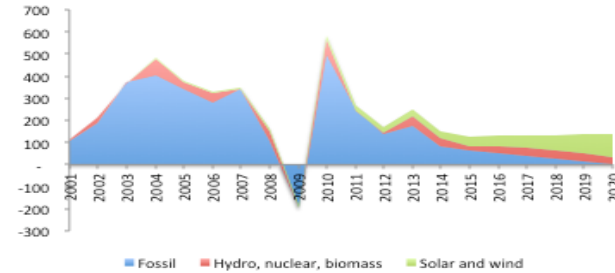
The energy transition is happening as we speak

Split of global fuel sources 2000-2100



Source: BP, IEA, TSRP estimates

Incremental energy supply (mtoe)

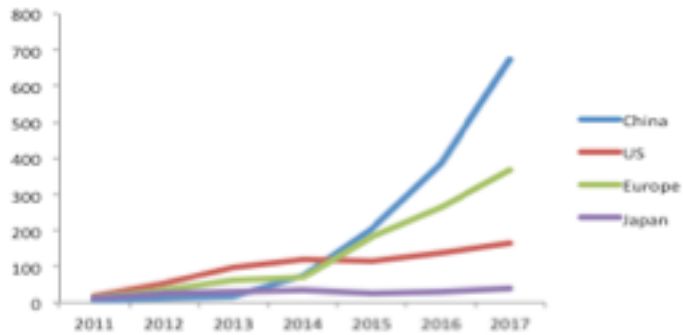


Source: IEA, TSRP estimates

- The move from fossil fuels to renewables.
- Systemic and incremental change are different.
- Incremental changes happen fast.
- Global fossil fuel demand will peak around 2020.
- We are already surrounded by demand peaks.

The opportunity

EV sales (000)



Source: IEA, TSRP estimates

Solar price (cents per KWh)

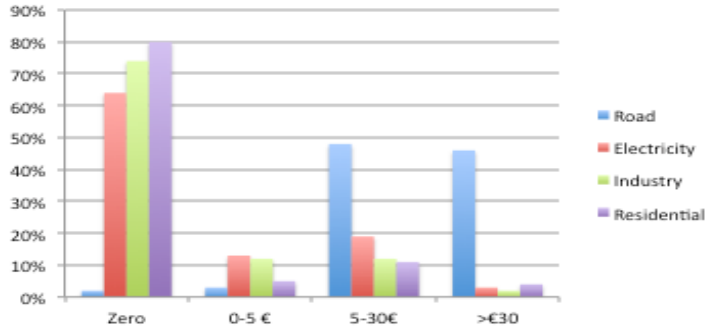
Capex per W\$	Insolation hours pa			
	1000	1500	2000	2500
0.5	5	3	2	2
1	7	5	4	3
1.5	10	6	5	4
2	12	8	6	5
2.5	15	10	7	6
3	17	11	9	7

Source: TSRP estimates

- The emerging market energy leapfrog.
- China, SE Asia, India, Africa.
- Invention.
- Integration.
- Regulation.

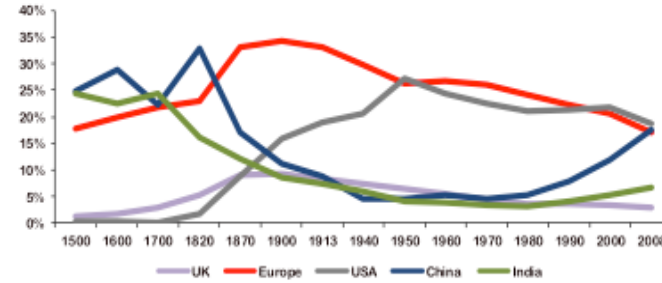
The risks

Level of carbon taxation €/t



Source: OECD 2015

Share of global GDP



Source: Maddison, IEA

- Stranded assets.
- Hidden costs.
- Poorly designed subsidy regimes.
- Dead-end technology.
- The eclipse of the West.

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