



energy
visions

2050

Global energy and climate and futures- Scenarios to 2050

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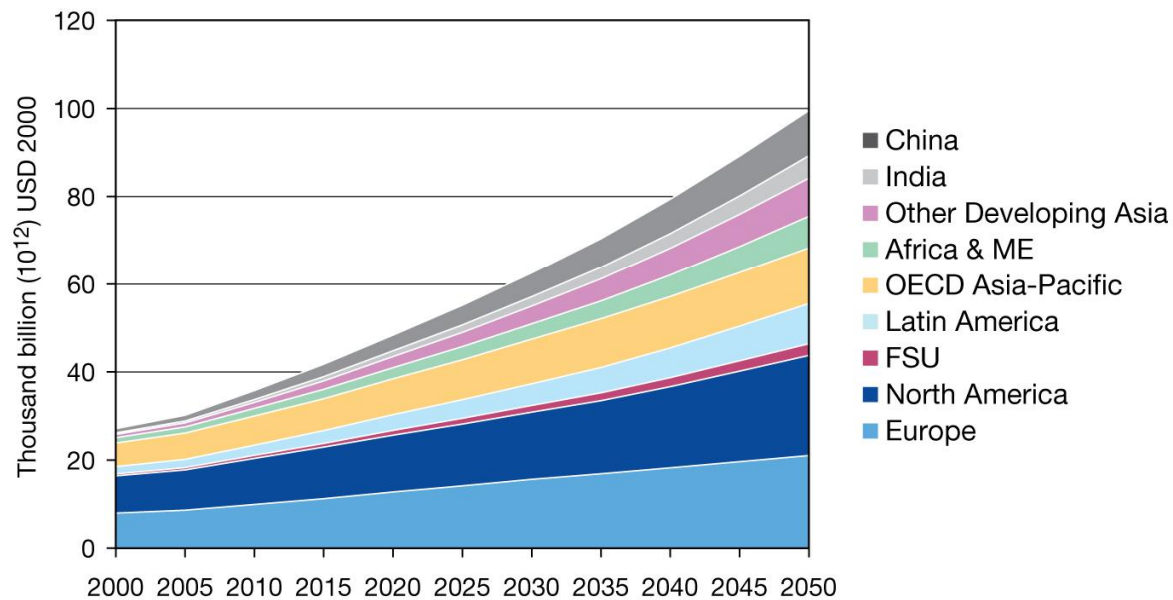
Business from technology

FOUR STORYLINES TO CHARACTERISE FUTURE DEVELOPMENT

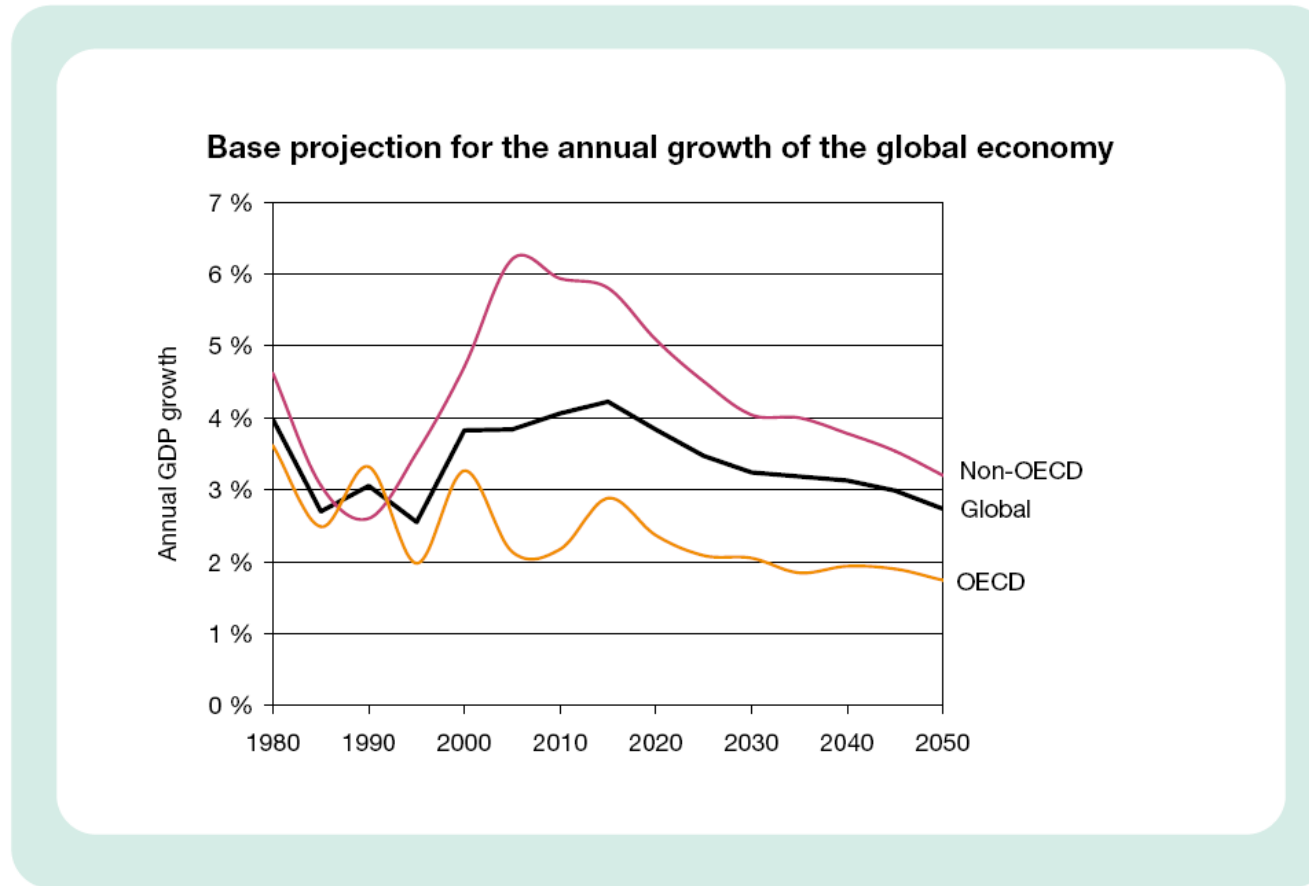
| Characteristic | Baseline | 2°C Market | 2°C Boosted | Regional world |
|---|----------------------|----------------------|---------------------|---------------------------|
| Development of economy | Globalisation | Globalisation | Globalisation | Regional policies |
| Costs and potential of new technologies | Moderate development | Moderate development | Boosted development | Moderate development |
| Level of required return on energy efficiency investments | Moderate | Moderate | Low | Moderate |
| GHG emission reduction objective | None | 2°C warming limit | 2°C warming limit | Regional emission targets |

THE VALUE OF GLOBAL INDUSTRY OUTPUT IN 2050 WILL BE FIVE TIMES THE VALUE OF 2005

World GDP 2000-2050 in the baseline simulation



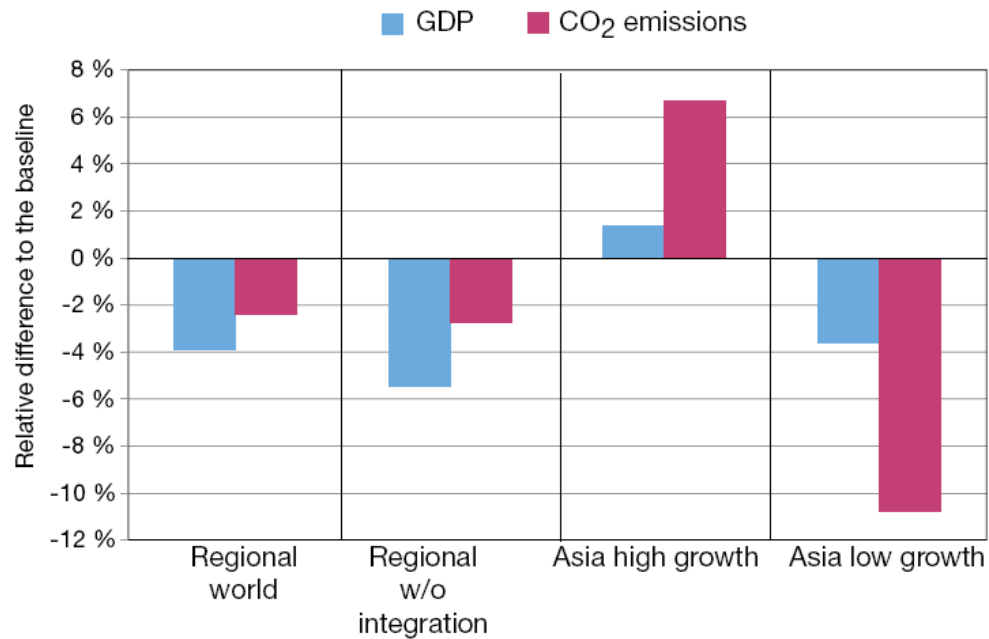
GLOBAL ECONOMY GROWTH IS PROJECTED TO DECREASE BELOW 3% BY 2050



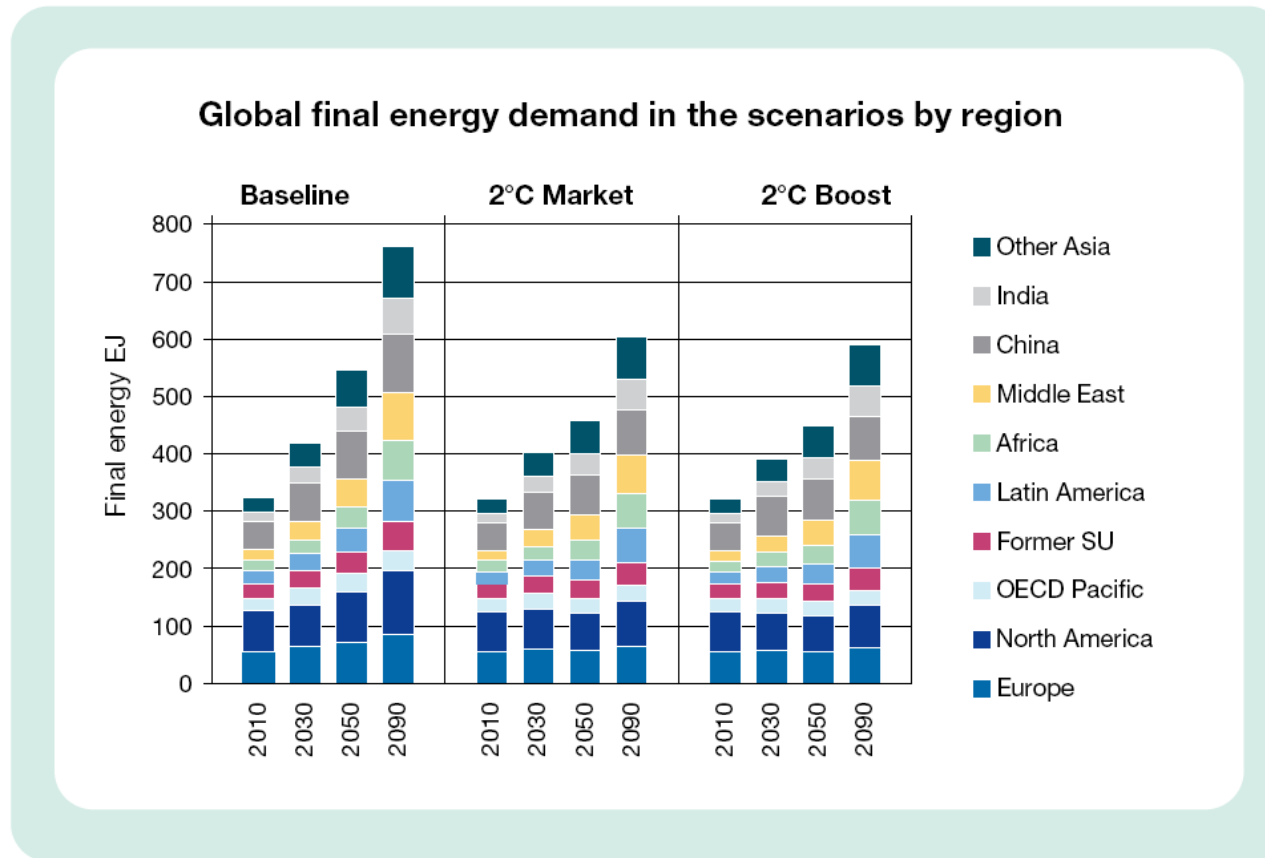
GDP, 2000 PPP

TRADE POLICIES HIT GDP HARDER THAN THEY REDUCE EMISSIONS

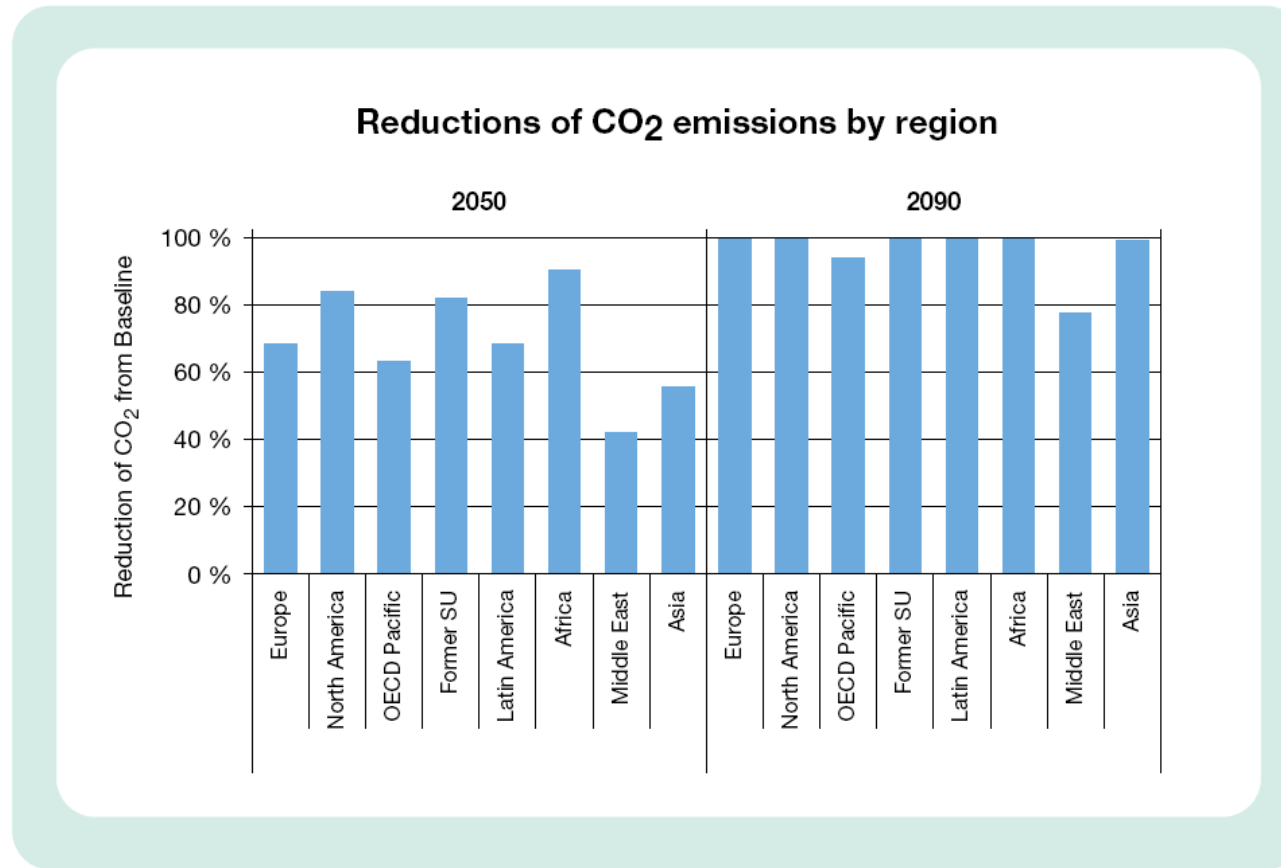
GDP and CO₂ emissions in 2050 - relative difference to the baseline



GLOBAL FINAL ENERGY DEMAND INCREASES MOST NOTABLY IN NON-OECD-COUNTRIES, BOOSTED DEVELOPMENT ACCELERATES ENERGY SAVING

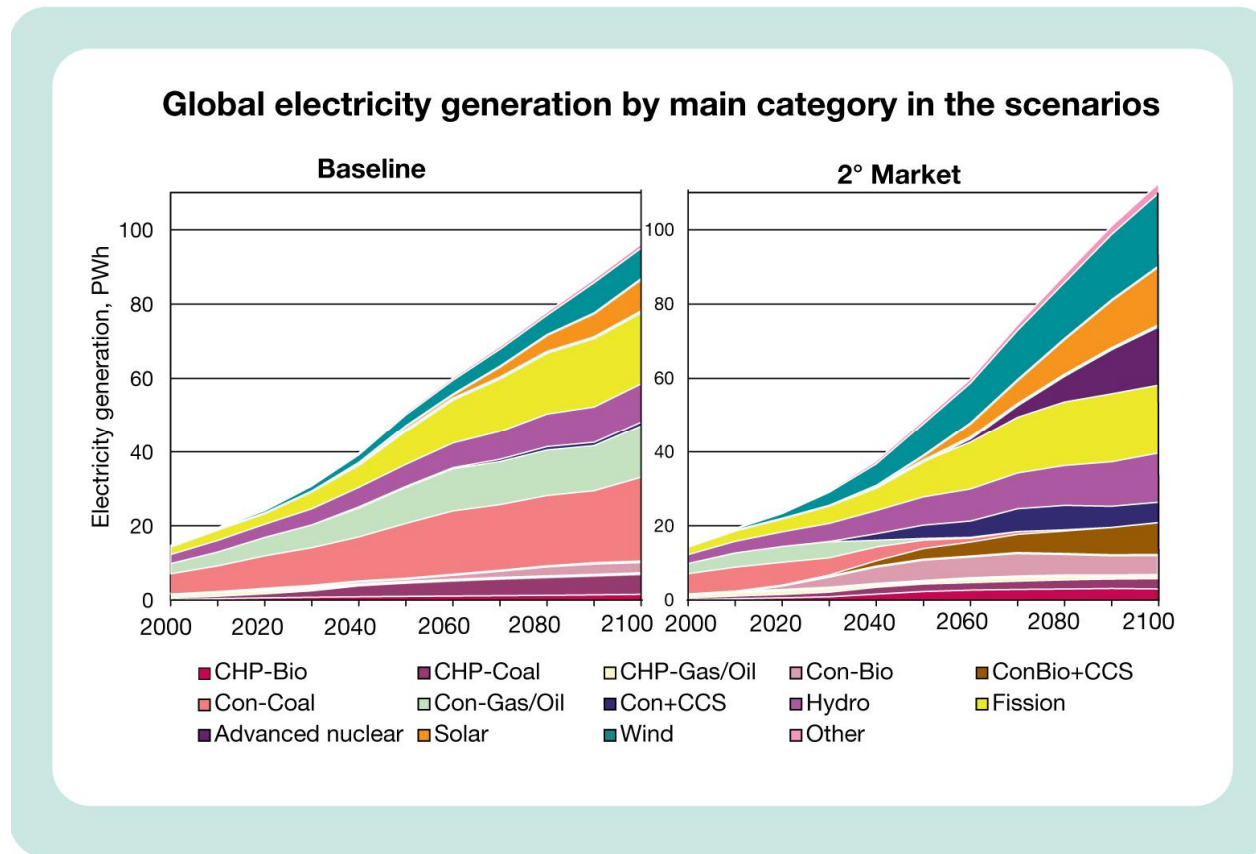


ON AVERAGE, 65% REDUCTIONS OF CO₂ EMISSIONS FROM THE BASELINE ARE NEEDED BY 2050, AND OVER 95% BY 2090



A WIDE VARIETY OF TECHNOLOGY OPTIONS ARE NEEDED FOR TACKLING CLIMATE CHANGE

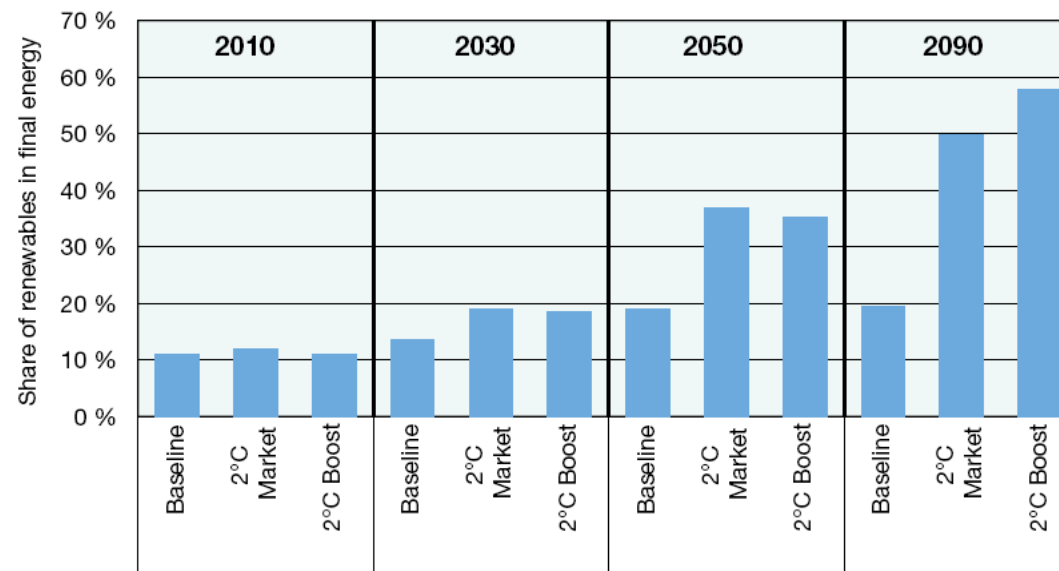
Efficiency improvements are more than counterbalanced by electrification as a cost-effective emission reduction option



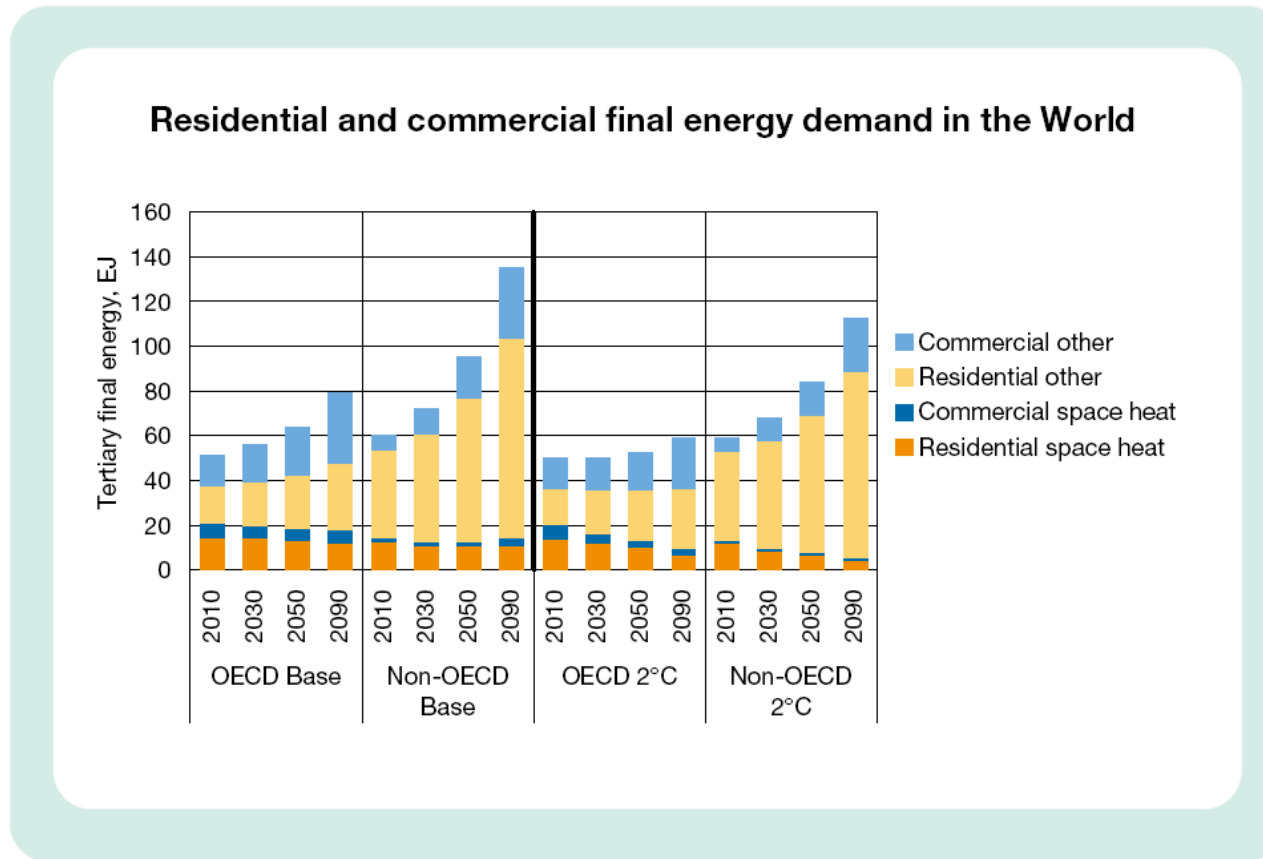
THE SHARE OF RENEWABLE ENERGY SOURCES IN EUROPE INCREASES ABOVE 20% AFTER 2030

The official EU-target for 2020 appears to be overshooting the cost effective level

Share of renewable energy in total final energy consumption in Europe

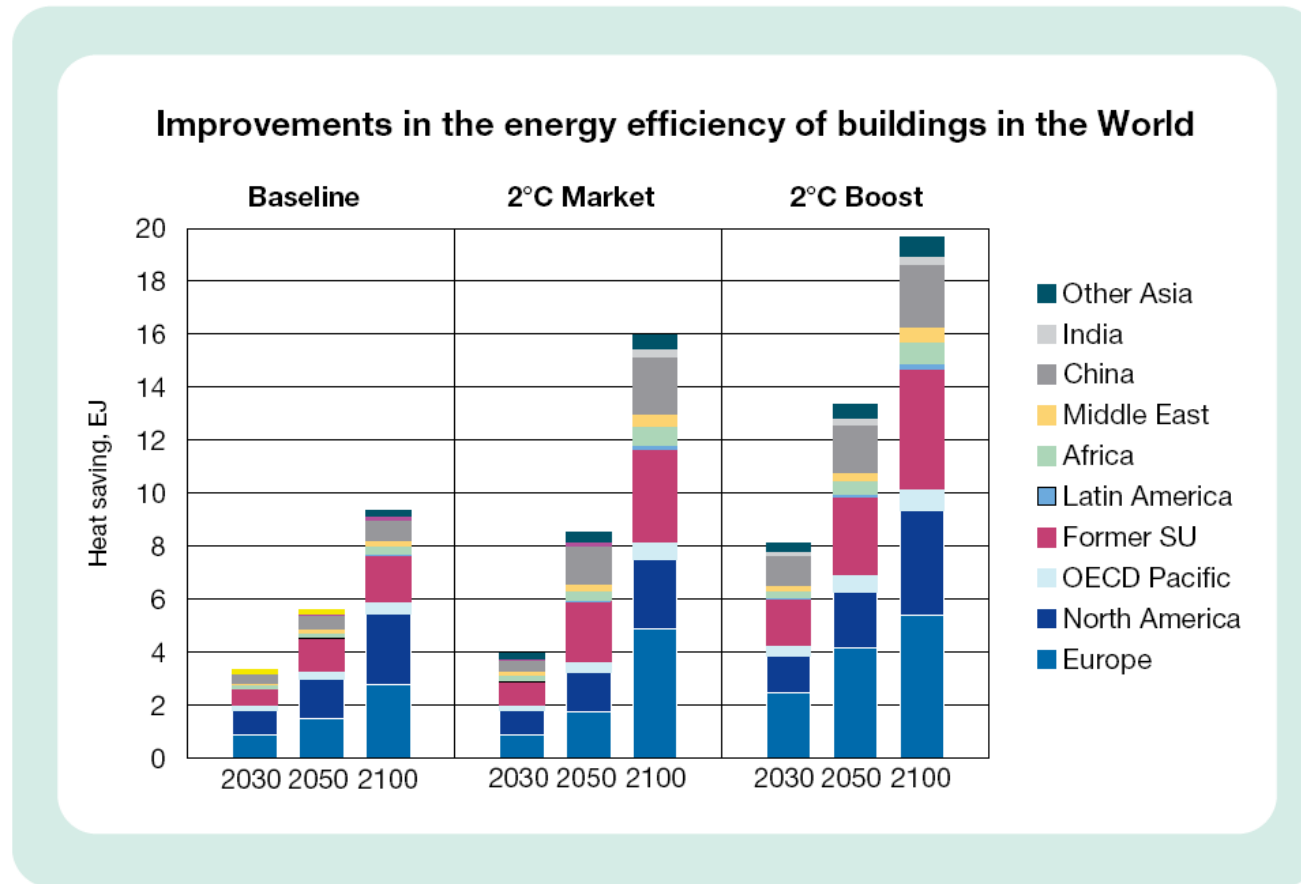


THE SHARE OF ENERGY USED FOR SPACE HEATING WOULD BE DECREASING CONSIDERABLY IN MITIGATION SCENARIOS

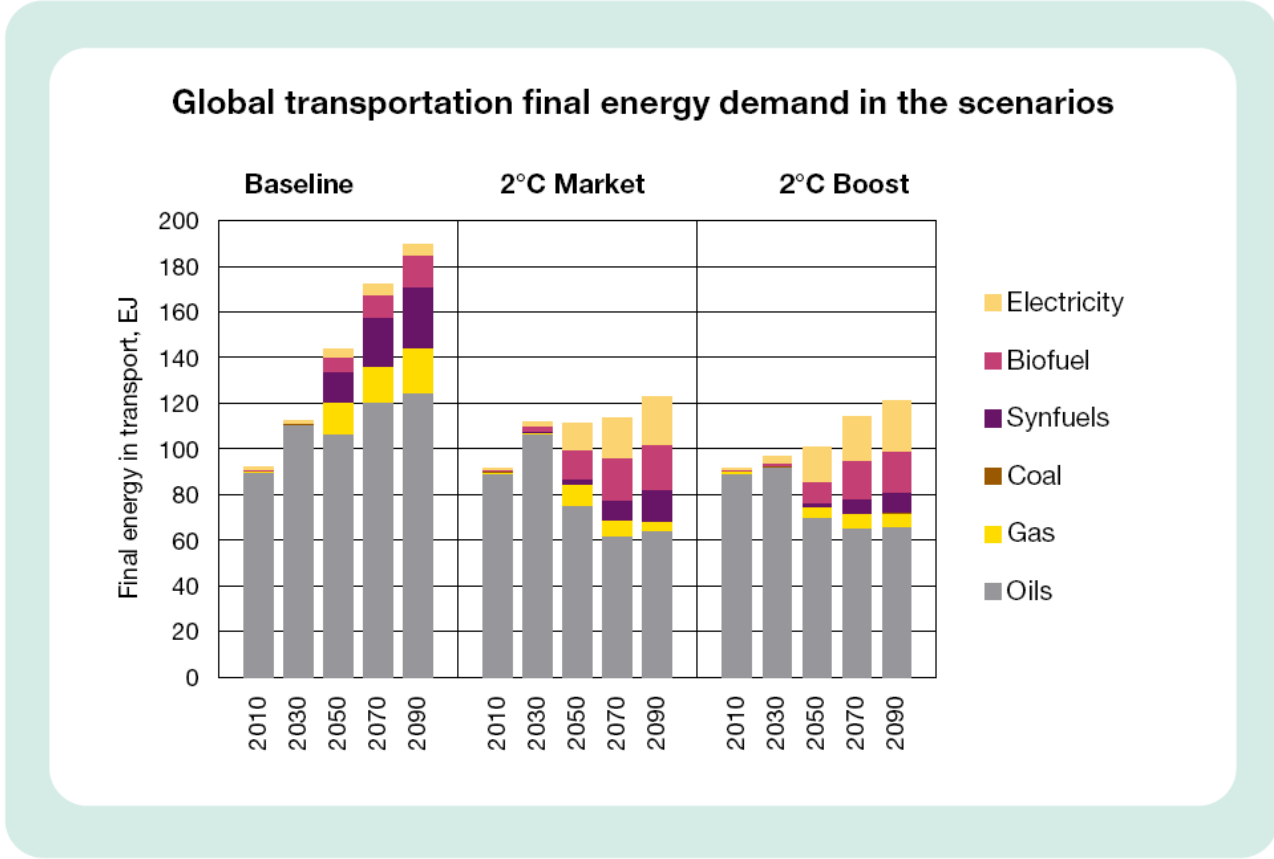


LOW-ENERGY BUILDINGS BECOME COST-EFFECTIVE UNDER CLIMATE POLICIES

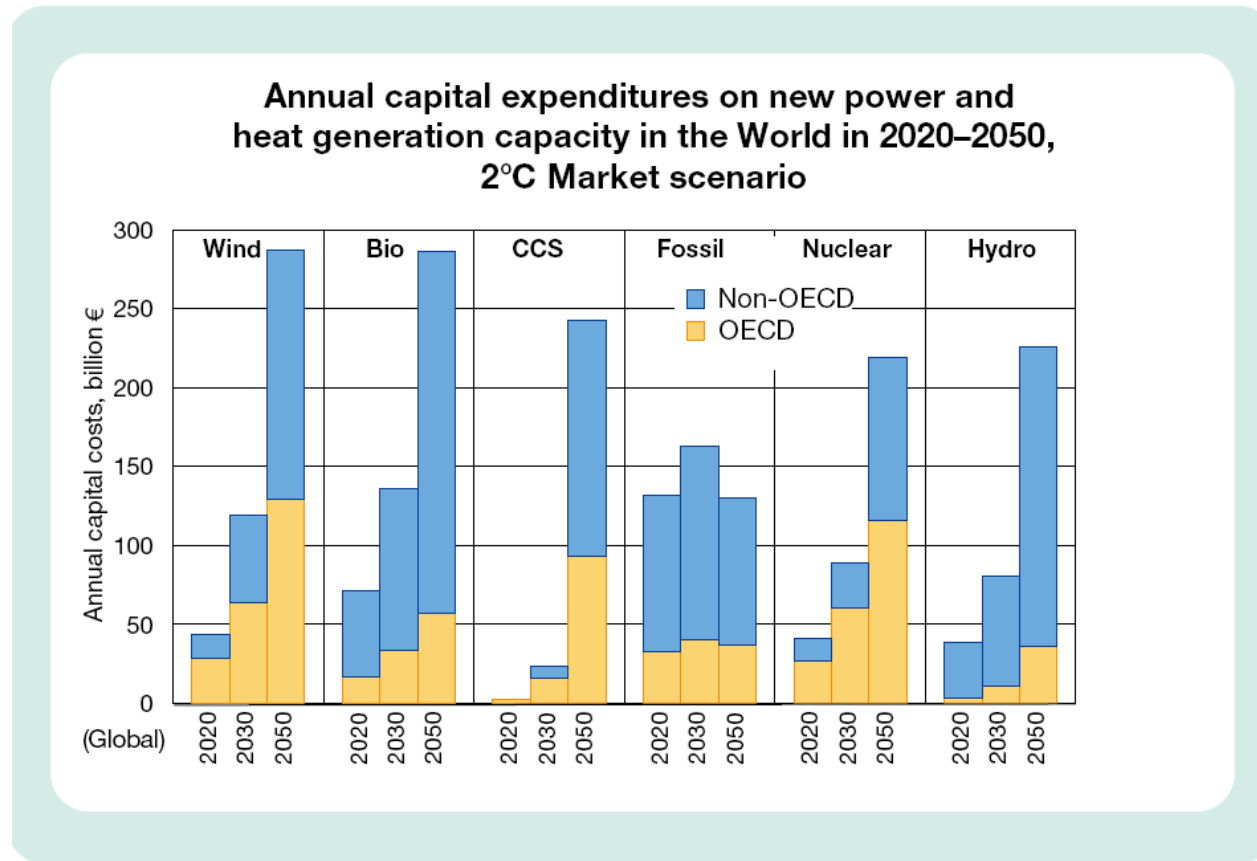
With building standards the slow development could be considerably facilitated



BIO- AND SYN FUEL VEHICLES PENETRATE THE MARKET IN THE BASELINE AND ELECTRIC VEHICLES UNDER THE 2 °C TARGET



ANNUAL CAPITAL EXPEDITURES ON ZERO AND LOW-EMITTING ENERGY PRODUCTION INCREASES TO MORE THAN 1000 BILLION PER YEAR IN 2050



CONCLUSIONS

- Cost efficient climate change mitigation is possible but means radical changes in energy systems and large investments
- Regional policies would hamper both economic growth and climate change mitigation by stagnating the development of economies
- Boosted technology development would facilitate investments in clean energy technologies and reduce costs for mitigation
- International co-operation, innovative policies, as well as changes in both economic structures and human behaviour would be the key elements for the future development