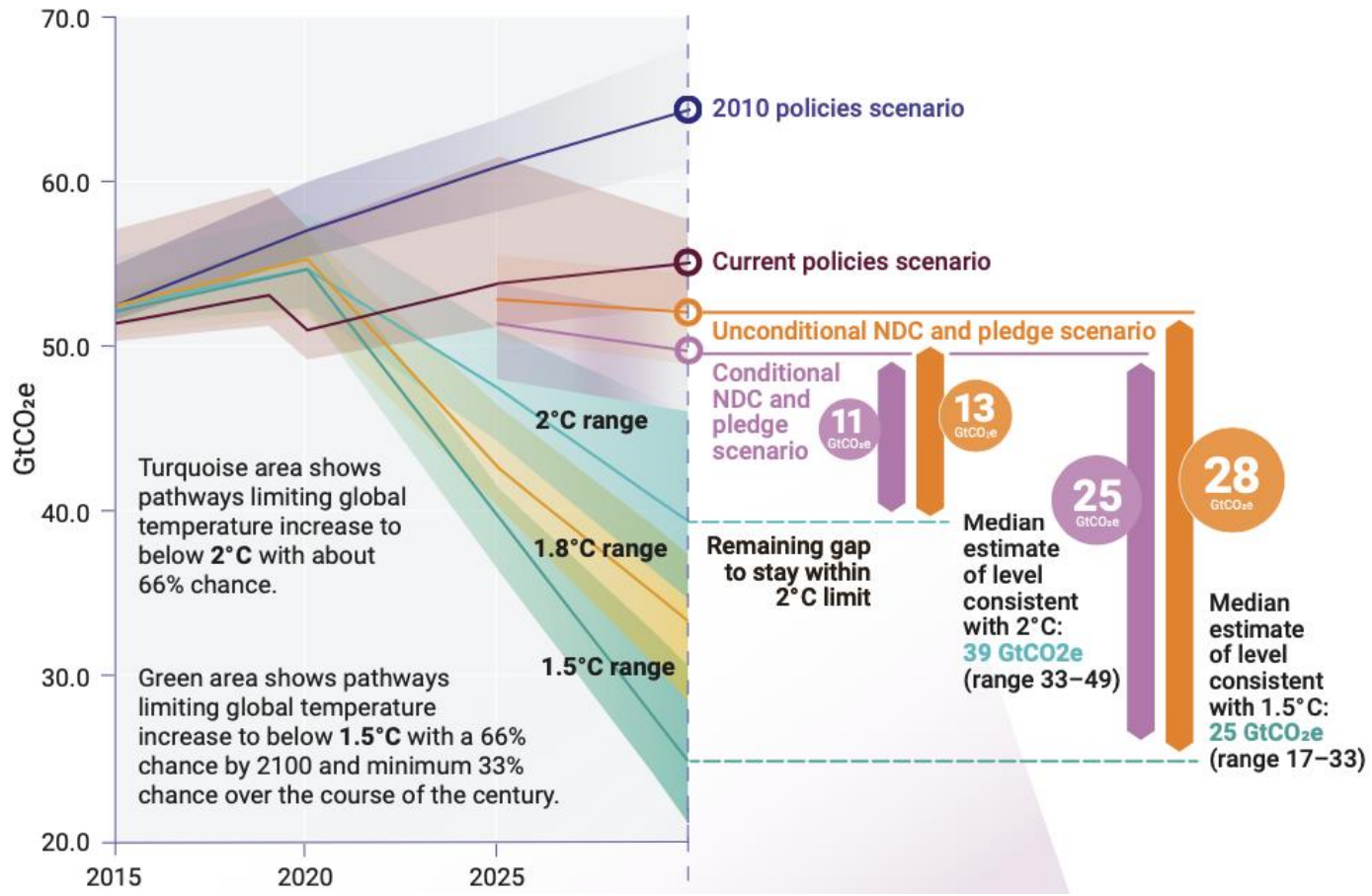December 2021

International Methane Emissions Observatory

Accelerating methane mitigation through data integration and beyond

Meghan Demeter

The world is not on track to limit the temperature increase to 1.5 degrees

UNEP Emissions Gap Report 2021

New NDC pledges for 2030 reduce projected 2030 emissions by only **7.5%**, but **30%** is needed for 2°C and **55%** is needed for 1.5°C.

Current NDCs cover only about **one third** of the methane reduction required to be consistent with a 2 ° C temperature goal, and only about **23%** for the 1.5 ° C goal.

Reduction of anthropogenic methane emissions can contribute significantly to closing the emissions gap and reduce warming in the short term.

Methane mitigation is crucial to limit temperate warming– and the fossil fuel sector has the greatest potential for cost-effective emissions reduction

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Methane by the numbers

80+ *Methane is over 80 times more powerful than CO_2*

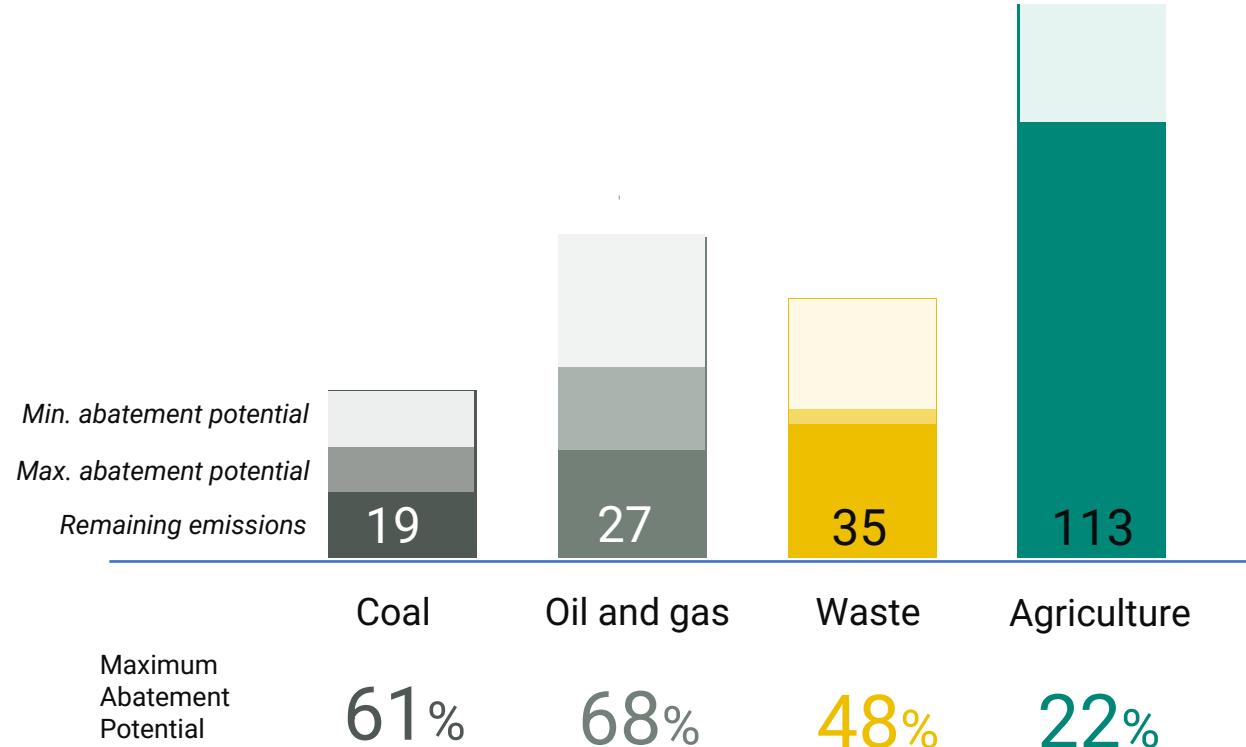**25%** *Responsible for one-quarter of the warming we are experiencing today*

45% *Technically feasible mitigation levels today*

0.28° *Avoided warming if all technically feasible measures are undertaken*

Methane emissions reduction potential by sector

Min. abatement potential
Max. abatement potential
Remaining emissions

	Coal	Oil and gas	Waste	Agriculture
Remaining emissions	19	27	35	113

Maximum Abatement Potential	61%	68%	48%	22%

Source: UNEP-CCAC Global Methane Assessment

Better data is needed to enable targeted methane mitigation strategies and policies

Data Landscape Today

Accuracy of data

- Most methane emissions data is from emissions factors
- Studies show that these underestimate observed emissions levels

Sample Measurement Data in Mexico

1,900 kg/h

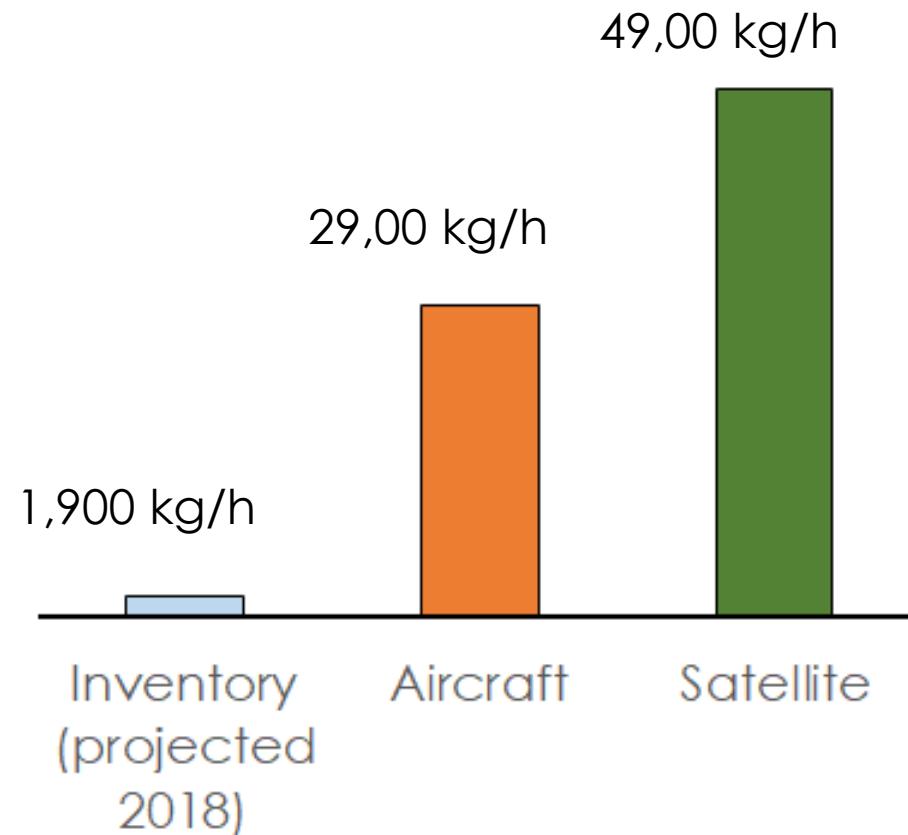Inventory (projected 2018)

(Zavala-Araiza et al. 2021)

Better data is needed to enable targeted methane mitigation strategies and policies

Data Landscape Today

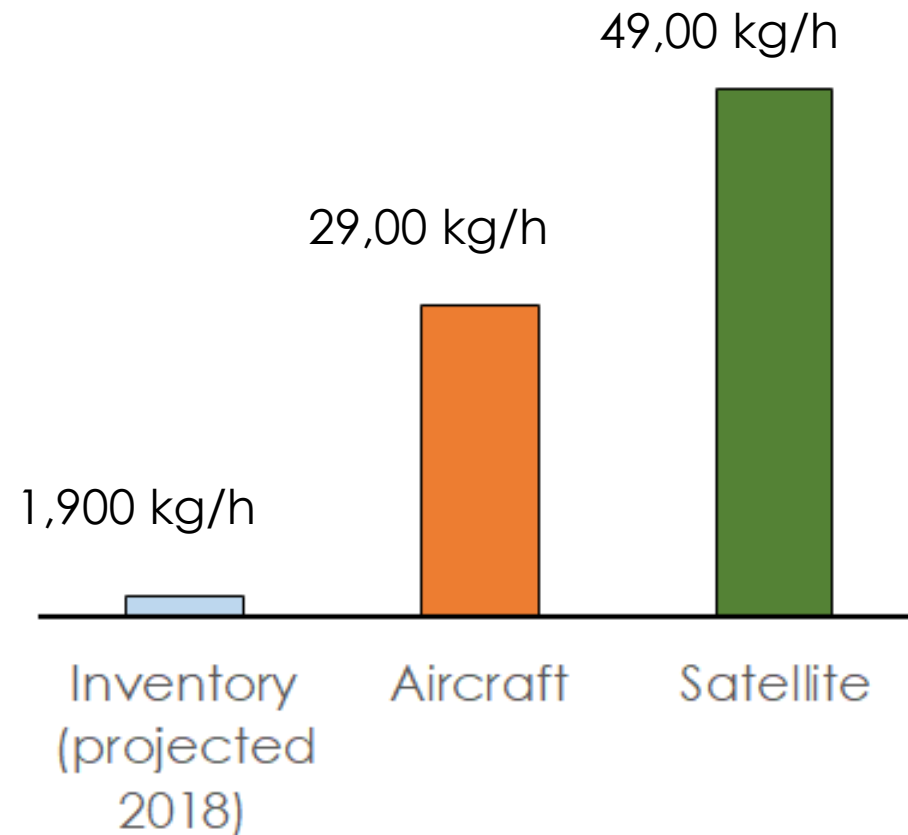**Accuracy of data**

- Most methane emissions data is from emissions factors
- Studies show that these underestimate observed emissions levels

Sample Measurement Data in Mexico

49,00 kg/h

29,00 kg/h

1,900 kg/h

Inventory (projected 2018) Aircraft Satellite

(Zavala-Araiza et al. 2021)

Better data is needed to enable targeted methane mitigation strategies and policies

Data Landscape Today

Accuracy of data

- Most methane emissions data is from emissions factors
- Studies show that these underestimate observed emissions levels

Action enabled by better data:

- Targeted emissions reduction plans
- Identification of super-emitters
- Set and track ambitious methane reduction targets

Sample Measurement Data in Mexico

(Zavala-Araiza et al. 2021)

Recent satellite observations reveal high methane emissions in Mexico's most important onshore oil and gas production region

Satellite observations of onshore oil and gas production in Mexico
Dec. 2017 – Nov. 2019 average
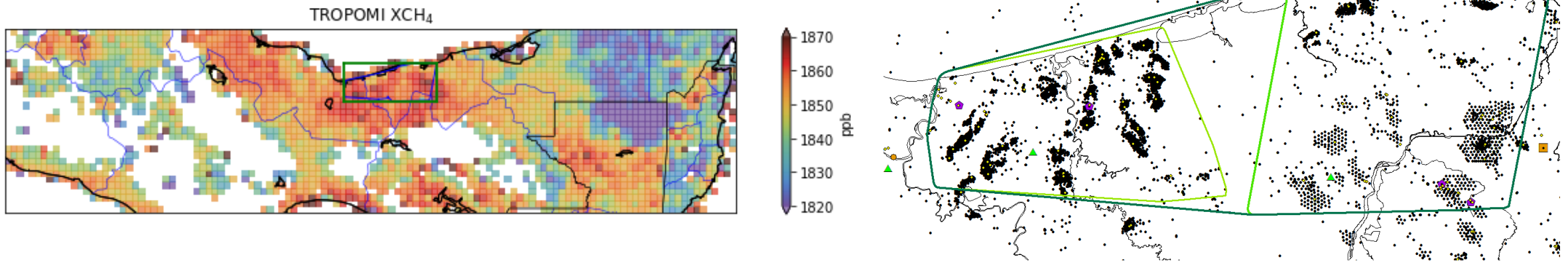
Satellite data-derived emissions shows a **loss rate of roughly 4.7%** compared to the US loss rate of 2.3% and loss rate for Permian basin in Texas of 3.7%.

Satellites alone cannot tell the whole story – methane emissions must also be understood at a source- and site-level

Detection scale

Region
Production areas (e.g., Permian Basin), countries, etc.

Site
Individual oil and gas facilities

Source
Specific components (e.g., compressors, seals, etc.)

Detection technologies

These technologies can also be used for verification of other measurements

UNEP, in collaboration with the European Commission, has established the **International Methane Emissions Observatory (IMEO)** to aggregate and understand emissions data from all levels.

IMEO will integrate and analyze data to create the best understanding of methane emissions sources and levels

Data flow of IMEO

COLLECT DATA
- OGMP companies' assets data
- Science measurements studies
- National inventories
- Satellite data

Apply Big Data, data science, and machine learning

Reconcile inconsistencies and identify gaps

GENERATE FINAL PRODUCTS

- Full methane emissions dataset
- Annual methane report
- Direct measurement studies
- Science-based implementation support
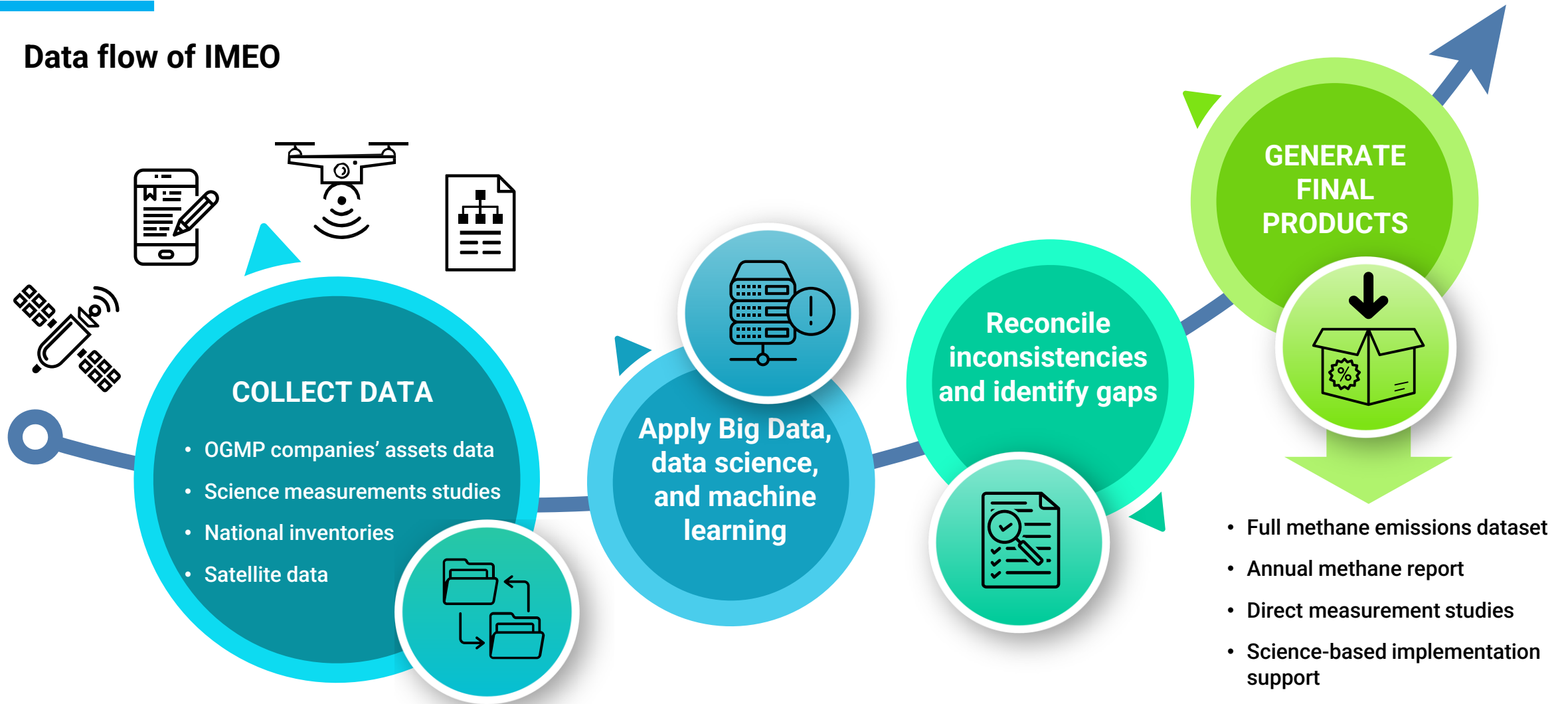
IMEO will integrate data from multiple sources based on a robust hierarchy
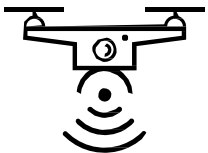
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Satellites
Satellites such as TROPOMI and MethaneSAT provide global data, while those like GHGSat provide data for point sources
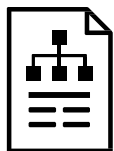
Company reporting through OGMP
Annual reports from member companies detailing emissions operated and non-operated assets based on direct measurements

Direct measurements
Field campaigns, including those sponsored by IMEO, using a combination of top-down and bottom-up measurements

National Inventories
Reporting from countries to the IPCC and other sources

Data inputs to IMEO will be classified and weighted according to tiers based on:

- **Transparency:** Estimation methods are fully disclosed

- **Measurement**: Estimates are based on measurements at different spatial scales

- **Verifiable methodologies**: Estimates have been compared to independent measurement-based quantifications.

- **Accuracy:** Uncertainty is robustly characterized and the precision is sufficient to characterize emissions for a given scale

IMEO interconnects various methane activities to transforms high-level ambition into field-level action

SCIENCE

TRANSPARENCY

DATA

IMPLEMENTATION
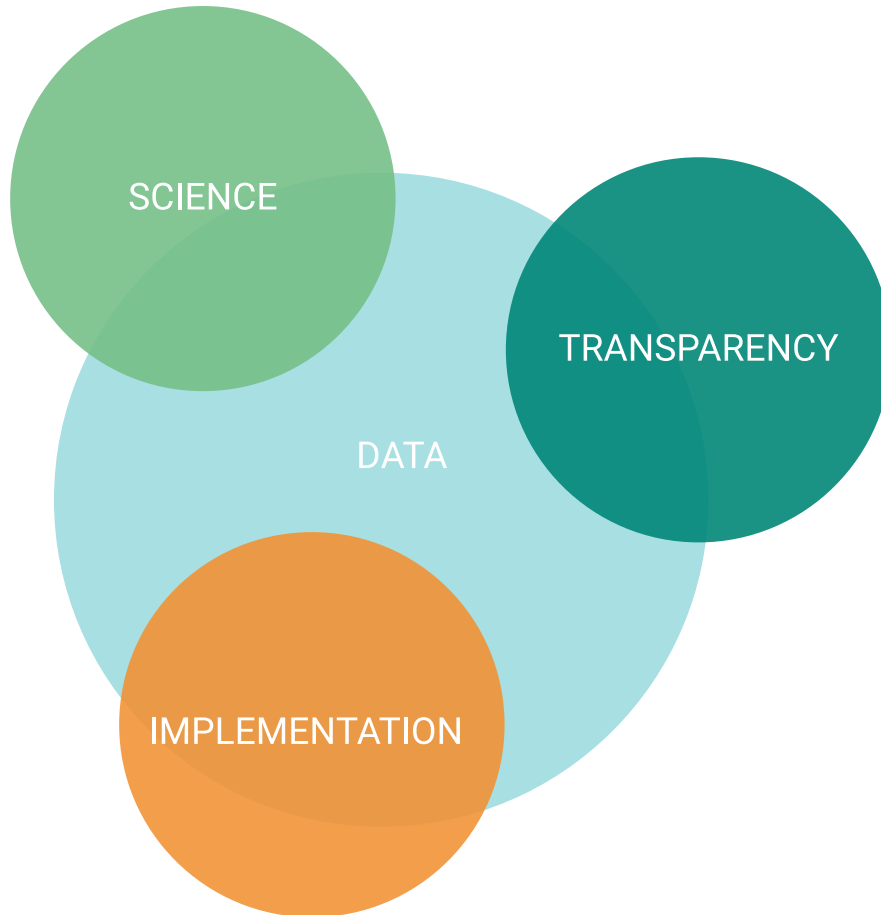
Governments – use data to focus targeted action domestically and abroad

Companies – provide means to credibly reduce emissions at the asset level

Investors – differentiate company performance on methane management

Civil society – hold governments and companies accountable for reduction targets

Conclusion

1 Better data is needed to catalyze the methane emissions reductions needed to limit warming to 1.5 degrees.

2 Satellite observations are an important source of data to improve methane emissions estimates and verify other data sources.

3 However, satellite data alone cannot provide all the answers. Data from other sources and at other levels is crucial to accurately understand methane emissions.

4 IMEO will aggregate date from all these sources to develop a public dataset of methane emissions and work with stakeholders to use this data to direct targeted mitigation action.

Thank you

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