Selected themes from IPCC Reports

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AR5 Chapter 10 : industry, SR 1.5
ch 5 Sustainable Development, poverty eradication and reducing inequality
Emissions from industry sector comprises direct and indirect emissions

Total emissions of industry sector are 15.5 GtCO$_2$eq in 2010 – they are larger than the emissions from either the buildings or transport sectors and represented just over 30% of global GHG emissions in 2010.

Direct emissions from the sector are dominated by five main products.

IPCC 2014
Five main options for reducing GHG emissions in the industry sector (considering also traded goods)
Industry (I)

- **GHG mitigation option categories comprises**

  (1) Energy efficiency (e.g., through furnace insulation, process coupling, or increased material recycling);

  (2) Emissions efficiency (e.g., from switching to non-fossil fuel electricity supply, or applying CCS to cement kilns);

  (3) Material efficiency

    (3a) Material efficiency in manufacturing (e.g., through reducing yield losses in blanking and stamping sheet metal or re-using old structural steel without melting);

    (3b) Material efficiency in product design (e.g., through extended product life, light-weight design, or de-materialization);

  (4) Product-Service efficiency (e.g., through car sharing, or higher building occupancy);

  (5) Service demand reduction (e.g., switching from private to public transport, new product design with longer life)

IPCC 2014
Significant mitigation potentials exist in various cost ranges including cost effectives measures (case study of steel)
Attractive mitigation potentials exist in all areas

- Chemicals
- Steel
- Cement
- Paper
Emissions from the waste sector have doubled since 1970 – mitigation measures can follow waste hierarchy

IPCC 2014
Global Warming of 1.5°C

An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.
## SPM3b | Characteristics of four illustrative model pathways

### Breakdown of contributions to global net CO₂ emissions in four illustrative model pathways

<table>
<thead>
<tr>
<th>Pathway</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>P1</strong></td>
<td>A scenario in which social, business and technological innovations result in lower energy demand up to 2050 while living standards rise, especially in the global South. A downsized energy system enables rapid decarbonization of energy supply. Afforestation is the only CDR option considered; neither fossil fuels with CCS nor BECCS are used.</td>
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<td><strong>P2</strong></td>
<td>A scenario with a broad focus on sustainability including energy intensity, human development, economic convergence and international cooperation, as well as shifts towards sustainable and healthy consumption patterns, low-carbon technology innovation, and well-managed land systems with limited societal acceptability for BECCS.</td>
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<td><strong>P3</strong></td>
<td>A middle-of-the-road scenario in which societal as well as technological development follows historical patterns. Emissions reductions are mainly achieved by changing the way in which energy and products are produced, and to a lesser degree by reductions in demand.</td>
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<tr>
<td><strong>P4</strong></td>
<td>A resource- and energy-intensive scenario in which economic growth and globalization lead to widespread adoption of greenhouse-gas-intensive lifestyles, including high demand for transportation fuels and livestock products. Emissions reductions are mainly achieved through technological means, making strong use of CDR through the deployment of BECCS.</td>
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Strengthening the Global Response in the Context of Sustainable Development
Links to Sustainable Development Dimensions?
Stringent climate mitigation measures can generate positive impacts (synergies) and negative impacts (tradeoffs) with developmental actions.

Knowing those is important for making policy choices.
Mitigation actions

**Energy demand** (transport, buildings, industry) sector: behavioural responses, fuel switching, energy use efficiency, (carbon capture and storage-CCS/U)

**Energy Supply** sector: Biomass-non biomass renewables, nuclear, CCS-bio energy, CCS-fossil

**Land Sector**: sustainable diets, reduced food waste, soil carbon sequestration, livestock manure management, reduce deforestation, afforestation, reforestation, responsible forest product sourcing
**Indicative linkages between mitigation options and sustainable development using SDGs** (The linkages do not show costs and benefits)

Mitigation options deployed in each sector can be associated with potential positive effects (synergies) or negative effects (trade-offs) with the Sustainable Development Goals (SDGs). The degree to which this potential is realized will depend on the selected portfolio of mitigation options, mitigation policy design, and local circumstances and context. Particularly in the energy-demand sector, the potential for synergies is larger than for trade-offs. The bars group individually assessed options by level of confidence and take into account the relative strength of the assessed mitigation-SDG connections.

<table>
<thead>
<tr>
<th>Energy-supply</th>
<th>Synergies</th>
<th>Energy-demand</th>
<th>Synergies</th>
<th>Land</th>
<th>Trade-offs</th>
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*Length shows strength of connection:*

- Short line: Low
- Medium line: Medium
- Long line: High

*Shades show level of confidence:*

- Light shade: Low
- Medium shade: Medium
- Dark shade: High

*The shades depict the level of confidence of the assessed potential for trade-offs/synergies.*
Indicative linkages between mitigation and sustainable development using SDGs (the linkages do not show costs and benefit)
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| SDG 10 | Reduced Inequality |
| SDG 11 | Sustainable Cities and Communities |
| SDG 12 | Responsible Consumption and Production |
| SDG 14 | Life Below Water |
| SDG 15 | Life on Land |
| SDG 16 | Peace and Justice/Strong Institutions |
| SDG 17 | Partnerships for the Goals |

**Energy-supply**
- **Trade-offs**
- **Synergies**

**Energy-demand**
- **Trade-offs**
- **Synergies**

**Land**
- **Trade-offs**
- **Synergies**

*Length shows strength of connection*

*Shades show level of confidence*

The overall size of the coloured bars depict the relative for synergies and trade-offs between the sectoral mitigation options and the SDGs.

The shades depict the level of confidence of the assessed potential for Trade-offs/Synergies.

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE
Synergies and Trade offs

For energy demand sectors most of the measures facilitate achievement of goals.

But model pathways that rely more on land based measures like bioenergy, afforestation if poorly managed can compete with food security.

Redistributive policies across sectors and populations can resolve trade offs.