

18th VEF

„Energy transition,,  
Nov 22nd, 2021



Dr. Friedhelm Boschert

Infrastructure and financial challenges for the countries  
in a SUSTAINABILITY and CLIMATE SCENARIO perspective

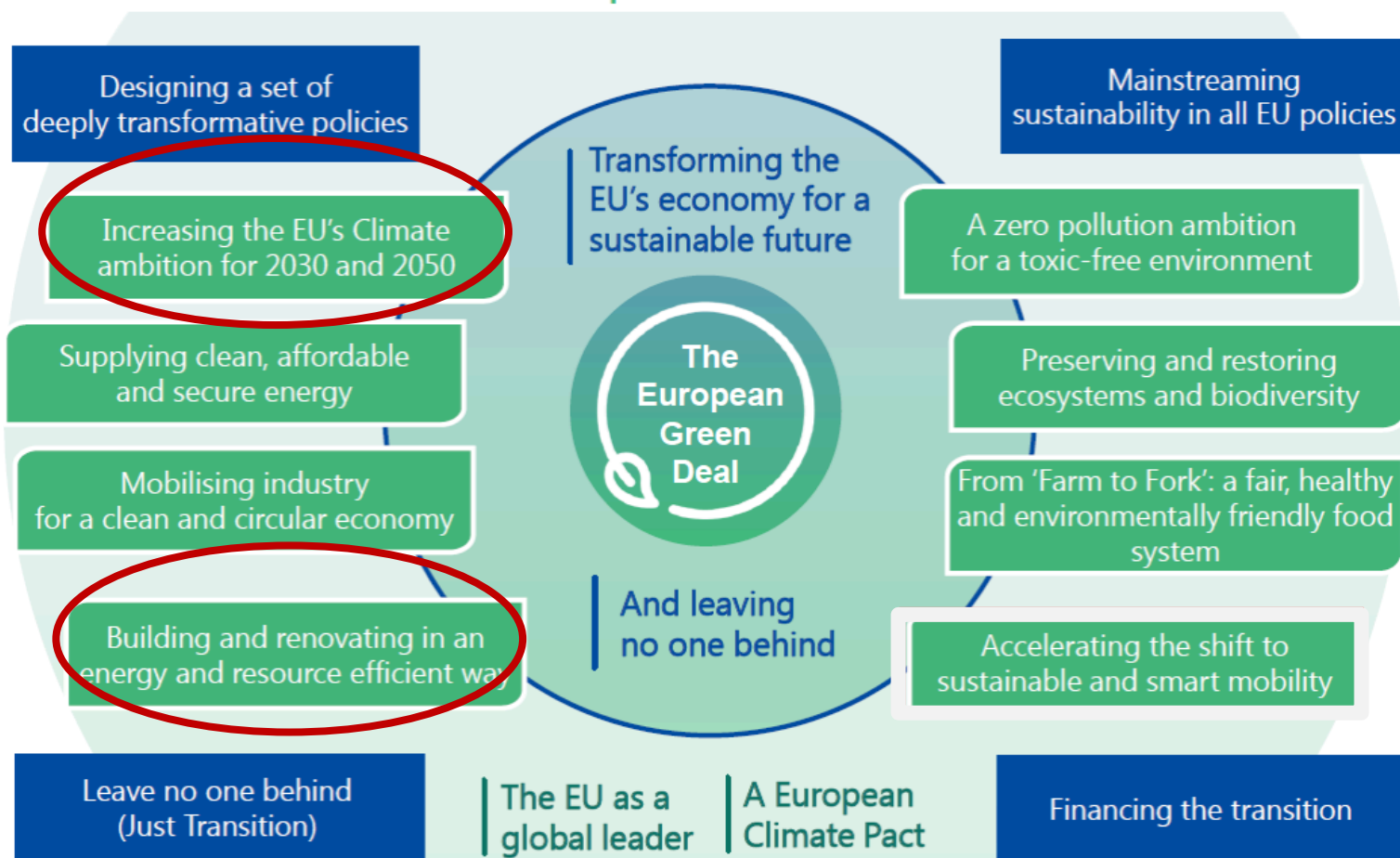
# Experts for corporate transition to zero carbon business



# The European Green Deal



European  
Commission



# RENEWABLE ENERGY PROSPECTS FOR CENTRAL AND SOUTH-EASTERN EUROPE ENERGY CONNECTIVITY

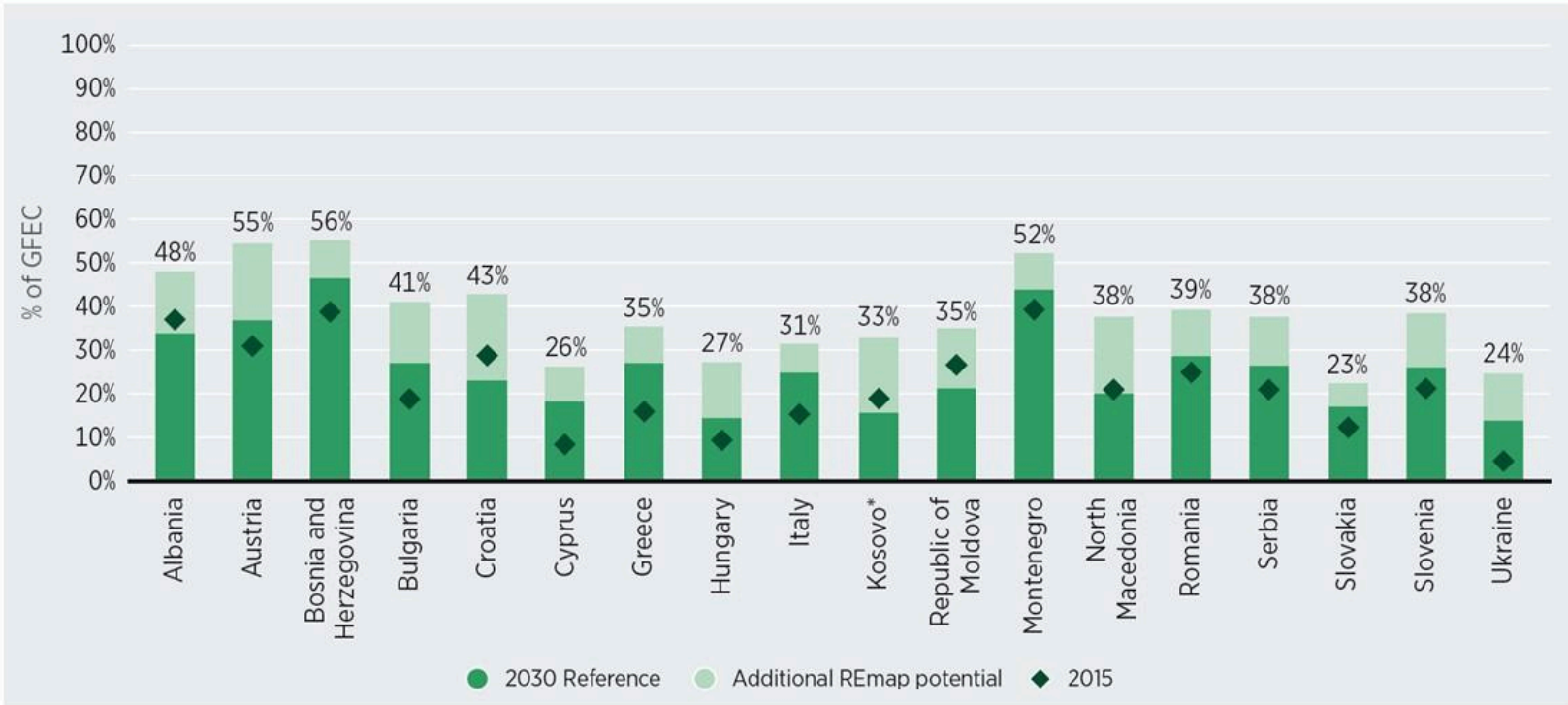
# CESEC

Central and South-East Europe's energy systems could be transformed through **massive uptake of cost-competitive renewable powergeneration**, efficient electrification of heat and transport, and increased investments insustainable bioenergy across the regional system, the report shows.

Investment in renewables could give CESEC members:

- Savings on energy costs estimated at EUR 3.4 billion (about USD 4 billion) yearly by2030;
- Benefits worth up to EUR 35 billion (USD 40 billion) with environmental and healthimpact factored in;
- Greatly improved security of energy supply;
- A more modern, resilient regional energy system;
- Closer alignment with Paris Agreement climate goals.

# All CESEC members have additional cost-effective potential beyond existing plans / projections.



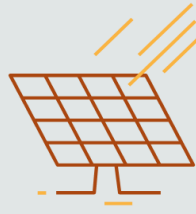


# Renewable options for CEE



## Wind

- Estimated > 845 GW potential in CESEC region.
- Cost reduction of ~ 39% since 2010.
- Wind resource well distributed throughout the year.
- Turbine optimisation leading to higher load factors



## Solar

- Estimated > 402 GW potential in CESEC region.
- Cost reduction of ~ 82% since 2010.
- Mature technology -> 80% of a new solar capacity installed worldwide, cheaper than fossil.
- Substantial further cost reductions possible.



## Bioenergy

- Estimated > 47 GW potential in CESEC region.
- Key asset for energy security.
- Can provide firm capacity.
- Synergies with heat sector (CHP district heating).



## Hydro

- Estimated > 75 GW potential in CESEC region.
- Key asset for energy security.
- Strong complementarity with wind and solar.
- Cost-effective integration of renewables.

# THE EN-ROADS CLIMATE WORKSHOP

Simulating Global Solutions



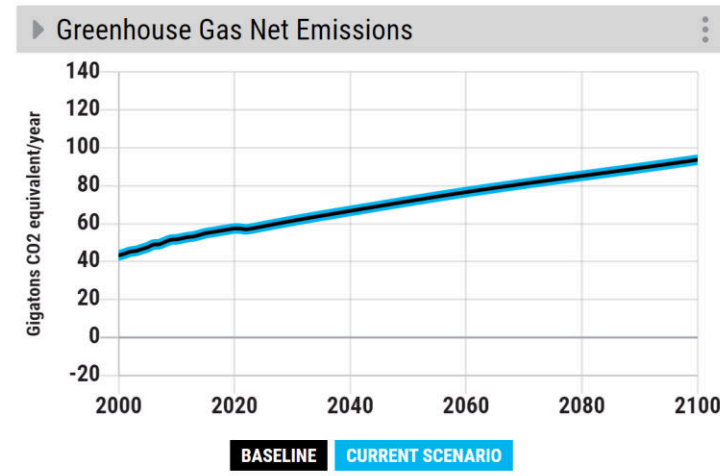
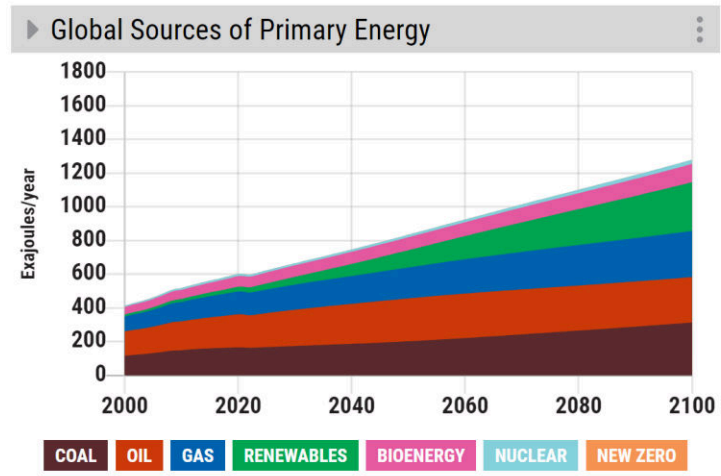
Improve decision-maker and citizen understanding of energy, land, and climate dynamics as a means to effective action



Sustainability Initiative

The En-ROADS Climate Workshop helps build support for strategies to address climate change via interactive use of the cutting-edge simulation model [En-ROADS](#).

The workshop has been run for the U.S. Congress, Stattnet in Norway, a community group in Atlanta, the Energy Transition Forum in London, HSBC bank, the U.S. Climate Action Network, the UN Secretary-General's Office, and many others. Participants at GreenBiz 2020 rated it the best session of the conference.



+3.6°C

+6.5°F

Temperature Increase by 2100

#### Energy Supply

Coal	Renewables
Oil	Nuclear
Natural Gas	New Zero-Carbon
Bioenergy	Carbon Price

#### Transport

Energy Efficiency	Electrification
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#### Buildings and Industry

Energy Efficiency	Electrification
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#### Growth

Population	Economic Growth
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#### Land and Industry Emissions

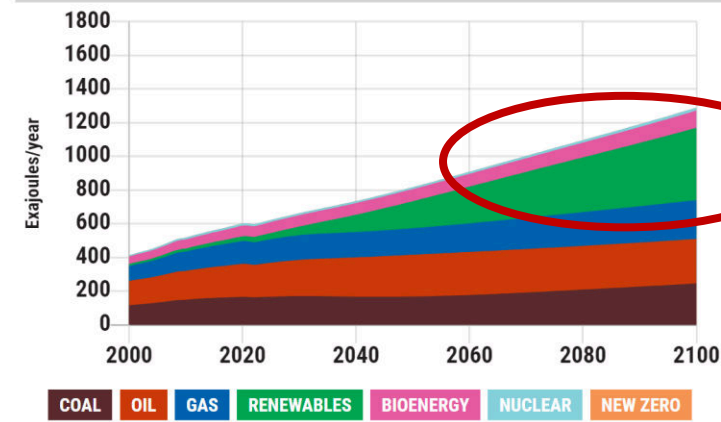
Deforestation	Methane & Other
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#### Carbon Removal

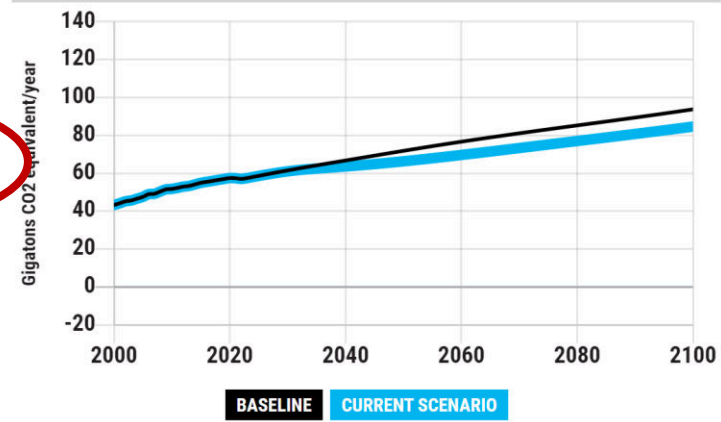
Afforestation	Technological
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Global Sources of Primary Energy



Greenhouse Gas Net Emissions



+3.4°C

+6.2°F

Temperature Increase by 2100

Energy Supply

Coal status quo

Oil status quo

Natural Gas status quo

Bioenergy status quo

Renewables highly subsidized

Nuclear status quo

New Zero-Carbon status quo

Carbon Price status quo

Transport

Energy Efficiency status quo

Electrification status quo

Buildings and Industry

Energy Efficiency status quo

Electrification status quo

Growth

Population status quo

Economic Growth status quo

Land and Industry Emissions

Deforestation status quo

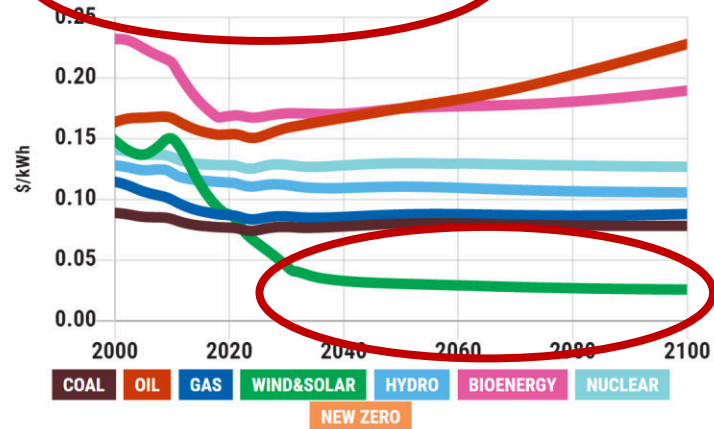
Methane & Other status quo

Carbon Removal

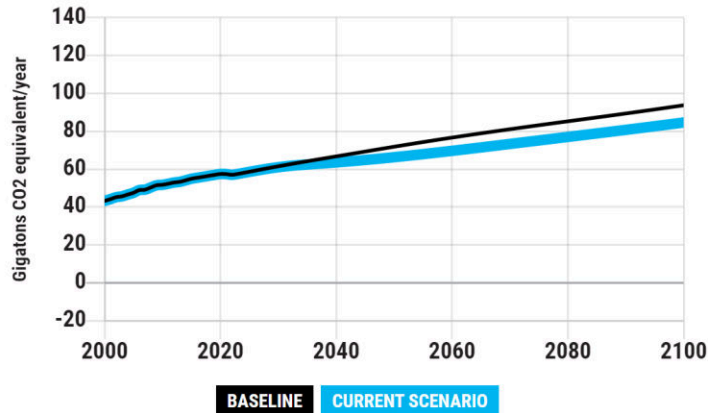
Afforestation status quo

Technological status quo

## Marginal Cost of Electricity Production



## Greenhouse Gas Net Emissions

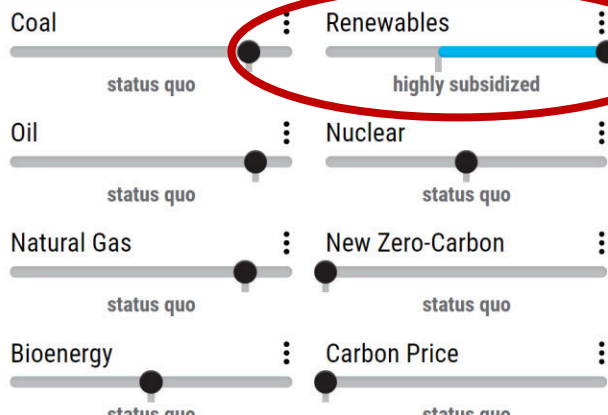


+3.4°C

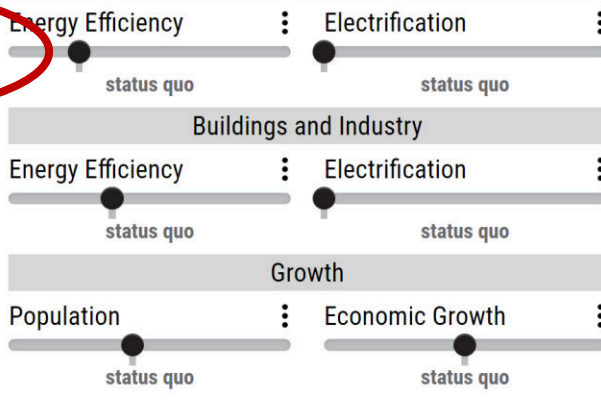
+6.2°F

Temperature Increase by 2100

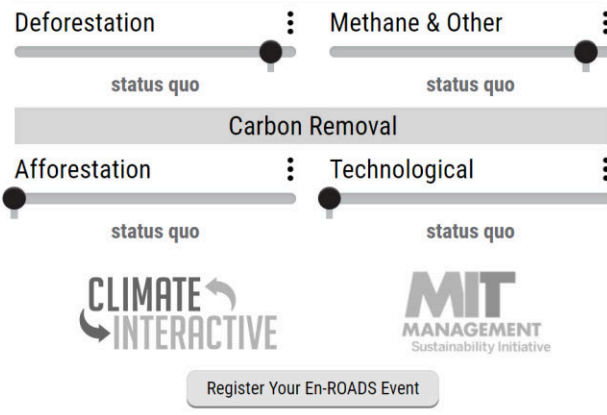
## Energy Supply



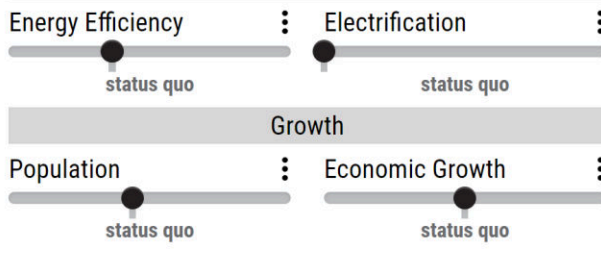
## Transport



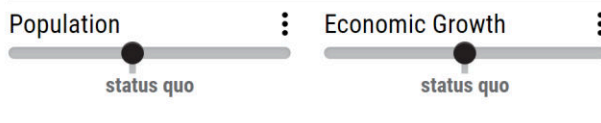
## Land and Industry Emissions



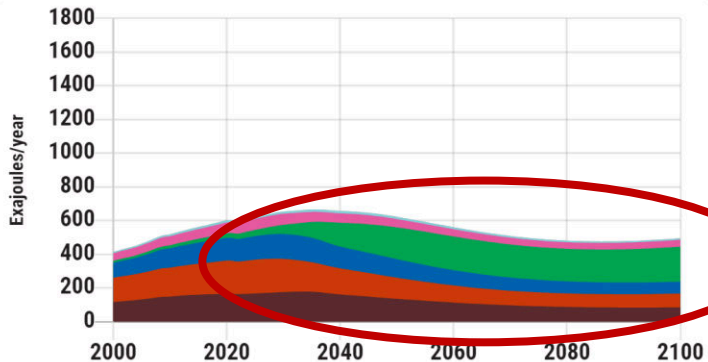
## Buildings and Industry



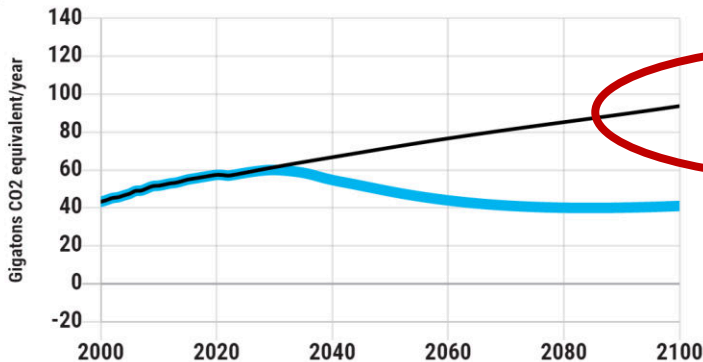
## Growth



### Global Sources of Primary Energy



### Greenhouse Gas Net Emissions



+2.8°C

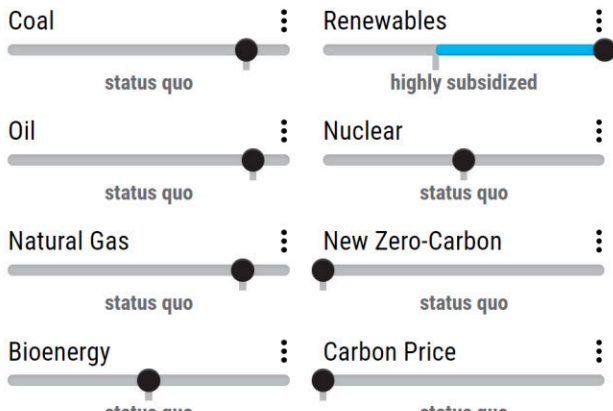
+5.0°F

Temperature Increase by 2100

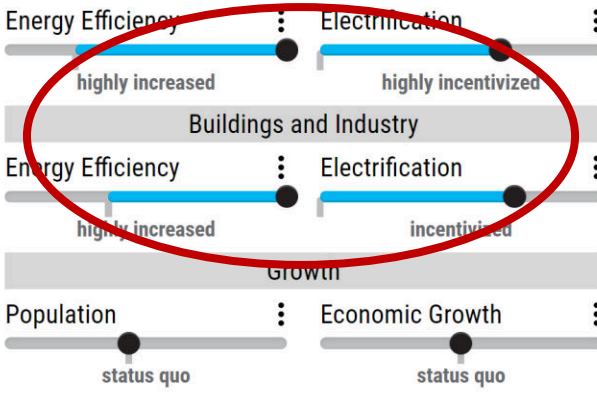
COAL OIL GAS RENEWABLES BIOENERGY NUCLEAR NEW ZERO

BASELINE CURRENT SCENARIO

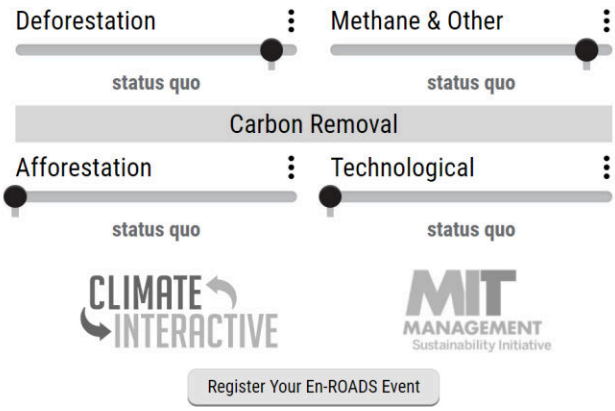
### Energy Supply



### Transport

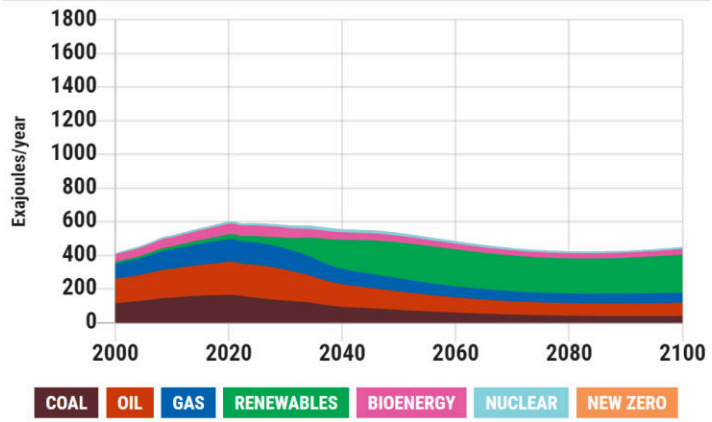


### Land and Industry Emissions

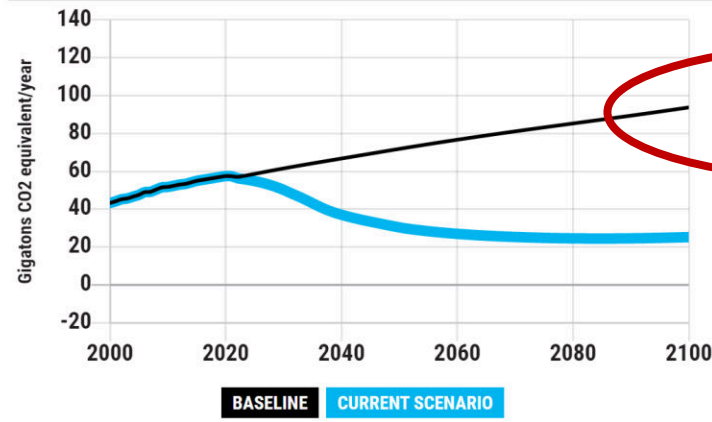




Global Sources of Primary Energy

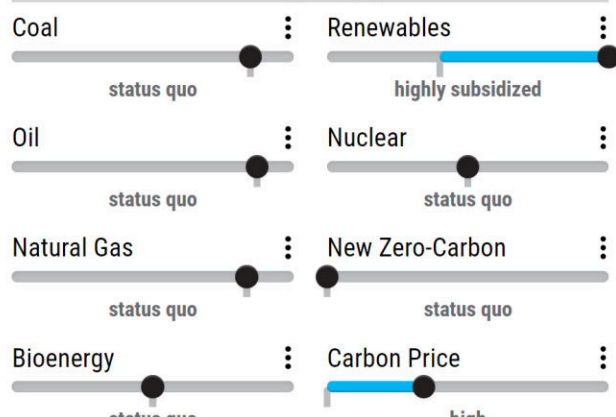


Greenhouse Gas Net Emissions

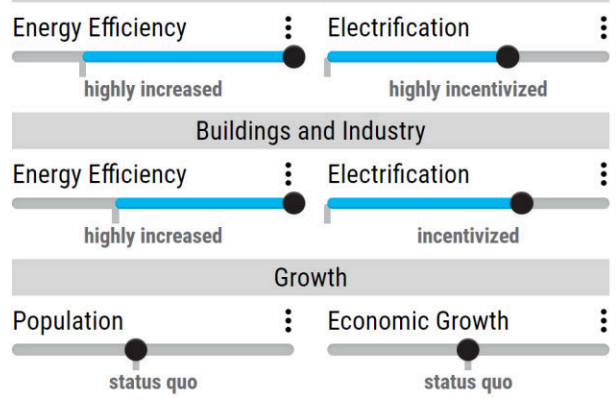


+2.2°C  
+4.0°F  
Temperature Increase by 2100

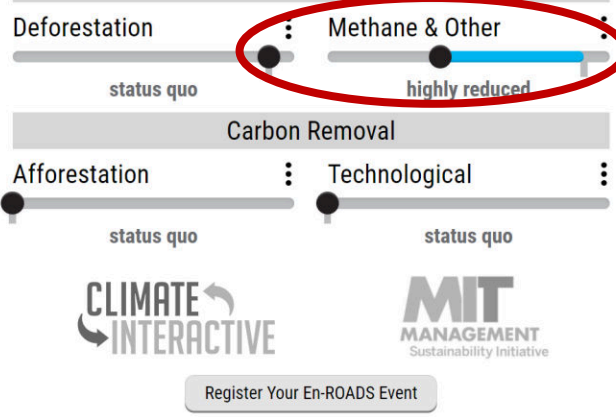
Energy Supply



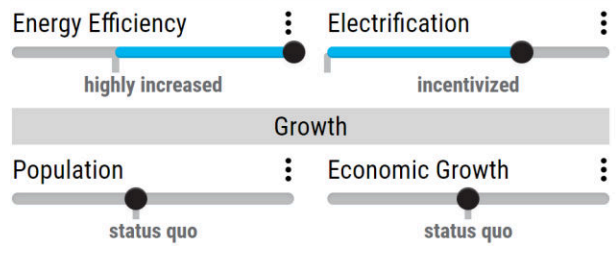
Transport



Land and Industry Emissions



Buildings and Industry



Carbon Removal



Growth



# Insights from En-ROADS i.a. ...

- There is no silver bullet – there's no one solution that will prevent climate change.
- To achieve  $\sim 2^\circ$  requires “silver buckshot” – success with most everything.
- Even when low-carbon supply is encouraged and thrives, we still burn fossil fuels.
- New technologies grow via reinforcing “learning” feedback loops.
- Energy efficiency starves growth in renewables.
- When energy becomes inexpensive (e.g., renewables, nuclear, new tech breakthroughs), energy demand increases via a modest “rebound effect.”
- In a high-mitigation scenario, more nuclear/new-tech/renewables just displaces the other low-carbon Sources. “Other gases” reduction mitigates a good bit.

# Our contact details

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Climate neutrality @ work is our passion.  
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