FAO TECHNICAL ADVISORY GROUP ON METHANE

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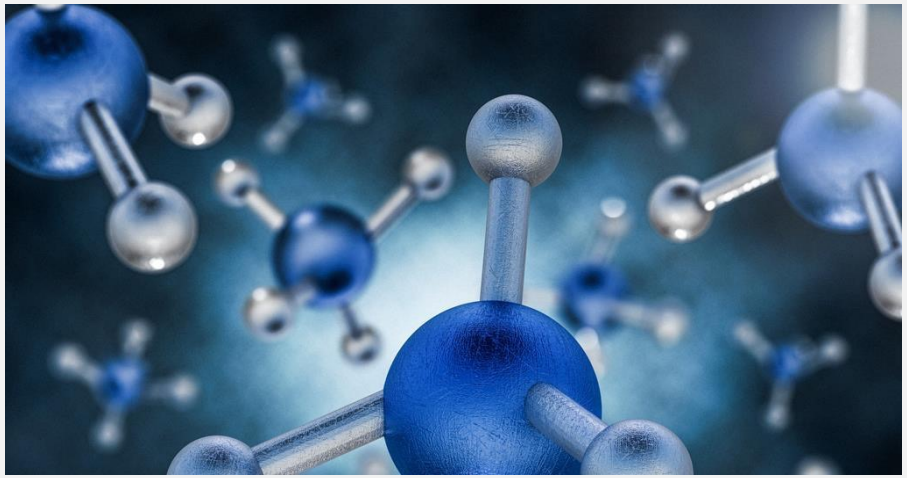
TAG COMPOSITION

- The Methane Technical Advisory Group (TAG) of the FAO formed in February 2021 (23 countries represented)
- Core group of 59 experts
- Expertise represented in the TAG includes:
  - animal/crop/soil sciences
  - life cycle assessment
  - environmental science
  - climate science
  - emissions metrics



OBJECTIVE

- To better inform GHG assessments instrumental to mitigation strategies and comparisons between sectors (e.g. livestock vs air transport) and products.

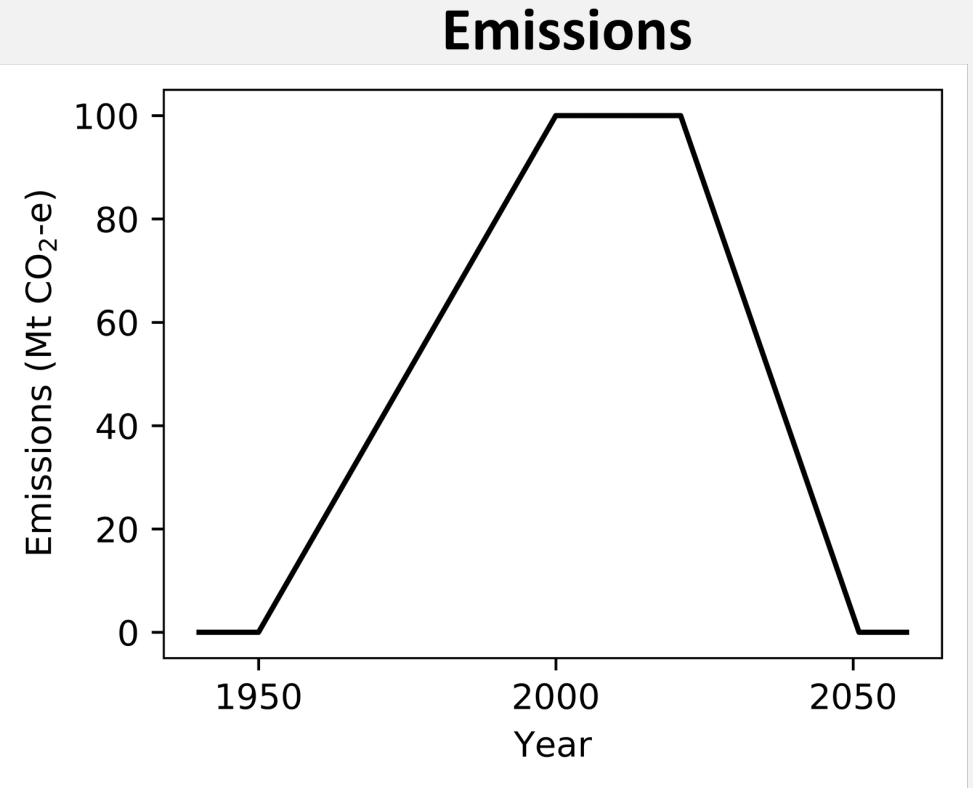
SCOPE

- Sources of methane
- Methane sinks
- Quantification of methane emissions
- Measurement
- Estimation of methane emissions
- Mitigation of methane emissions
- Metrics

MOTIVATION

- Livestock and rice production account for over 40% of all anthropogenic methane emission sources
- Methane is a potent greenhouse gas, but short-lived (half-life of ~10 years)
- Methane therefore has non-permanent climate implications, unlike CO_2
- What does this mean for how we assess methane emissions?

HOW METHANE AND CO_2 DIFFER



- Consider this CO_2e emissions profile
- How would these emissions affect global mean temperature?
- Does it matter if they are CO_2 emissions or methane emissions?

CO_2e is calculated by multiplying methane emissions by GWP100

HOW METHANE AND CO_2 DIFFER

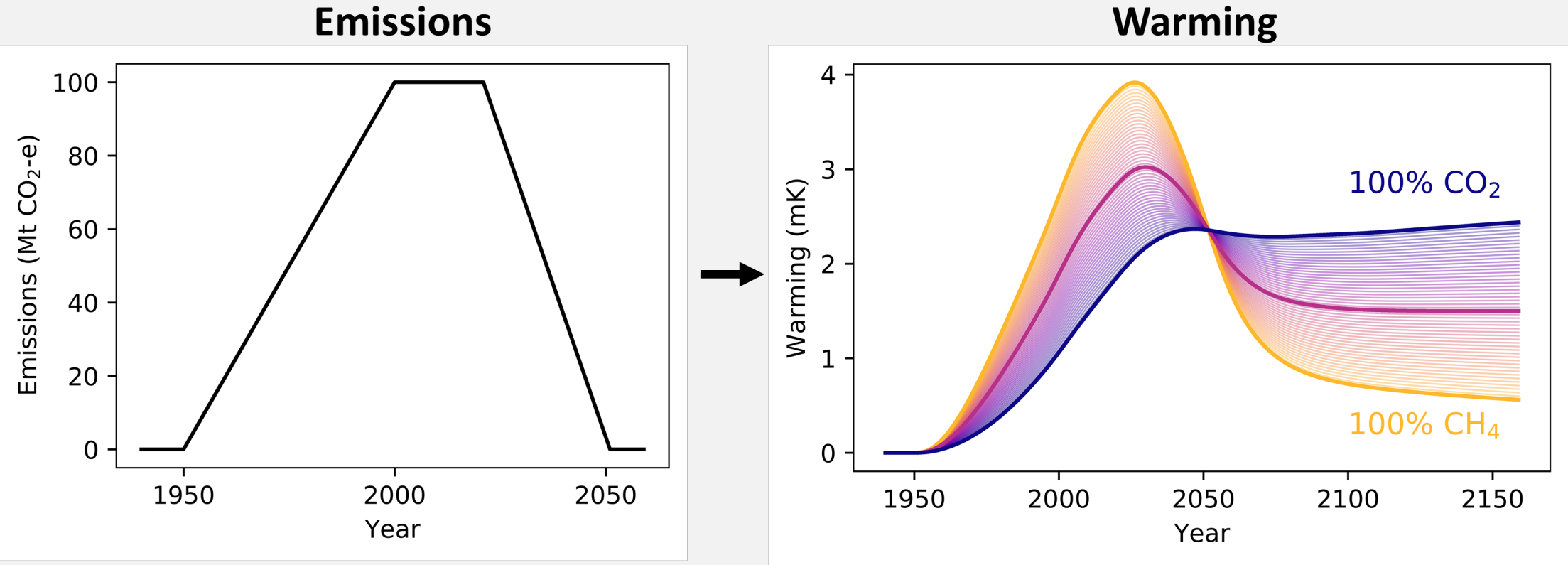


Figure from Lynch et al., (2021)

HOW METHANE AND CO_2 DIFFER

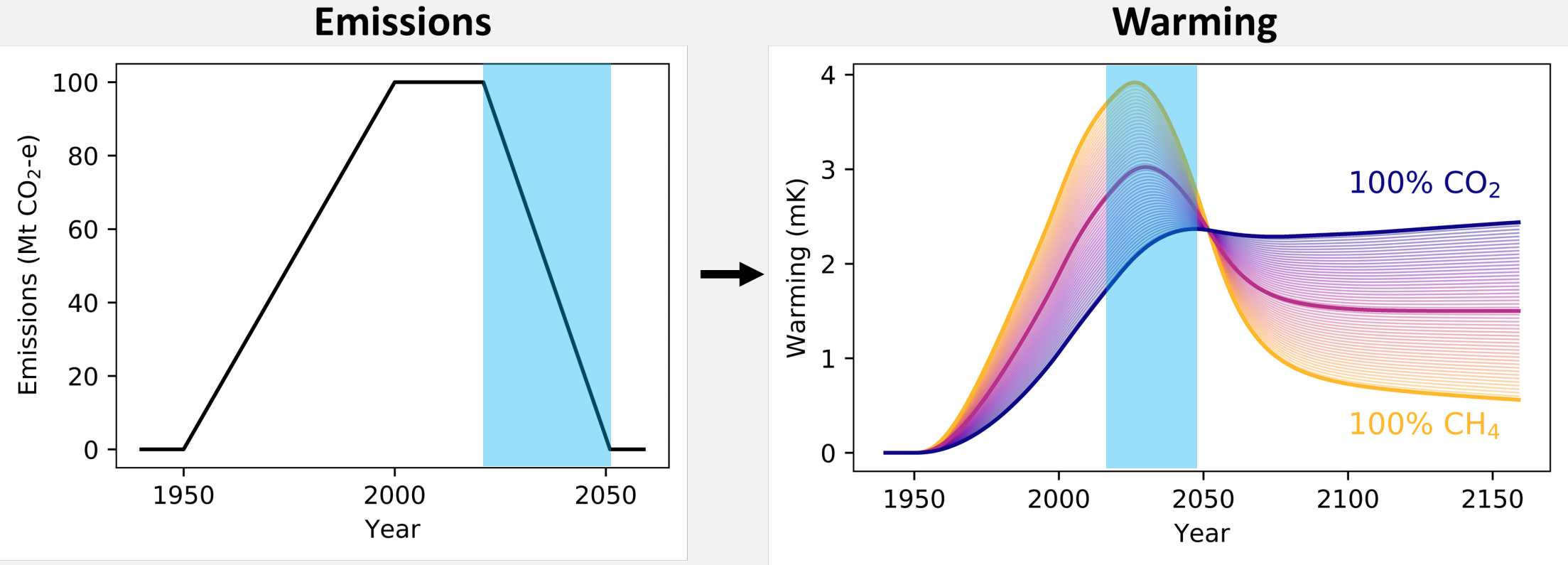
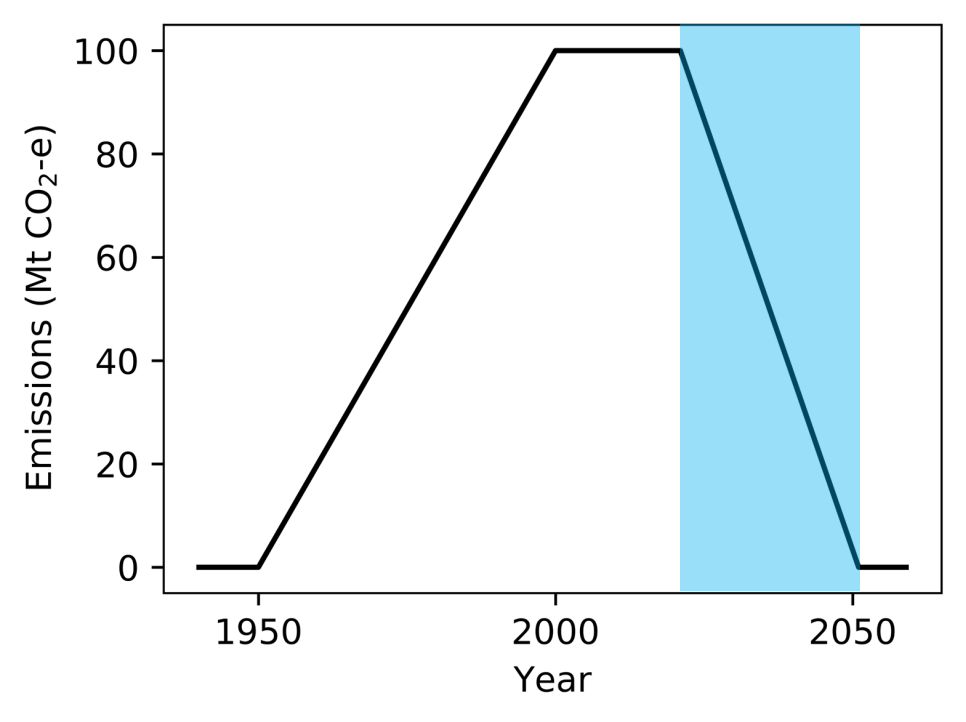


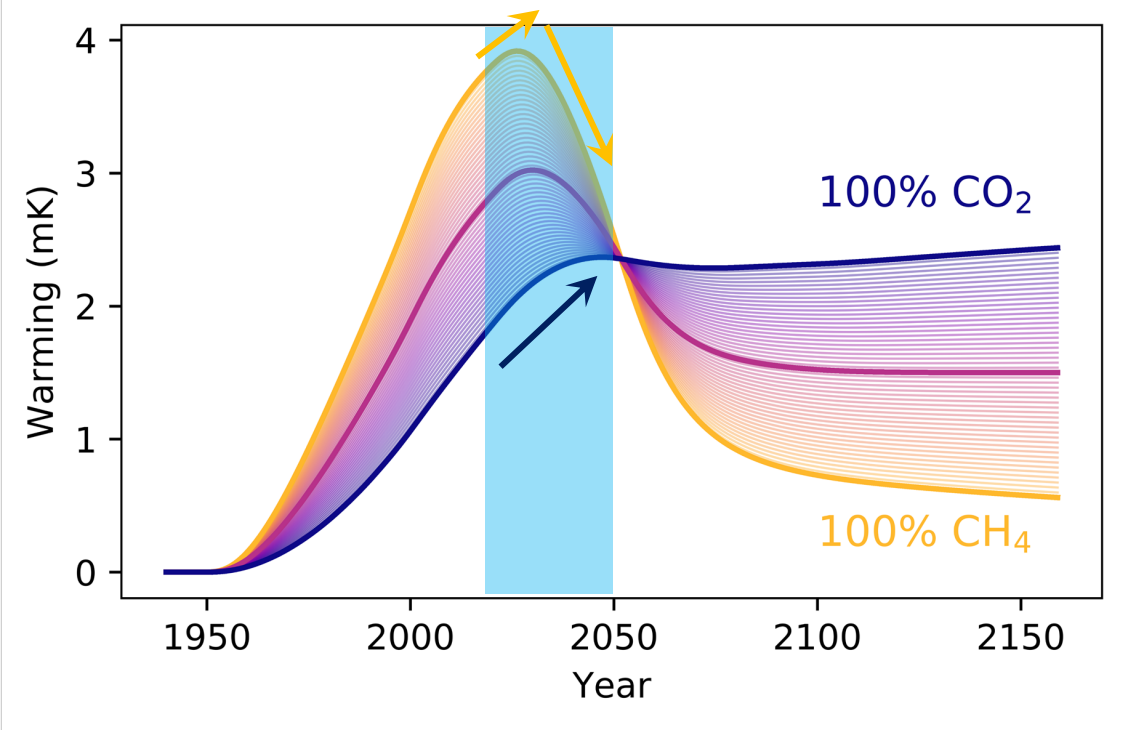
Figure from Lynch et al., (2021)

HOW METHANE AND CO_2 DIFFER

Emissions



Warming



'Equivalent' emissions of CO_2 and methane based on GWP100 do not cause the same level of warming

IMPLICATIONS

- Standard CO_2-equivalence does not accurately represent methane's contribution to global warming
  - it undervalues the warming from new methane emissions by 4-5x over the initial 20 years after emission
  - it overvalues the warming from stable methane emissions by 3-4x
  - it undervalues the temperature reduction from eliminating a methane emission by 4-5x over the initial 20 years after elimination
- New "step-pulse" metrics capture methane's contribution to global warming better
  - GWP*, CGTP, CGWP are described in AR6

See: *Section 7.6.1.4, Chapter 7, AR6 WGI. Forster et al., (2021)*

SUMMARY

- Each emission metric is based on the same climate science, but each one captures different impacts arising from emissions
- Different metrics can be useful to answer different questions
- There is no one metric which is universally applicable

TAG REPORT

- The TAG report on methane chapter on metrics aims to cover:
  - context and definitions
  - use in mitigation applications
  - climate targets and related issues
  - guidance and worked examples
- Currently a work in progress
- Content is not agreed yet
- Aiming to be ready for peer review before the end of this year

REFERENCES

- Lynch, J., Cain, M., Frame, D., & Pierrehumbert, R. (2021). Agriculture's Contribution to Climate Change and Role in Mitigation Is Distinct From Predominantly Fossil CO2-Emitting Sectors. *Frontiers in Sustainable Food Systems*, *4*(February), 1–9. https://doi.org/10.3389/fsufs.2020.518039
- Forster, P., et al., 2021, The Earth's Energy Budget, Climate Feedbacks, and Climate Sensitivity. In Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press. In Press. https://www.ipcc.ch/report/sixth-assessment-report-working-group-i/