



EVALUATION OF AUSTRIA'S CARBON DIOXIDE POINT SOURCES: TODAY, 2030, 2040 AND 2050

SUSANNE HOCHMEISTER

18TH SDEWES CONFERENCE
28TH SEPTEMBER 2023

CONTENT

- Motivation and Open Research Areas
 - Climate goals
 - Austria's GHG-emissions
 - Terminology
- Austria's future CCU and CCS demands
 - Major CO₂ point sources today
 - Technology-based projections of CO₂ point sources until 2050
- Conclusion

MOTIVATION AND OPEN RESEARCH AREAS

CLIMATE GOALS

Paris Agreement [1]:

- Limiting global warming to 1.5°C compared to pre-industrial levels

European Green Deal [2]:

- Climate neutrality by 2050
- Negative emissions afterwards

Austrian governmental program [3]:

- Climate neutrality by 2040

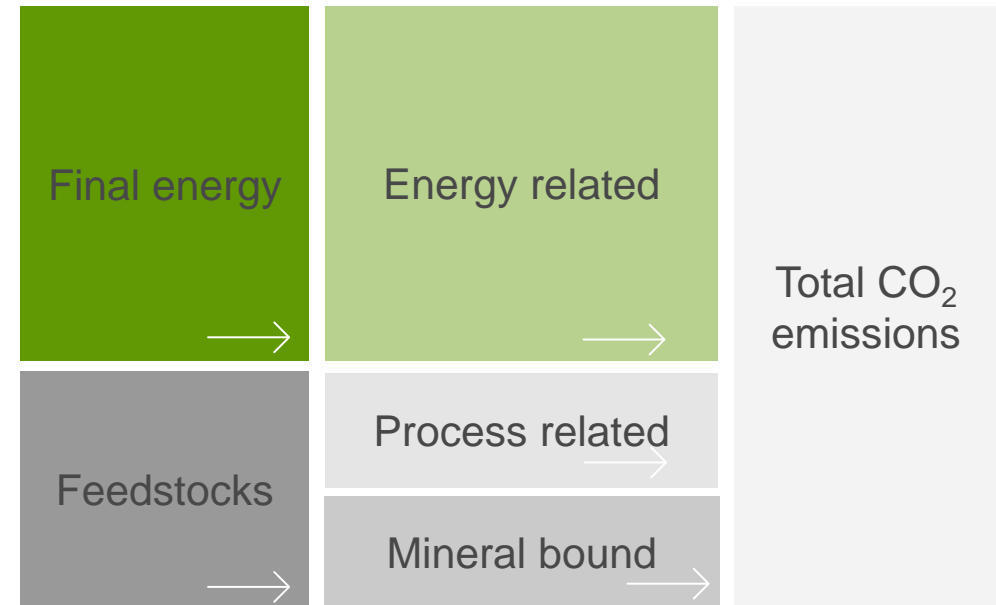
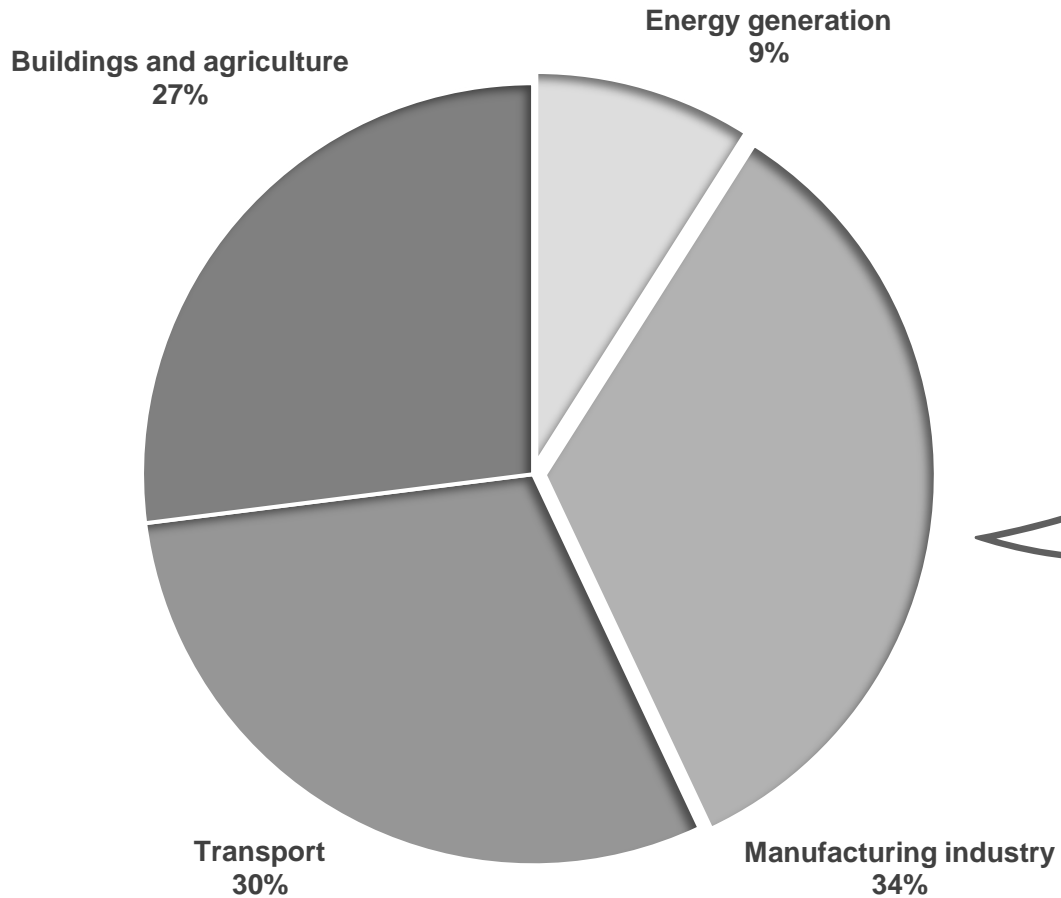
[1] United Nations Framework Convention on Climate Change, „Paris Agreement“

[2] European Union, „European Climate Law“

[3] Bundeskanzleramt, „Österreich und die Agenda 2030: Freiwilliger Nationaler Bericht zur Umsetzung der Nachhaltigen Entwicklungsziele“

MOTIVATION AND OPEN RESEARCH AREAS

AUSTRIA'S GHG-EMISSIONS [4]

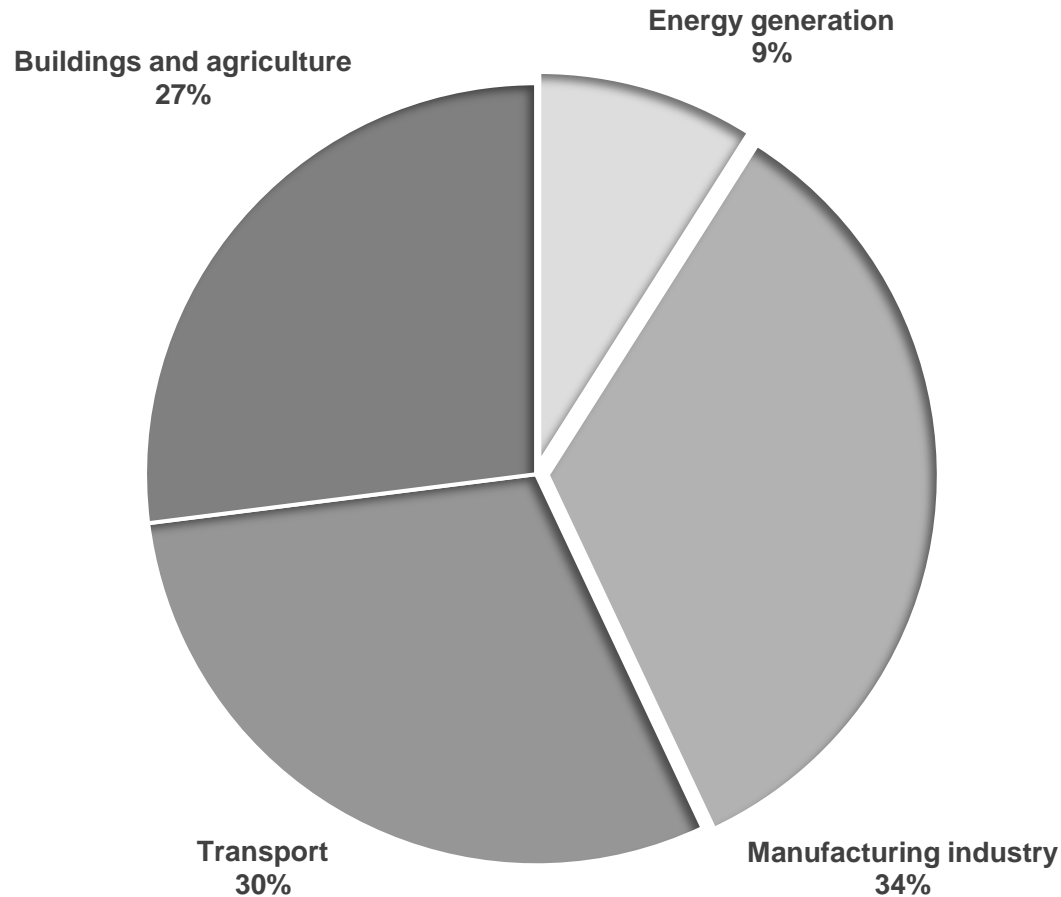


[4] Austrian Federal Environment Agency, „National Inventory Report 2021“

[5] Based on NEFI – New Energy for Industry, „Pathway to industrial decarbonization“

MOTIVATION AND OPEN RESEARCH AREAS

AUSTRIA'S GHG-EMISSIONS [4]



IPCC: „All pathways that limit global warming to 1.5°C use Carbon Dioxide Removal (CDR).“ [6]

[4] Austrian Federal Environment Agency, „National Inventory Report 2021“

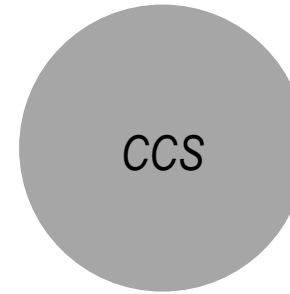
[6] IPCC, „IPCC Special Report on Global Warming of 1.5°C“

MOTIVATION AND OPEN RESEARCH AREAS

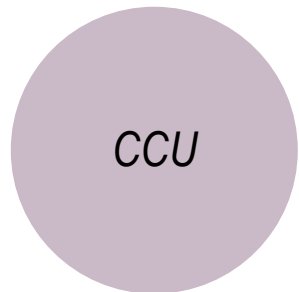
TERMINOLOGY



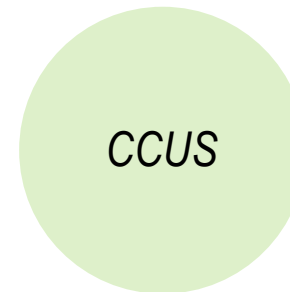
All activities removing CO₂ from the atmosphere and durably storing it in geological, terrestrial or ocean reservoirs or in products.



A process in which CO₂ from energy generation and industrial sources is separated, conditioned, compressed and transported to a storage location for long-term isolation from the atmosphere.



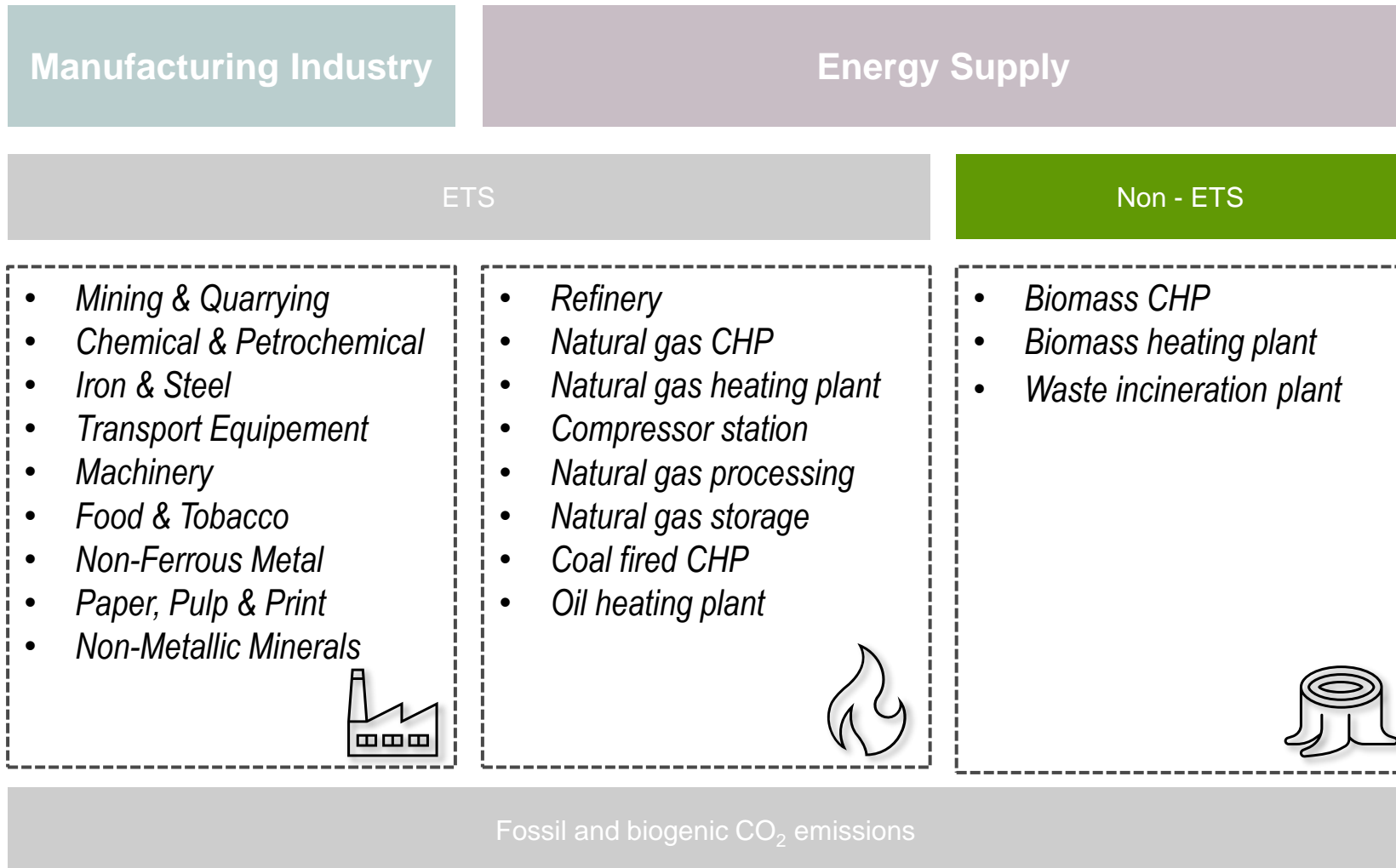
A process in which CO₂ is captured and then used to produce a new product.



A process in which captured CO₂ is stored in a product for a climate-relevant time horizon.

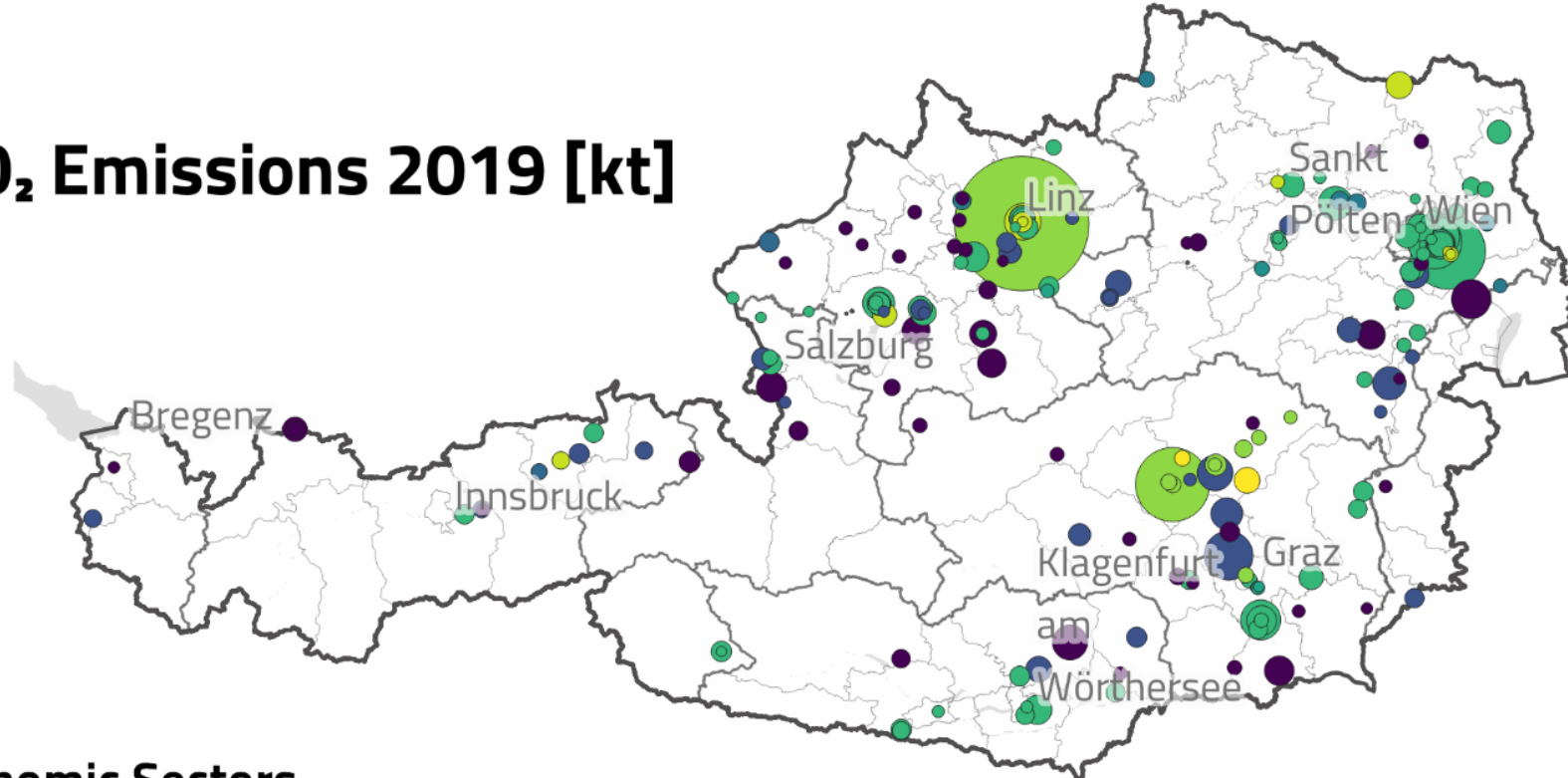
AUSTRIA'S FUTURE CCU AND CCS DEMANDS

CO₂ POINT SOURCES



AUSTRIA'S FUTURE CCU AND CCS DEMANDS

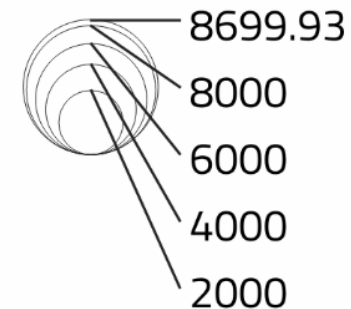
CO₂ Emissions 2019 [kt]



Economic Sectors

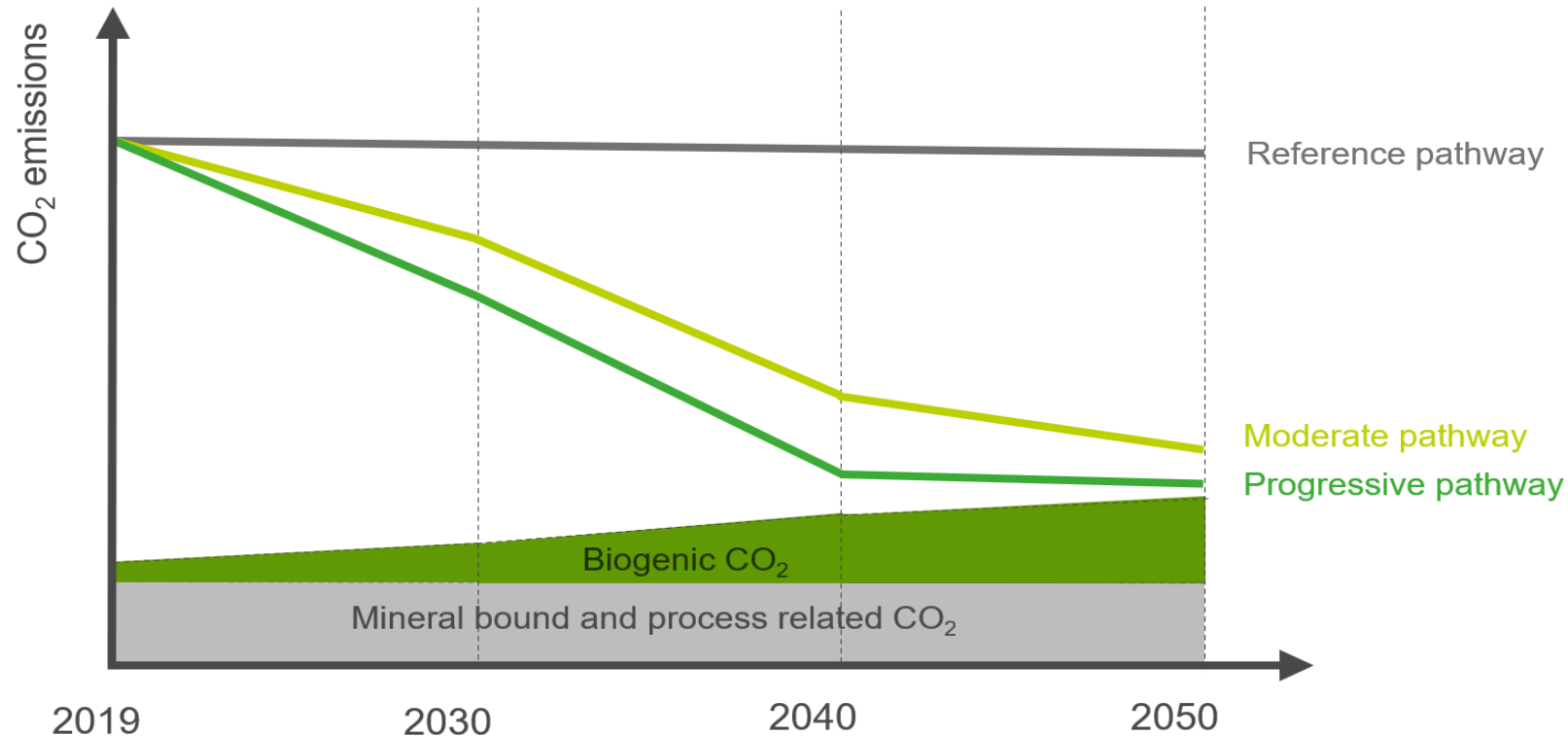
- | | |
|--|---|
| ● Mining & Quarrying | ● Machinery |
| ● Chemical & Petrochemical | ● Food & Tobacco |
| ● Iron & Steel | ● Non-Ferrous Metal |
| ● Energy Supply | ● Paper, Pulp & Print |
| ● Transport Equipement | ● Non-Metallic Minerals |

CO₂ Emissions [kt]



AUSTRIA'S FUTURE CCU AND CCS DEMANDS

TECHNOLOGY-BASED PROJECTIONS OF THE CO₂ POINT SOURCES UNTIL 2050



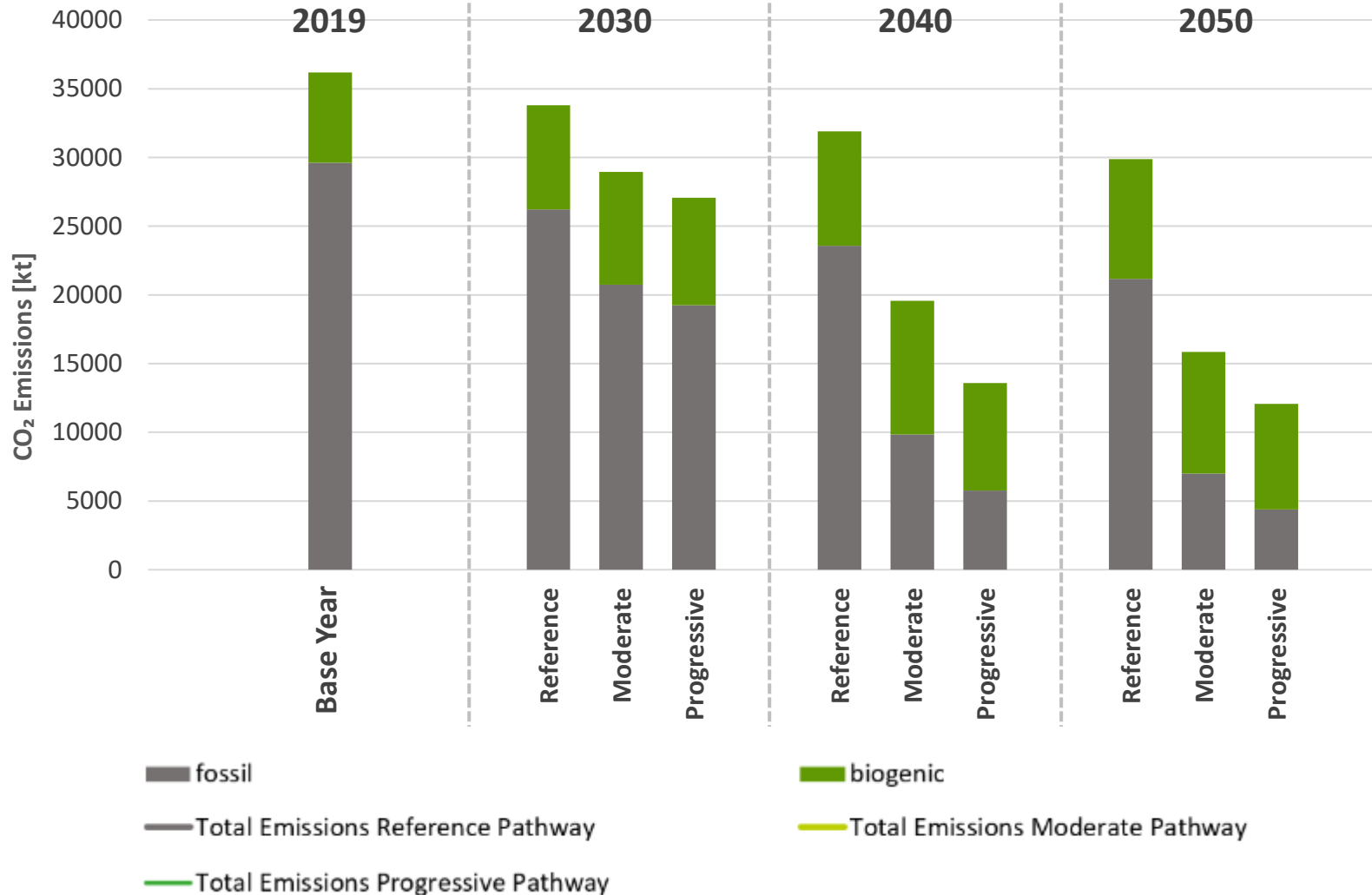
Decarbonisation strategies:

- Electrification
- Use of CO₂-neutral gases (H₂, Bio-CH₄, synthetic CH₄) and biomass combustion

AUSTRIA'S FUTURE CCU AND CCS DEMANDS

TECHNOLOGY-BASED PROJECTIONS OF THE CO₂ POINT SOURCES UNTIL 2050

CO₂ Emissions - Scenario Comparison



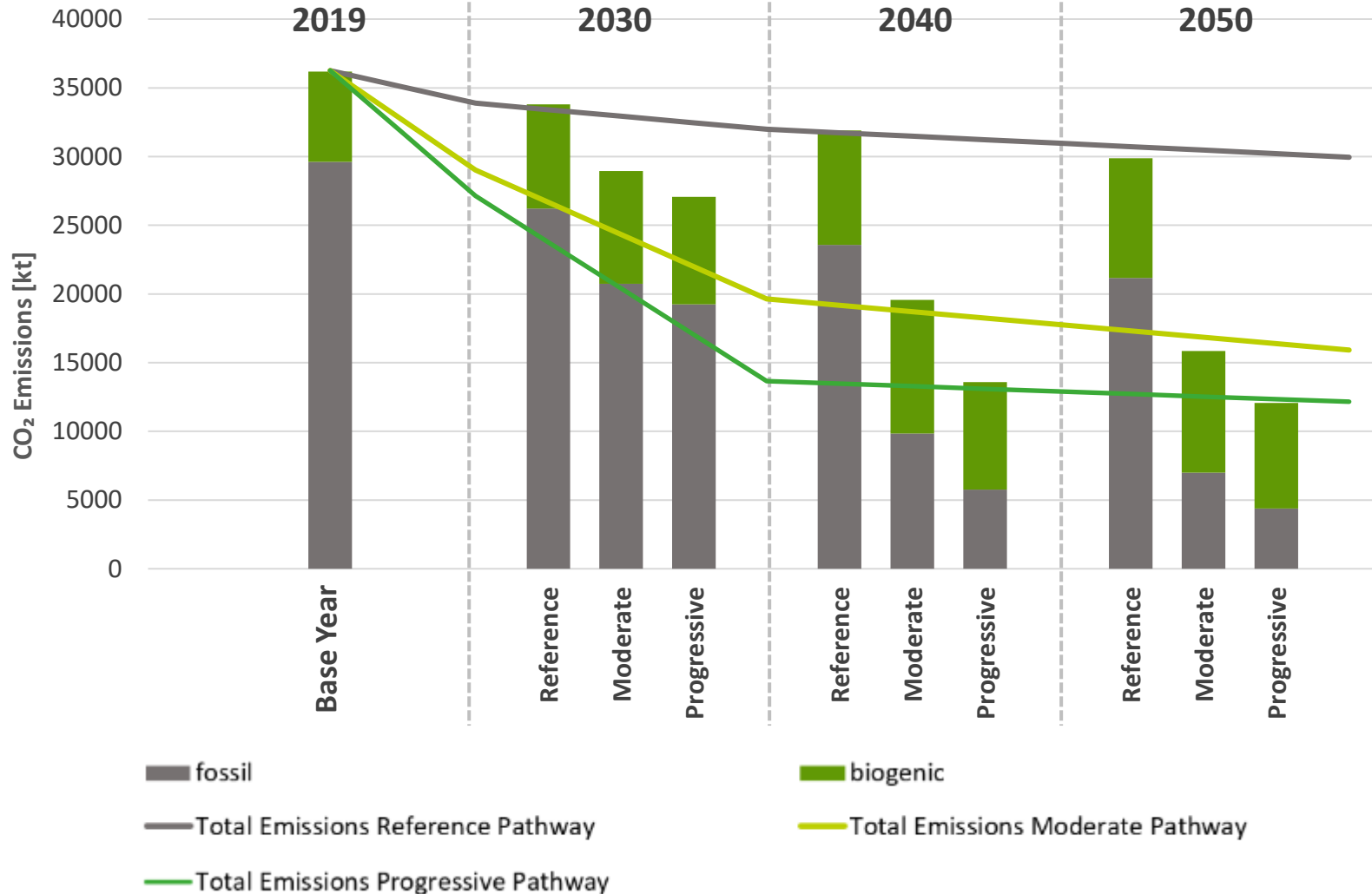
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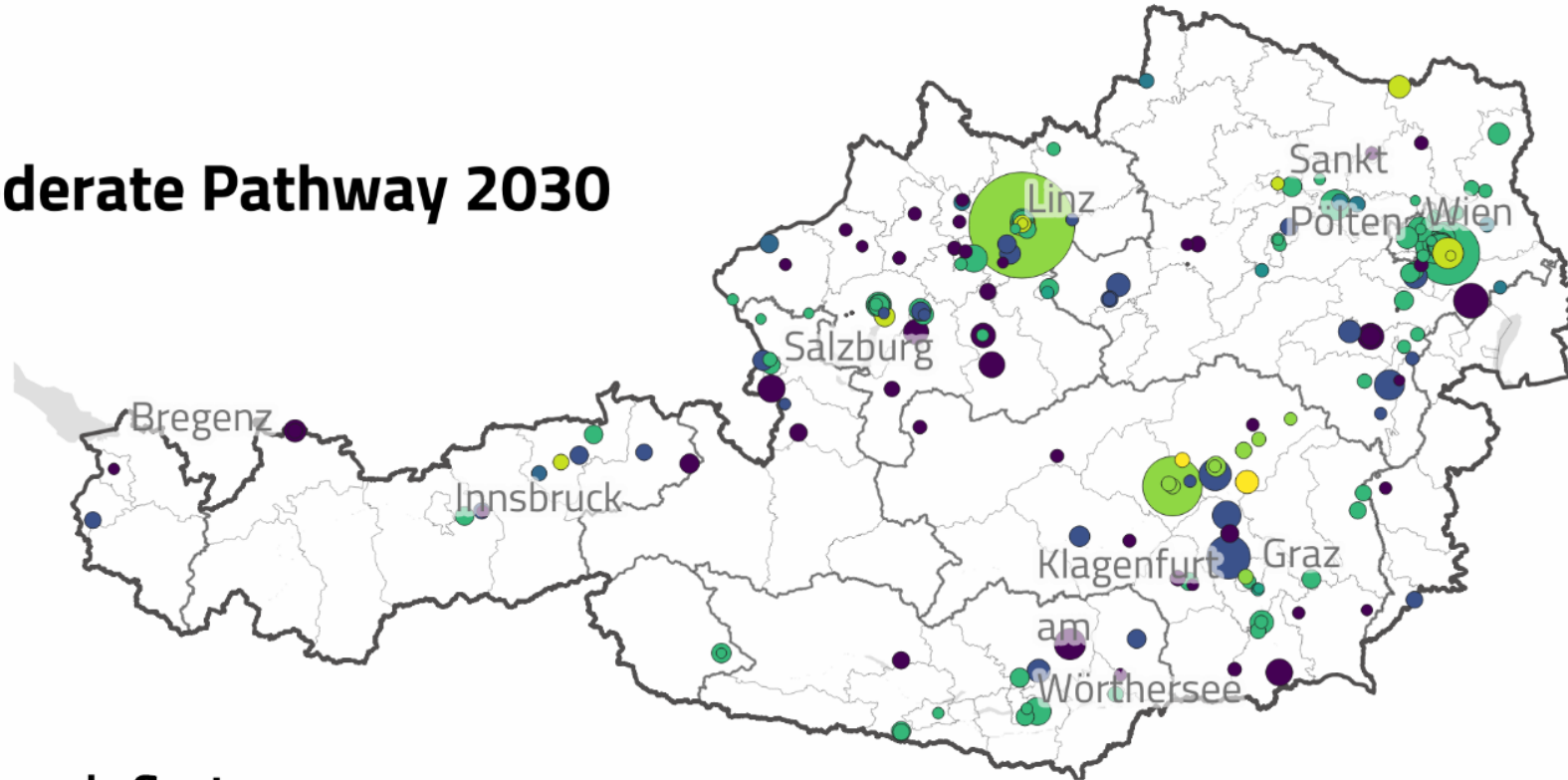


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AUSTRIA'S FUTURE CCU AND CCS DEMANDS

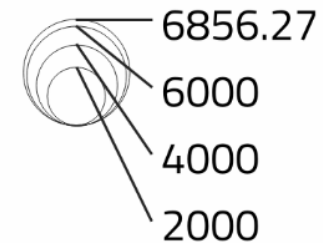
Moderate Pathway 2030



Economic Sectors

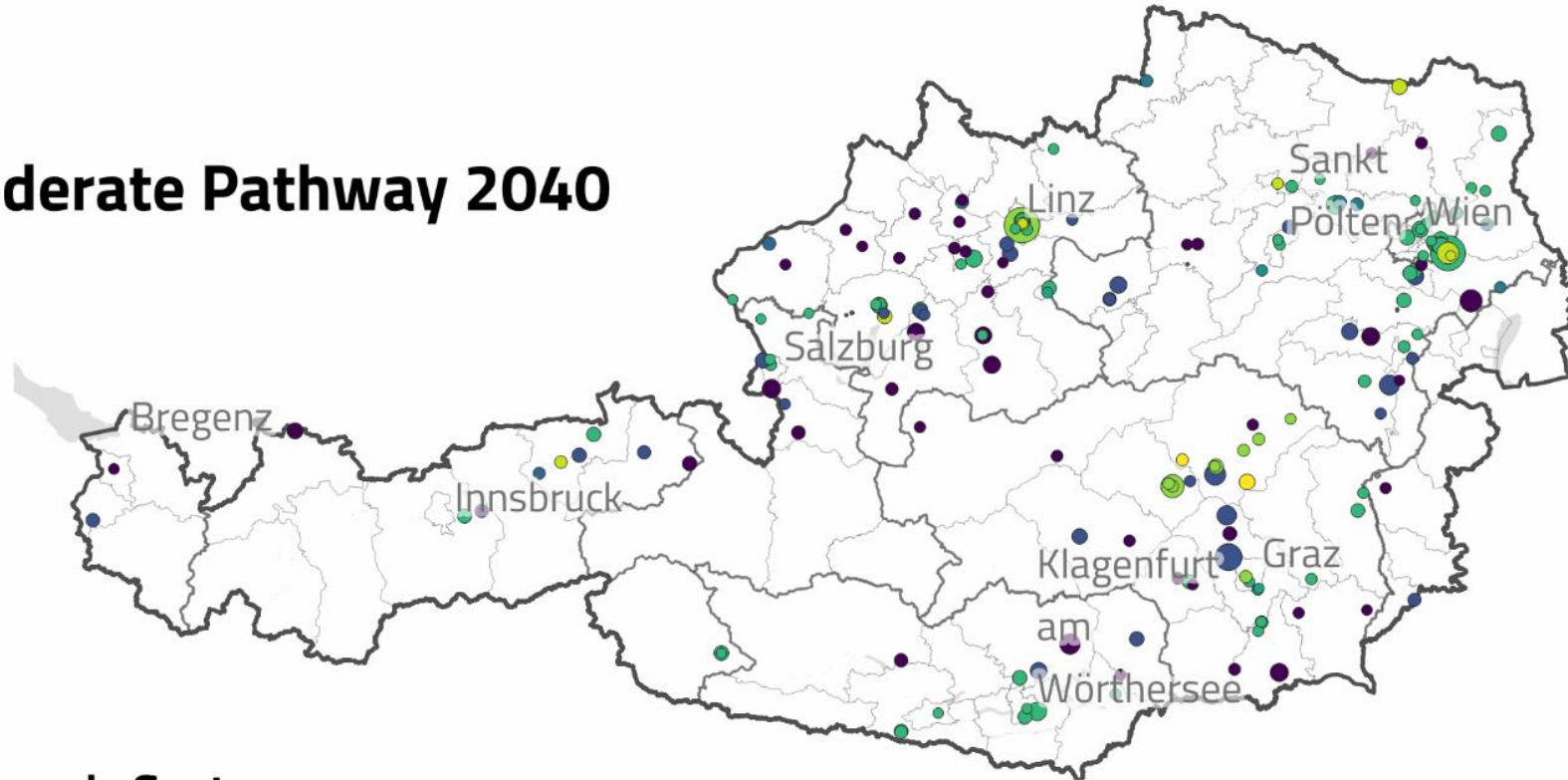
- | | |
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CO₂ Emissions [kt]



AUSTRIA'S FUTURE CCU AND CCS DEMANDS

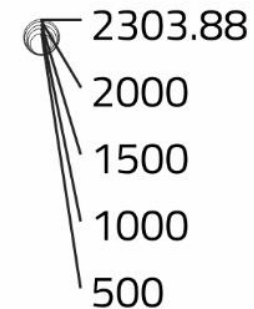
Moderate Pathway 2040



Economic Sectors

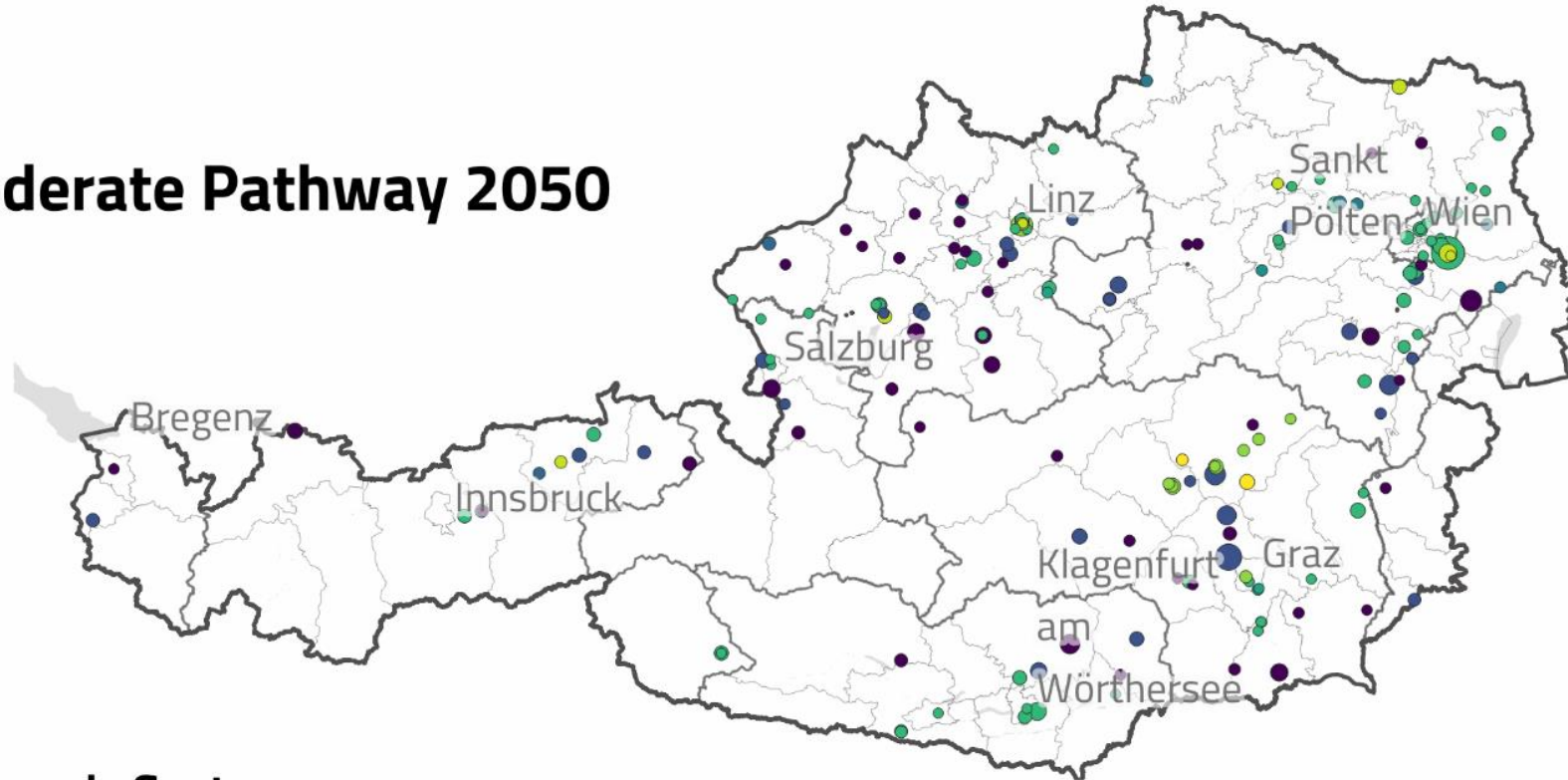
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CO₂ Emissions [kt]



AUSTRIA'S FUTURE CCU AND CCS DEMANDS

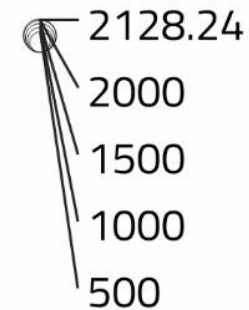
Moderate Pathway 2050



Economic Sectors

- | | |
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CO₂ Emissions [kt]



CONCLUSION

- Climate neutrality isn't possible without capturing **non avoidable mineral bound and process related CO₂ emissions** from the industry sector.
- With the evaluated CO₂ point sources preferable **CCU and CCS source-to-sink routes** until 2050 **considering the emission origin (fossil, biogenic)** could be defined.
- Following a progressive pathway aligning with the Austrian governmental program **the only fossil CO₂ remaining** from 2040 ongoing **is mineral bound or originates from waste incineration.**

THANK YOU FOR YOUR ATTENTION



DIPL.-ING. SUSANNE HOCHMEISTER

SUSANNE.HOCHMEISTER@UNILEOBEN.AC.AT
0043 3842 402 5404



LISA KÜHBERGER, BSc.

LISA.KUEHBERGER@UNILEOBEN.AC.AT
0043 3842 402 5407



PROF. THOMAS KIENBERGER

THOMAS.KIENBERGER@UNILEOBEN.AC.AT
0043 3842 402 5400

@ evt@unileoben.ac.at

www.evt-unileoben.at