Complete Scope 3 Progress, Including Upstream Emissions from Energy

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Outline

What is complete scope 3?

- *What aspects of scope 3 are already in SIMAP?*
- *Benefits to accounting for complete scope 3*

Progress on fuel and energy-related activities

- *Solar, fuel oil, and natural gas*

Managing changing system boundaries

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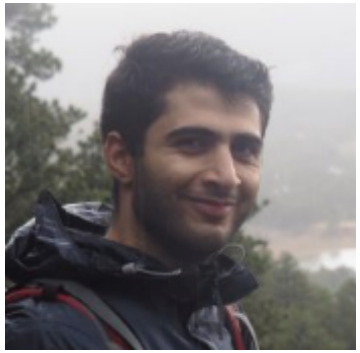

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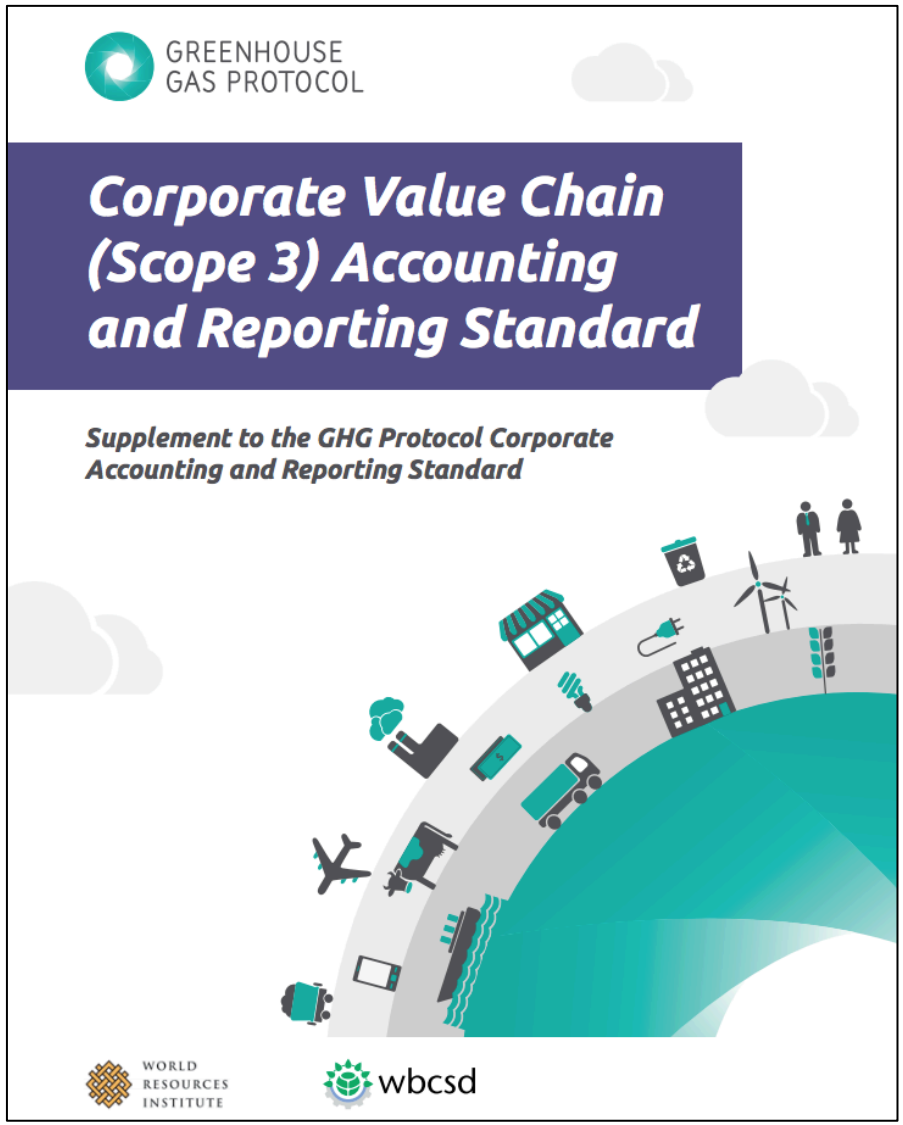
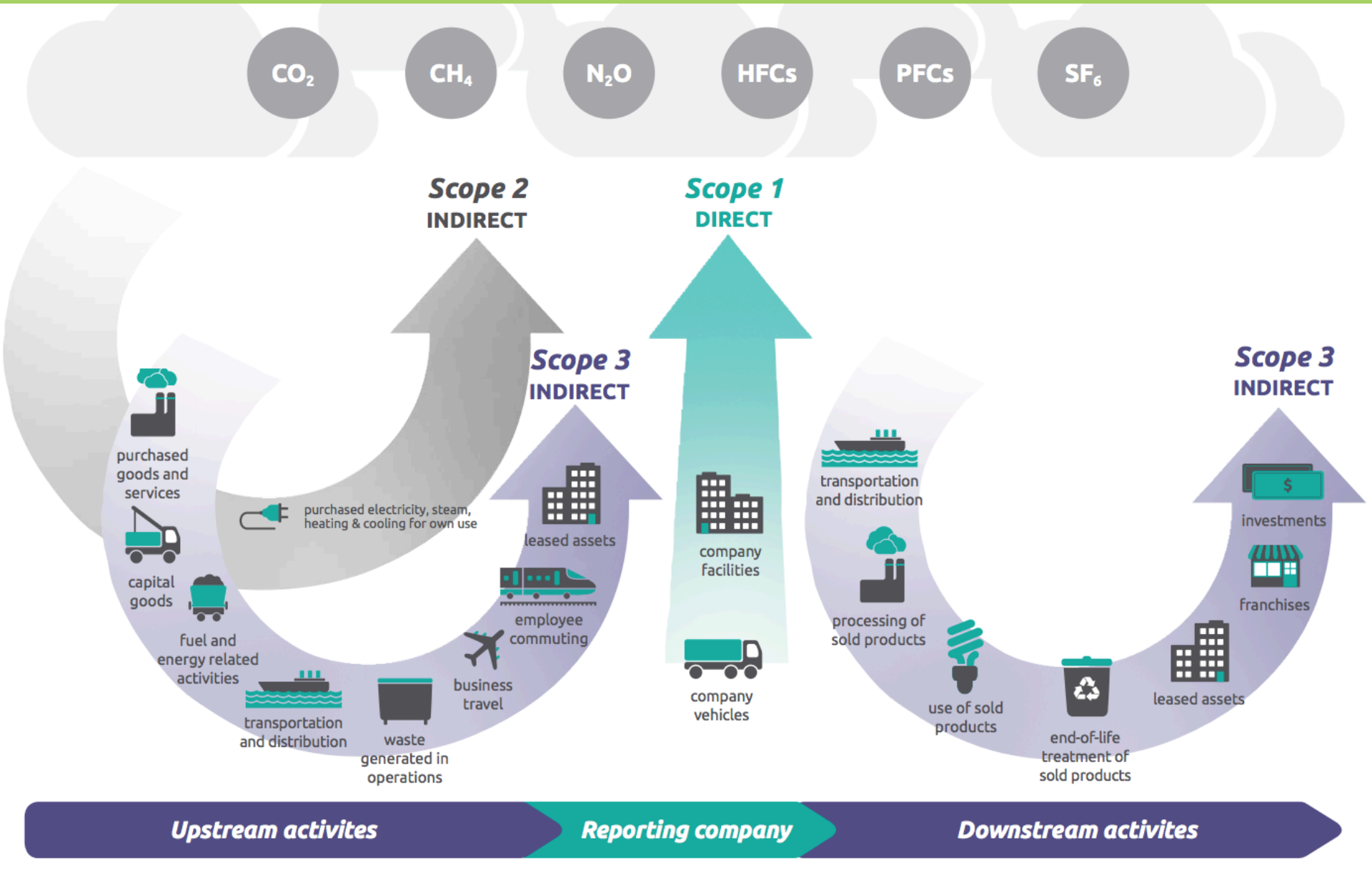
GHG Protocol for Scope 3



- Standards developed by the World Resources Institute for reporting scope 3 at the corporate level
- For SIMAP, we are adapting these guidelines for higher ed

What are Scope 3 Emissions?



Which scope 3 categories are in SIMAP now?

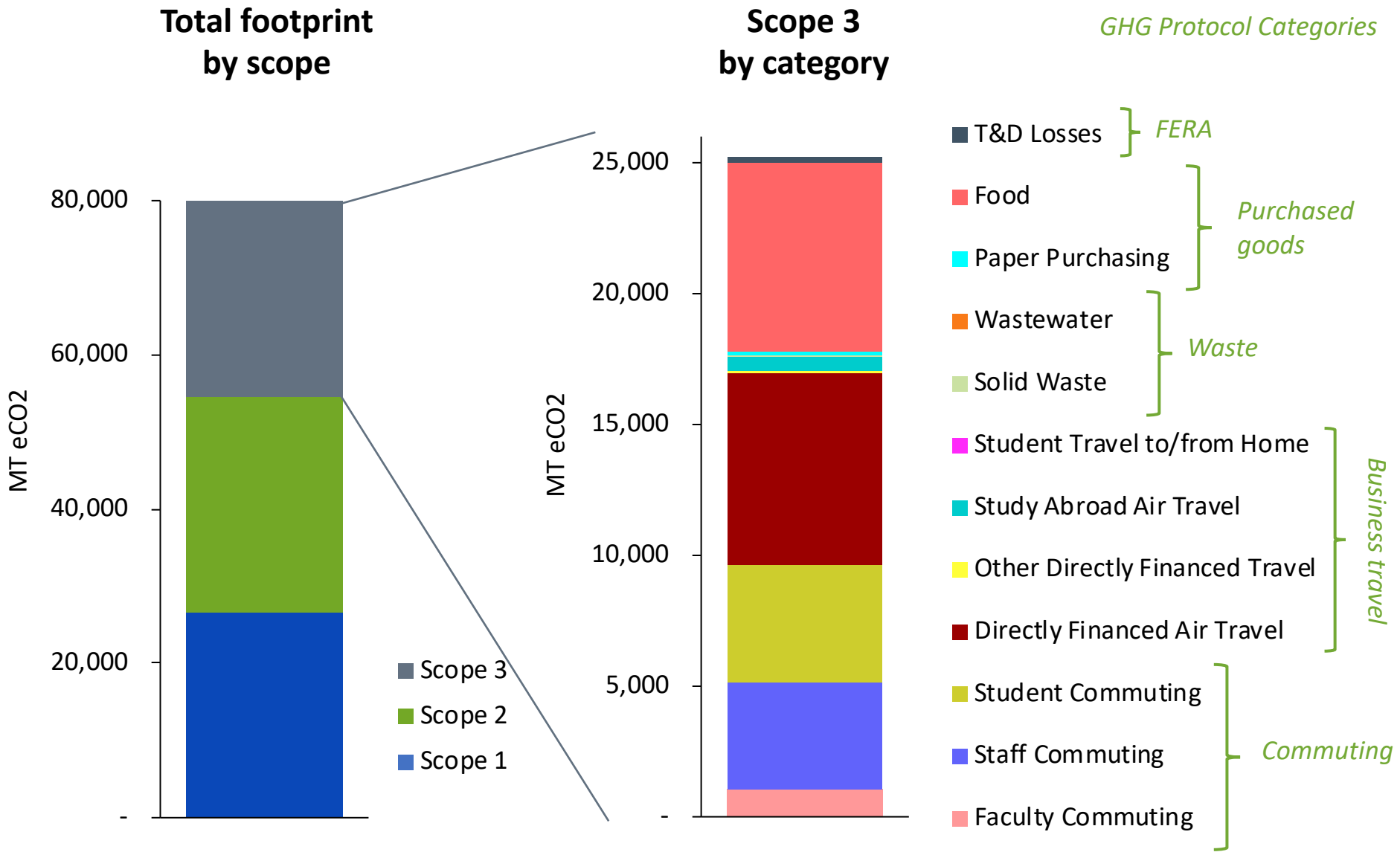
Upstream scope 3 emissions

Downstream scope 3 emissions

Scope 3 category	
1.	Purchased goods and services **Partial: Food, Paper**
2.	Capital goods
3.	Fuel- and energy-related activities (not included in scope 1 or scope 2) **Partial: Electricity T&D losses** Second Nature
4.	Upstream transportation and distribution **Partial: Food**
5.	Waste generated in operations ✓
6.	Business travel ✓ Second Nature
7.	Employee commuting ✓ Second Nature
8.	Upstream leased assets
9.	Downstream transportation and distribution
10.	Processing of sold products
11.	Use of sold products
12.	End-of-life treatment of sold products
13.	Downstream leased assets
14.	Franchises
15.	Investments

Reference: Figure [5.3] Time boundary of scope 3 categories, Corporate Value Chain (Scope 3) Accounting and Reporting Standard

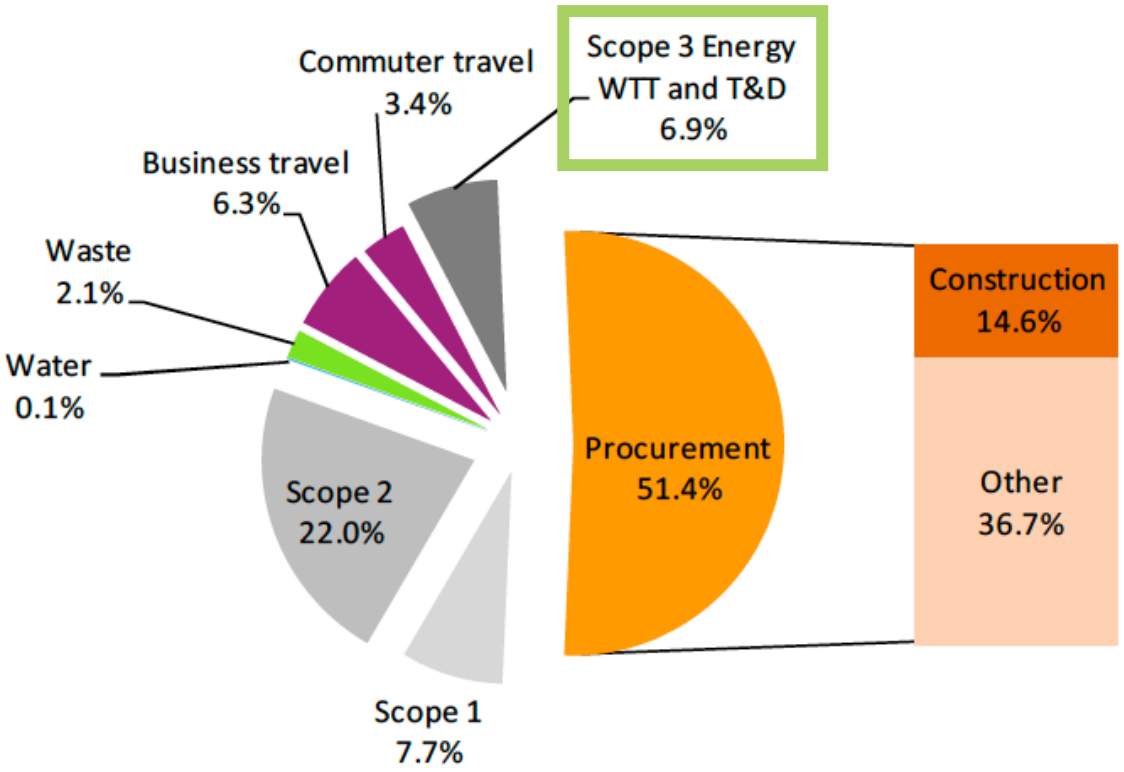
Scope 3 categories already in SIMAP



Complete scope 3: Potential magnitude

University of Cambridge

GHG Inventory 2011-2012 AY



Scope 1 + 2 = 30%

Scope 3 = 70%

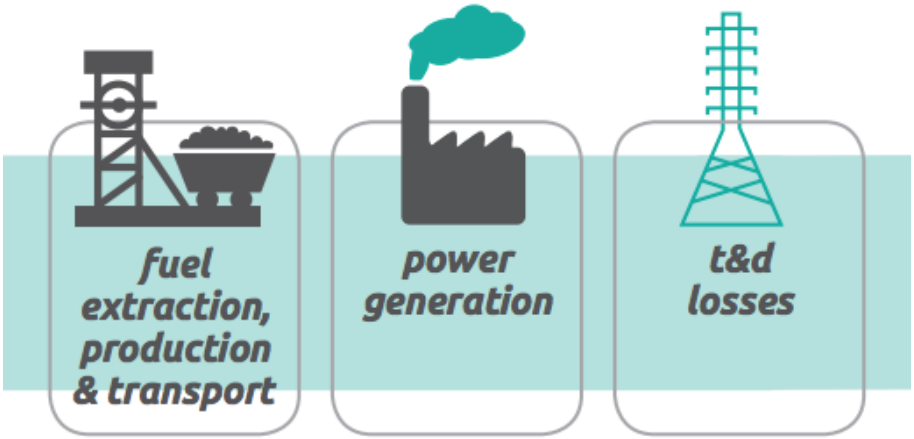
Scope 3 could be a significant proportion of total campus footprints

AECOM. 2014. University of Cambridge Footprinting and Analysis of Scope 3 Emissions. https://www.environment.admin.cam.ac.uk/files/university_of_cambridge_scope_3_element_1_final.pdf

Value proposition in scope 3 accounting

1. Informs decision-making
   - "Can't manage what you don't measure"
2. Quantitative data supports other initiatives
3. Campus as a 'living lab'
   - Student research, high-impact learning
4. Leadership opportunity
   - For campus and vendor partners

Progress on
Fuel- and Energy-Related Activities



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What is included in category 3 of scope 3 emissions?

Emissions related to the production of fuels and energy purchased and consumed by the reporting company that are not included in scope 1 or scope 2

This category includes emissions from four activities

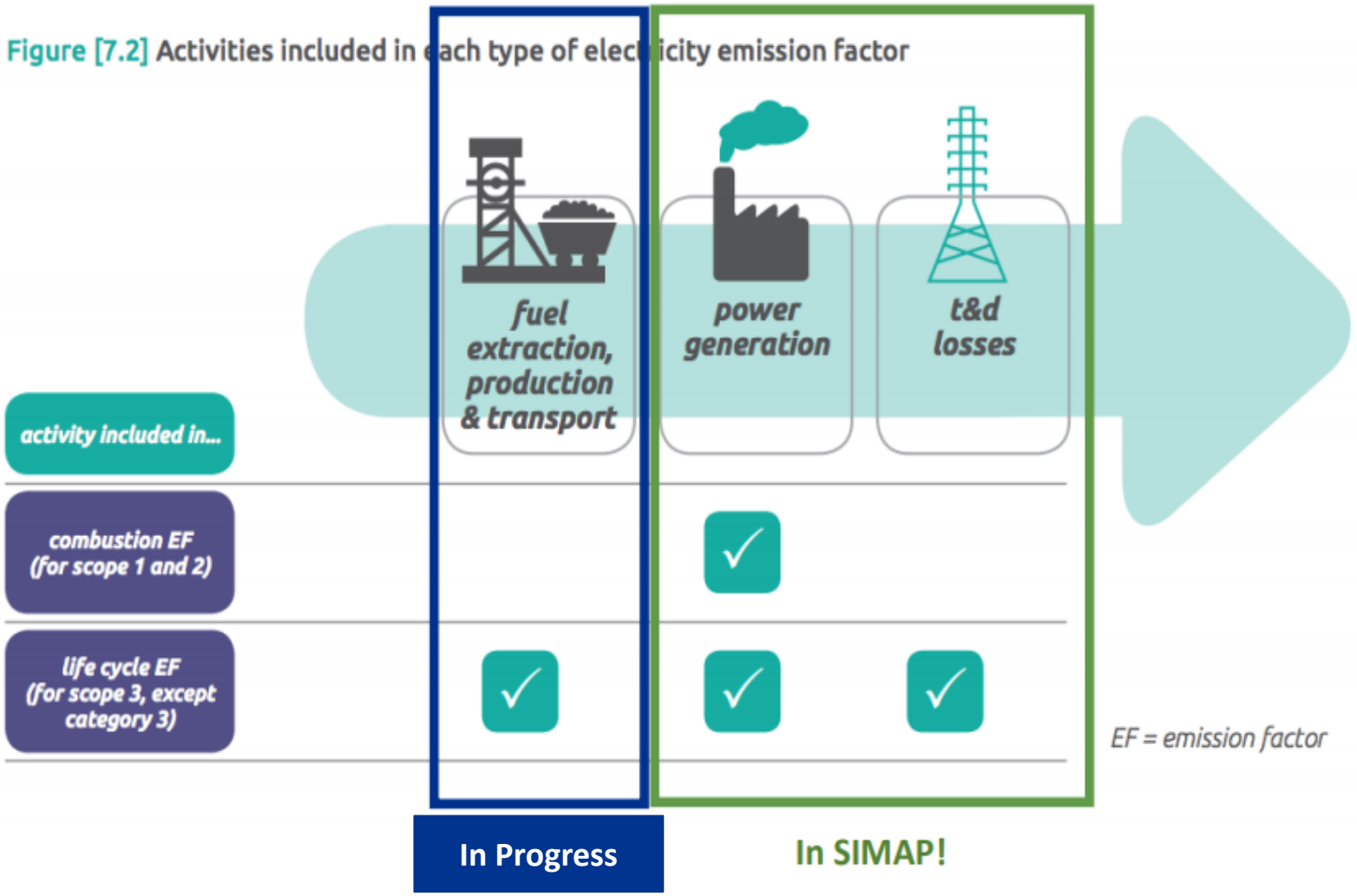
A) Upstream emissions of purchased fuels

B) Upstream emissions of purchased electricity

C) Transmission and distribution (T&D) losses

D) Generation of purchased electricity that is sold to end users

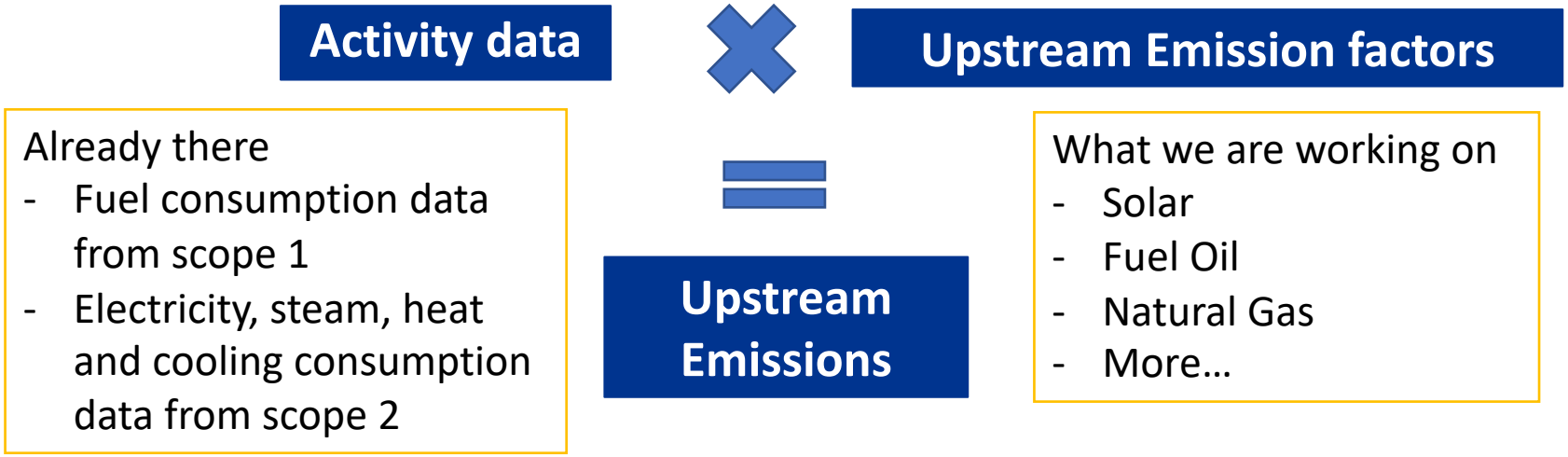
Activities included in each type of emission factors



Calculation of category 3 (FERA) emissions in scope 3

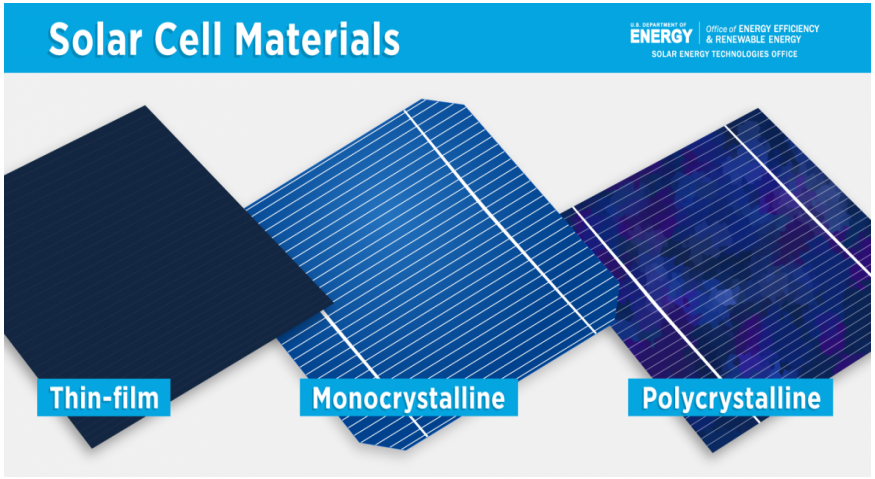
Methods

- Average-data method / Default EF
- Supplier-specific method / Custom EF



Solar Energy Technologies

- Photovoltaic (PV) Solar Energy:
  - Crystalline silicon
  - Thin film
- Thermal Solar Energy:
  - Solar thermal collectors
  - Concentrating solar power (CSP)



Life Cycle Stages of Solar Technologies

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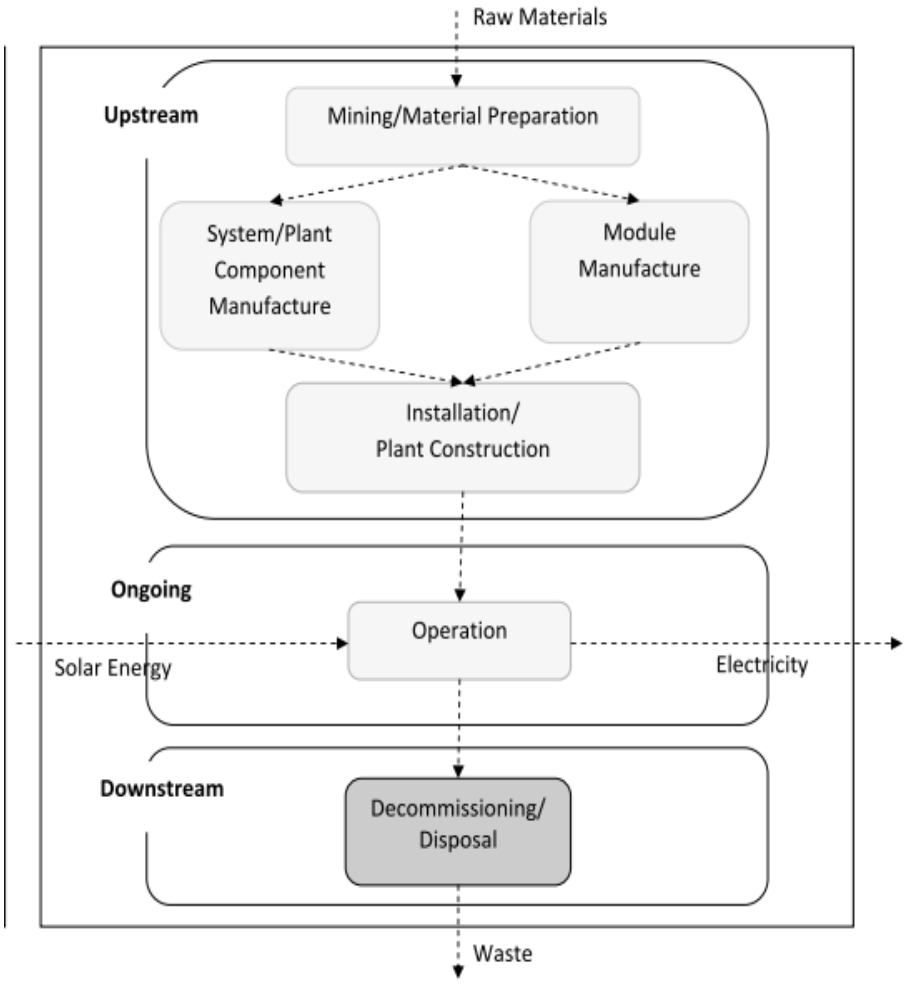
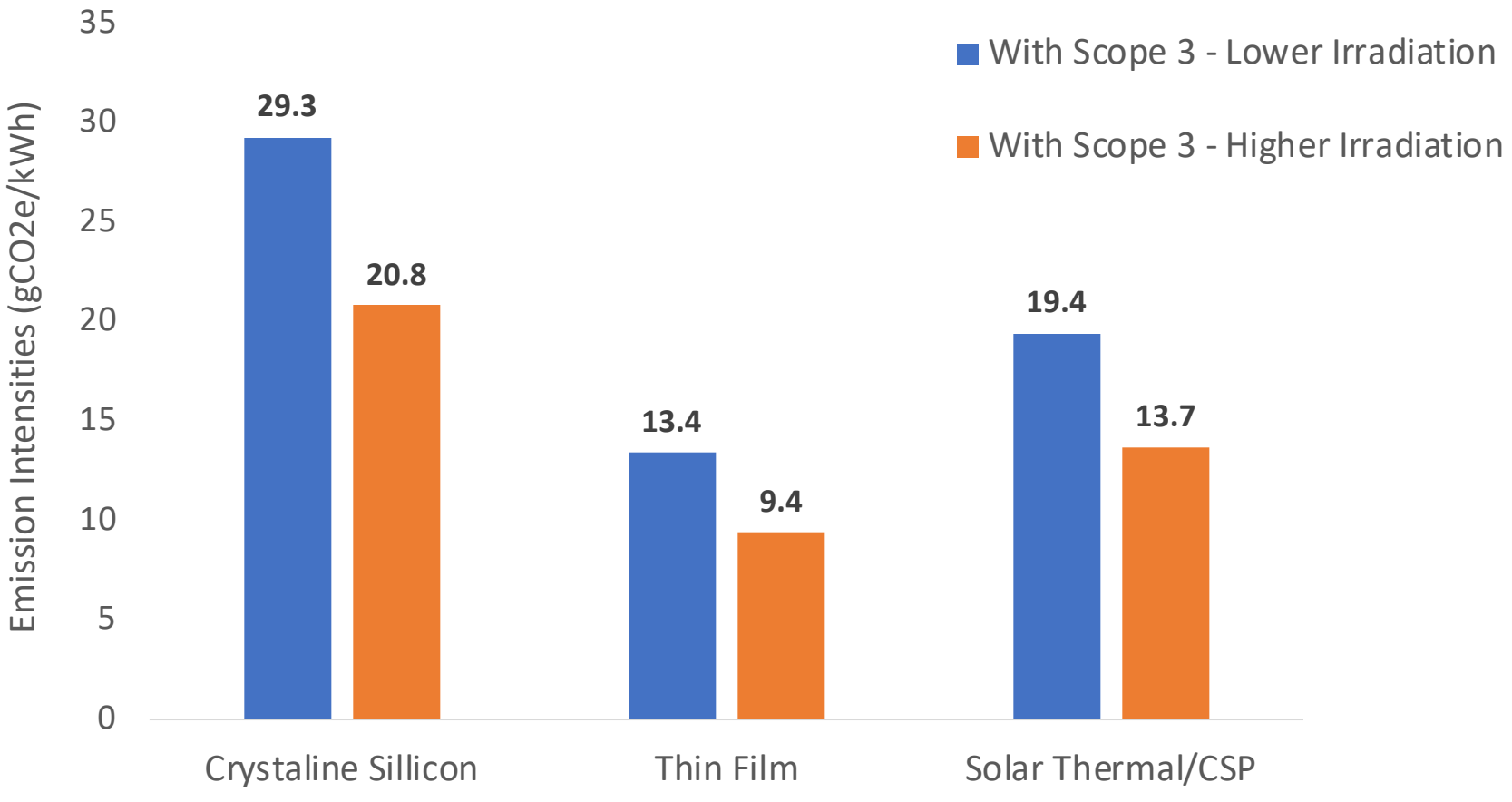


Factors affecting life cycle emissions of solar energy

- **Solar irradiation (DNI) –** amount of sunshine they absorb – *changes by location*
- **Operating lifetime** – *30 years*
- **Module efficiency** - *varies by technology*
- **Performance ratio** – *varies by type of installation*

Upstream Emissions of Solar Energy Technologies



Without scope 3, no emissions from solar technologies

Future Steps for Solar Scope 3 Emissions

Add emission factors for each life cycle stage instead of using average proportions

Add emission factors for each GHG type separately in order to account for future GWP changes in SIMAP

Questions we have for the user community about solar

Do your institutions own solar PV panels, thermal collectors or RECs?

Are you aware of types of technologies used for your solar panels/RECs?

Who is responsible for operational processes /maintenance of your solar systems?

Scope 3 Emissions of Fuel Oil

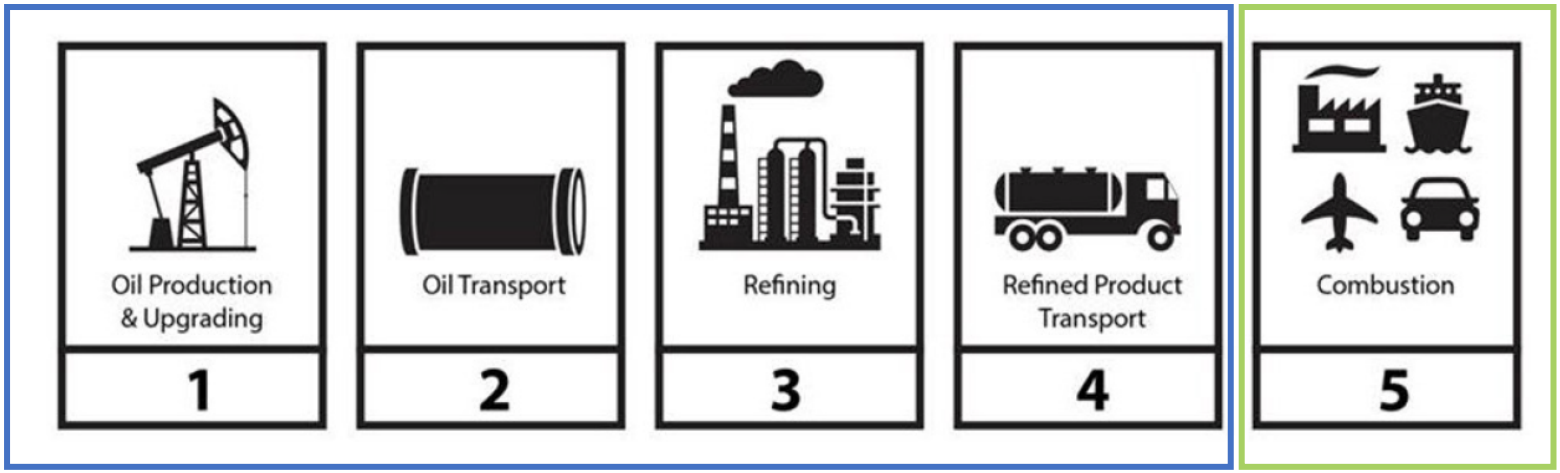
- Fuel Oil is a petroleum product
  - Derived from crude oil
  - Used mainly in furnaces and boilers

- Types of Fuel Oil considered in SIMAP:
  - Distillate Oil (#1-4)
  - Residual Oil (#5-6) (not common anymore)

- The type is determined by how it is REFINED

Scope 3 Emissions of Fuel Oil

System Boundaries



Source: ARC Financial Corp.

Scope 3

To be added into SIMAP

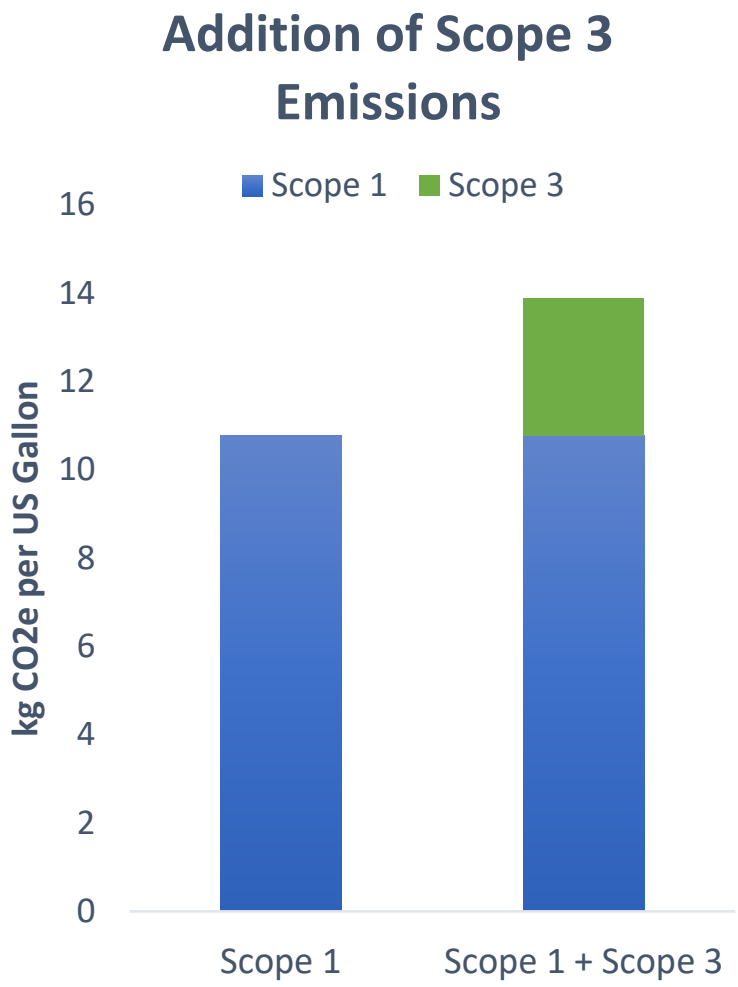
Scope 1

Currently Included in SIMAP

Fuel Oil Scope 3 Emissions

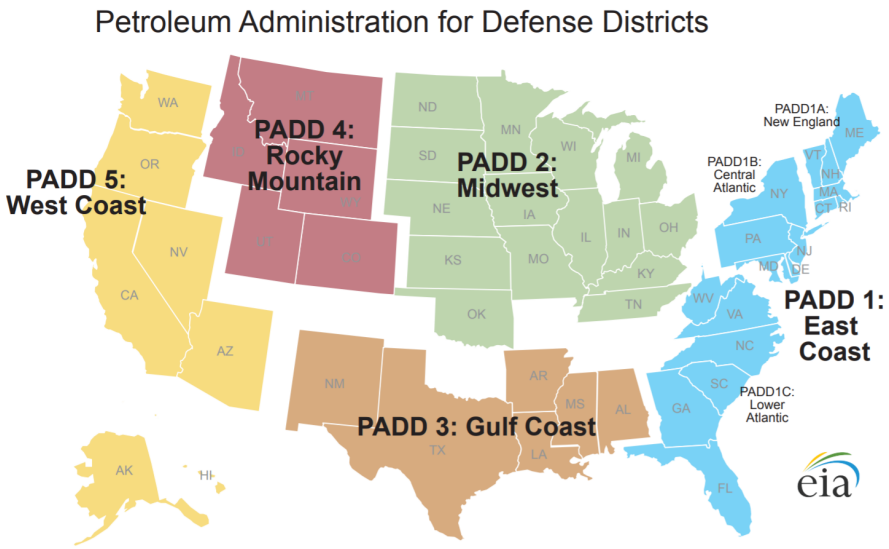
- The addition of Scope 3 Emissions will add 25-34% to the life cycle emissions from fuel oil based on location

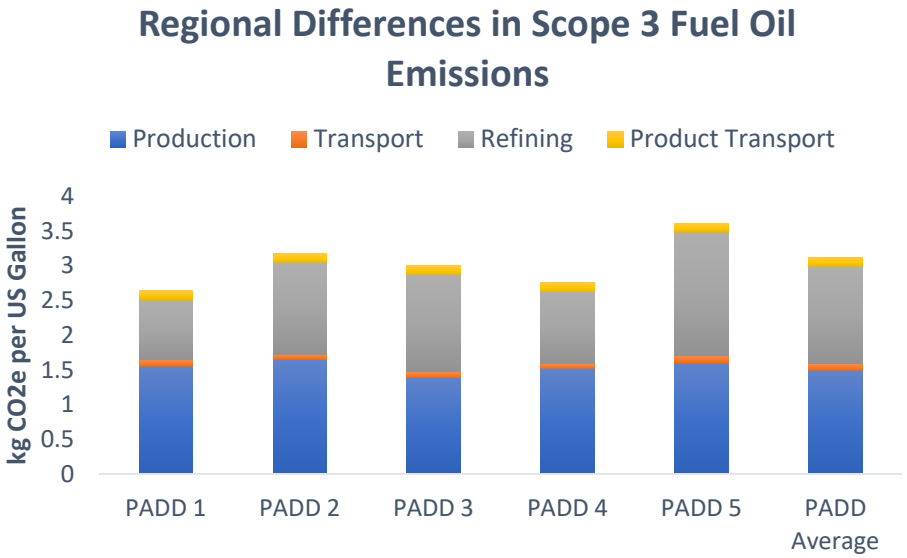
- The average Scope 3 Emission Factor for Fuel Oil is 3.12 kg CO2e per US Gallon



Fuel Oil Regional Districts (PADDs)

SIMAP will be using the emission factors for the user's specific region





Regional differences in emissions are due to the regional differences in the type of crude oil being processed and refined

Scope 3 Emissions for Natural Gas

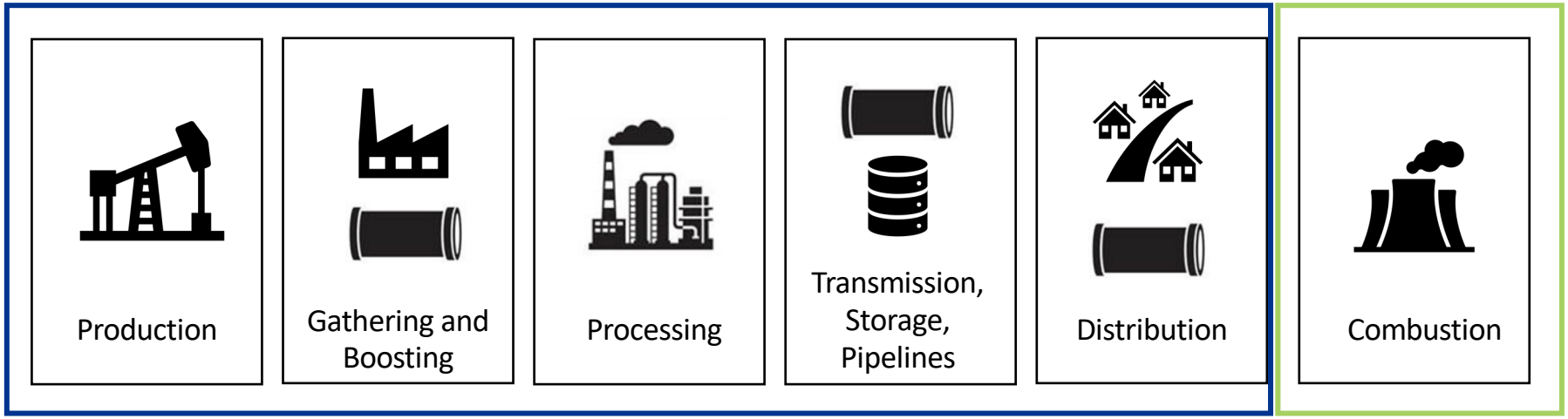
- Natural Gas is composed of mainly methane (CH4)
- It is commonly used for heating, cooking, and electricity generation

- There are several types of Natural Gas
  - Shale (75% of US Natural Gas Production)
  - Conventional
  - Tight
  - Associated

- The type is determined by how it is EXTRACTED

Scope 3 Emissions for Natural Gas

Supply Chain Boundaries



Scope 3

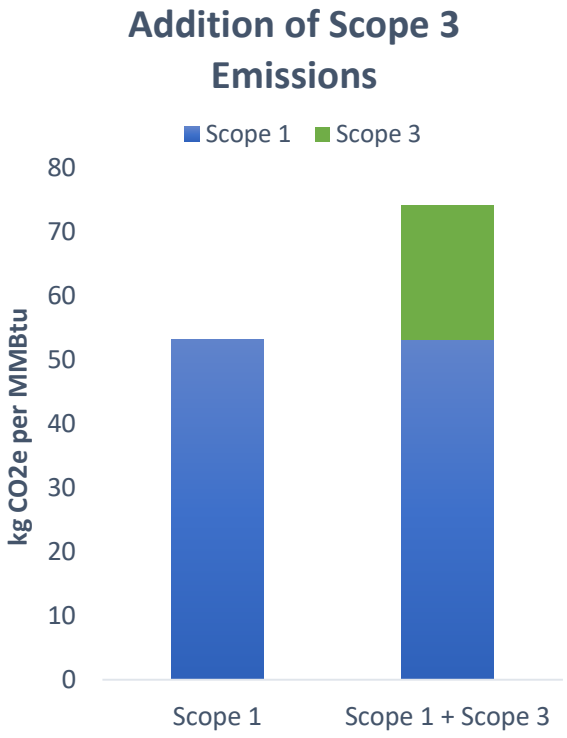
To be added into SIMAP

Scope 1

Currently Included in SIMAP

Natural Gas Scope 3 Emissions

- The addition of Scope 3 Emissions will add 39% to the life cycle emissions from natural gas
- The scope 3 emission factor for natural gas is 21.01 kg CO2e per MMBtu
- This is a weighted average for the US

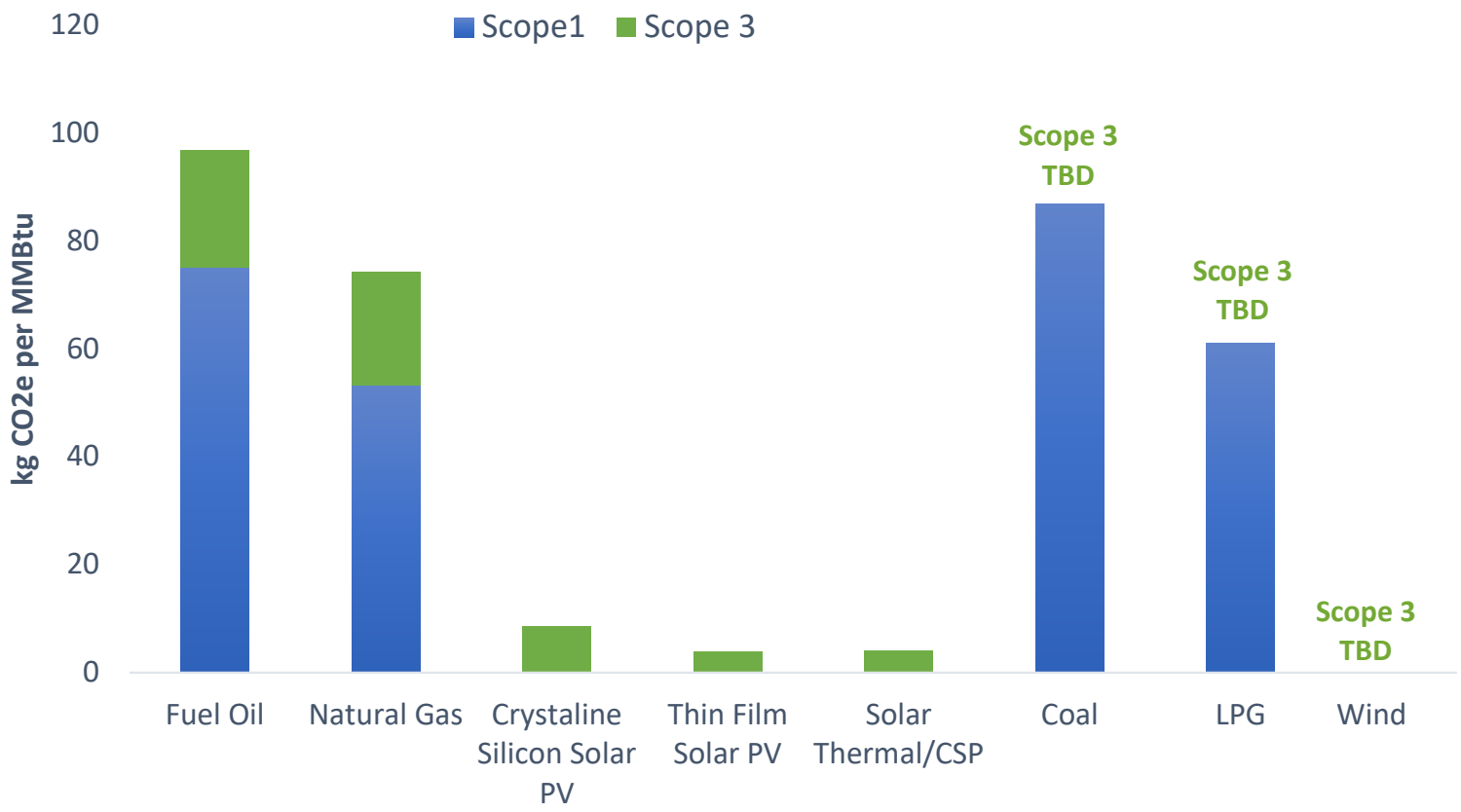


Natural Gas Scope 3 Methane Leaks

Further research is needed!

- Methane leakage rates range from 1% to 7% (per unit of natural gas delivered) depending on method and boundaries
- Shale Natural Gas extraction produces significantly higher amounts of CH_4 than Conventional Natural Gas
- Howarth et al. 2014 suggests that when using the 20-year GWP, Natural Gas has higher life cycle emissions than coal

Scope 1 and Scope 3 Emissions for Stationary Fuel and Energy Related Activities



Note: This graph does not include biofuels

Managing changing system boundaries

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Challenges w/Expanding Boundaries

1) Social capital: maintaining ”credibility” and buy-in

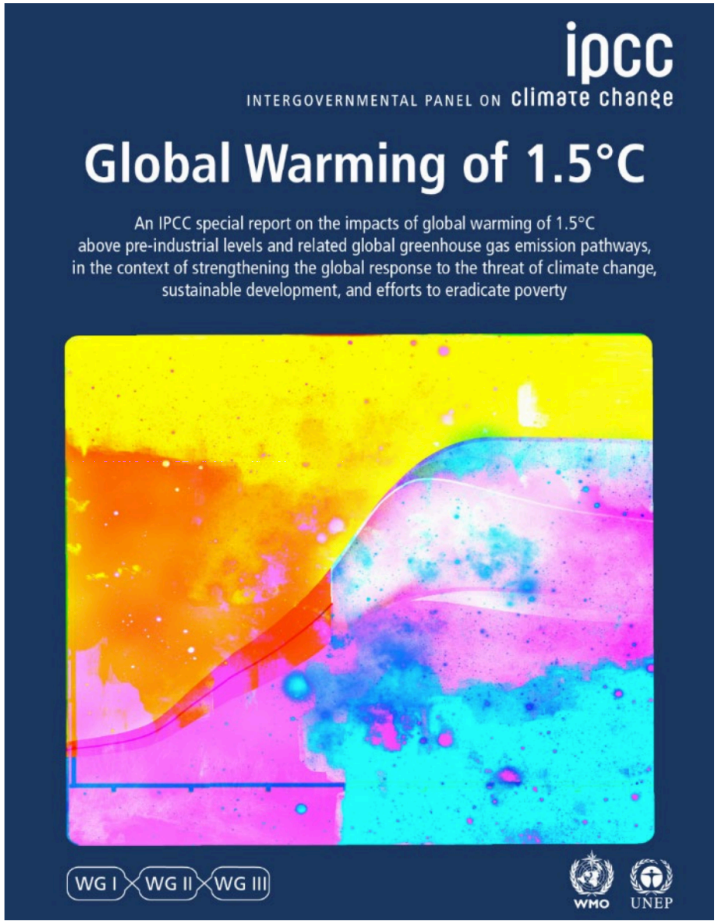
2) Capacity: balancing hours, energy and focus w/potential for impact

3) Communications: balancing clarity and context to motivate ACTION and CHANGE

So **Why** "Move the Goalposts"?

Because reality demands it

From the IPCC slide deck.
Accessed at https://www.ipcc.ch/sr15/mulitimedia/presentation/ on 8/13/20



Wrestling with Changing Boundaries at UNH

Original WildCAP goals and reporting

1. **Reporting and setting goals using Climate Commitment "combined" boundaries**
   - 80% across-the-board reductions by 2050; 50% by 2020
2. **2001 baseline**
   - "back-casted " for business air travel, still don't have complete business travel or study abroad

WildCAP 2020 – Plans for updated goals and reporting

1. **Reporting and setting goals separately**
   - Scope 1+2: Net zero by 2030
   - Scope 3: category-specific, with categories added over time as available (purchasing, investments)
2. **Varied baseline year**
   - For S1+S2, adjusted to 2010 to be able to communicate how we are aligned with IPCC 1.5c report
   - For Scope 3 categories, first year for which there is complete data/analysis (e.g. food, 2014)

Summary

Scope 3 Accounting

- Challenging to do, but can be of strategic value, especially if coupled with related initiatives (e.g. student research, STARS)
- Need to move toward “dual reporting”
- SIMAP will help!

FERA next steps

- Finalize emission factors for additional categories (e.g., biofuels, wind, coal)
- Finalize methods for upstream direct energy and purchased electricity
- Incorporate into SIMAP!

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Questions?

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