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Carbon accounting for NEPA

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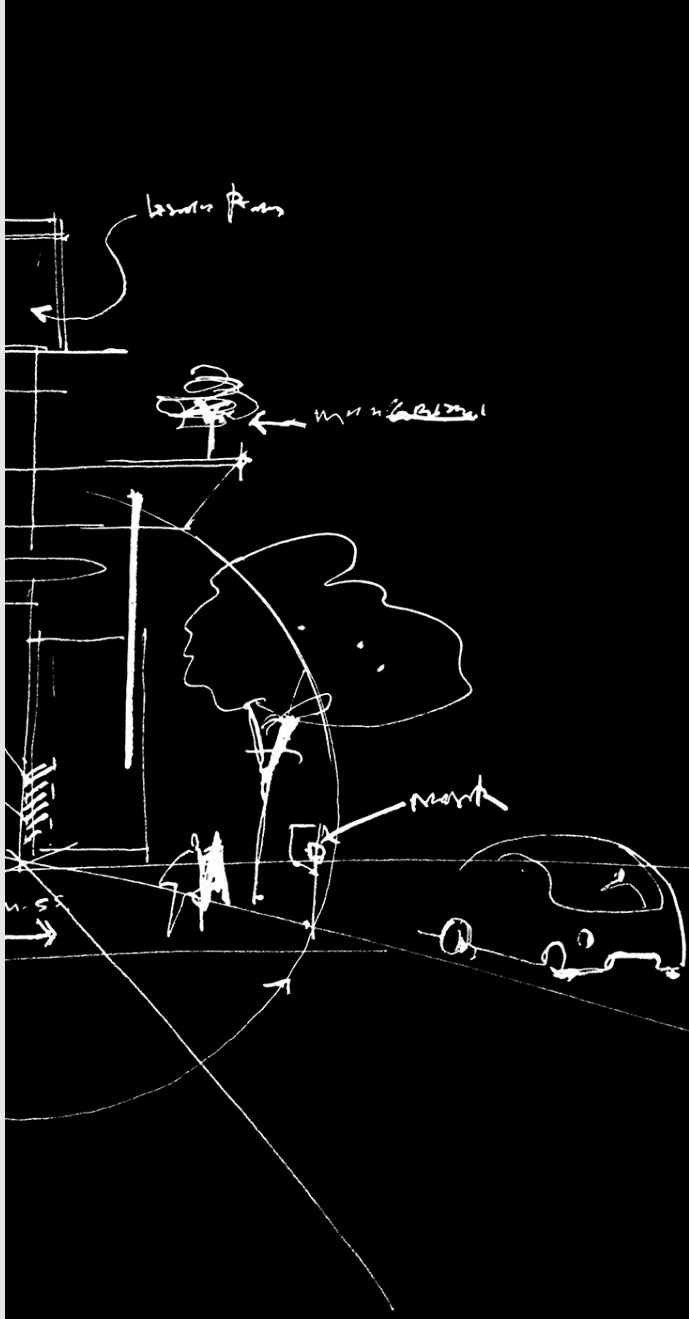
Agenda

Project and climate change

- Overview of the principles
- Direct and indirect emissions
- Baseline selection
- Outstanding questions

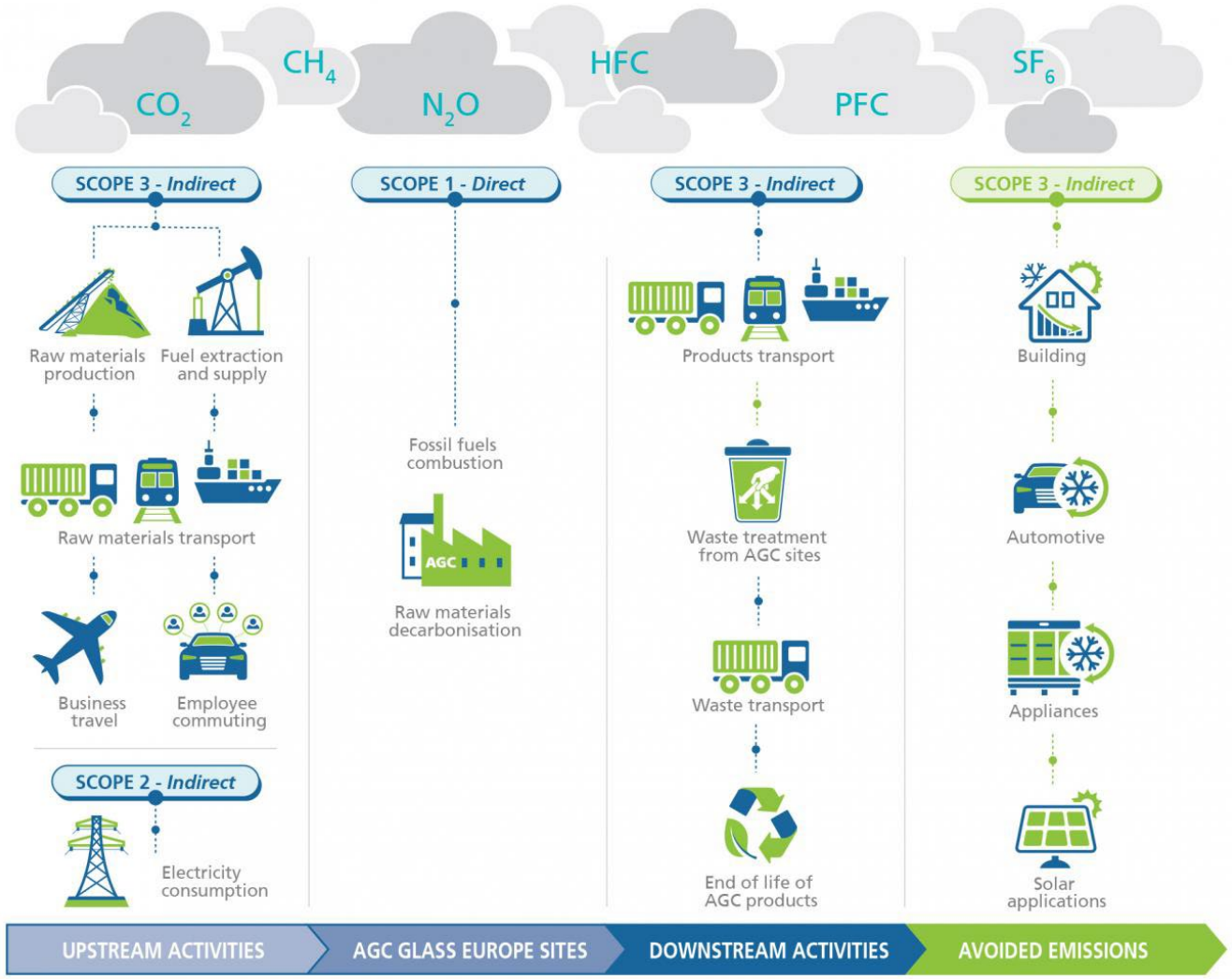
Project accounting examples

- White Pine Energy Station
- Gateway Pacific Terminal
- Chiquita Canyon Landfill
- Dubai Expo

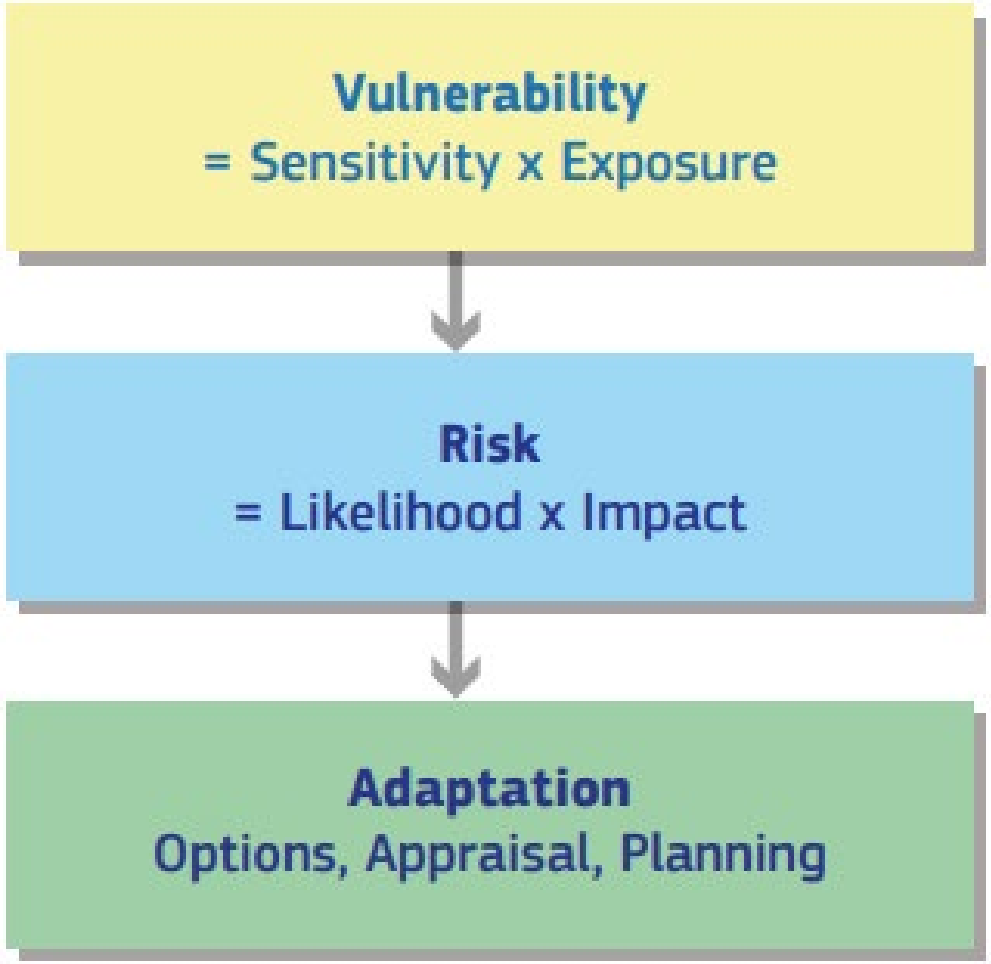


Projects and Climate Change

- Projects → Climate Change



- Climate Change → Projects



Level of Effort

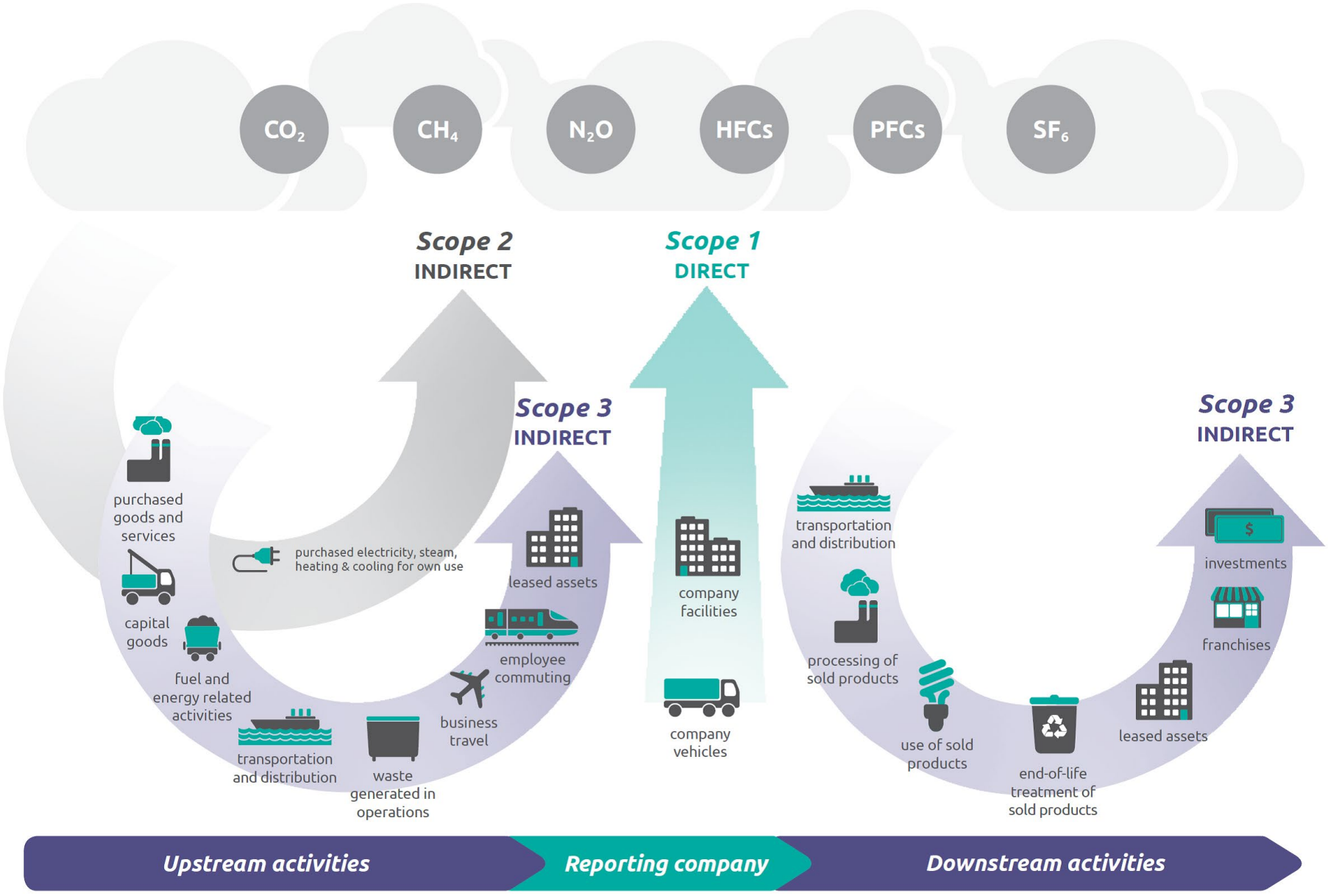
- **“The rule of reason** should guide the agency's analysis and the **level of effort** can be **proportionate to the scale of the net GHG effects** and whether net effects are positive or negative, with actions resulting in very few or an overall reduction in GHG emissions generally requiring less detailed analysis than actions with large emissions.”

Direct and Indirect Effects

- "**Direct effects**" - refers to reasonably foreseeable effects that are **caused by the action** and occur **at the same time** and **place.**
- "**Indirect effects**" – refers to effects that are **caused by the action** and **are later in time** or **farther removed in distance**, but are still reasonably foreseeable, and generally include reasonably foreseeable emissions related to a proposed action that are **upstream or downstream** of the activity resulting from the proposed action.

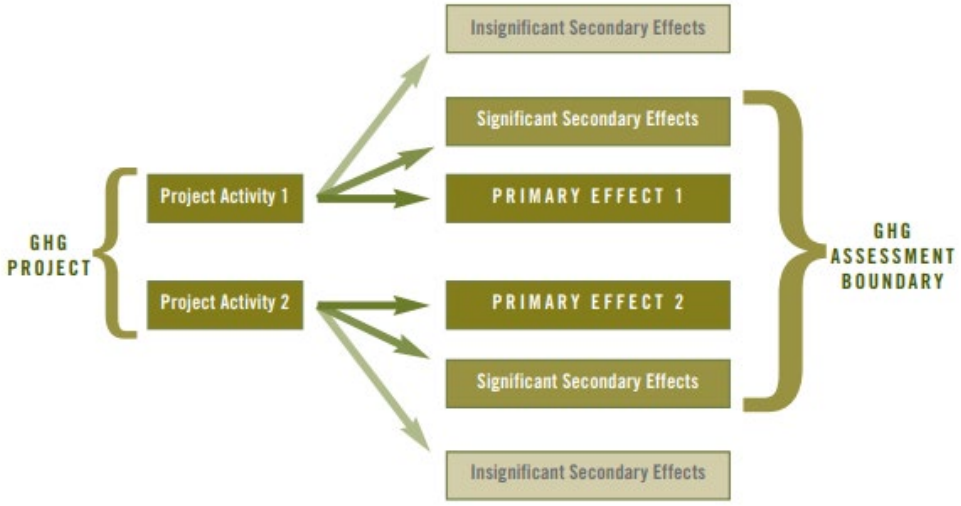
Direct and Indirect Effects

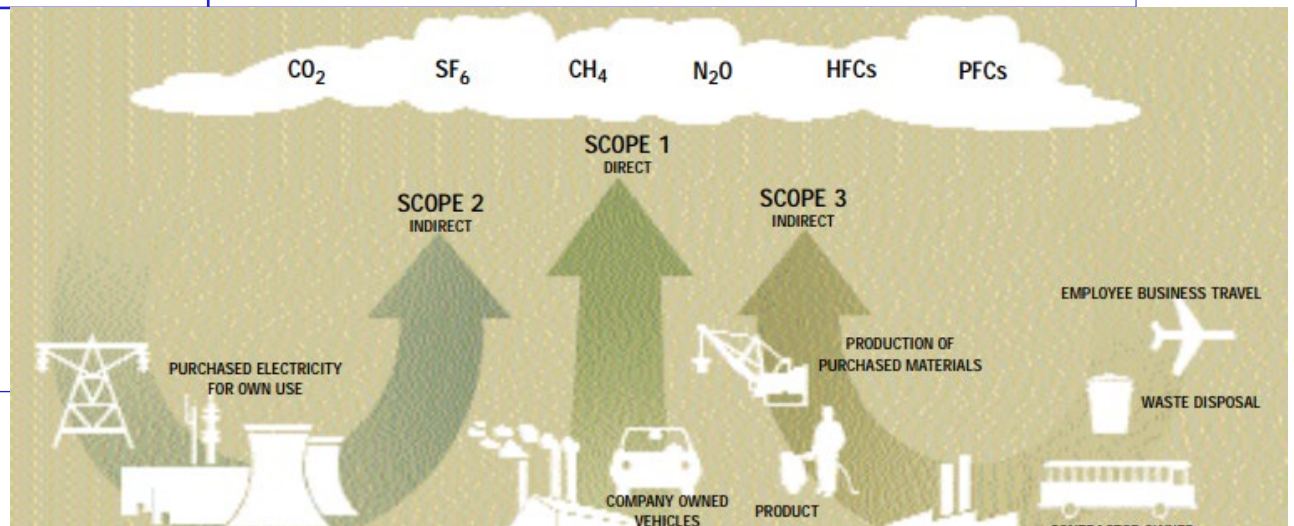
Everything is included… according to the "rule of reason"



Project vs corporate carbon footprint

Project-based	Corporate
Boundary: - Mapping of all direct and indirect project activities, similar to corporate Scope 3 screening - Analyze if the secondary effects are significant for estimating and justify any exclusion Baseline: - Other common/standard practices or performance criteria - Similar geographic and temporal context, used for comparison to project case - Likely dynamic over time	Organizational boundaries: - Differentiate Scope 1 vs. 3 based on equity share, financial control, or operational control - Mapping of Scope 3 supply and product chains can be extensive Base year: - Progress is measured based on change versus the base year, not difference versus baseline





Temporal Considerations – Corporate vs. Project Accounting

FIGURE 2.1 Quantifying GHG reductions relative to a baseline scenario

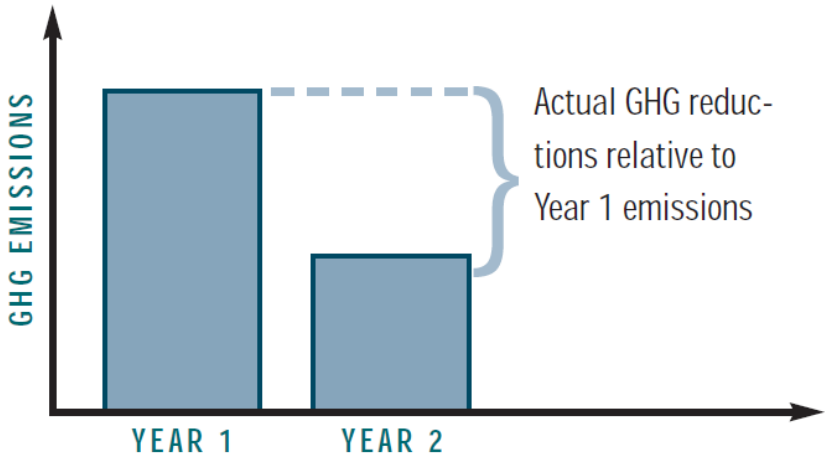


FIGURE 2.1a: **Comparison against a base year for corporate/entity accounting**

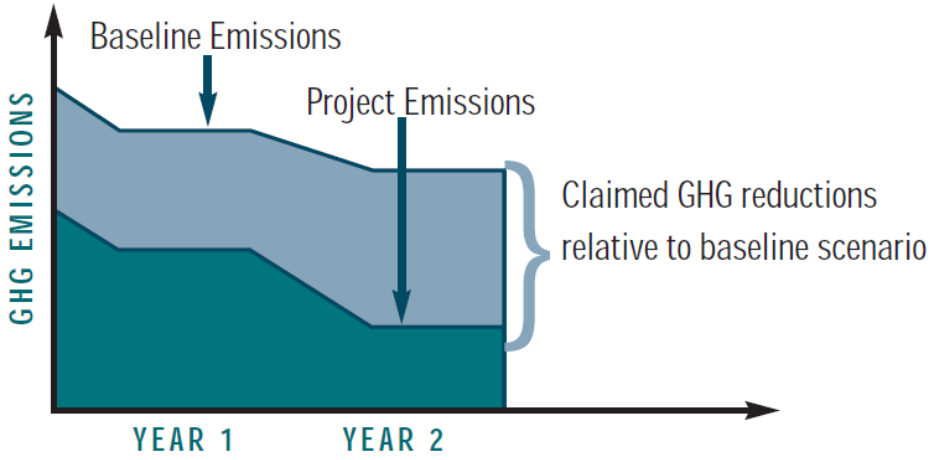


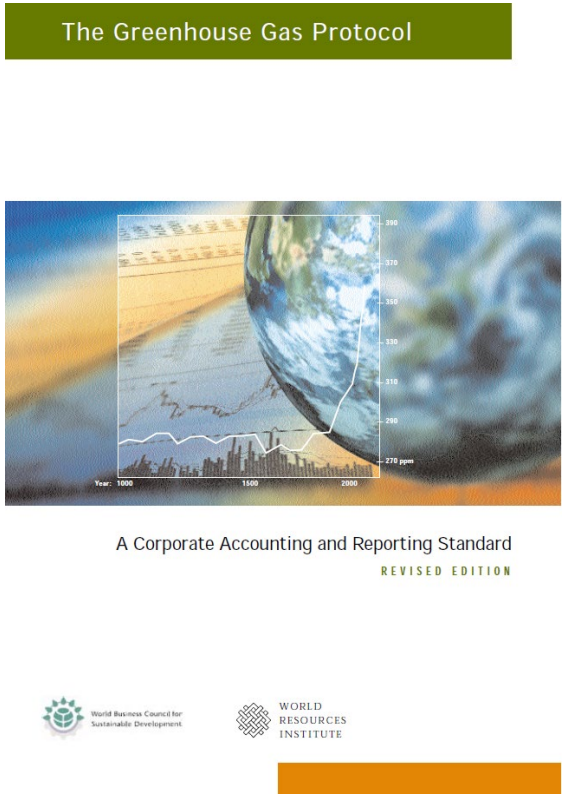
FIGURE 2.1b: **Comparison against a baseline scenario for project accounting**

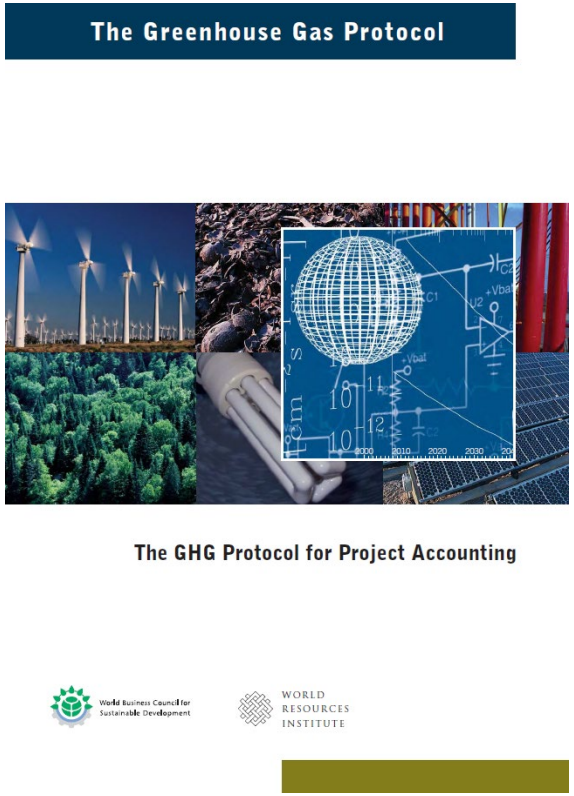
GHG reductions must be quantified relative to a reference level of GHG emissions. Under national and corporate-level GHG accounting, reductions are typically quantified against actual GHG emissions in a historical base year (see Figure 2.1a). For project-based GHG accounting, however, GHG reductions are quantified against a forward-looking, counter-factual baseline scenario (see Figure 2.1b). The most important challenge for GHG project accounting is identifying and characterizing the baseline scenario.

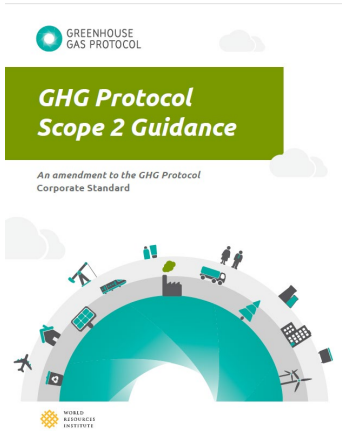
Source: GHG Protocol for Project Accounting, P. 13

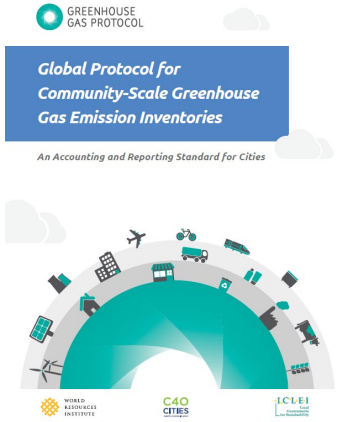
One Catch?

The Project Protocol was written to quantify GHG reduction projects, not emission-increasing energy or infrastructure projects









Therefore it must be considered in conjunction with other guidance

Baseline setting – what is Business as Usual

- Project vs No Project

- “No action alternative” interpretations:
  - **U.S. Army Corps of Engineers**: an alternative resulting in construction not requiring a permit (e.g., a different design or location).
  - **National Park Services**: 1) no change from current management, 2) no project.
  - **Department of Transportation**: “no-build” alternative, and can include short-term reconstruction, mass transit, etc.

- Project vs Existing conditions

- “Current state of resources” as a baseline to predict changes of the environment.

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Examples

NEPA and Non-NEPA
Infrastructure Carbon Assessments

White Pine Energy Station

- 2004-2009, BLM
- Proposed 1600 MW coal fired power plant
- ~20 million tons/year CO2e
- No comparison to project alternatives or significance threshold; only versus theoretical gas fired or lower efficiency coal fired technology
- No review of climate vulnerabilities

Gateway Pacific Terminal

- NEPA (USACE) / SEPA / Whatcom County
- Proposed coal export terminal & rail spur
- 2011-2017
- EIS halted after USACE denied coastal use permit
- Direct GHG impacts – onsite energy; truck, train, rail, and ship traffic; terrestrial
- Indirect GHG impacts – induced demand and fuel switching on world energy markets
- Thorough climate vulnerability analysis

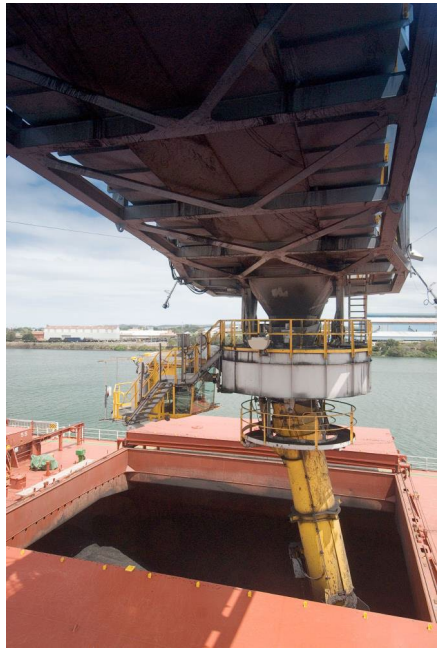
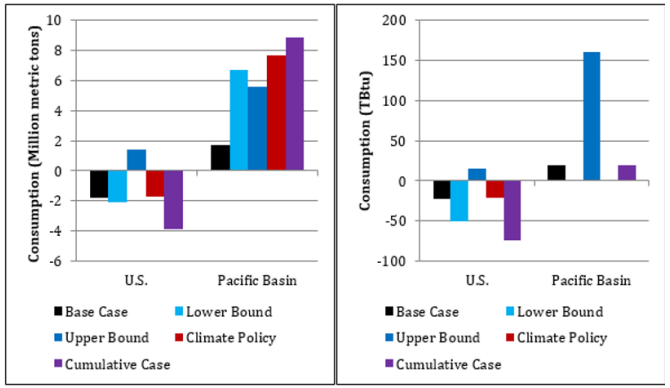
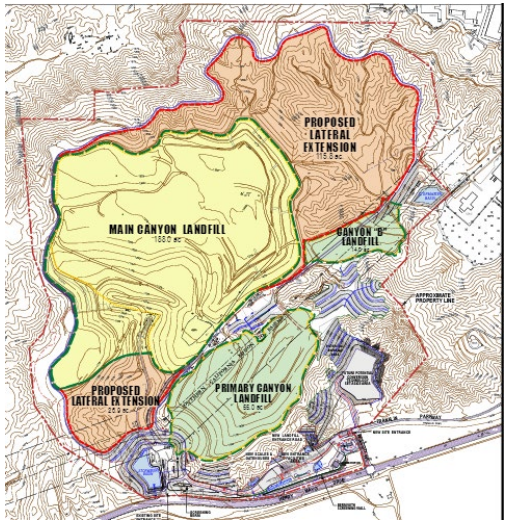


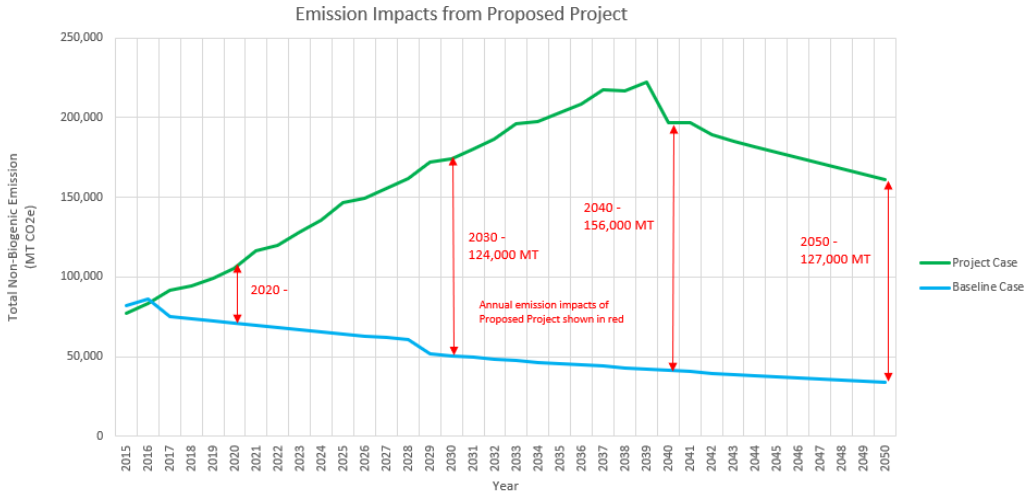
Figure 6-2. Change in Averge Consumption for 2020 to 2040—Proposed Action minus No Action Alternative (million metric tons and trillion Btu (TBtu))



Chiquita Canyon Landfill

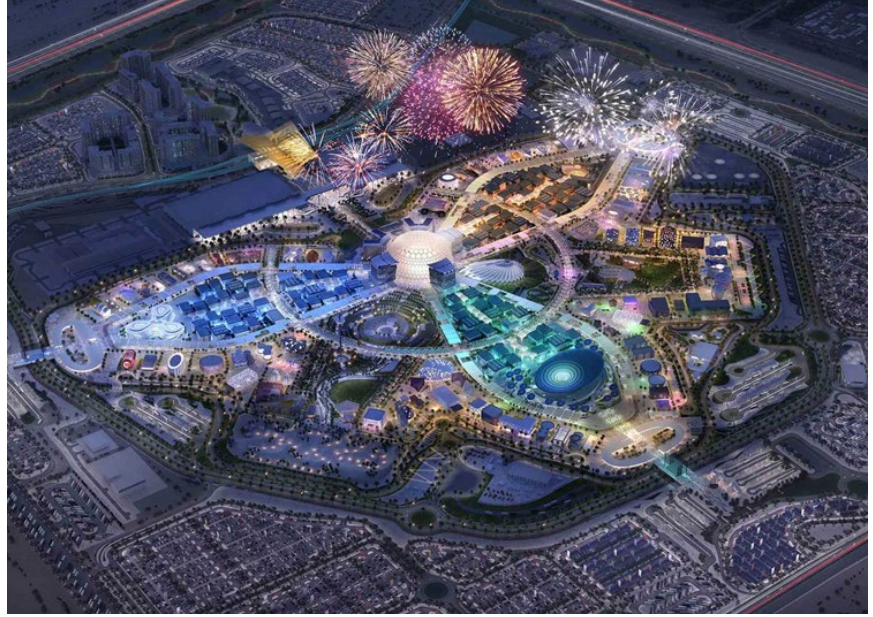
- CEQA Analysis of Landfill Expansion
- Circa 2013-2017+
- Project based accounting approach
- Unique issues with landfills
  - GHG emissions continue for decades after waste is placed and action stops
  - Emissions from old waste occur without the project, but are better controlled with
  - True impact of no action (waste is managed somewhere else) not considered
  - Storage of carbon otherwise deemed biogenic if emitted
  - Beneficial use of methane

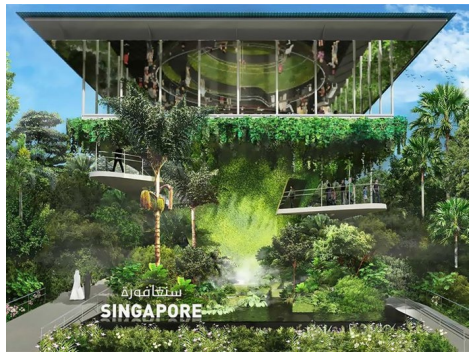




Dubai Expo (ie the latest World's Fair)

- Project accounting approach for all direct and indirect impacts of this mega-event
- US$10B+ of construction projects, 24 million visitors
- GHG inventory considered embodied carbon, water supply, onsite electricity and fuel, international and local travel, and other indirect impacts
- BAU vs. Project quantification of GHG benefits of LEED buildings, water conservation programs, light rail system expansion, etc.



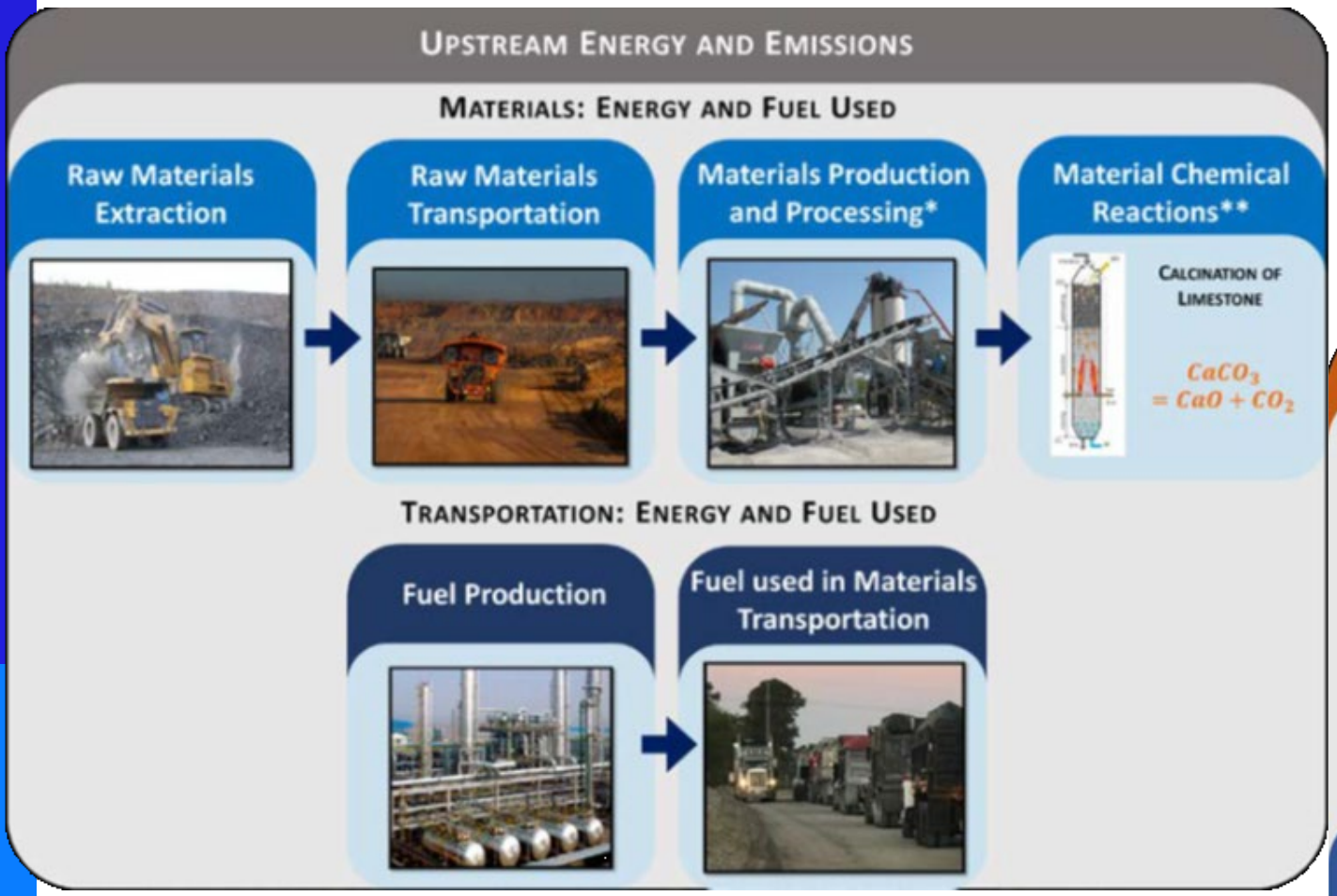


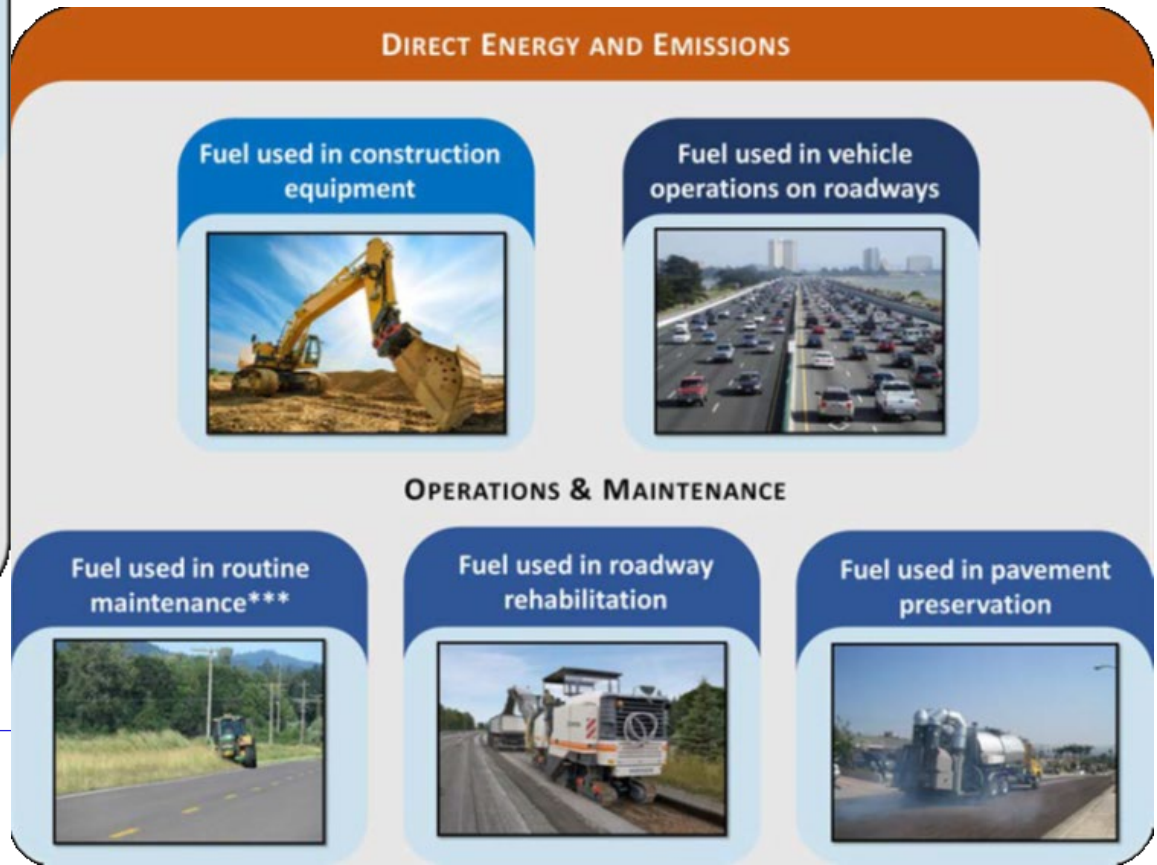
Texas DOT: I-35 Capital Express Central Project

- Project scope:
  - Improvements to the Interstate 35 in Austin, for a distance of 8 miles. Improvements include lowering the roadway, adding two high-occupancy vehicle lanes, reconstructing bridges, adding shared-use paths and bus rapid transit.
- Project-level GHG quantification:
  - Infrastructure Carbon Estimator (ICE) version 2.1.3
    - A spreadsheet model that estimates lifecycle energy and GHG emissions from construction, operation, and maintenance of transportation facilities

Cover image of the FHWA Infrastructure Carbon Estimator Tool

Project-level GHG analysis





Texas DOT GHG analysis

Infrastructure Type	No Build Alternative	Alternative 2	Alternative 3 Modified
	Total MT CO_2e	Total MT CO_2e	Total MT CO_2e
Bridges/Overpasses	0	201,914	399,984
Bus Rapid Transit	0	19,336	17,616
Culverts	0	12,731	12,731
Lighting	0	11,689	11,689
Pathways (Bike and Pedestrian)	0	870	948
Roadways	18,606	111,448	105,173
Signage	0	12,628	11,403
Vehicle Operations	7,374,840	7,838,340	7,851,675
Total	7,393,446	8,208,956	8,411,220

- Build Alternative 2
  - Bus Rapid Transit (40.3 miles*), Shared-use Paths (17.7 miles)
- Modified Build Alternative 3
  - Bus Rapid Transit (36.7 miles*), Shared-use Paths (19.3 miles)
- No Build
  - No Bus Rapid Transit or Shared-use Paths

Other recent examples

- **Arkansas DOT**
  - GHG estimates included vehicle emissions derived from annual average daily traffic data (using Infrastructure Carbon Estimator Tool).
  - Did not discuss climate vulnerability or risk.

- **West Coast transportation project**
  - GHG estimates included vehicle emissions (with EPA's MOVES model for regional vehicle miles) and construction emissions.
  - Did not discuss climate vulnerability or risk

Thank you!

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Additional Info

Examples of direct and indirect impact mapping

What is included? Example 1 – Natural Gas pipeline

1. Proposed **project** actions

E.g. build a pipeline in location A

2. No-action alternative

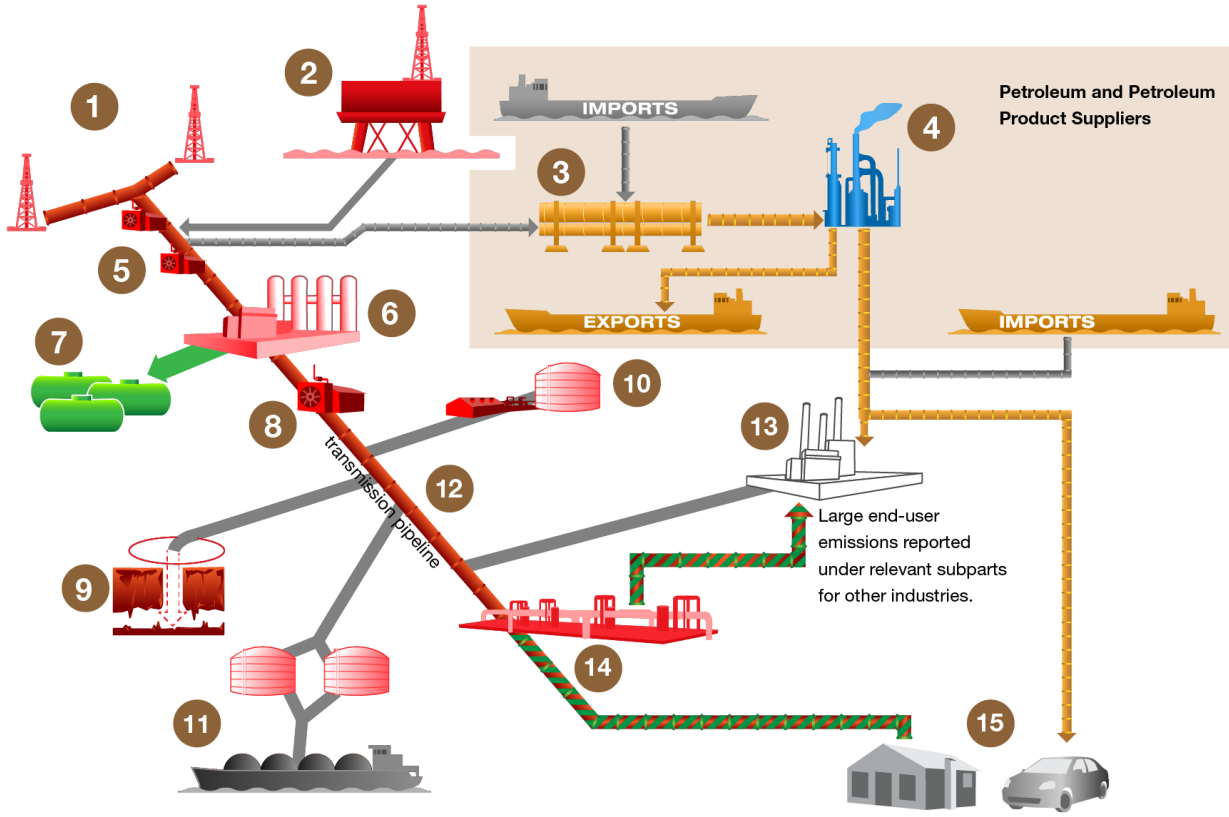
E.g. maximize use of existing pipeline, or electrification

3. Reasonable **alternatives** that accomplish the purpose and need of the proposed action

E.g. build a pipeline in location B

Emissions compared to the current state

E.g. native prairie



Production & Processing

1. Onshore Petroleum & Natural Gas Production
2. Offshore Petroleum & Natural Gas Production
3. Total Crude Oil to Refineries
4. Petroleum Refining
5. Gathering and Boosting
   *Data collection began in RY 2016
6. Gas Processing Plant
   *May contain NGL Fractionation equipment
7. Natural Gas Liquids (NGL) Supply

Natural Gas Transmission & Storage

8. Transmission Compressor Stations
9. Underground Storage
10. Liquified Natural Gas (LNG) Storage
11. LNG Import-Export Equipment
12. Natural Gas Transmission Pipeline
    *Data collection began in RY 2016

Distribution

13. Large End Users
14. Natural Gas Distribution
15. Natural Gas & Petroleum Supply to Small End Users

- Subpart W: Emissions from petroleum & natural gas systems
- Subpart Y: Emissions from petroleum refineries
- Subpart MM: CO_2 associated with supplies of petroleum products
- Subpart NN: CO_2 associated with supplies of natural gas & natural gas liquids
- Not reported under GHGRP

What is included? Example 2 - Landfill

1. Proposed **project** actions

E.g. build a landfill with biogas capture

2. **No-action** alternative

E.g. use of existing landfill or recycling expansion

3. Reasonable **alternatives** that accomplish the purpose and need of the proposed action

E.g. build a landfill without biogas capture

Emissions compared to the current state

E.g. forest