

A scenic photograph of a rural landscape. In the foreground, there is a field of tall grasses. A dirt path winds through the field on the right side. In the background, there is a dense forest of trees, and the sun is shining from the left, creating a bright, hazy atmosphere with lens flare effects.

BIOMETHANE WITH BENEFITS – AN IMPORTANT CONTRIBUTION TO EU TARGET ACHIEVEMENT

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Biogas PowerOn 2023 | 27th of September, 2023

AS A LEADING BIOMETHANE TRADER IN EUROPE, LANDWÄRME CONNECTS PRODUCER & CONSUMER



BIOMETHANE PRODUCTION

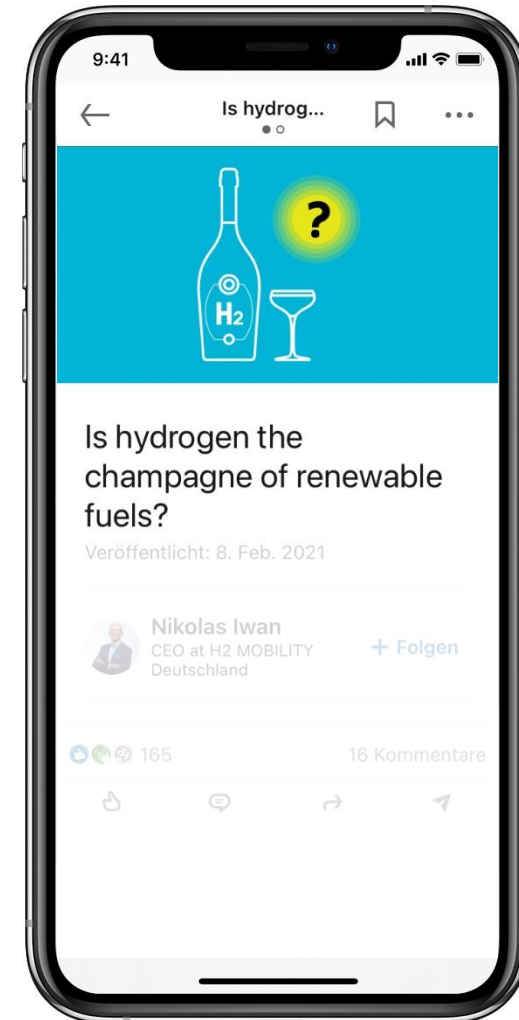
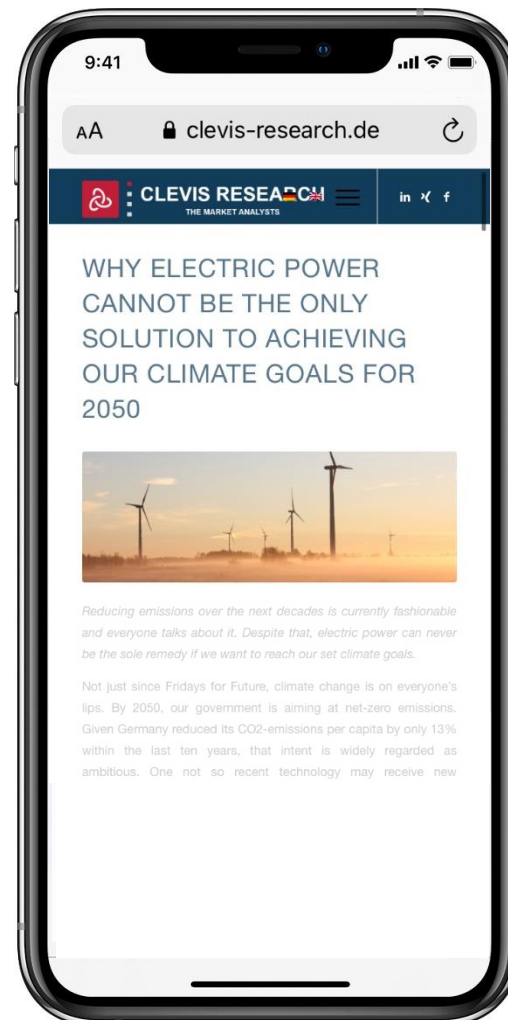
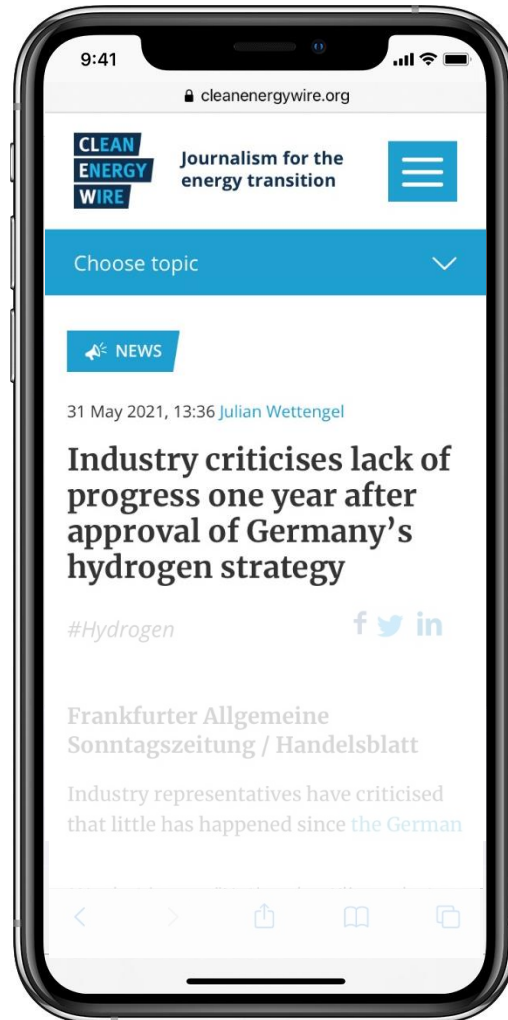
TRADING

SERVICES



From our offices in Berlin, Budapest, Dortmund and Munich, a **team of 90** manages a **portfolio of over 3,5 TWh** and supplies more than **300 utilities & consumers** with biomethane.

HYDROGEN & ELECTRICITY ARE NOT SUFFICIENT FOR A QUICK ENERGY TRANSITION



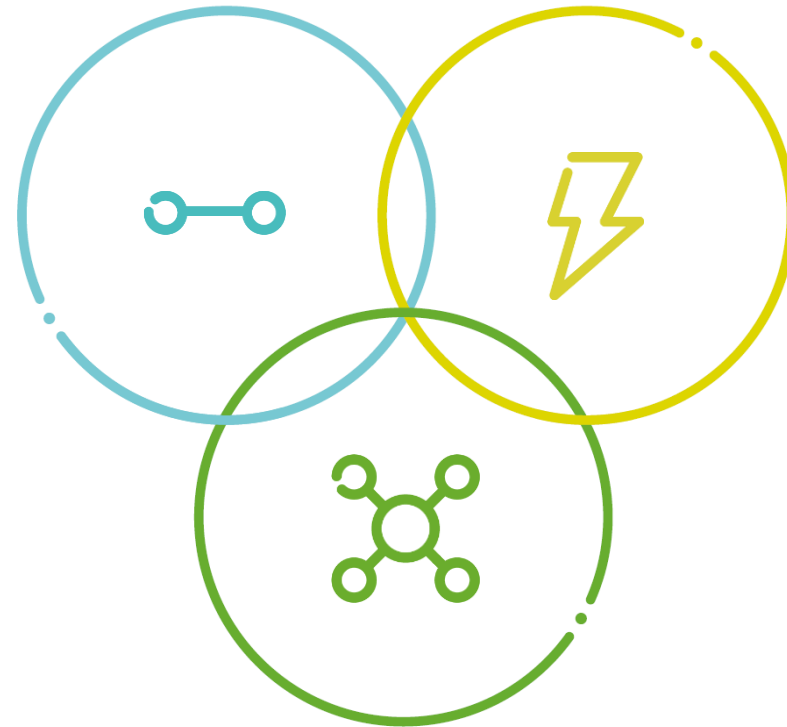
WE NEED THE TRIAD OF THE ENERGY SOURCES

GREEN HYDROGEN

electrolysis to hydrogen as most useful application for excess electricity

Complement to H₂ & electricity

- sector coupling with waste and agriculture sector
- enables a gradual shift from the energy source natural gas
- possible production from biogas, wood and hydrogen



GREEN METHANE

RENEWABLE ELECTRICITY

fluctuating, cheap, renewable electricity will be the primary energy of the future

Cheaper than hydrogen in certain existing applications

- combined heat & power generation
- fuel for ships, busses & heavy duty

IN THE TRIAD THE WEAKNESSES AND STRENGTHS COMPLIMENT EACH OTHER



Renewable electricity



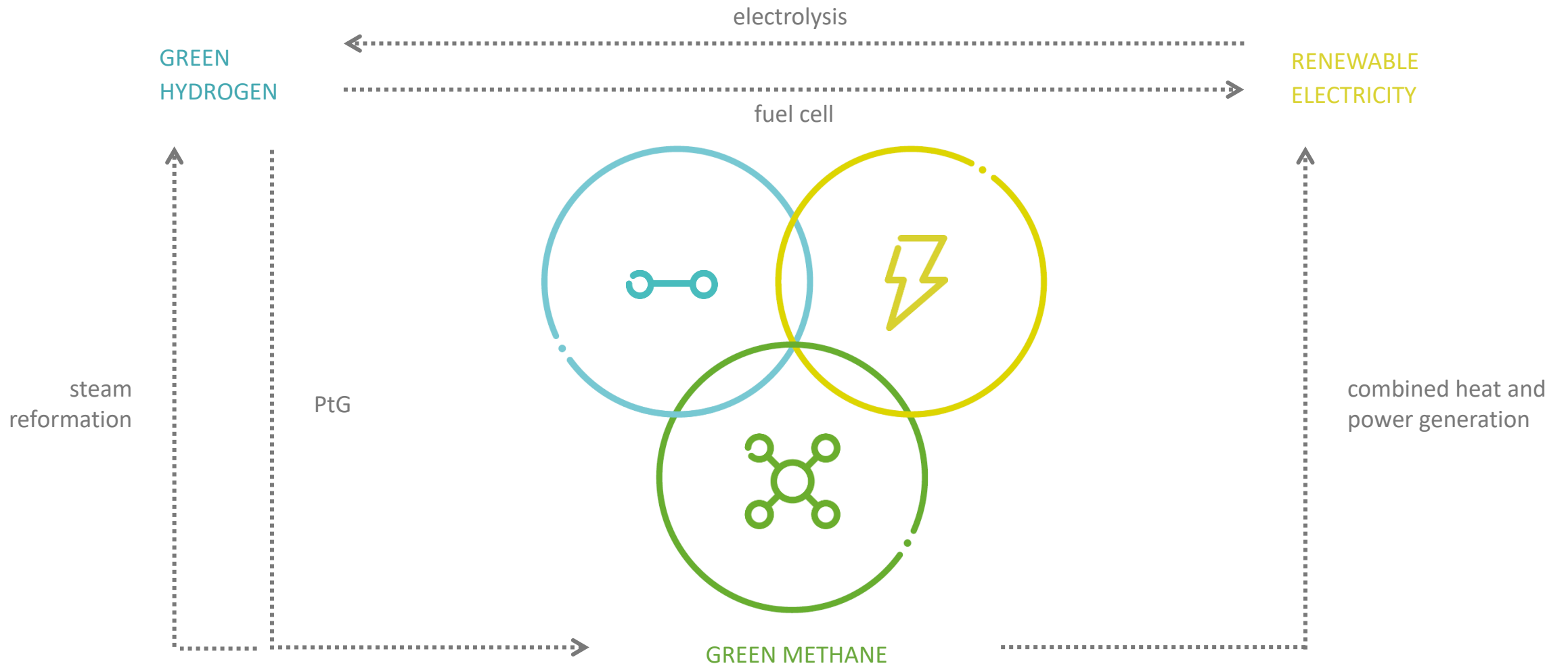
Green hydrogen



Green methane

	Renewable electricity	Green hydrogen	Green methane
Global potential	●●●	●●	●
Maturity	●●●	●	●●●
Storability	●	●●	●●●
Transport over long distances	●	●●	●●●
Cost	●●●	●	●●
Joker	already more than 50 % renewable	replaces natural gas in chemical industry	infrastructure exists already

COUPLING BETWEEN ENERGY SOURCES



REPOWER EU FOR A RESILIENT & INDEPENDENT ENERGY SYSTEM: AN UPSCALE PLAN FOR BIOMETHANE IS SET



EU TARGET

35 bcm biomethane (~380 TWh)
in the EU until 2030

GERMAN CONTRIBUTION

100 TWh

A wide-angle photograph of rolling green hills under a bright sunset sky. The sun is low on the horizon, casting a warm glow over the landscape. The hills are covered in lush green grass, and a few trees are scattered across the terrain. The sky is a mix of orange, yellow, and light blue.

BIOMETHANE & CARBON REDUCTION

CCS AT BIOMETHANE PLANTS IS AN EFFECTIVE WAY TO DECARBONIZE THE ATMOSPHERE



CARBON CAPTURE & STORAGE

is already part of biomethane production

via part of existing gas infrastructure to final carbon storage (e.g. empty gas fields)



35 bcm biomethane production can generate 55 mio. tons of true negative emissions.

STEPS OF CO₂-UPGRADING IN A BIOMETHANE PLANT



CO₂ stream is split from CH₄ during biogas upgrading and liquefied



scrubbing with configuration dependent on raw-gas source characteristics, typical contaminating gases and use case, initial purity of up to 99,9 %



drying and filtration leads to taste-, smell- and colorless end product



condensing separates non-condensable gases, liquifies CO₂ at (usually) 18 bar (g) / -24° C



final scrubbing in liquid form, leading to up to 99,998 % purity, to be taken to a storage or used as biogenic CO₂ in industry processes

CHALLENGES AROUND CCS AND CCU AT THE BIOMETHANE PRODUCTION

DECENTRAL PRODUCTION AND LOGISTICS

- nearly 1,000 existing biomethane sites
- wide range: 1,000 – 50,000 t of CO₂ p.a.
- 5,000 – 10,000 new sites for 35 bcm
- average size will be ~10,000 of CO₂ p.a.



LIQUID OR GASEOUS GAS TRANSPORT

- liquid carbon standard for usage
- gaseous transport for Mt scale storage more efficient and ecological
- unclear linkage between decentral production and backbone carbon grid



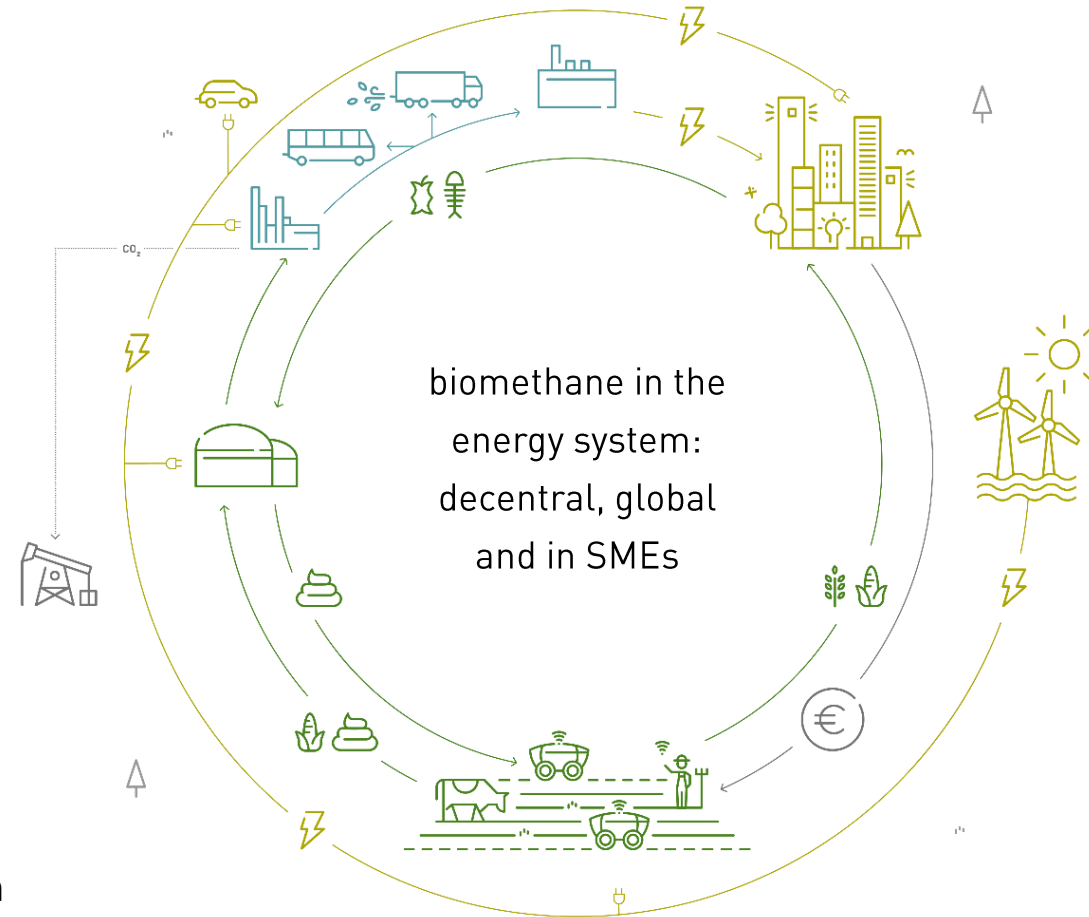
BIOMETHANE WITH CCS CREATES NEGATIVE EMISSIONS AND SOLVES DIVERSE GLOBAL CHALLENGES



bio-CNG & bio-LNG as a fuel for buses, heavy duty and shipping

negative emissions: carbon storage via BECCS

circular economy: digestate as green fertilizer for agriculture



high temperature application in industrial production

heat and power for the cold season and dark doldrums

value generation & jobs in rural areas

environment & climate protection in agriculture: solution to nitrate & methane challenge

A wide-angle photograph of a rolling green landscape at sunset. The sun is low on the horizon, casting a warm, golden glow over the hills. The sky is a mix of orange, yellow, and light blue. The foreground shows a field of yellow flowers, possibly rapeseed, in the lower right corner. A semi-transparent teal banner is overlaid across the middle of the image, containing the text "35 BCM BIOMETHANE DONE RIGHT".

35 BCM BIOMETHANE DONE RIGHT

35 BCM - LET'S DO IT RIGHT: NEW PRODUCTION MUST COMBINE BEST AVAILABLE TECHNOLOGIES



AVOID ANY METHANE EMISSIONS

- covered digestate storage & exhaust gas treatment
- constant monitoring & measuring

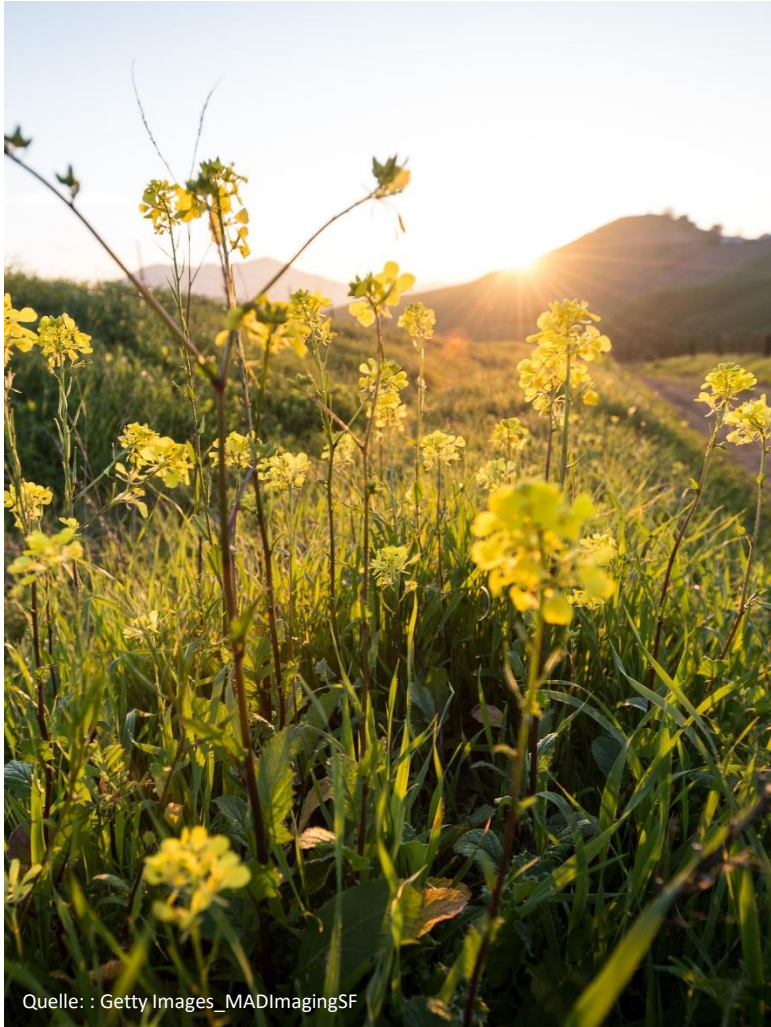
DECENTRAL ELECTRICITY PRODUCTION AS REDUNDANCY

- upgrading & feed-in have non-availability of min. 5 %
- alternative use of gas always needed: gas engines as preferred option
- 35 bcm biomethane can deliver 20 GW decentral electricity production capacity

RENEWABLE ENERGY INPUT

- up to 6 % energy self-consumption to generate biomethane
- power-to-heat approach can help to utilize excess electricity
- integration of local renewable sources

OPTIMIZE FEEDSTOCK FOR A SUSTAINABLE SCALE UP



Quelle: : Getty Images_MADImagingSF

FERMENTATION OBLIGATION FOR:

- manure
- biological waste
- waste water

SCALE UP BY FOCUSING ON:

- agricultural residues
- non-food crops
- intermediate crop

FERMENTATION WITH ADDITIONAL VALUE

- avoiding methane emissions
- protecting groundwater
- producing organic fertilizer

RIGHT CROP WITH RIGHT BENEFITS

- enhancing biodiversity
- fostering soil enrichment

biomethane plants shall have high flexibility in feedstock deployment

A photograph of a wooden structure, possibly a sculpture or a large piece of furniture, made of weathered wood. The structure is set against a bright blue sky with scattered white clouds. A semi-transparent teal banner is overlaid on the bottom half of the image, containing the title text.

35 BCM BIOMETHANE: HOW TO SET THE LEGAL FRAMEWORK ON FASTTRACK

LEGAL FRAMEWORK NEEDED FOR 35 BCM BIOMETHANE



Quelle: Adobe Stock_Natascha

COMMITMENT TO THE TARGET

- binding targets in every Member State:
- reliable framework in every MS
- financial commitment

GRID ACCESS

- quick & reliable access
- transparent & fair cost sharing

AUTHORIZATION & CERTIFICATION

- fair & quick permit processes
- adjust RED sustainability certification to the reality of biomethane

ENABLE EU INTERNAL MARKET

- remove import barriers
- enable system for „certificate“ transfer/tracking



35 BCM BIOMETHANE MAY COME WITH MASSIVE BENEFITS!



55 Mio. t CO₂ in CCS



> 100.000 new jobs



95 Mio. t CO_{2eq}
avoided emissions from
burning fossil gas




100 billion € investment
in rural areas



100 Mio. t CO_{2eq} avoided
direct methane emissions



> 25 % defossilization in
road transport

A scenic landscape photograph showing a sunlit field with tall grasses and a dense forest in the background. The sun is low on the horizon, creating a warm, golden glow and lens flare effects. A dirt path is visible on the right side of the field.

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