

**ALTERNATIVE FUELS OR ELECTRIC MOBILITY –
WHAT MEETS THE REQUIREMENTS ACCORDING TO
THE MATHEMATICS OF CLIMATE PROTECTION?**

An inconvenient truth Al Gore may not be happy about

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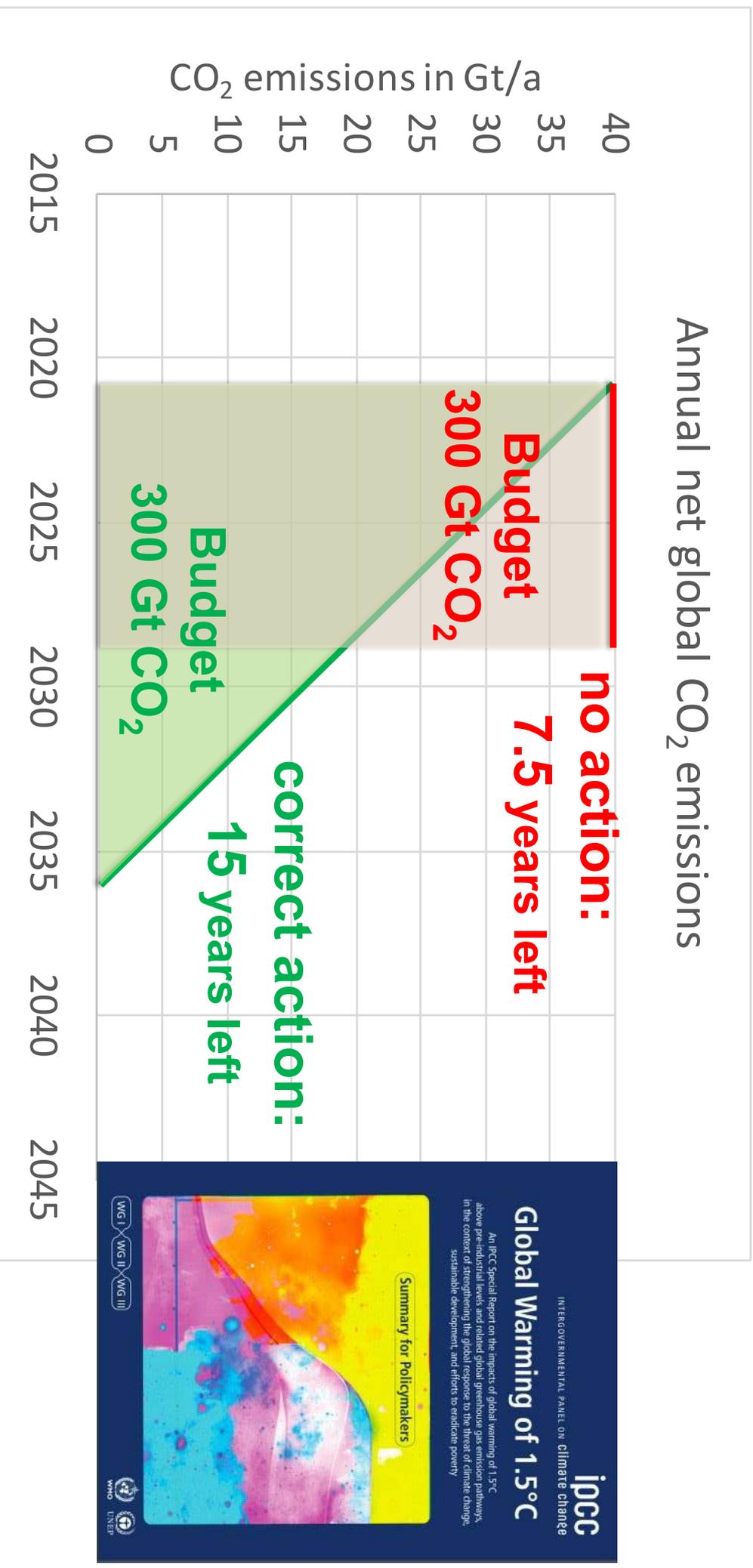
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**Lunchtalk about the need for greening fuels – Netherlands Platform Sustainable Biofuels
10 Dec. 2020**

MATHEMATICS OF CLIMATE PROTECTION

Residual CO₂ emission budget (1.5 degree target) from Jan. 2021: **300 Gt CO₂**

Current level of the annual CO₂ emissions: **40 Gt/a CO₂**



Source: IPCC (2018) Special Report on Global Warming of 1.5° C, October 2018

MATHEMATICS OF CLIMATE PROTECTION

Requirements for climate protection measures:

- **No delay:** Immediate GHG reduction effect
- **No GHG export:** GHG reduction in one sector (or country) must not lead to GHG increases in other sectors (or countries)
- **Fast roll-out:** It must be possible to implement the measure quickly worldwide



Willner 2020

MATHEMATICS OF CLIMATE PROTECTION

Requirements for climate protection measures:

- **No delay:** Immediate GHG reduction effect
 - **Alternative Fuels:** Yes, immediate effect in the big existing fleet
 - **BEVs:** No effect in the big existing fleet and too much time delay due to both additional CO₂ emissions for battery production and high fossil share in the power mix

DECHEMA /	Joanneum	Fraunhofer ISE	Frontier	Willner 2020
ProcessNet 2018	Research 2019	2019	Economics 2020	

Alternative Fuels = Fuels based on biomass, residues, waste or ren. power and CO₂ from the air

BEVs = Battery Electric Vehicles

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MATHEMATICS OF CLIMATE PROTECTION

Requirements for climate protection measures:

- **No GHG export:** GHG reduction in one sector (or country) must not lead to GHG increases in other sectors (or countries)
 - **Alternative Fuels: Yes, GHG saving of existing biofuels in high (more than 80 % in Germany)** BLE 2020 Buchspiess, Kaltschmitt 2018
 - **BEVs: Electric cars are counted with zero GHG emission in the transport sector. But, more than the counted saving is exported to other sectors or countries (for battery production and power production)**

DECHEMA / Joanneum
ProcessNet 2018 Research 2019

Fraunhofer ISE
2019

Frontier
Economics 2020

Willner 2020

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MATHEMATICS OF CLIMATE PROTECTION

Requirements for climate protection measures:

- **Fast roll-out:** It must be possible to implement the measure quickly worldwide
 - **Alternative Fuels:** Yes, more than 1 billion cars based on liquid fuels are waiting for green fuels and e-fuels imported from desert countries give the chance to bring prosperity to those countries and to cover some energy import demand
 - **BEVs: No, many developing countries are not waiting for electric cars and BEVs need the power from the local grid**

DECHEMA /
ProcessNet 2018

Joanneum
Research 2019

Fraunhofer ISE
2019

Frontier
Economics 2020

Willner 2020

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MATHEMATICS OF CLIMATE PROTECTION

Conclusion

- **Alternative fuels fulfill all requirements for effective climate protection. Thus, they must be supported by reliable legal boundary conditions immediately**
- **Electric mobility meets none of the criteria and can be ruled out as a climate protection measure. Thus, the unilateral preference for e-mobility at national and European level must therefore be reversed immediately.**



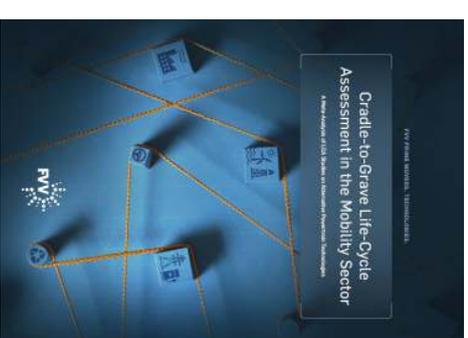
DECEMA /
ProcessNet 2018



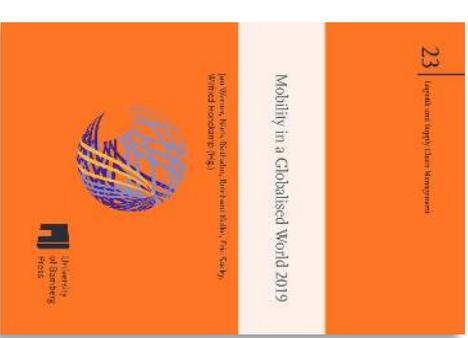
Joanneum
Research 2019



Fraunhofer ISE
2019



Frontier
Economics 2020



Willner
2019+2020

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MATHEMATICS OF CLIMATE PROTECTION

Call for action

- **We must act immediately**
- **We cannot afford any more mistakes**
- **The climate does not wait for us**

MATHEMATICS OF CLIMATE PROTECTION

The bad news

An inconvenient truth Al Gore may not be happy about

MATHEMATICS OF CLIMATE PROTECTION

The good news

- There is a way to go.
- We do not need e-mobility for climate protection.
- We can save a lot of money for new infrastructure.
- We must not cause environmental, social and health damage in the countries where the raw materials for batteries and electric infrastructure come from.
- We can finally reduce electricity consumption instead of increasing it further through new consumers.
- We can cooperate internationally and bring prosperity to countries with surplus renewable energy (e.g. desert countries).
- We can cover our energy import needs with renewable fuels from these countries (transport distance does not matter for liquids).
 - Alternative fuels will be cheaper than expected today.
- There is sufficient potential in the world for alternative fuels in terms of residues and waste and CO₂ from the air. (e.g. MVaK, ITAD 2015, S2Biom 2016, SGAB 2017, UBA 2019)

MATHEMATICS OF CLIMATE PROTECTION

Scientists' demands on German politics (open letter to the Chancellor Dec. 2020)

- Measures must be technology-neutral, sustainable and must lead to real physical GHG reduction.
- The expected **real GHG reductions** from the planned measures must be **disclosed and transparently aligned** with the remaining CO₂ emissions budget for Germany in the global context to achieve the 1.5 degree objective of global warming.
 - The potential for GHG reduction through **sustainable alternative fuels** must be fully utilized.
 - All climate protection measures should count towards the GHG quota obligation solely on the basis of their **real GHG reduction**.
 - **Multiple counting** of individual climate protection measures against the GHG quota obligation must be **rejected** in principle.
 - Every climate protection measure must be subject to equally **strict sustainability criteria** in the interests of **technological neutrality**. This also includes the consideration of ecological, social and health effects in the entire global value chain.
 - Because of the immense and constantly growing time pressure, the following **criteria** must generally be met **for climate protection measures**:
 - They must lead to GHG reductions without delay.
 - They must not result in the export of GHG emissions.
 - It must be possible to apply them globally quickly.

THANK YOU FOR YOUR ATTENTION

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