



# Know your Oil and Gas with the OCI+: Climate Intelligence for the Petroleum Sector



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Solutions Initiative**

# Agenda

- 5-minute demo video—intro to the Oil Climate Index plus Gas (OCI+)
- OCI+ models and methodology
- Key findings—emissions footprints and reduction levers, by resource type
- Visit the tool
- Users, Next Steps & Areas of Collaboration

# Demo video



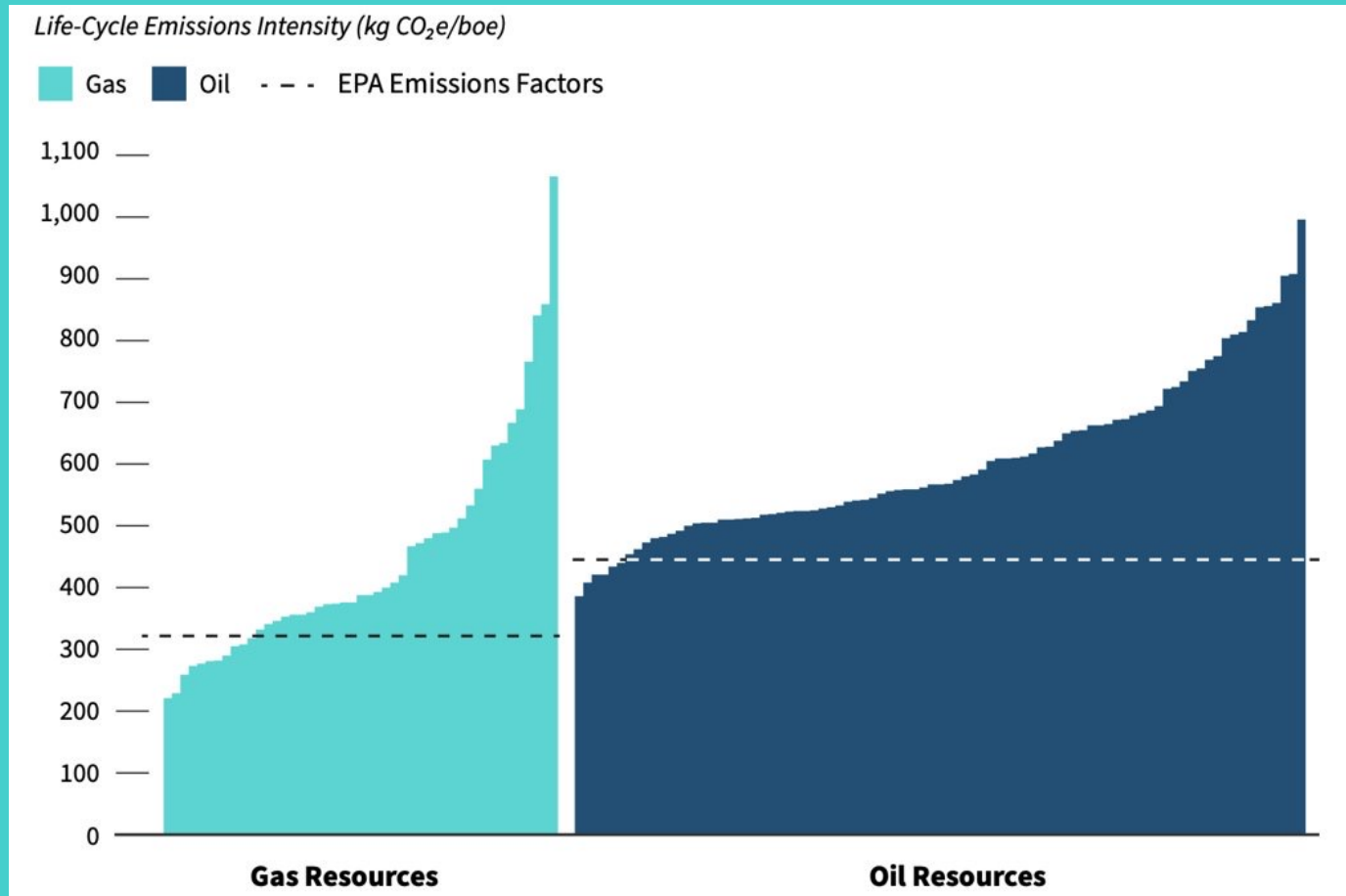
<https://www.youtube.com/watch?v=VOVo0KKLO4Y&t=295s>

# Oil and Gas Are Heterogeneous



# And so are their climate footprints

Simple  
emission  
factors  
undercount  
life-cycle  
emissions  
intensities



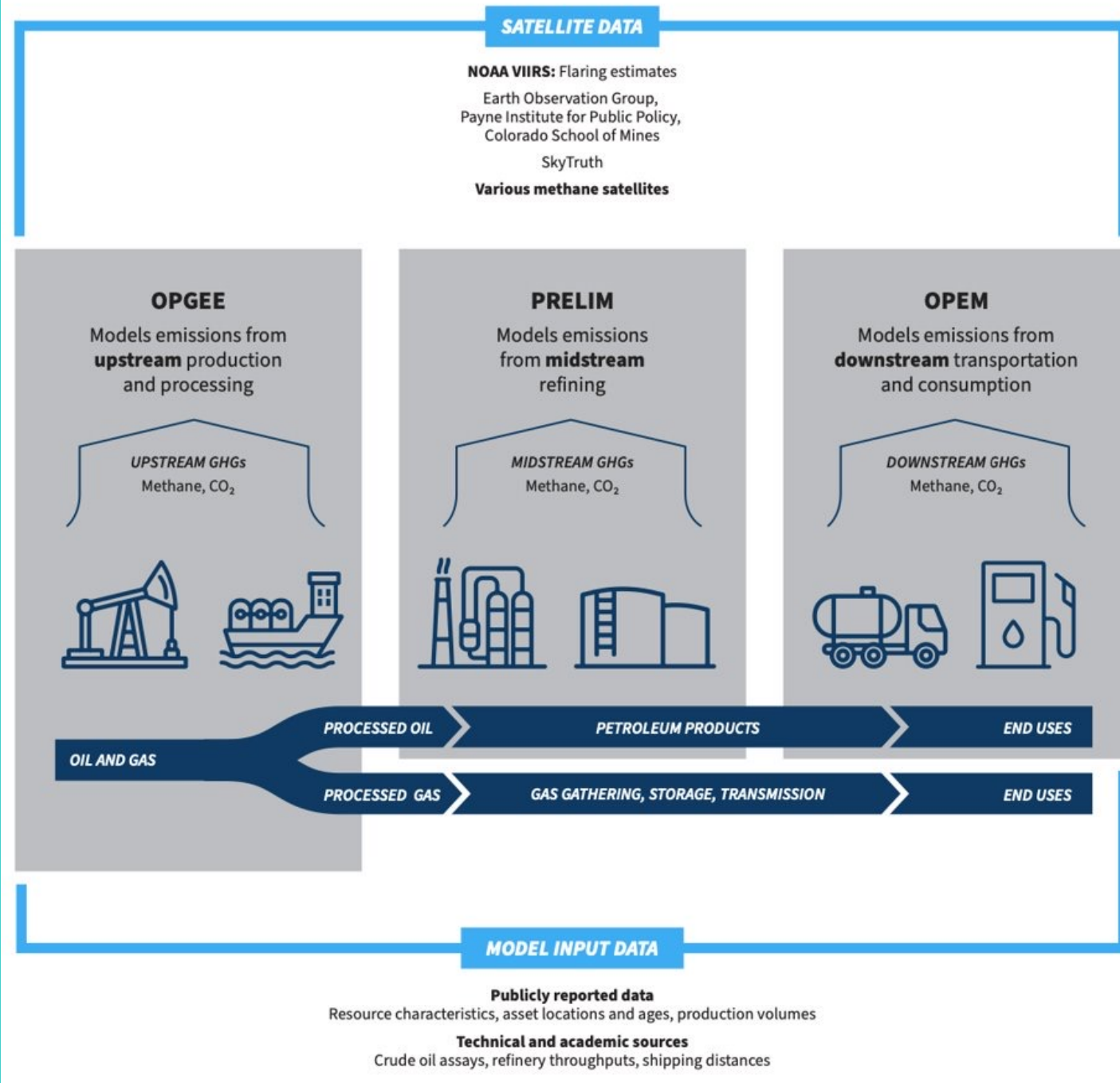
# OCI+ Model Schematic

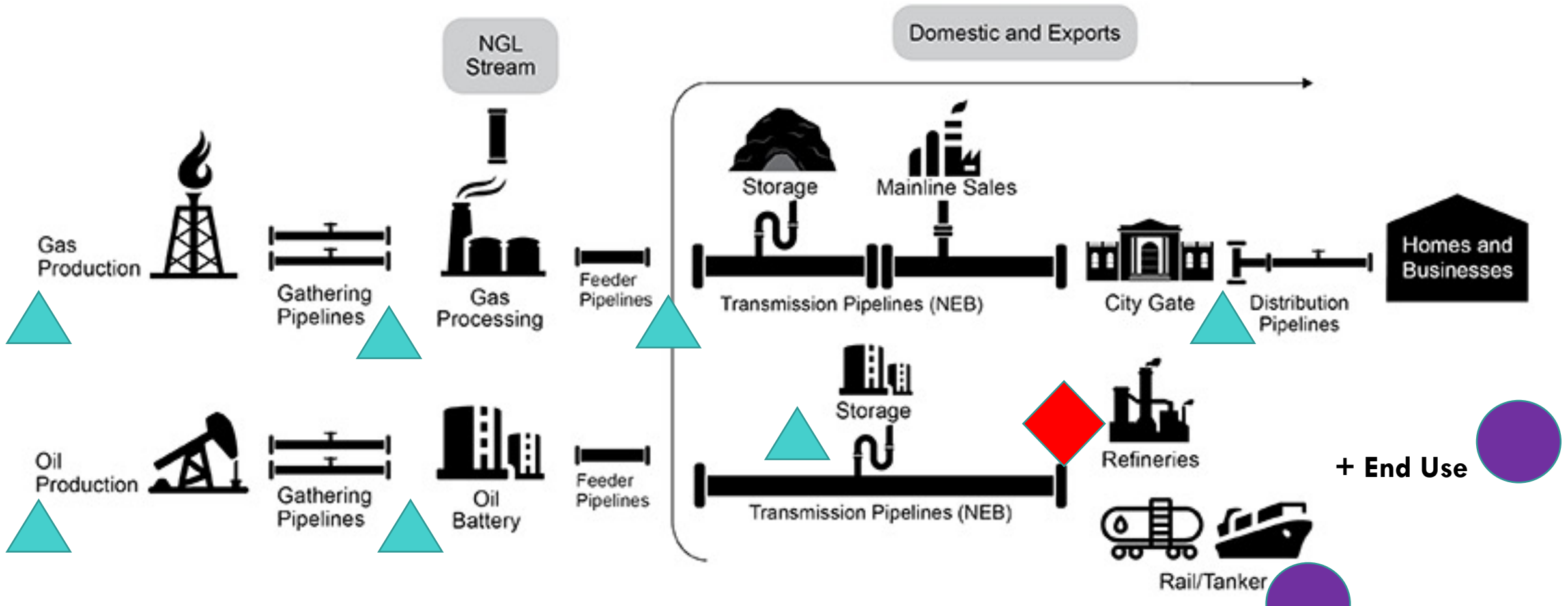
## Data sources

- Oil and gas asset characteristics
- Activity and operational inputs
- Satellite data

## Peer-reviewed, open-source models

- **OPGEE**: Oil Production Greenhouse Gas Estimator (upstream)
- **PRELIM**: Petroleum Refinery Life-cycle Inventory Model (refining and petrochemicals)
- **OPEM**: Oil Products Emissions Model (end uses, industry transport)



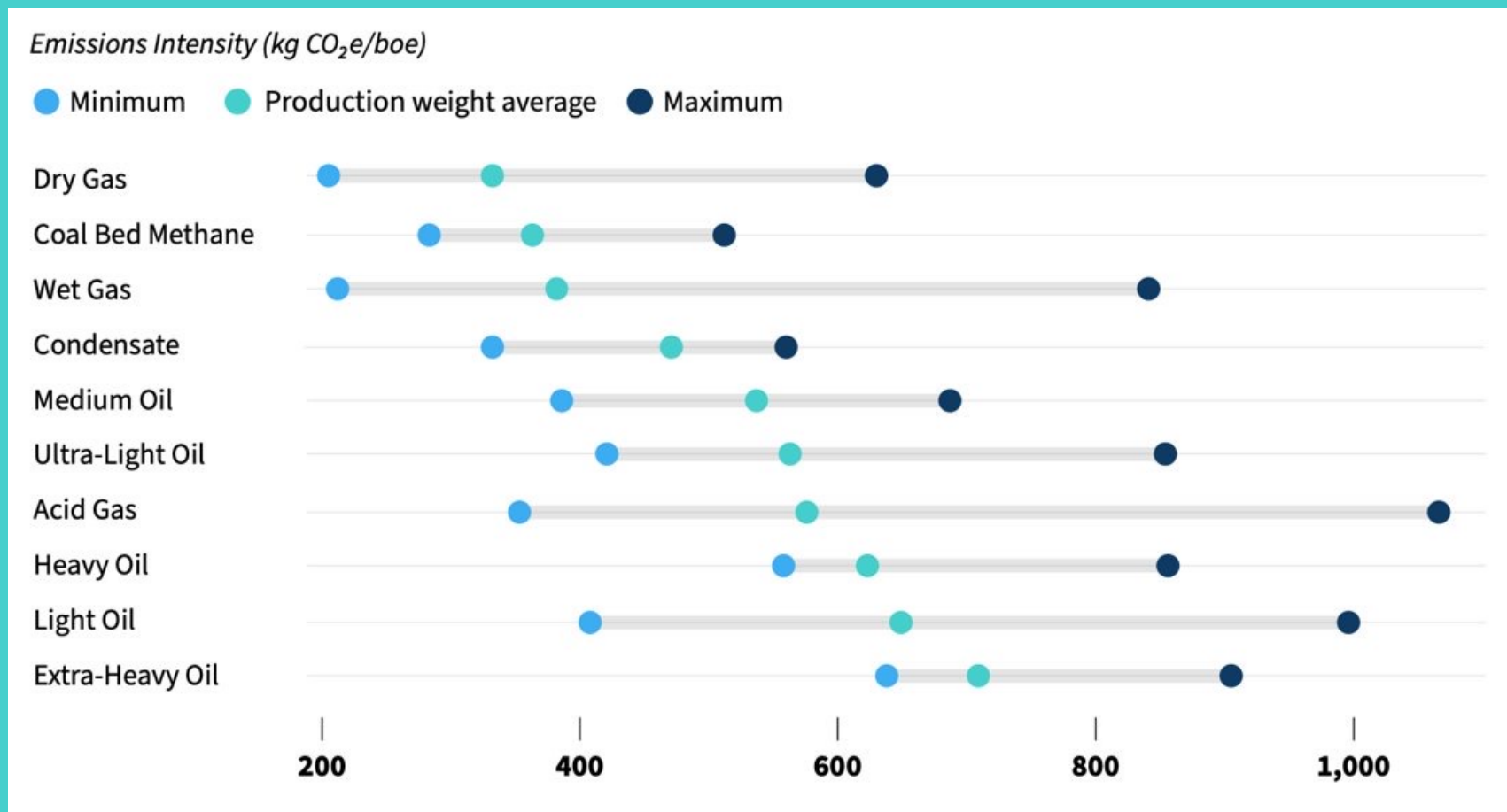


▲ OPGEE model

◆ PRELIM model

● OPEM model

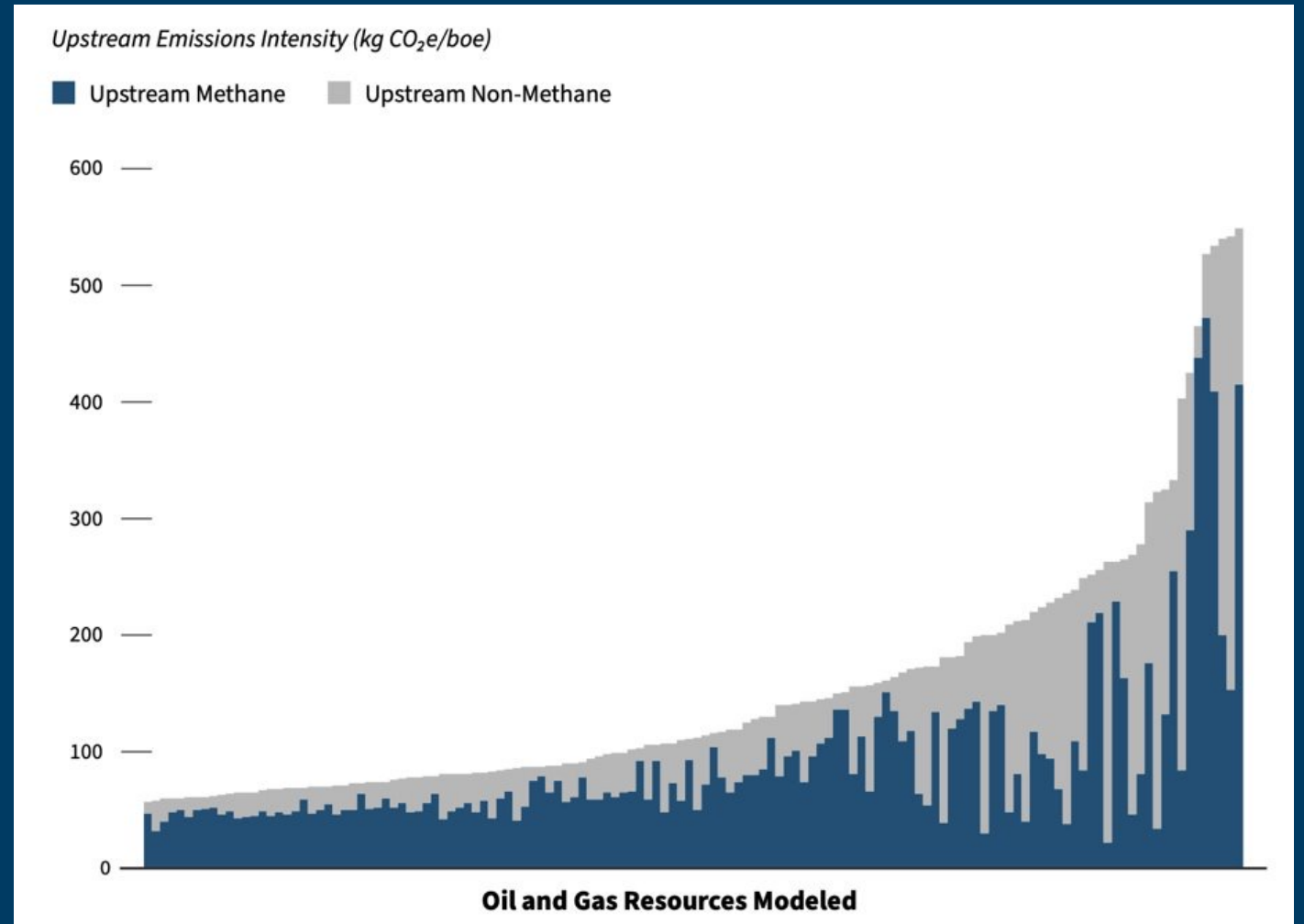
# Oil and gas resource emissions differ widely by category





# Methane's role in driving oil and gas emissions

On average, one-half of emission totals results from methane leakages in production and transport

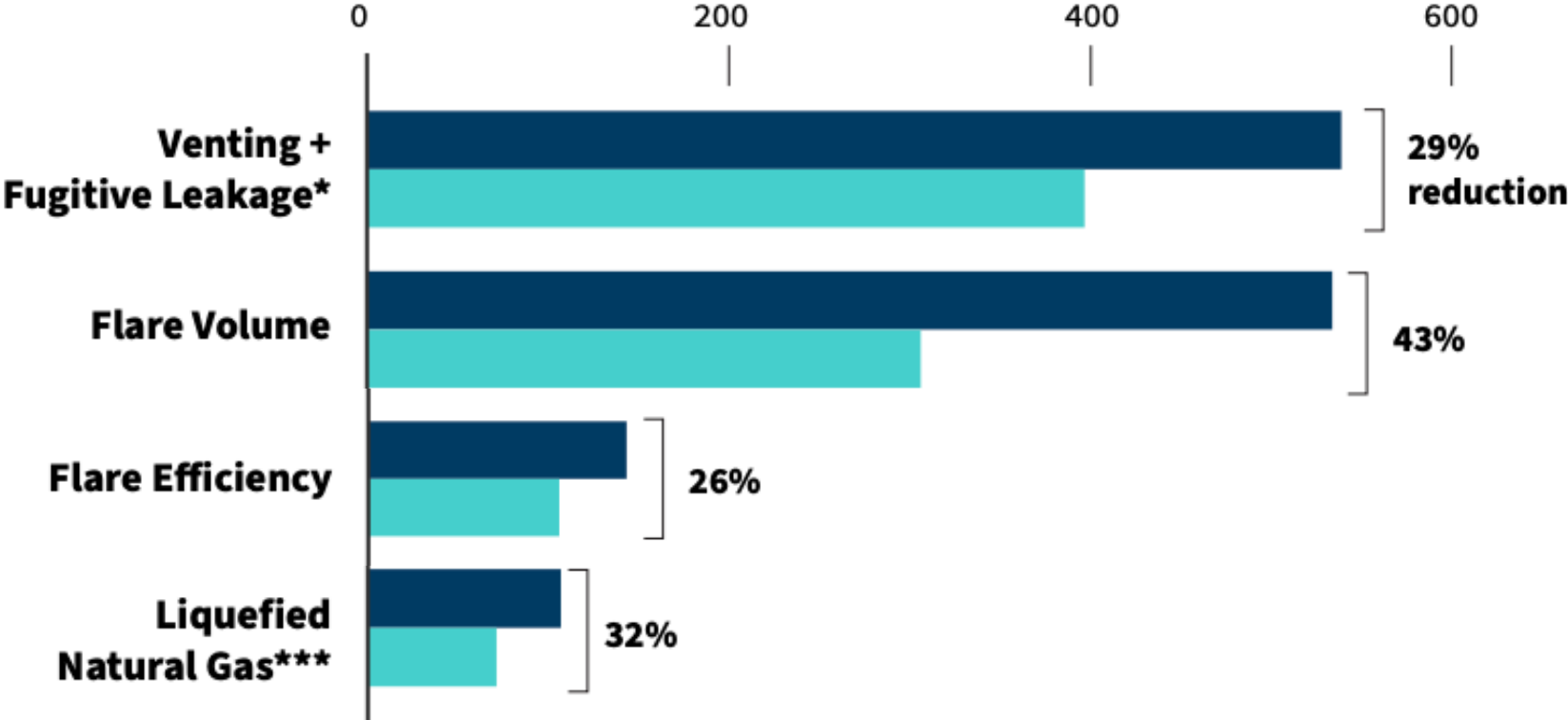


# Climate mitigation potential

## Light oils and various gases offer significant emissions reductions

Emissions Intensity (kg CO<sub>2</sub>e/boe)

■ Default Emissions ■ Emissions with Reduction Fully Implemented

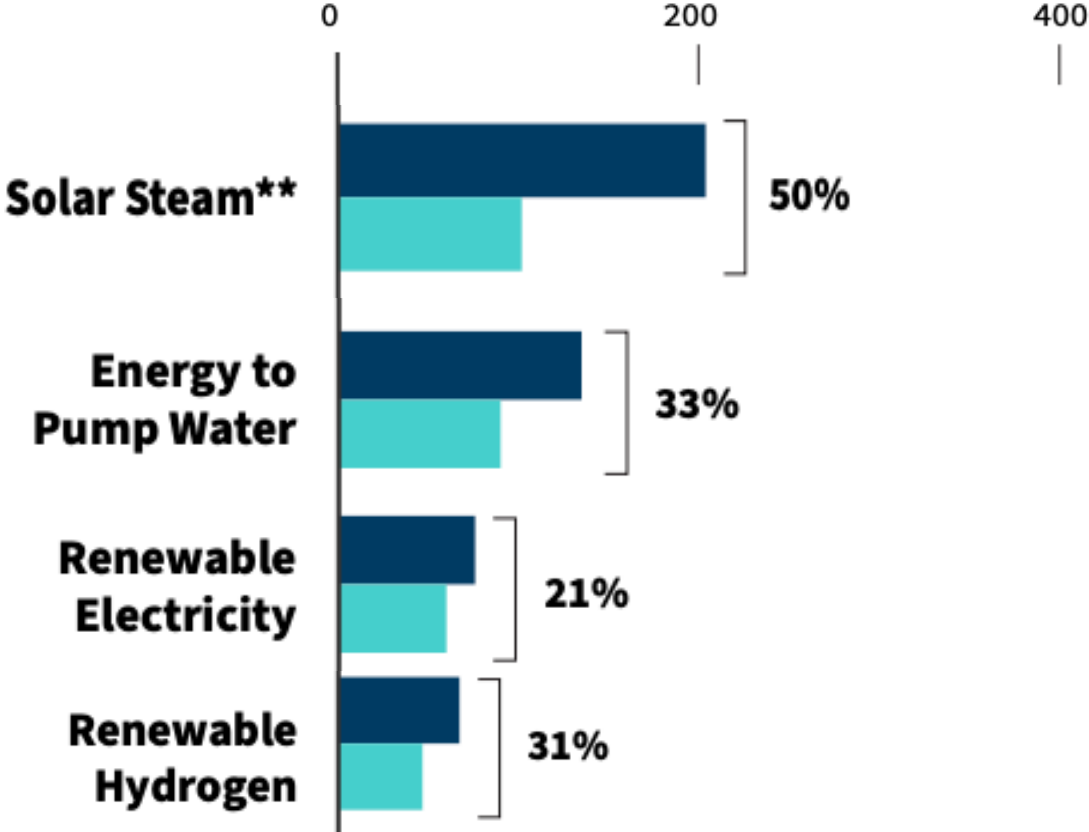


# Climate mitigation potential (cont.)

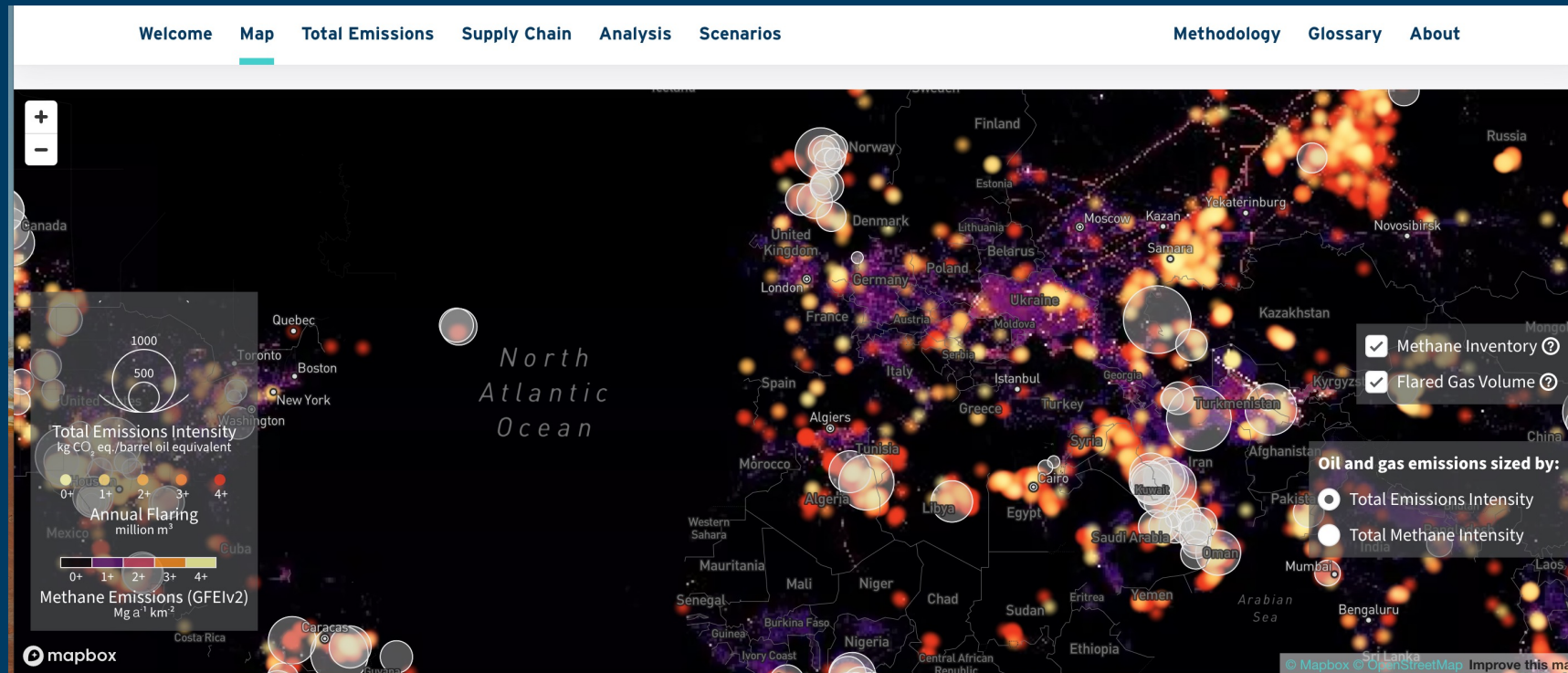
## Heavy and watery oils offer significant emissions reductions

Emissions Intensity (kg CO<sub>2</sub>e/boe)

■ Default Emissions ■ Emissions with Reduction Fully Implemented



# Let's visit the tool



<https://ociplus.rmi.org/>

# Who's using the OCI+ in decision making?



Stakeholders come from all sectors: public, private, and non-profit

Climate TRACE

Norwegian government

California Air Resources Board (CARB)

International Energy Agency (IEA)

Natural Resources Defense Council

World Resources Institute

Aramco

Shell

Munich Re

Energy Intelligence

Capital Group

SystemIQ

Bloomberg Green

Economist

# What's up next—Areas of collaboration\*\*?

- Pythonify the upstream and midstream models
- Increase # of assets modeled to over 500 fields in 90+ countries (2/3rds global production), with Climate TRACE
- Incorporate methane data from remote sensing, with Carbon Mapper and others\*\*
  - Contribute to an open-source oil and gas infrastructure dataset through satellite images and machine learning
- Deepen focus on flaring
  - Correlation between oil production volume and field-level flared gas volume using data derived from VIIRS satellite
  - Flare mitigation opportunity index, incl environmental justice indicators
- Examine and integrate land carbon intensity metrics\*\*
- Integrate economic assessments (e.g. methane shadow pricing)

# Thank you

OCI+ report, web tool and demonstration videos

<https://rmi.org/insight/kyog/>

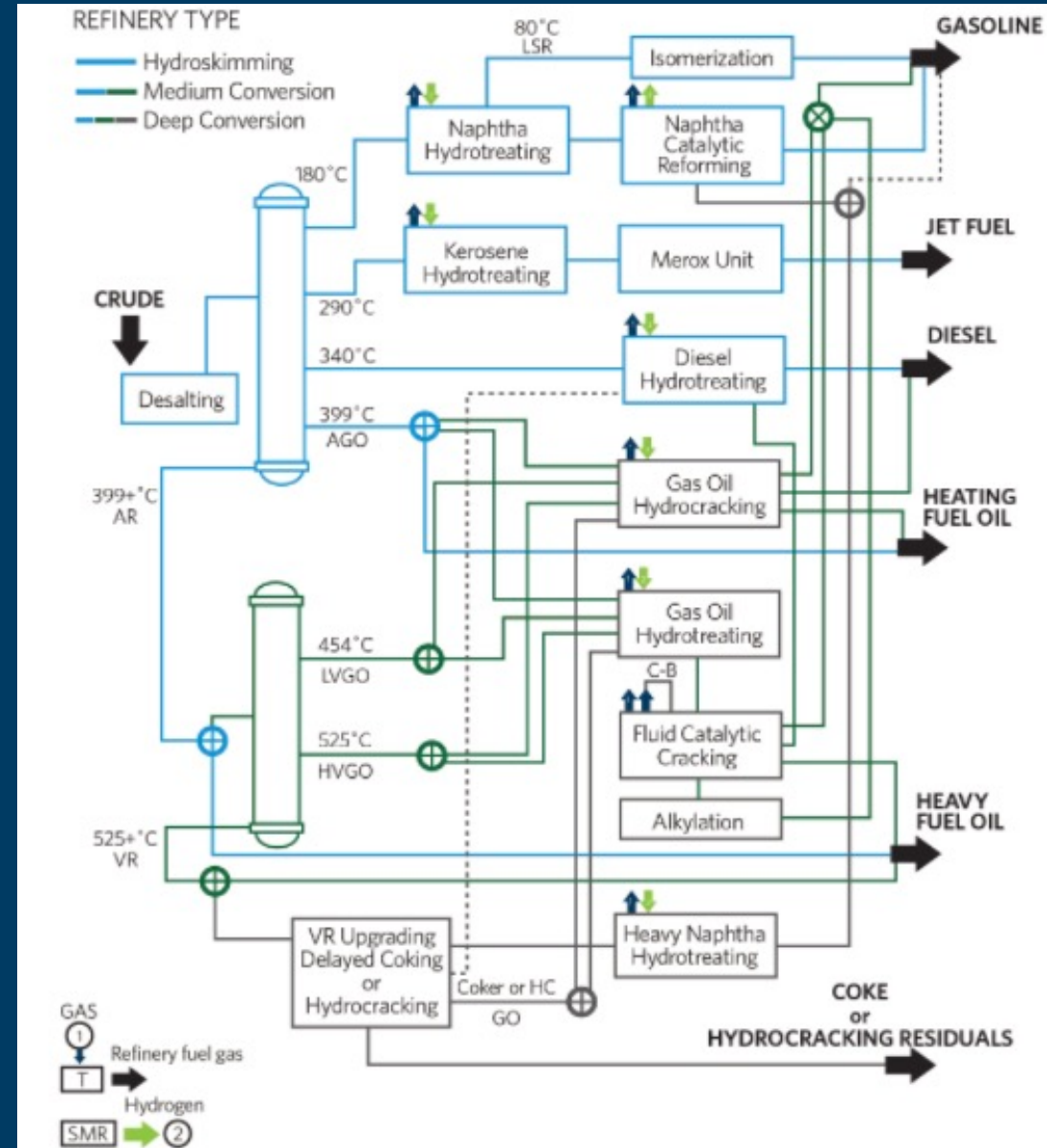




# Methodology- PRELIM

- Mass/energy based tool
- Key Inputs
  - Crude assay (Distillation curve, API Gravity, Sulfur content)
  - Refinery Configuration
  - Energy/Emissions Allocation Method
  - Electricity Source
  - Various other process heat/steam/electricity usage assumptions
- Key Outputs
  - Gasoline, Diesel, Jet Fuel production volumes + many more petroleum products
    - Direct input into OPEM
  - Total refinery emissions intensity (kg CO<sub>2</sub>e/bbl crude)

## PRELIM Model Schematic



# Methodology- OPEM

- **Estimates emissions from transportation and end use of oil and gas products**
- **Product slate based on output from OPGEE and PRELIM**
- **Estimates based on emissions factors from ANL GREET model**
- **Transport: mass CO<sub>2</sub>e/(mass product\*distance) for each transport mode**
  - Combustion: mass CO<sub>2</sub>e/volume product
  - Non-combustion: did not account for all products and through lifetime, but approximated first stage ethane to ethylene conversion emissions (GREET EF)
- **Assumptions: Same transport distance and methods, same combustion efficiency for all products**
  - Gas transport included in OPGEE, where some variation is included to account for LNG
- **[Link to model](#)**