GHG Accounting and Lifecycle Analysis for Carbon Negative Pathways

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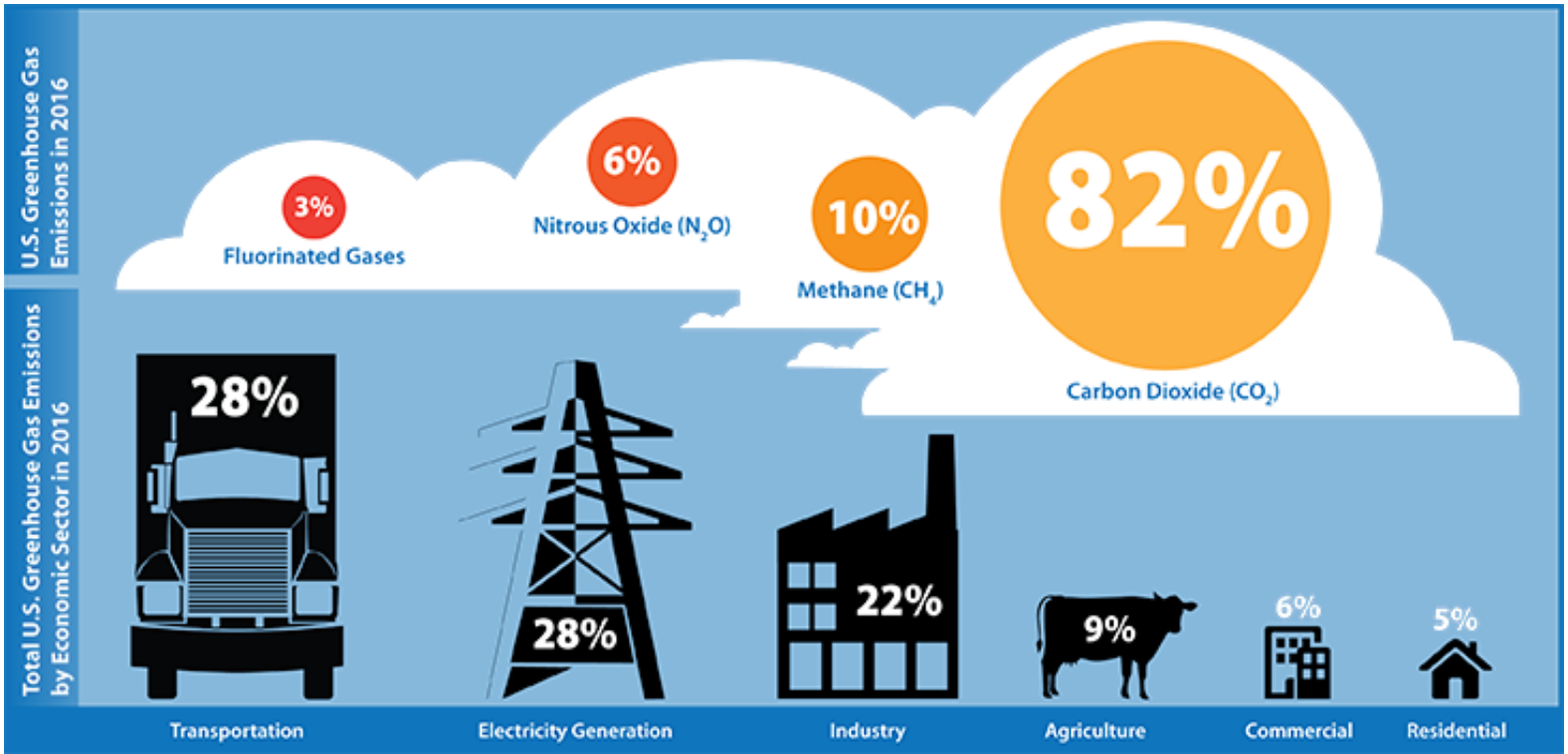
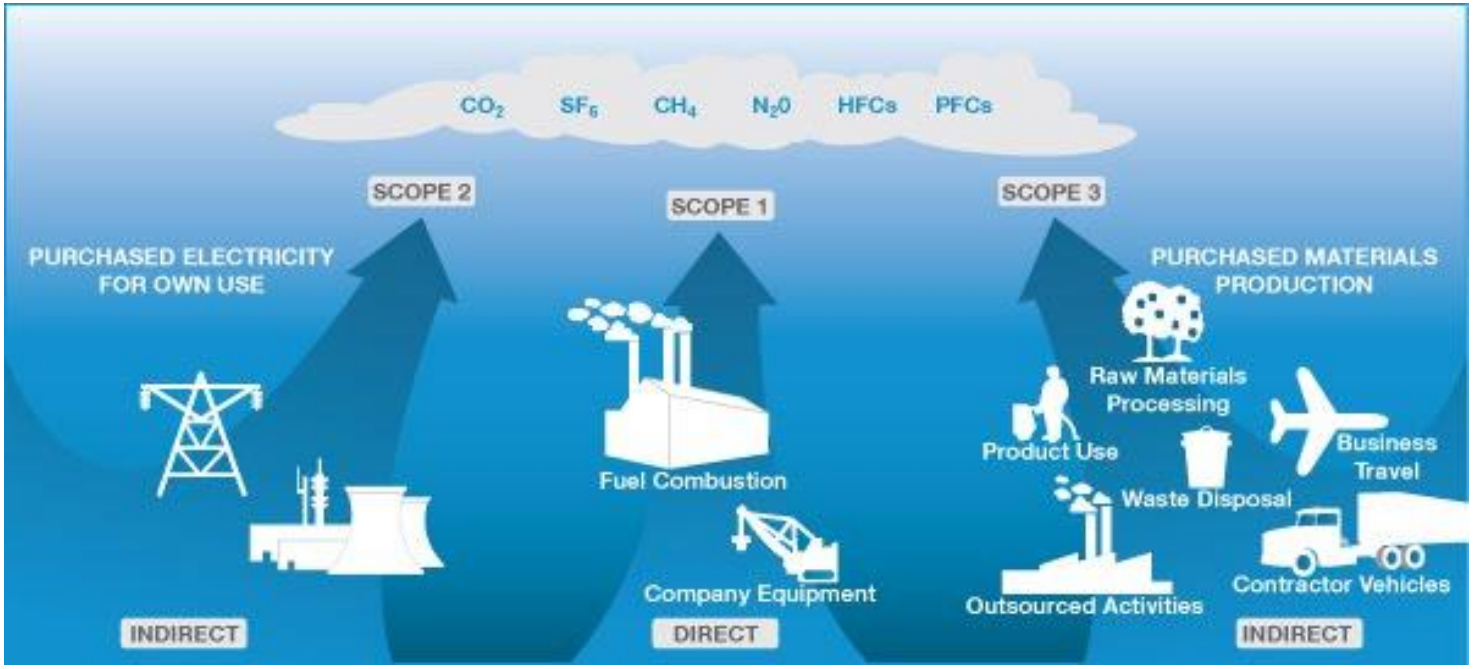
Purpose of GHG estimation methods

- Set baseline and track progress towards a goal
- Model different policy & technology scenarios
- Identify emission hot spots



GHG Inventories

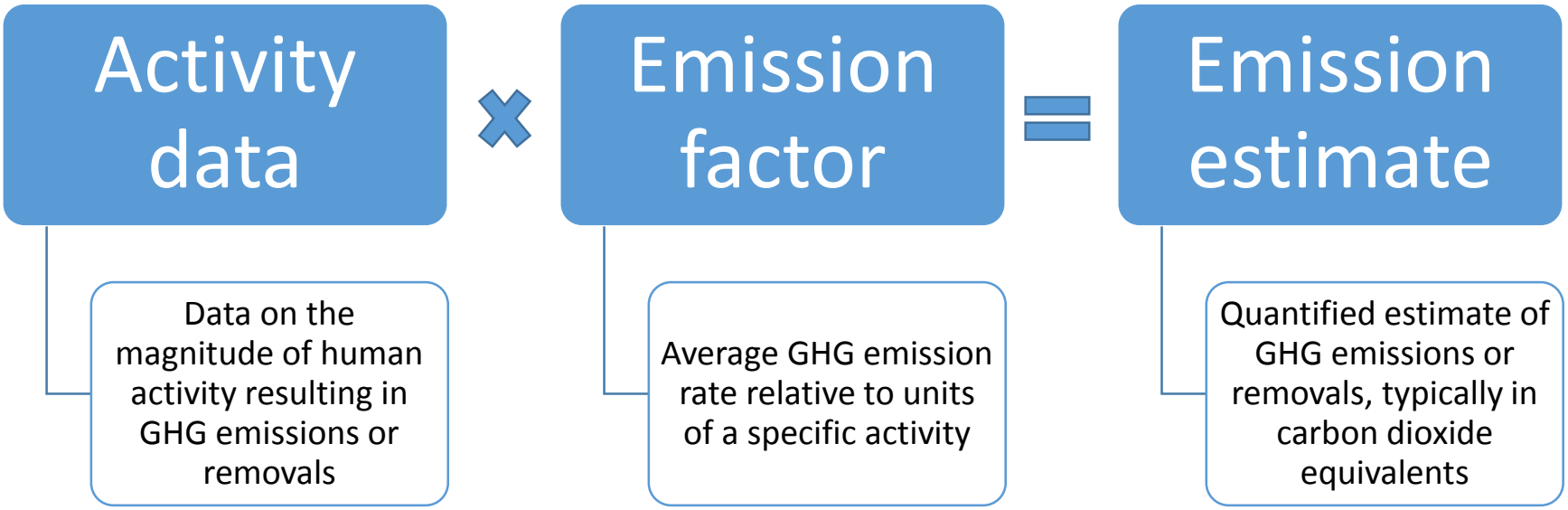
- All emissions from one entity (e.g., company, city, country)
- Addresses a set period of time rather than the pdt lifecycle (some exceptions: harvested wood products)
- Ideally, inventories should be comparable across entities



EPA's National GHG Inventory

- Purpose: report annual emissions to United Nations Framework Convention on Climate Change (UNFCCC)
- 5 sectors: Energy; Industrial processes and product use; Waste; Agriculture, Land use, land-use change, and forestry
- Anthropogenic emissions and removals originating in-country only
- Time series estimations from 1990 to 2 yrs before present
- Methods should improve and uncertainty reduced over time; all years recalculated
- Challenges: lack of nationally-relevant management data in agriculture

Basic inventory method

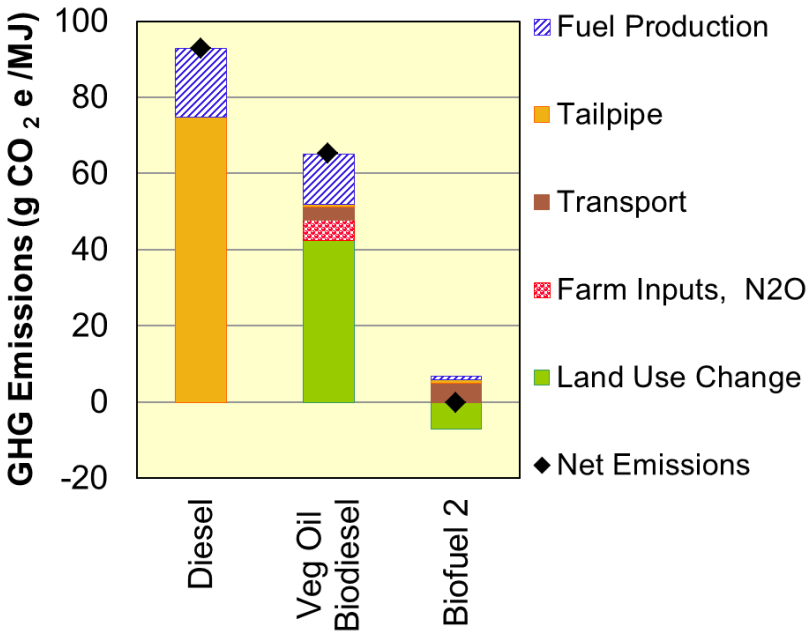


GHG Accounting

- Similar to inventory methods, but assigns value to an emissions unit
- Kyoto Protocol: based on inventories and national registry for tracking “Kyoto units”
- Paris Agreement: Nationally Determined Contributions
- Accounting for the land sector has specific challenges
  - Anthropogenic vs. natural emissions and removals
  - How to account for “natural” disturbances
  - High uncertainties
  - Countries using different methodologies

Life Cycle Assessments

- Based the entire lifespan of a product's functional unit,
  - e.g. 1 lb cement
- Can identify emission hot spots
- LCA modeling enables testing different inputs and scenarios
- Challenges: system boundaries, attribution, substitution, indirect effects



Summary & Next Steps

- Inventories and LCAs have different uses, strengths, and weaknesses
- How do we enable a “knowledge system” of:
  - Sustainable data collection
  - Data sharing
  - Incorporating remote-sensed data with survey-based data
  - Transparency of models
  - Reducing uncertainty