



# The New World Economy: Raising Capital for Disruptive Innovation & Cleantech

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# Interconnected Megatrends and the New World Economy

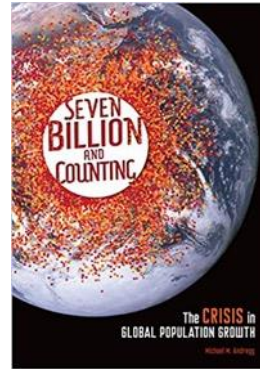
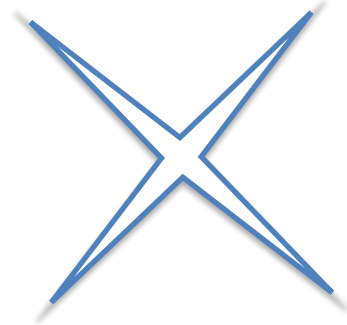
ALL ASKING FOR BIG INVESTMENTS

CO2 explosion and resource extraction from 4.6T to 10.6T annually per person in one century



*From mitigation to adaptation*

Need smart bulwarks against hostile climate & safe havens for the most vulnerable



Population growth explosion in Africa while declining in the developed world



Automation of work; making everything SMARTER & cheaper

# Need for Disruptive Innovation and Cleantech

INTELLIGENT SYSTEMS THAT BY SENSING, THINKING, ACTING & LEARNING WILL TACKLE THE CLIMATE CRISIS AND “FUTURE-PROOF” OUR TRADITIONAL INDUSTRIES AND SOCIETY

CITIES AND SOCIAL SYSTEMS

← ENABLING TECHNOLOGIES →

TRADITIONAL INDUSTRIES



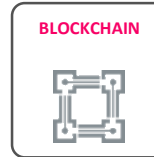
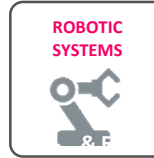
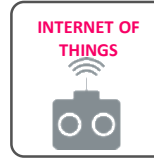
NEW

GOVERNANCE

SERVICES

PROCESSES

TAXES



NEW

PRODUCTS

SERVICES

PROCESSES

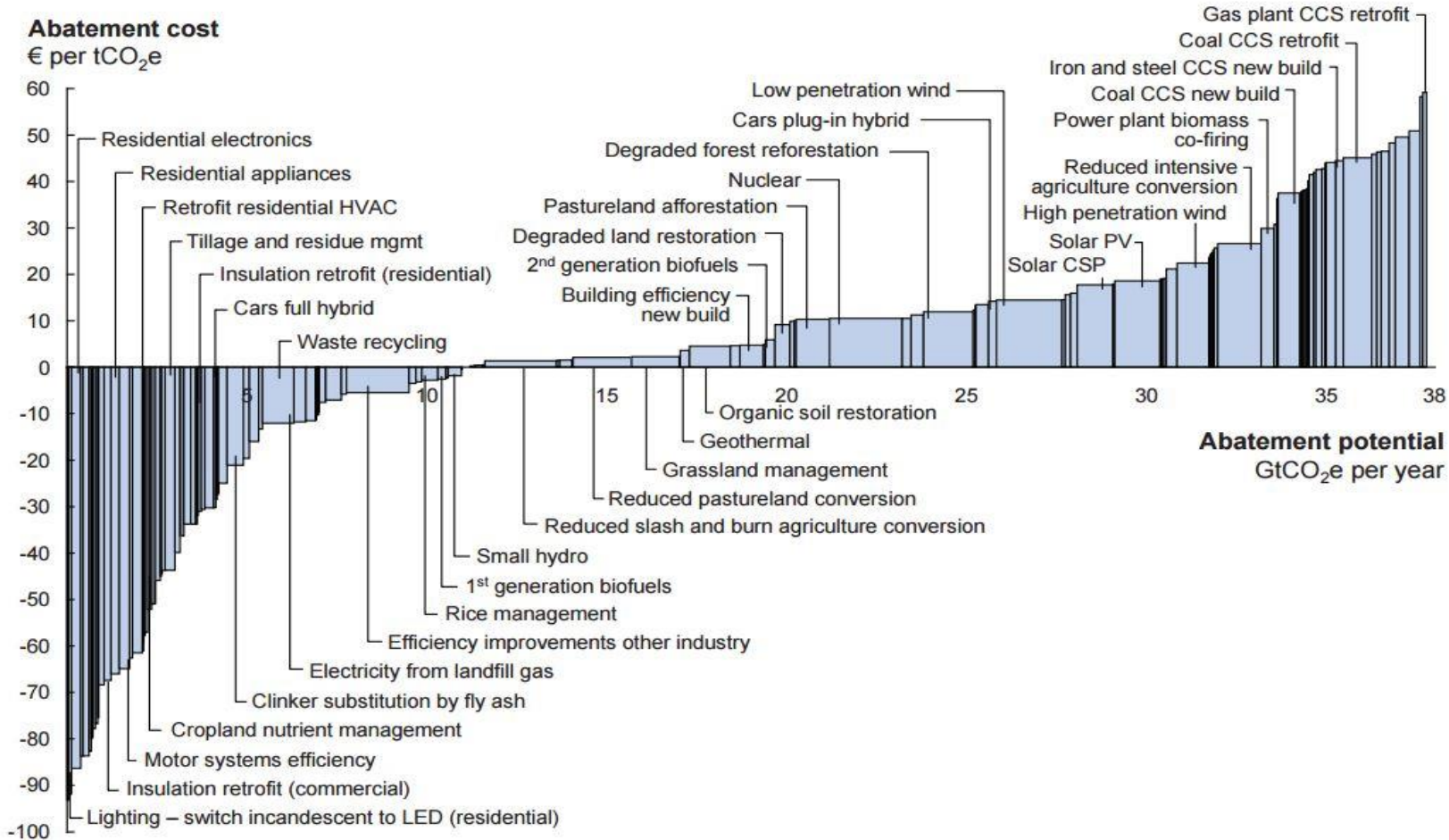
B-MODELS



EVERYTHING NEEDS TO BECOME SUSTAINABLE, DIGITAL AND AFFORDABLE



# Global GHG abatement cost curve beyond business-as-usual – 2030



Note: The curve presents an estimate of the maximum potential of all technical GHG abatement measures below €60 per tCO<sub>2</sub>e if each lever was pursued aggressively. It is not a forecast of what role different abatement measures and technologies will play.

Source: Global GHG Abatement Cost Curve v2.0

# Industry 4.0 Will Unlock Significant Value



## Vehicles

Autonomous vehicles and condition-based maintenance

**\$210B-740B**



## Home

Chore automation and security

**\$200B-350B**



## Offices

Security and energy

**\$70B-150B**



## Factories

Operations and equipment optimization

**\$1.2T-3.7T**



## Retail environments

Automated checkout

**\$410B-1.2T**



## Cities

Public health and transportation

**\$930B-1.7T**



## Outside

Logistics and navigation

**\$560B-850B**



## Human

Health and fitness

**\$170B-1.6T**



## Worksites

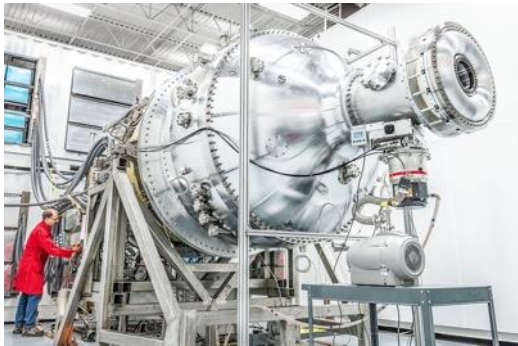
Operations optimization/health and safety

**\$160B-930B**

Potential impact of \$3.9 - \$11.1 trillion per year in 2025

Source: McKinsey

# Who Has the Courage to Bring Necessary 'Breakthroughs' to Market?



# Technical & Financial Road Blocks





# New Technologies Have Long Development Cycles



**Long Capital-Intensive Development Cycles with Multiple Valleys of Death**



# Limited Access to Capital for Disruptive Technologies and Cleantech

## Divesting from fossil fuels doesn't necessarily translate into cleantech investments:

- Of the \$40trn in global pension funds, \$8trn has been divested from the fossil fuel industry; only a part of that has been invested in cleantech and disruptive technologies

## Focus on saving, instead of investing:

- A quarter of all investment-grade bonds, worth \$15trn, have negative yields

## Risk management departments rule:

- Assisted by AI, they virtually only allow for (debt) investments in proven technologies, not equity investments in cleantech and disruptive technologies

## Concentration of wealth:

- Increasing wealth disparity & “have-nots” after a century of bringing more people out of poverty; slows down investment cycle

## Impact investing growing:

- But still small while many big financial institutions use “green washing” in their impact funds

# So: Are Subsidies Essential?

## SUBSIDIES MYTHS & REALITIES

Subsidies started Silicon Valley:

- *NASA was the most important early customer for silicon semiconductors*
- *Pentagon's research arm, DARPA, sponsored the creation of the Internet*
- *Government remains major source of funding for top computer science programs like Stanford*

Subsidies have always been important in the energy industry

# Government Funding: WHY?





# Of Fossil Fuel Profits vs Subsidies

- The energy industry always depended on subsidies – and that was good
- In 2017, the world subsidized fossil fuels by \$5.2trn, equal to roughly 6.5% of global GDP; that's up half a trillion dollars from 2015 (Source: IMF)
  - Actual “direct” subsidies for fossil fuels were \$296bn in 2017
  - The IEA estimates that renewables got approximately \$60bn in subsidies in 2012
- In 2012 actual “direct” subsidies were still \$572bn; net profits of top 1,800 oil & gas and coal companies worldwide in that year totaled ~\$500bn (not including O&G equipment and distribution companies)

## *Food for Thought:*

- *Are we just shoveling tax payers' dollars into the hands of shareholders?*
- *What would the price of oil, gas & coal be without the subsidies?*
- *Is it realistic to expect the rise of a new clean energy industry without a bifurcation in funding?*

# So How to Raise Capital for Disruptive Innovations & Cleantech?

- Have a clear strategy on how to capture the high returns
- Marketing and communication as important as the technology
- Find enlightened billionaires & influencers to help wave the flag
- Approach visionary business leaders in old industries in transformation
- Find patient capital from sovereign wealth funds and pension funds
- Persuade governments of the importance of their contributions



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