



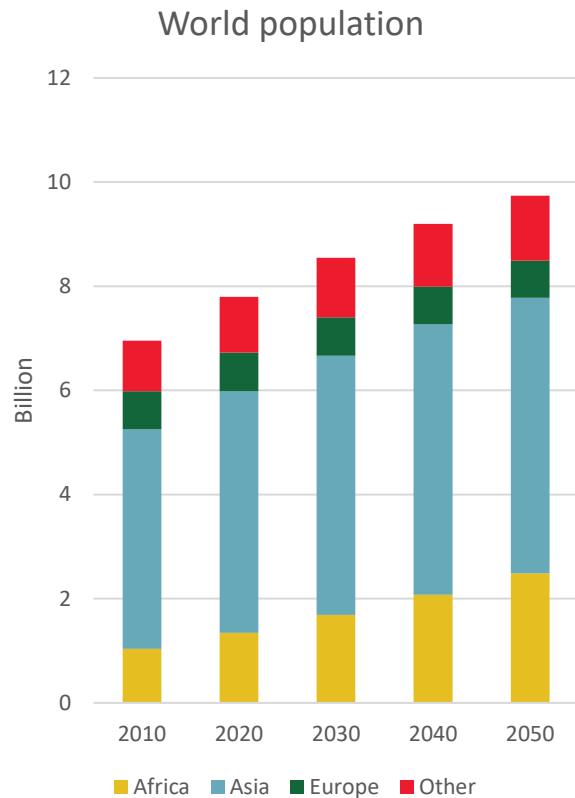
# Tackling Climate Change – The Way Forward

Mika Anttonen, Chairman of the Board, St1 Nordic Oy

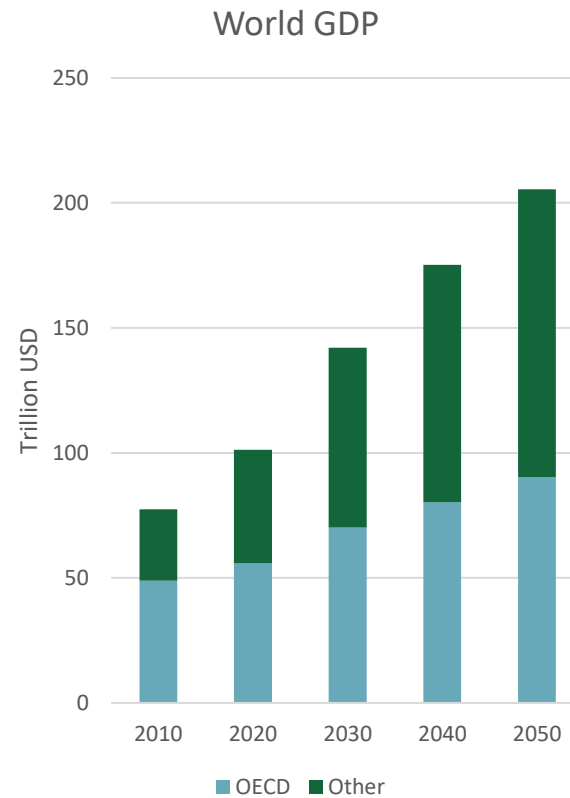
MIT R&D Conference

November 15, 2022

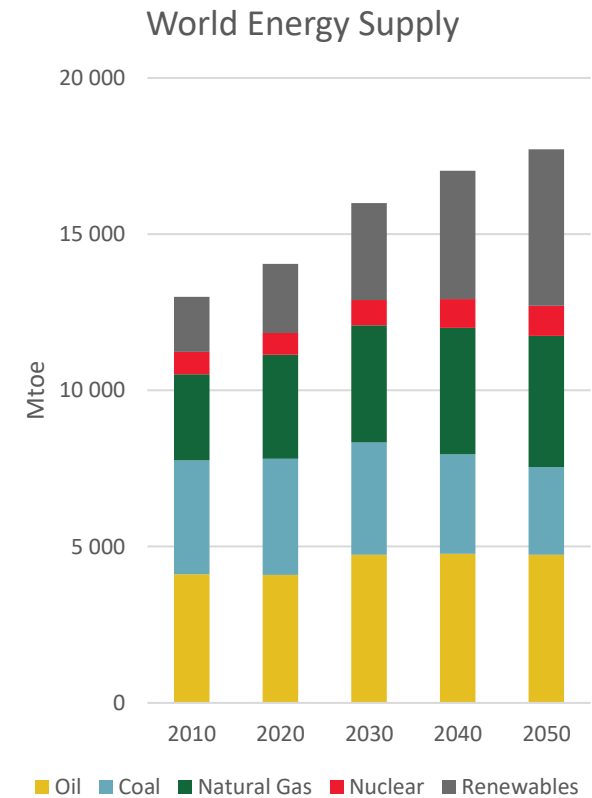
# The Global Energy Challenge



United Nations, World Population Prospects 2019, Medium variant

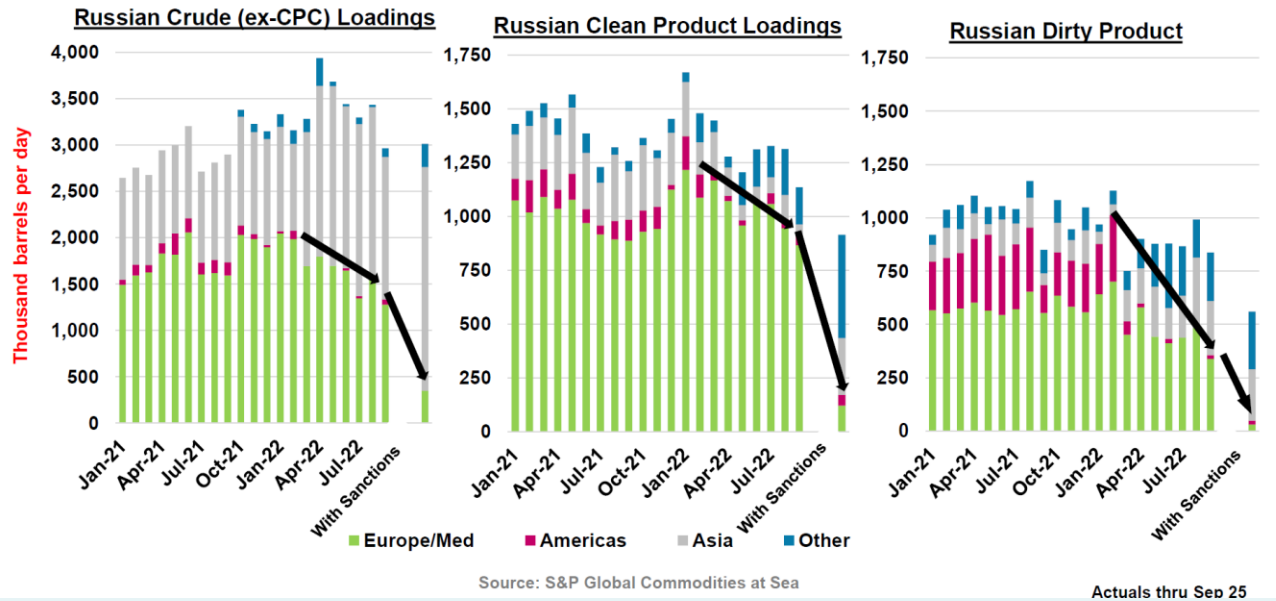


OECD (2022) Real GDP long-term forecast



IEA (2021), World Energy Outlook 2021, IEA, Paris, Stated policies scenario (STEPS)

## Russian waterborne exports resilient & destinations show only modest shift so far – much larger shifts expected with sanctions



## Impact of war in energy availability

- The demand for fossil products is increasing
- Russian products will not enter the European market (crude in dec and products in Feb)
- Replacing Russian crude oil with other oils reduces the production of European refineries
- The reduction of refining capacity does not take place in European countries but in Russia

# The way forward is by innovations and global solidarity

In industrialized countries, the transition is driven by regulation:  
**Breakthrough innovations** are needed!

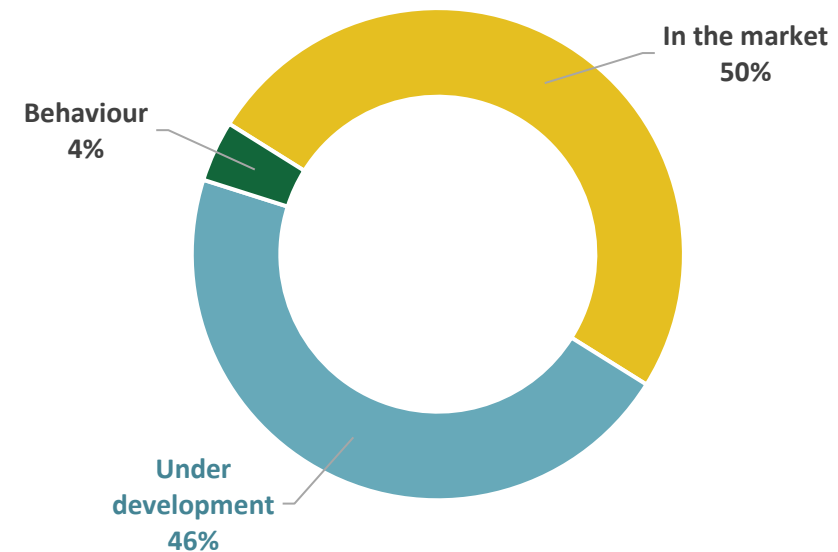
In developing countries, the transition is less driven:  
**Real Global Solidarity through finance** needed!

# Breakthrough innovations lacking for the net-zero

- We have all the technologies available in the market to make the required emission reductions **by the year 2030**
- **In 2050**, almost 50% of CO2 emissions reductions come from technologies **currently at demonstration or prototype stage**
- Huge investments and efforts to R&D aiming at commercializing the innovations at energy sector ↔ Energy companies must show leadership

<https://www.iea.org/events/net-zero-by-2050-a-roadmap-for-the-global-energy-system>  
[https://youtu.be/WQ5HsTyU\\_5Q?t=2100](https://youtu.be/WQ5HsTyU_5Q?t=2100)

CO2 savings by technology maturity in 2050  
NZE Scenario (IEA)

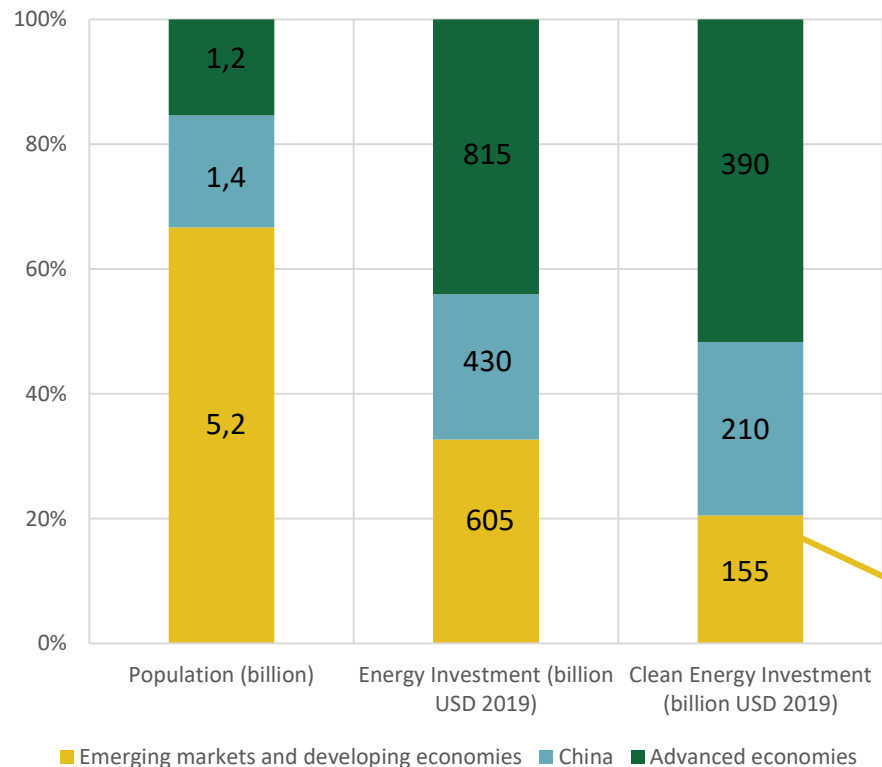


For example:

Refrigerant-free advanced cooling | Advanced batteries | Next-generation biofuels |  
 CO2 capture from cement | Hydrogen-based steel | Small modular reactors |  
 Synthetic liquid fuels | Electrolytic hydrogen for ammonia and methanol |  
 Autonomous trucks | Optimised heat pump with storage | Direct Air Capture (DAC) |  
 Ammonia-powered ships | Building-integrated storage | Electric steam crackers

# Annual Clean Energy investments in developing markets must increase to over \$1000 billion by 2030

Key indicators of Emerging Markets and Developing Economies in 2021



- Emerging and developing economies (EMDE) account for over 95% of the increase in global Greenhouse gas emissions
- EMDEs currently account for two-thirds of the world's population, but only one-fifth of global investment in clean energy, and one-tenth of global financial wealth
- Avoiding CO2 emissions in emerging and developing economies costs about half as much on average as in advanced economies

→ **How to mobilize these massive investments quickly?**

**Needs to increase by more than seven times to over \$1000 billion**

USD billion = 1 US dollar x 10<sup>9</sup> = 1 000 000 000 US dollar



# Global solidarity needed – Clean Energy investments in EMDEs to be financed by industrialized countries

## Annual investment in energy by 2030

1. Should be doubled
2. Rebalanced from fossil fuels towards clean energy
3. Targeted to developing countries

Annual average capital investment IEA NZE scenario, Billion USD (2019)

	2016-2020	2030	2040	2050
Bioenergy	33	181	133	150
Other renewables	93	100	107	111
Efficiency	334	777	706	640
Electrification	77	557	736	786
Electricity system	859	2419	2187	1885
Hydrogen	3	165	386	476
CCUS	4	205	157	163
Fossil fuels	836	559	389	288
Other	53	20	25	32
<b>TOTAL</b>	<b>2292</b>	<b>4983</b>	<b>4826</b>	<b>4531</b>

Of which \$1000 billion to Clean energy in EMDEs

## Focus should be on Africa



- There is the fastest growth in population and new middle-class households
- New investments in fossil energy production are constantly being made to meet the increasing energy demand
- Climate change impact on the people is significant, already today
- The most urgent thing is to find a mechanism to ensure that no new coal plants will be need in developing countries.
- The EU should enable companies to invest in non-EU countries to fulfil their climate targets and to minimize the share of new fossil energy production



# Summary: The way forward is by innovations and global solidarity

More money to R&D  
to find scalable  
breakthrough  
innovations.

Global Climate  
Regulation that  
enables cross-border  
and cross-sectoral  
investments in the  
most cost-efficient  
CO2 reductions.



Thank you!

