

German Environment Agency

Umwelt 
Bundesamt

Designing a resource efficient pathway towards a greenhouse gas neutral Germany

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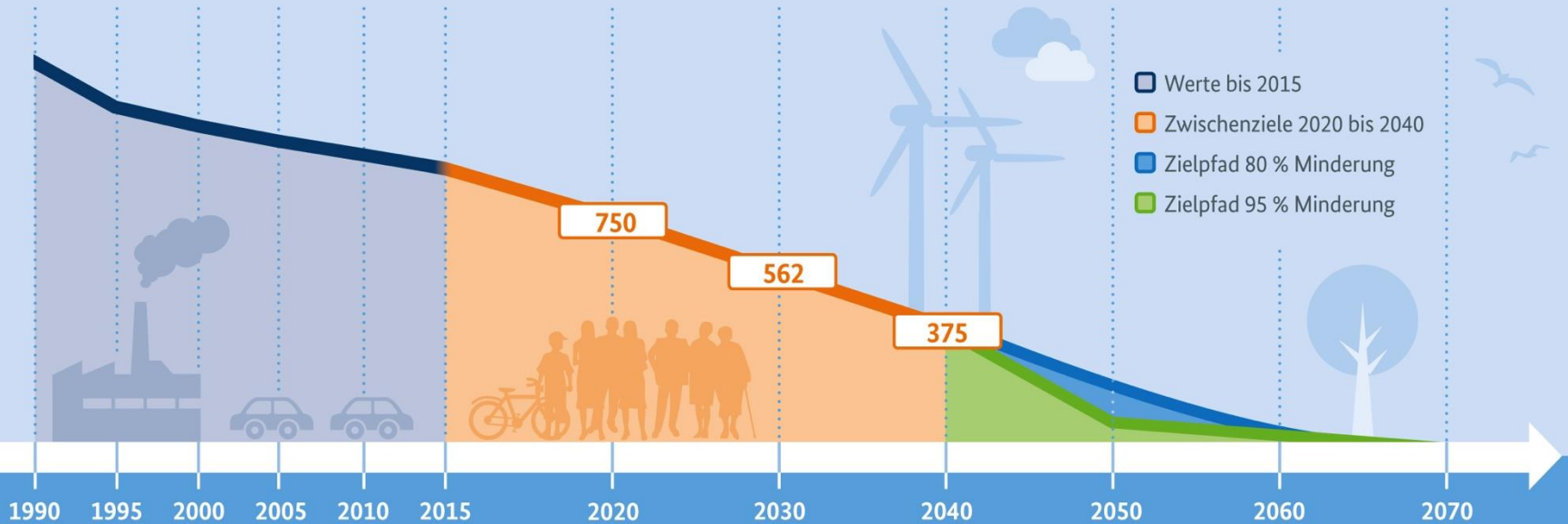
Jens Günther, Ullrich Lorenz, Katja Purr, Diana Nissler

Wolfgang Butz, Ulrike Döring, Eric Fee, Reinhard Herbener, Tim Hermann, Katja Hofmeier, Kai Kessler, Guido Knoche, Matthias Koller, Jan Kosmol, Kora Kristof, Martin Lambrecht, Martin Lange, Uwe Leprich, Lars Mönch, Nathan Obermaier, David Pfeier, Sebastian Plickert, Bettina Rechenberg, Martin Schmied, Jens Schuberth, Jan Seven, Sue Martina Starke, Max Werlein



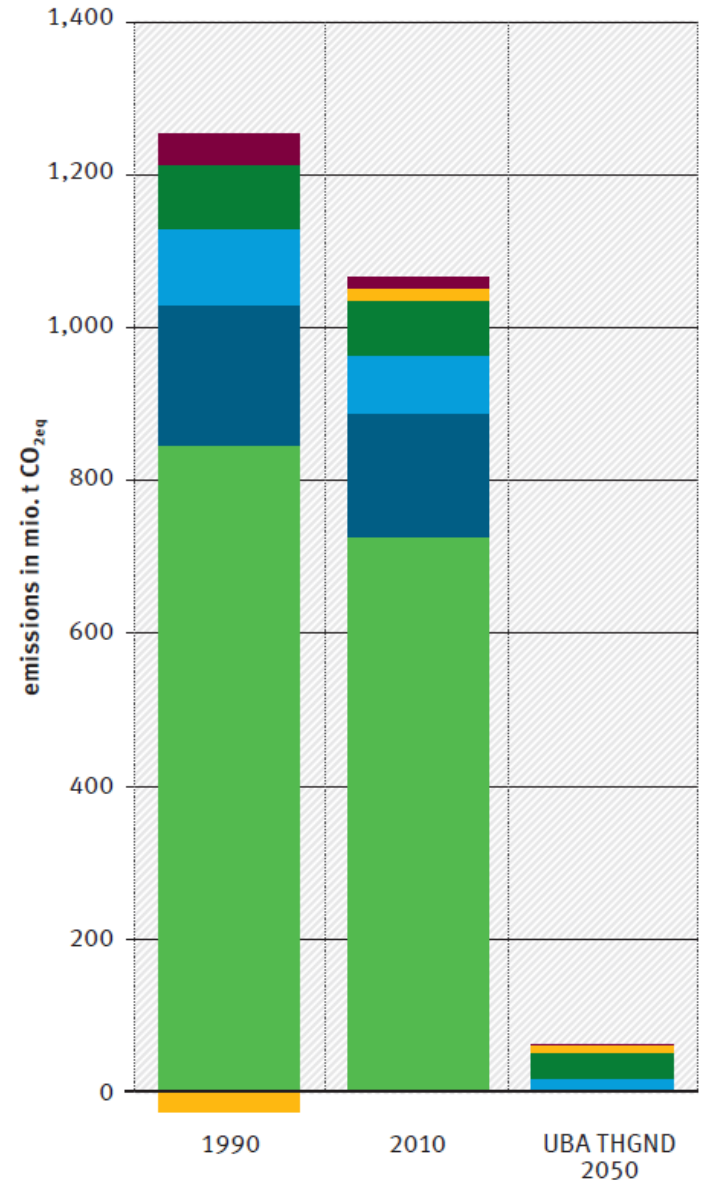
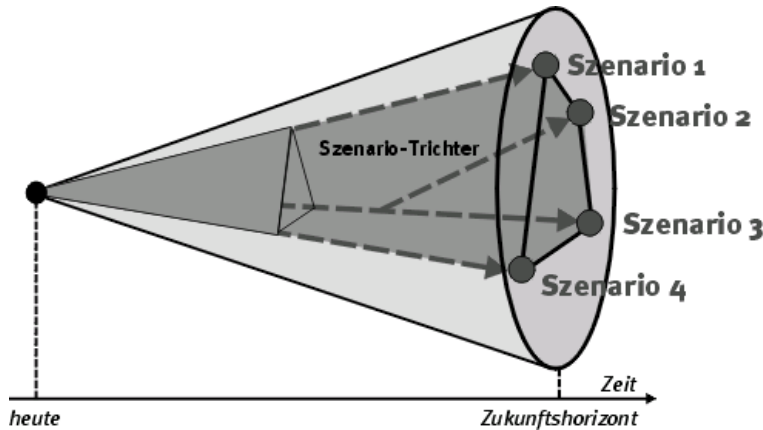
And others ...

Climate Action Plan 2050



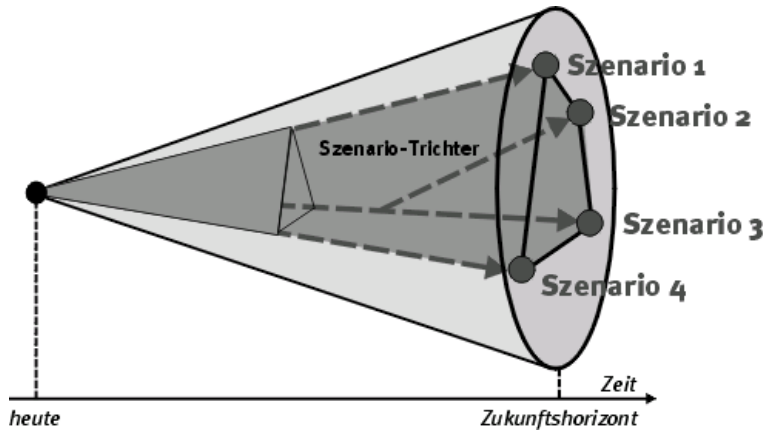
*bis 2015 Ist-Werte (2015 Schätzung UBA), ab 2020 Ziele

Goals and Scenarios

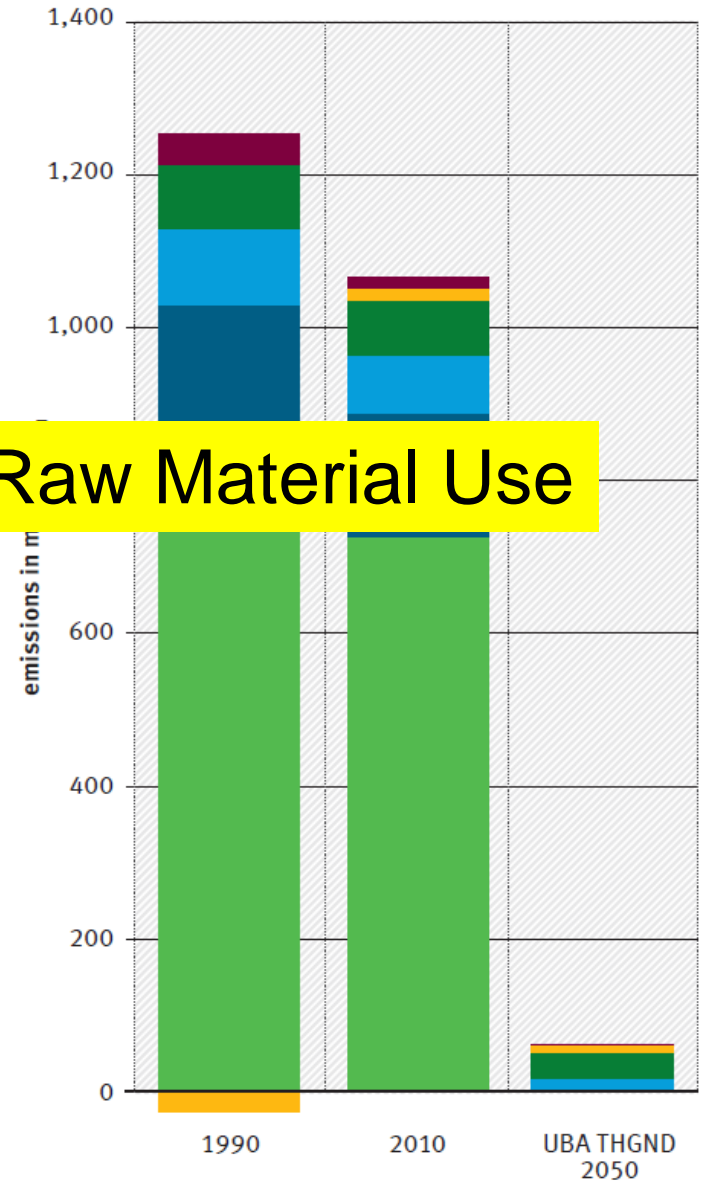


- Energy (excluding transport)
- Transport
- Industrial processes, solvents and other product applications
- Agriculture
- LULUCF
- Waste and wastewater

Goals and Scenarios

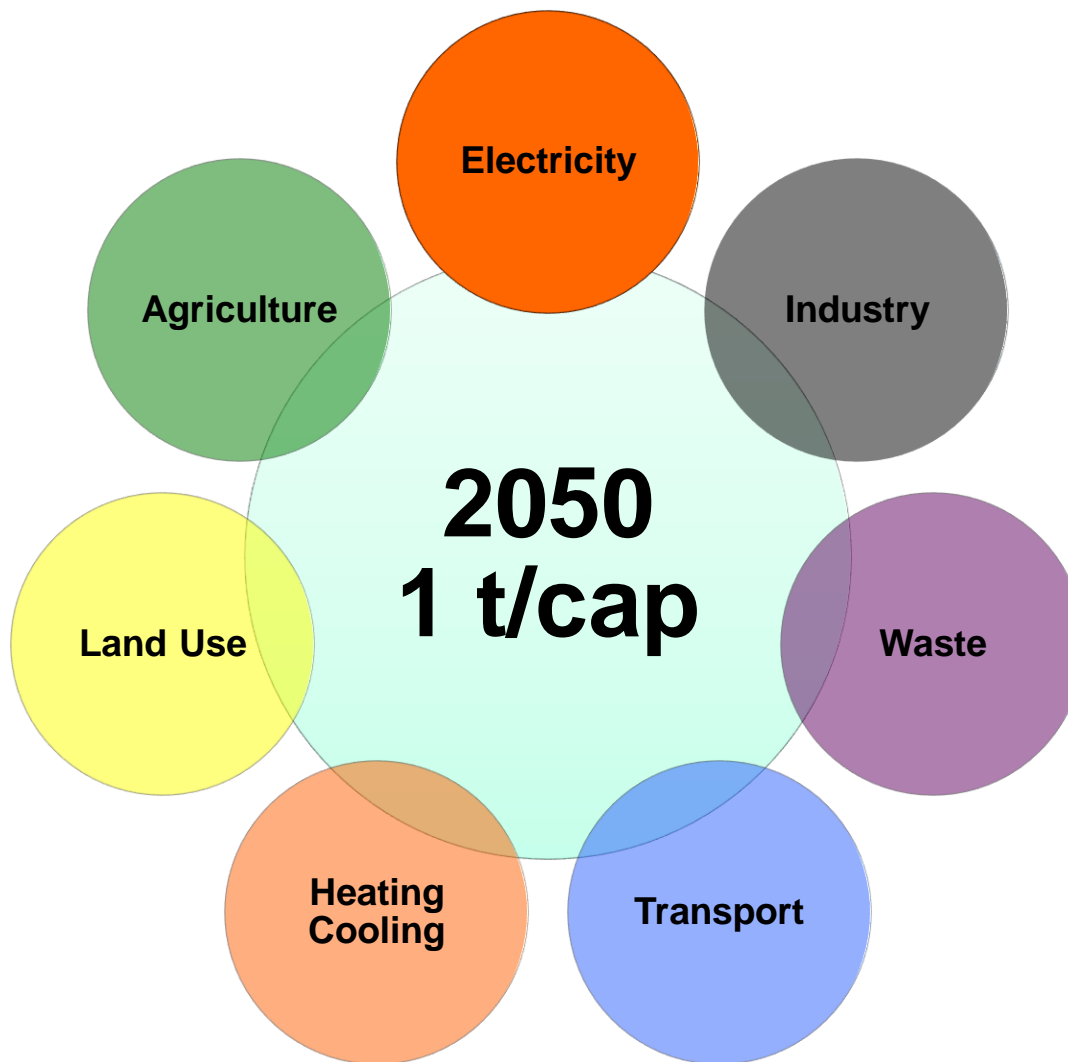


-50% Raw Material Use

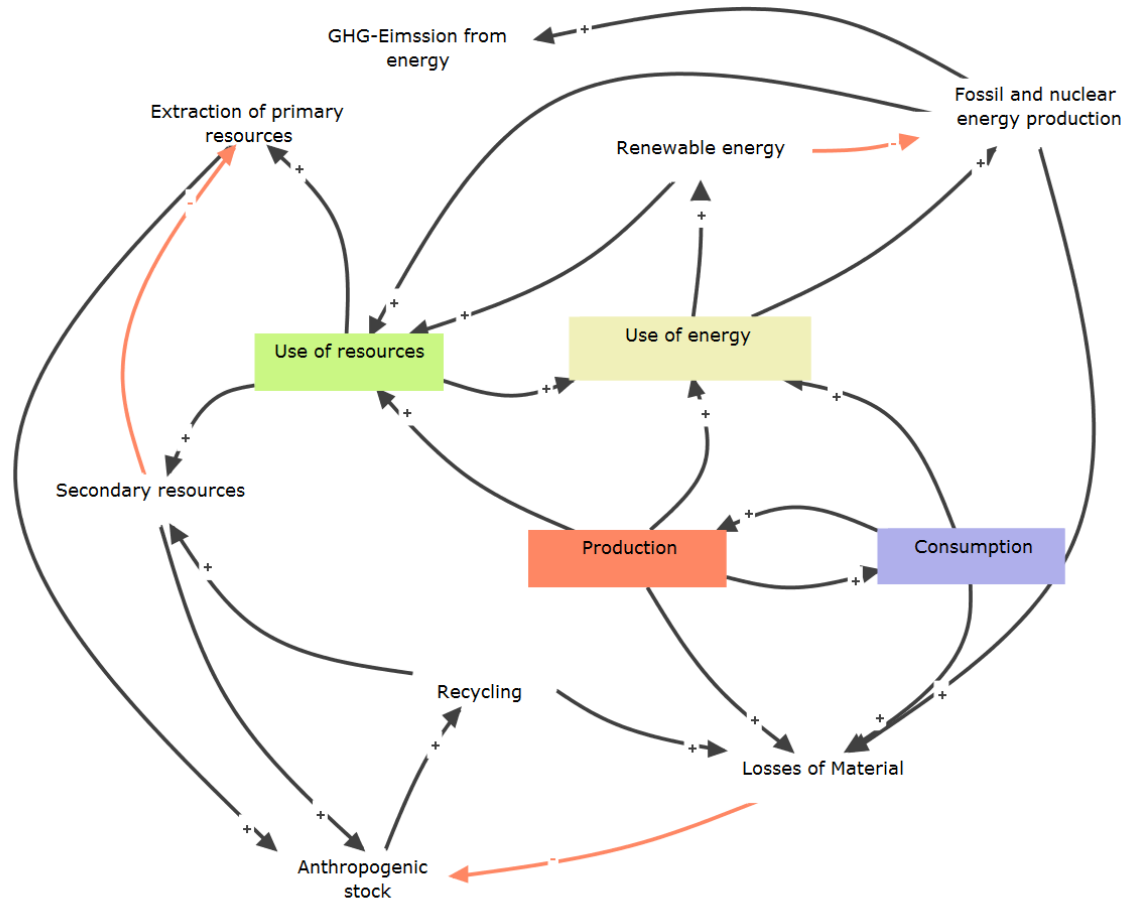


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A resource efficient pathway towards a greenhouse gas neutral Germany



Systems View – interaction of energy and material



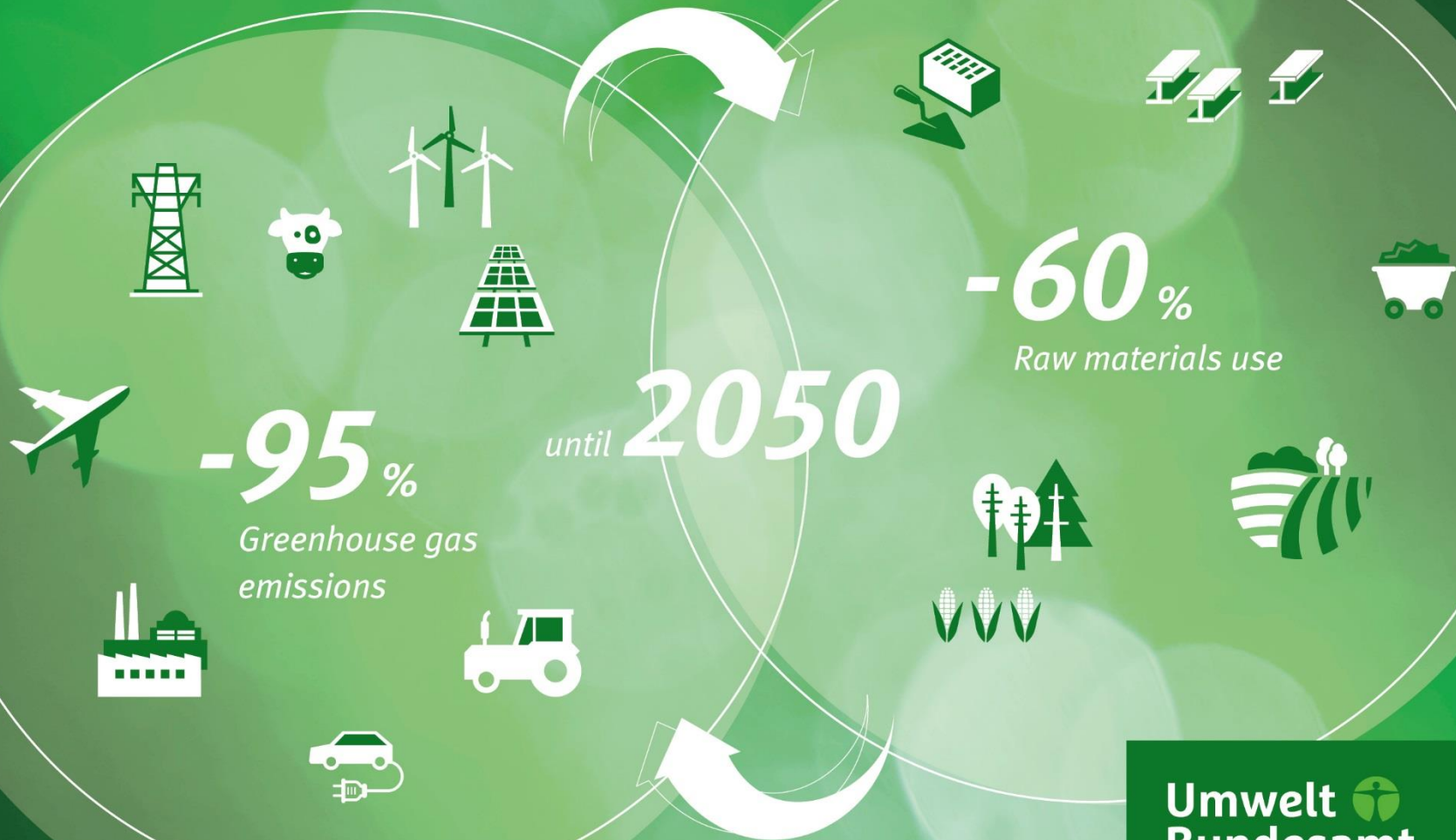
Scenario variation in the project

	GreenEe	Green	GreenMe	GreenLife	GreenSupreme
Greenhouse gas reduction 2050	very high	very high	very high	very high	very high
Level of ambition on climate protection measures in the pathway (2030 and 2040)	high	medium	high	high	very high
Ultimate energy demand	low	high	low	very low	low
Raw material use	medium	high	low	low	low
Raw material efficiency	high	medium	very high	high	very high
Behavioral changes	medium	medium	medium	very high	high

Basic assumptions in the GreenEe - Scenario

- Population in 2050 around 72 Mio.
- Germany is still a strong industrialised country with an export orientation
- Economic development 0,7 % annual growth in GDP
- Distinctive and future-proof ICT-technologies are inherent parts in society and in all economic sectors
- Net zero built-up area in 2050
- Demand on net dwelling area in 2050 equal to 2010

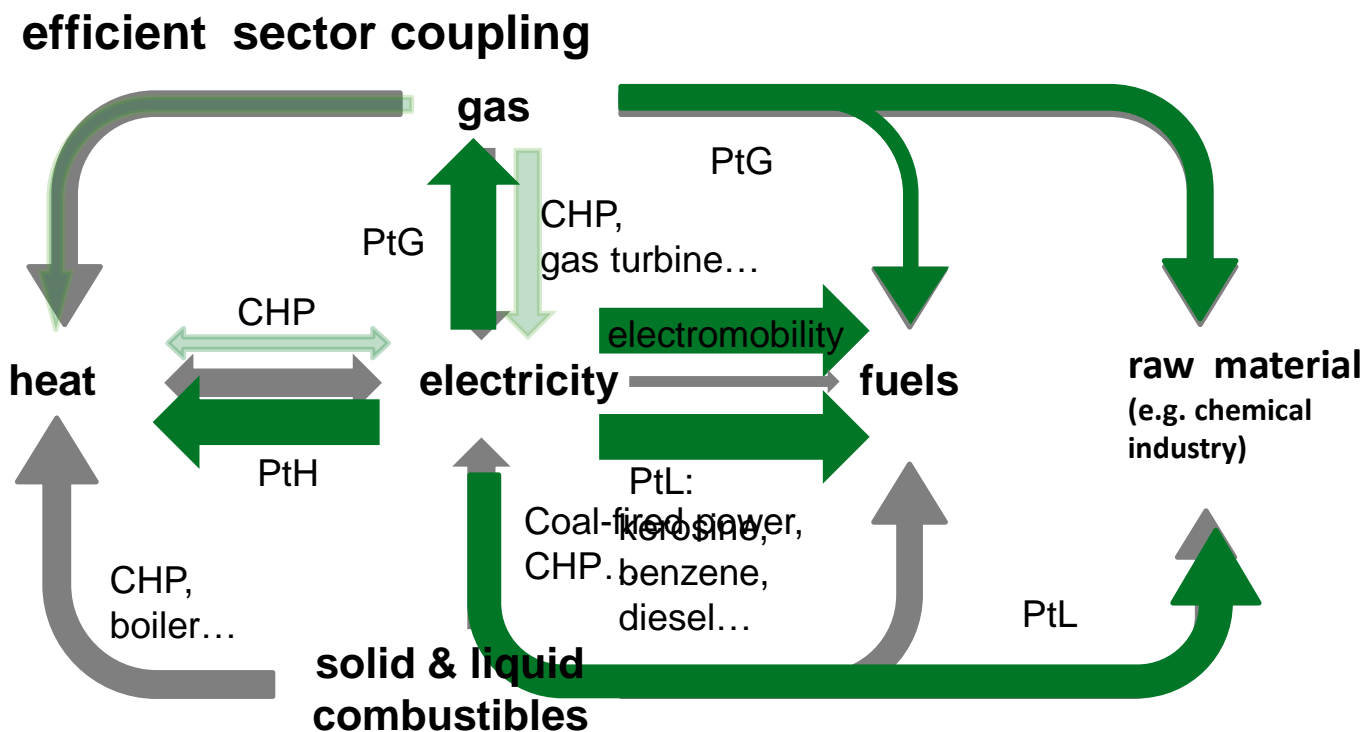
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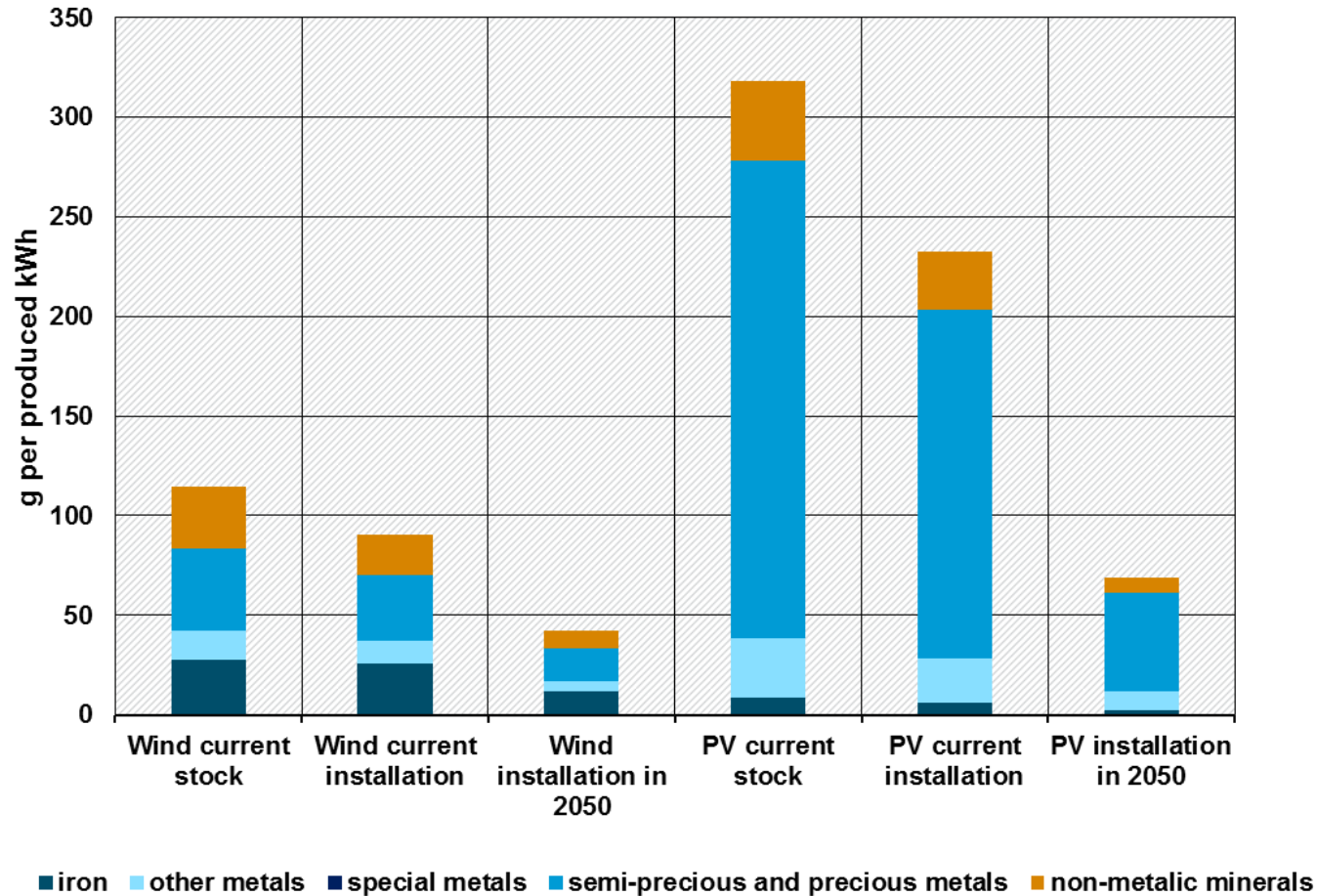
Energy System Transformation -

- **Sustainable energy system**
(no CCS, nuclear energy and crop-based bioenergy (to end after 2030))
- Fast introduction of **renewables**
- full exploitation of the potential for increasing **efficiency**



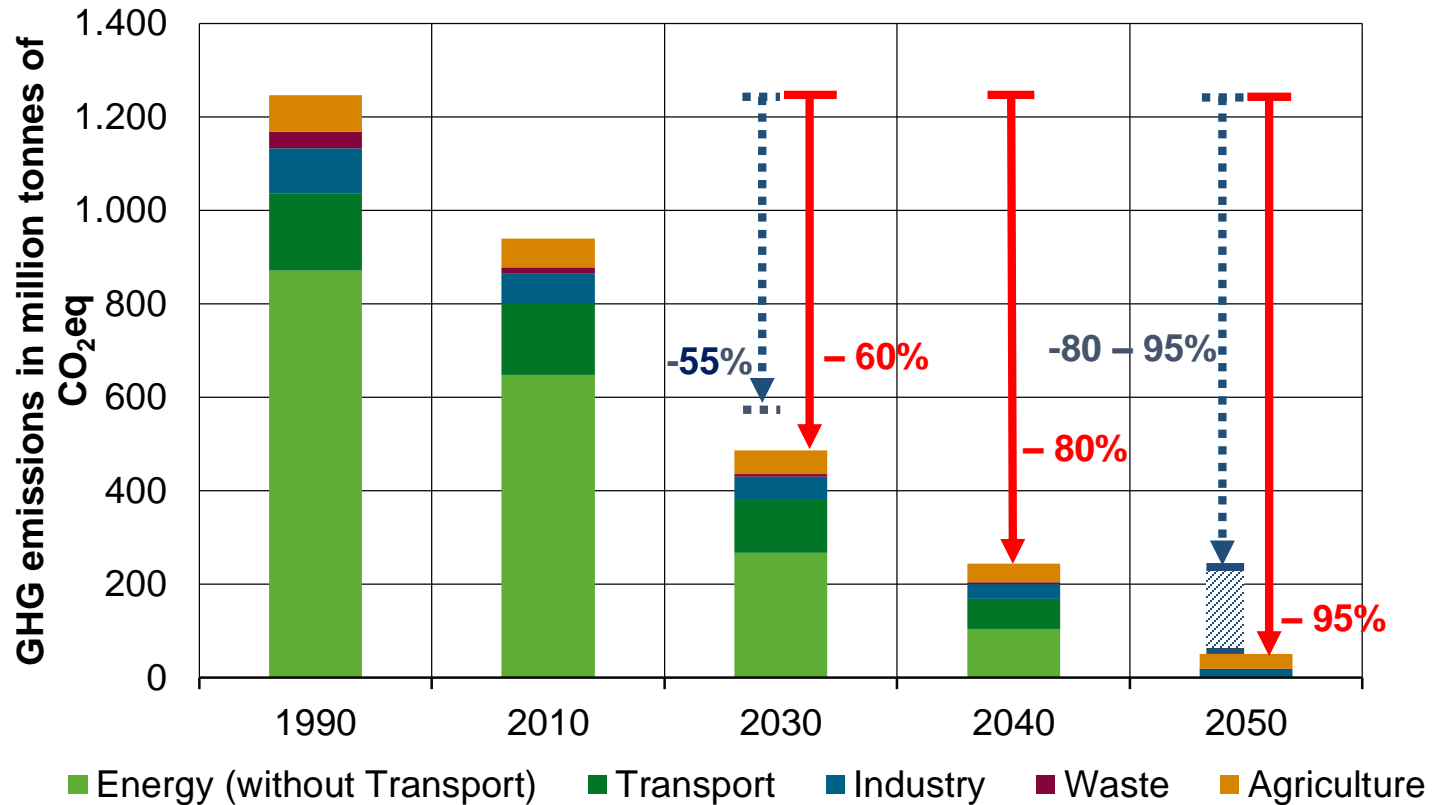
Quelle: UBA 2010 ff

Technology development has significant effects on raw material demand

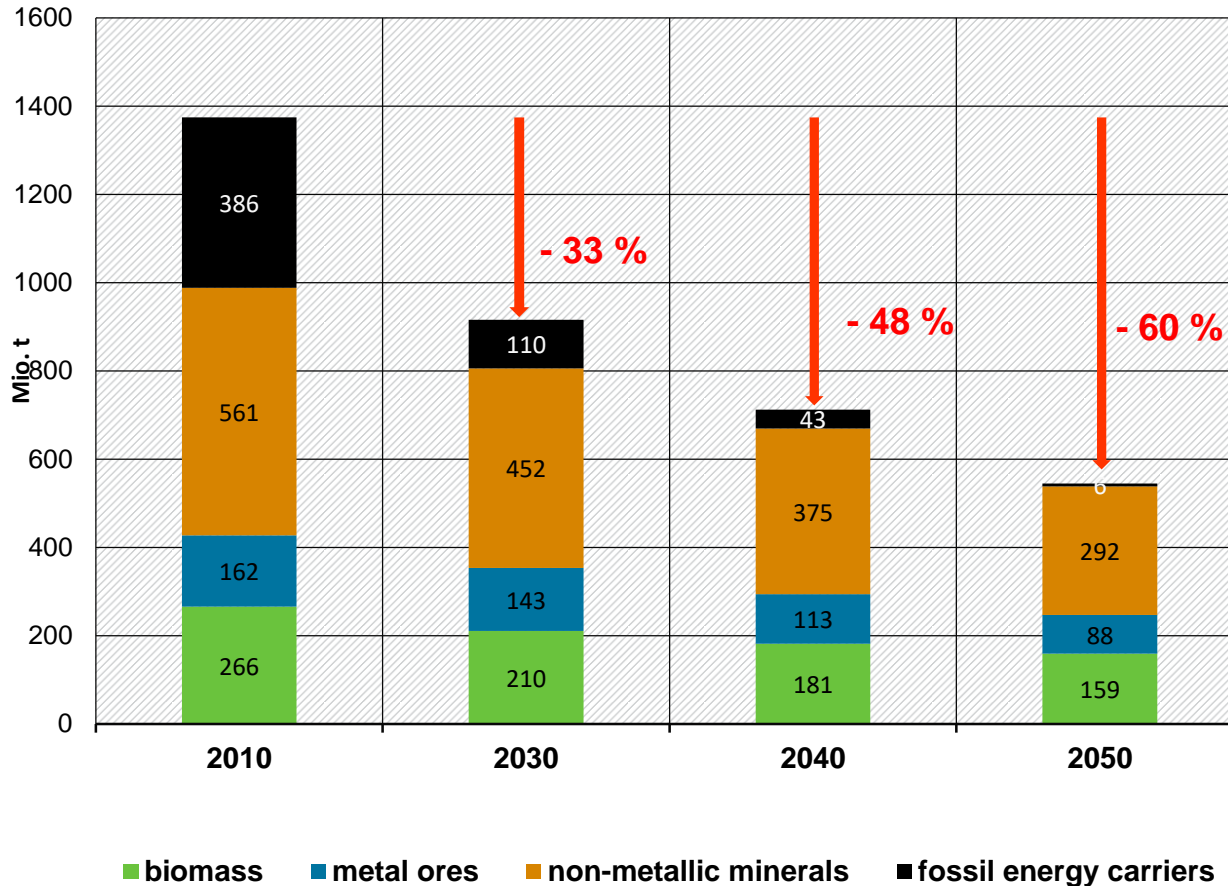


Wiesen, Klaus, et al. „Analyse des Rohstoaufwandes der Energieinfrastruktur in Deutschland.“
Sachverständigen Gutachten im Auftrag des Umweltbundesamtes – Wuppertal, Dessau-Roßlau, 2017l.

Result: GHG emissions reduction in the GreenEe - Szenario



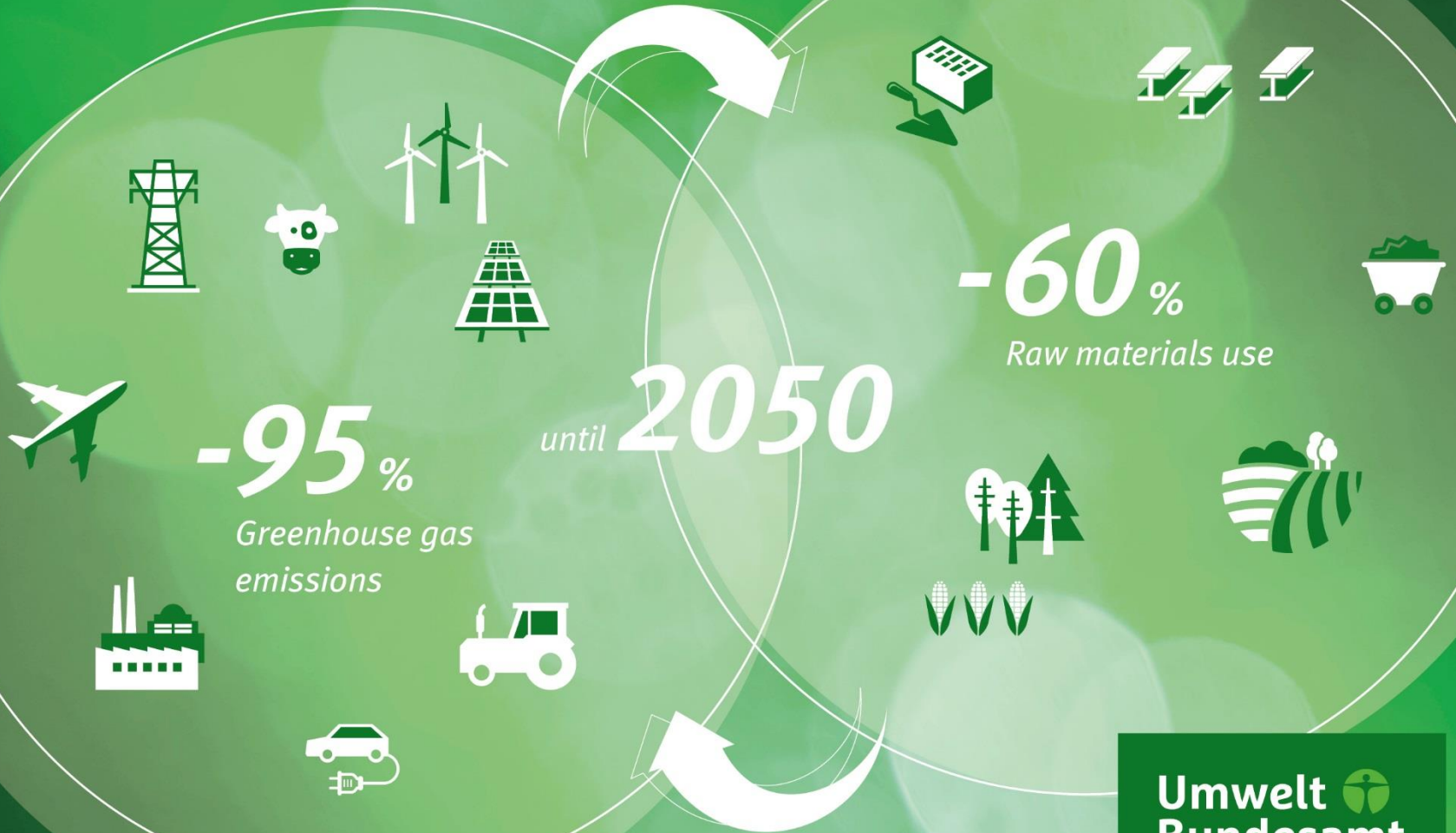
Primärrohstoffkonsum im GreenEe-Szenario



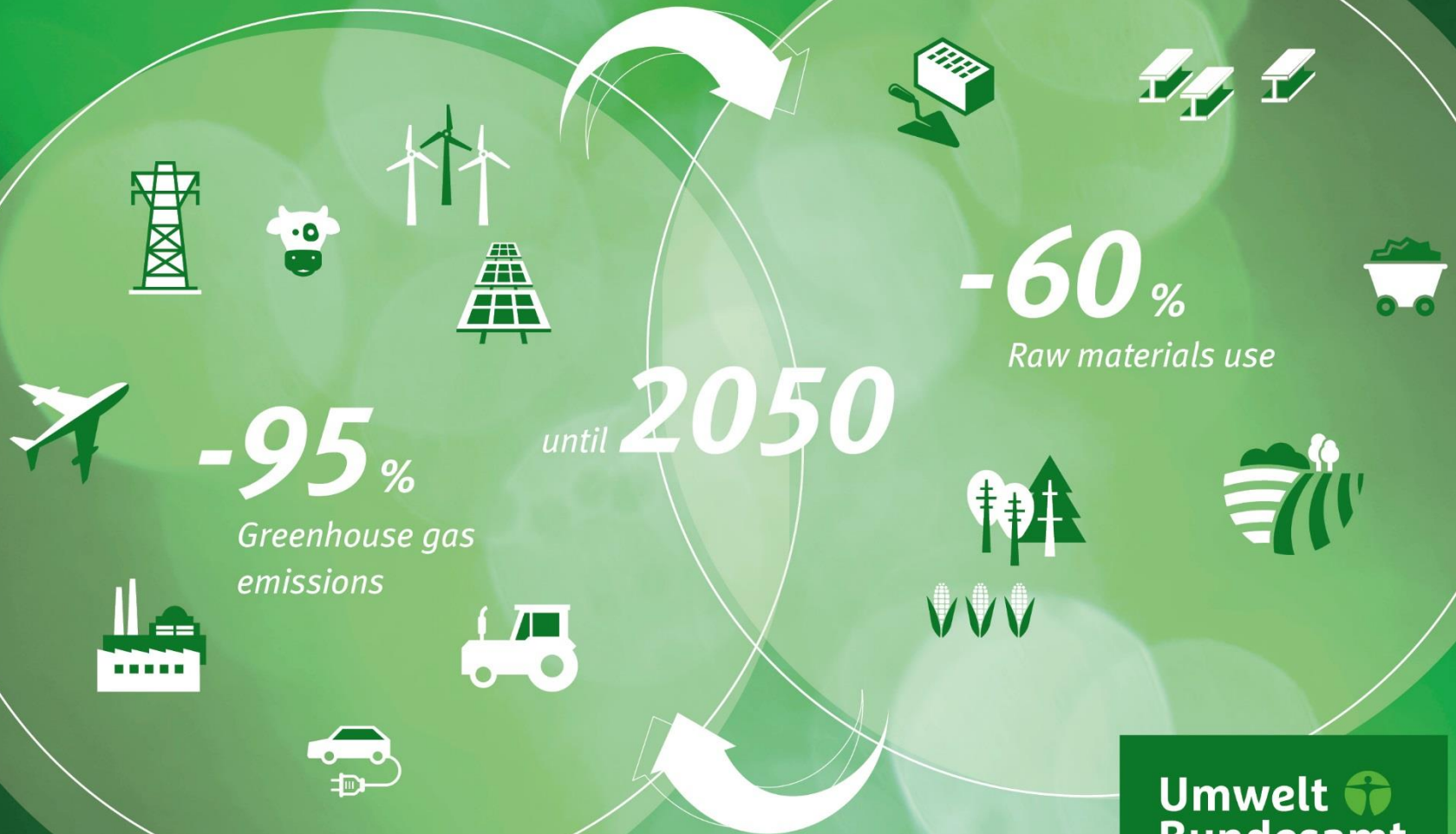
UBA/Ifeu/IEE/SSG

- Primärrohstoffkonsum (RMC) sinkt um 60 %
- RMC pro Kopf reduziert sich um 55 % auf 7,6 t/Person
- durchschnittliche Steigerung der Gesamtrohstoffproduktivität um 2,5 % pro Jahr

global transferability



Systemic Policies...



Systemic Policies... Factor X

Re - think

Re - design

Renewable

Regional

Re- pair

Re - manufacturing

Re - use

Re - cycle

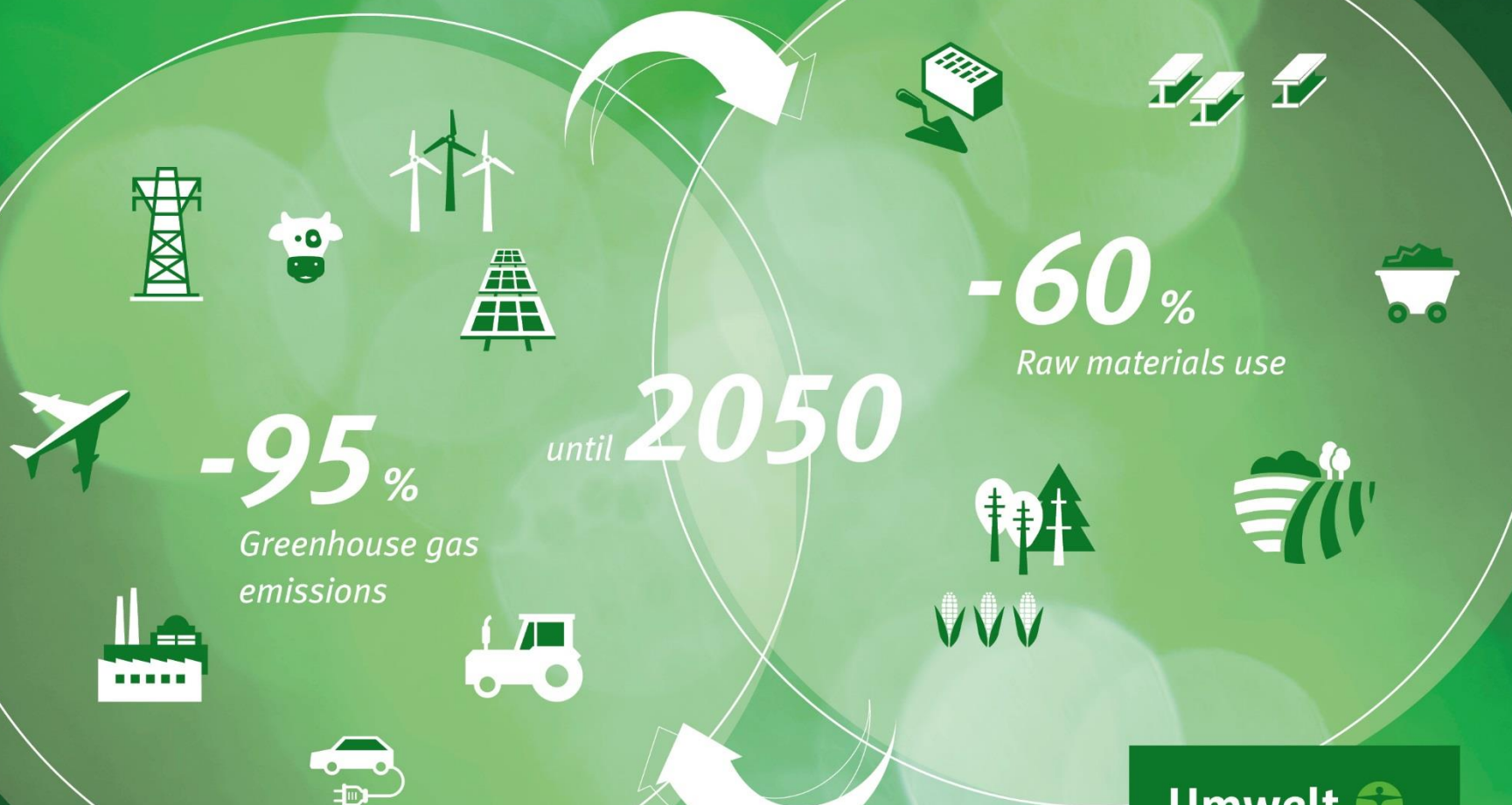
-95%

Greenhouse gas
emissions

-60%

Raw materials use

Lets start ... it is possible



-95%
Greenhouse gas emissions

until **2050**

-60%
Raw materials use

Conference 4./5.11 in Berlin

Umwelt Bundesamt

