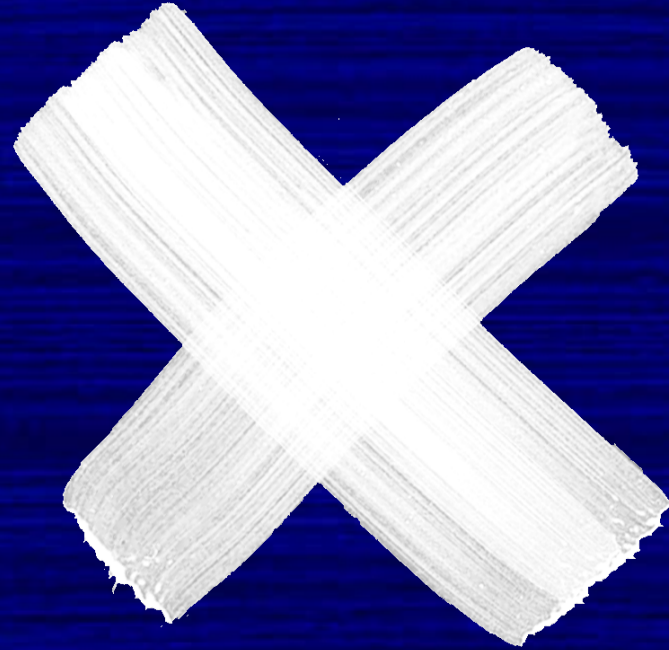




Finland

Long-term climate
and energy policy
&
greenhouse
emissions



A foresight report on long-term climate and energy policy of the Government of Finland, 2009, outlining the policy up to the year 2020.





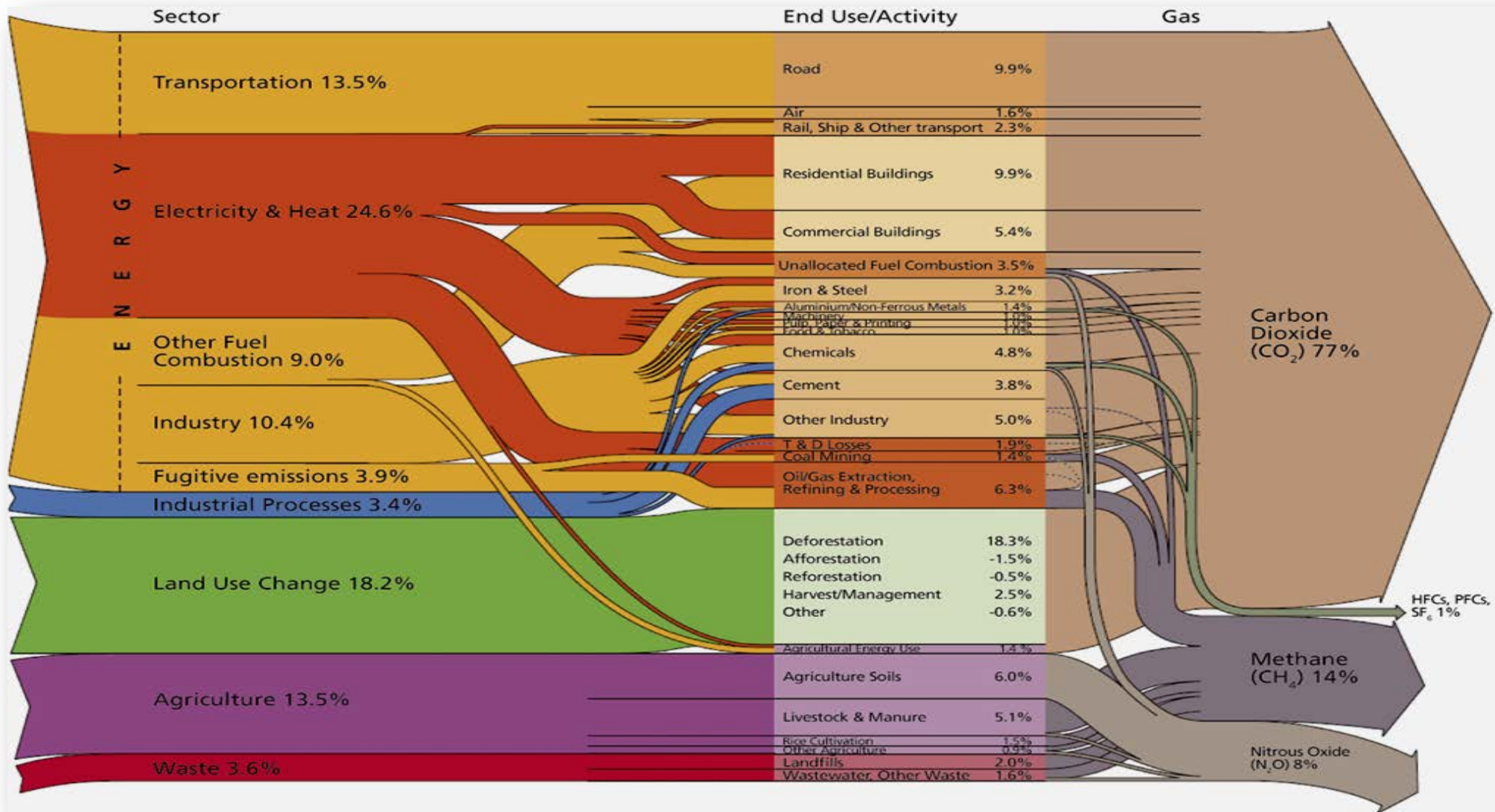
Causes and effects of the climate crisis.

Climate policy as a global challenge. *No country can solve climate change on its own.*

Even *a small country* can play a role by *setting a good example.*

Low-carbon Finland. 40% renewable methane target for Finland's transport sector.





Global greenhouse gas emissions

Global greenhouse gas emissions in 2000 by sector, end use and gas (excluding CFC compounds).

Source: Baumert, K. A. et al. 2005. Navigating the Numbers – Greenhouse Gas Data and International Climate Policy. World Resources Institute



Greenhouse gas emissions decreased from the year before in 2011

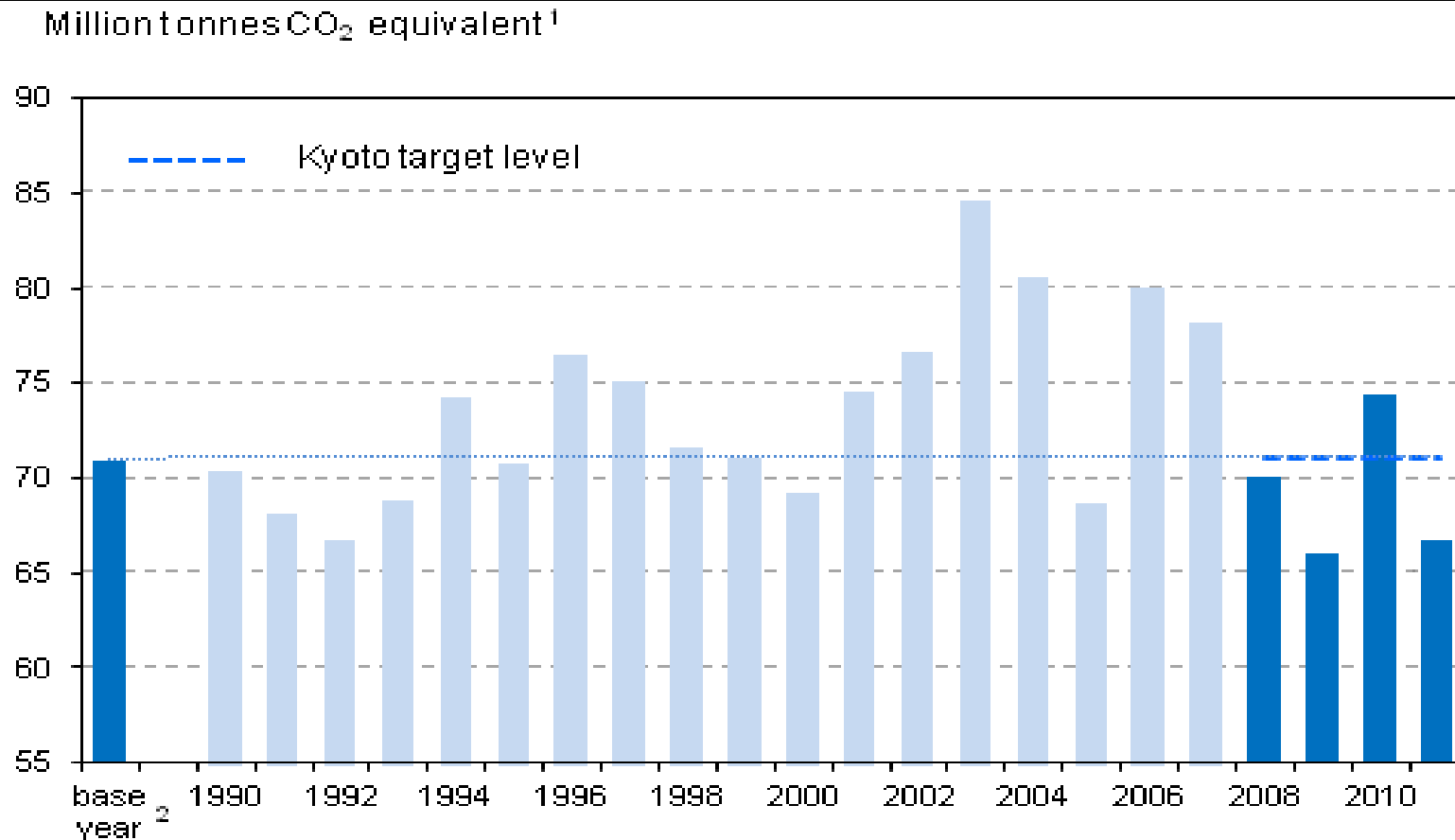
In 2011, Finland's greenhouse gas emissions amounted to 66.8 million tonnes of carbon dioxide (CO₂ eq.).

They declined by a total of 7.7 million carbon dioxide tonnes from the year before, falling below the commitment level of the Kyoto Protocol by around six per cent.

The data based on the report submitted by Statistics Finland to the European Commission on 15 January 2013 concerning emissions in 2011.



Commitment level of the Kyoto Protocol and Finland's greenhouse gas emissions in 1990-2011 (million tonnes of CO₂ eq.), excluding LULUCF sector



¹ CO₂ equivalent describes the warming effect of various gases in relation to CO₂, e.g. 1 t of N₂O is equivalent to 310 t of CO₂

² Finland's base year under the Kyoto Protocol is 1990, except for the so-called F-gases (HFC, PFC and SF₆) 1995. Finland's Kyoto target for 2008 - 2012 is estimated and fixed based on the reviewed base year inventory in the initial inventory submission under the Protocol



- The emissions decreased in all sectors compared to the previous year; the largest drop was seen in the energy sector 12 per cent.
- Fossil fuels in the production of electricity were replaced with electricity imports due to a good water situation in the Nordic countries.
- Overall energy consumption decreased due to fallen manufacturing output and the mild weather towards the end of 2011. A majority of the emission decrease materialised in the emissions trading sector.



- The monitoring under the Effort Sharing Decision of the EU's Climate and Energy Package will in future require emissions data to be broken down to emissions within and outside the emissions trading sector.
- The Effort Sharing Decision sets binding targets for emission reductions from the 2005 levels in the non-emissions trading sector during 2013-2020. **The reduction target for Finland is 16 per cent by 2020.**
- Between 2013 and 2020 the emissions must be on the so-called target path or below it. The path is linear and its starting point is the average of emissions from non-emissions trading sector sources in 2008-2010 and its final point is the target for emissions reduction by 2020.
- Emissions from non-emissions trading sector are calculated as the difference between reviewed total emissions and verified emissions of the emissions trading sector.



The development of emissions of the three main greenhouse gases in 1990-2010 (CO₂, CH₄ and N₂O) relative to the 1990 level is presented in Figure 2.2-1.

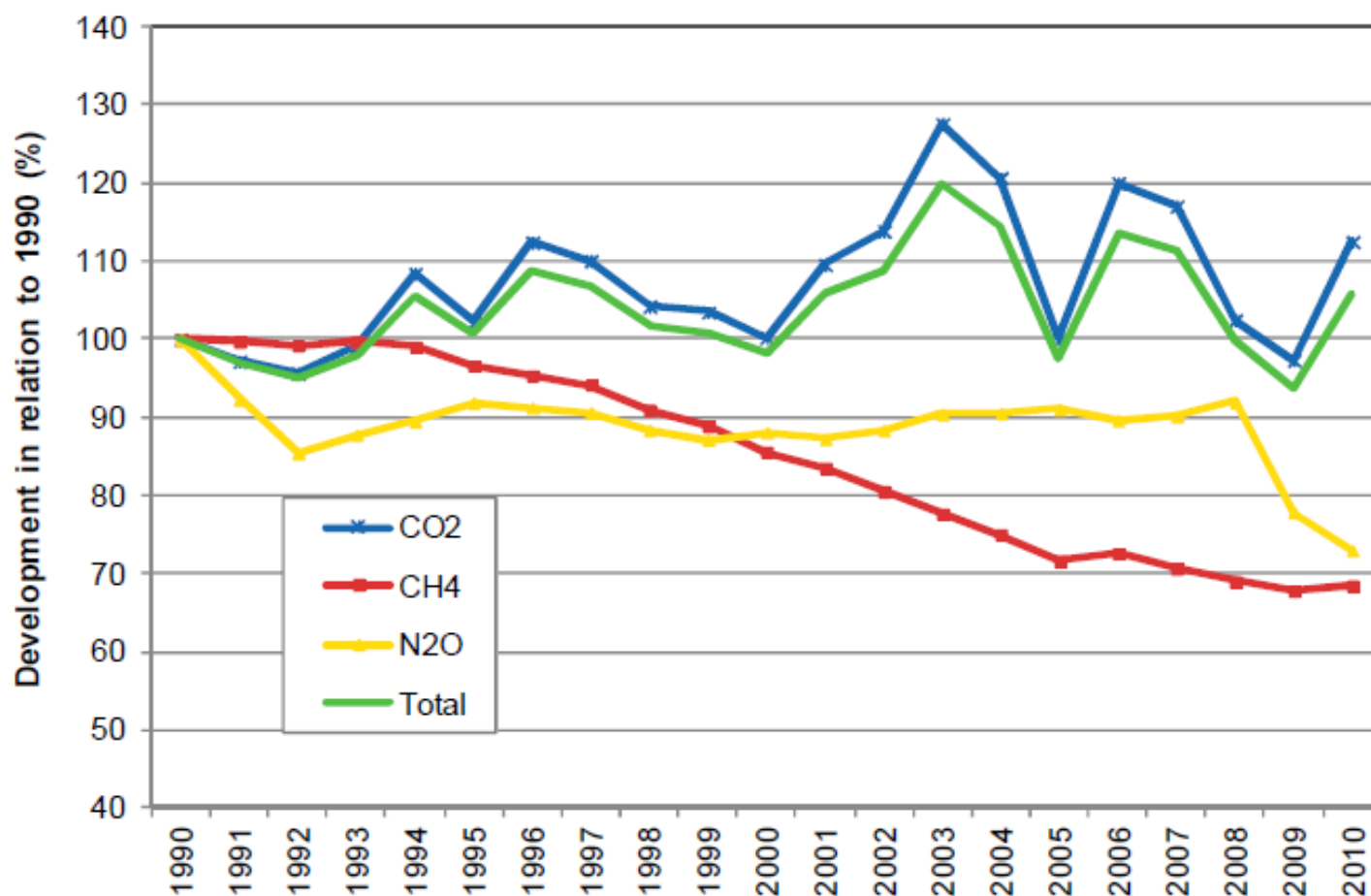
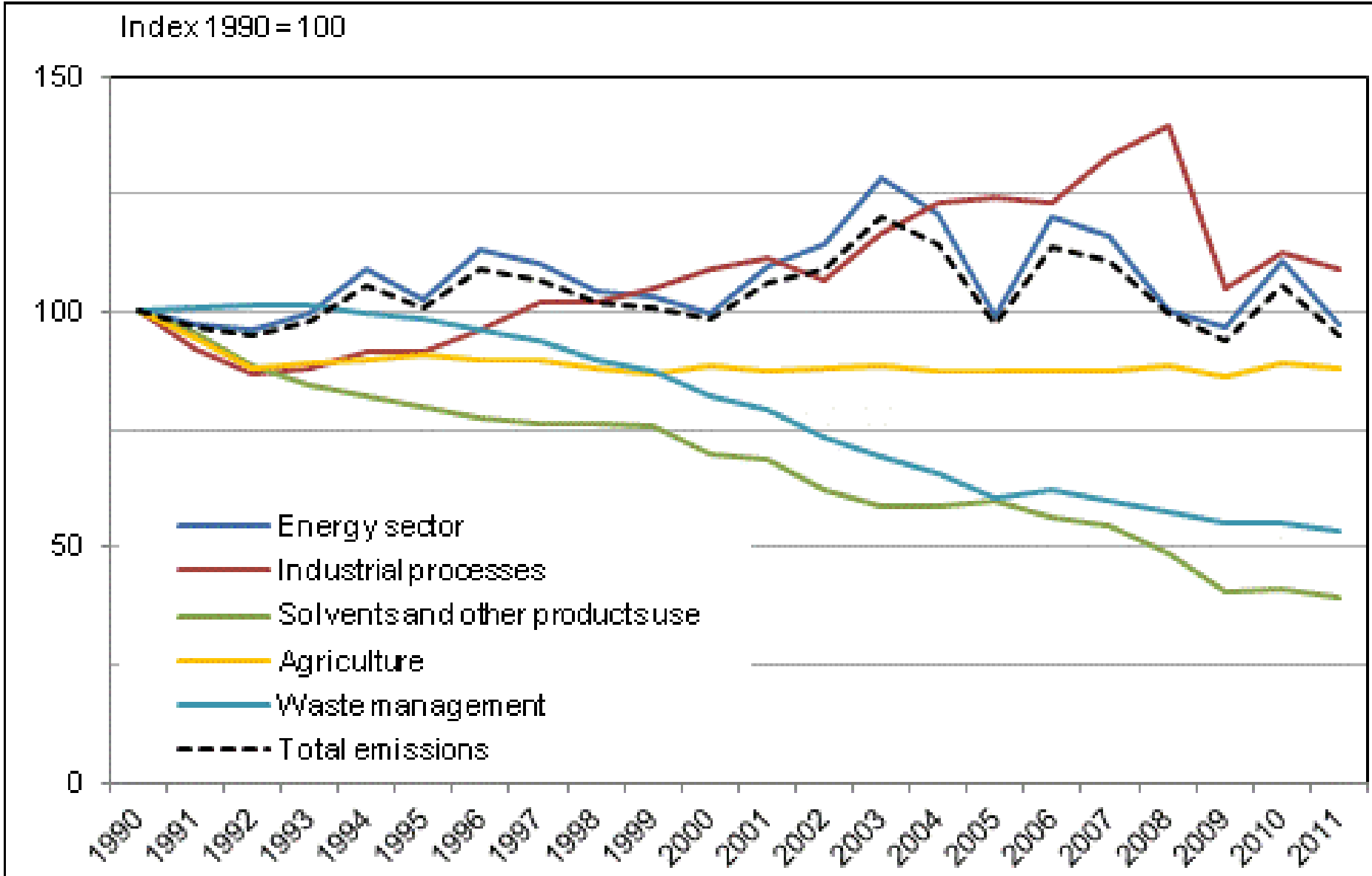


Figure 2.2-1 Relative development of CO₂, CH₄ and N₂O without the LULUCF sector in time series relative to the 1990 level (%)

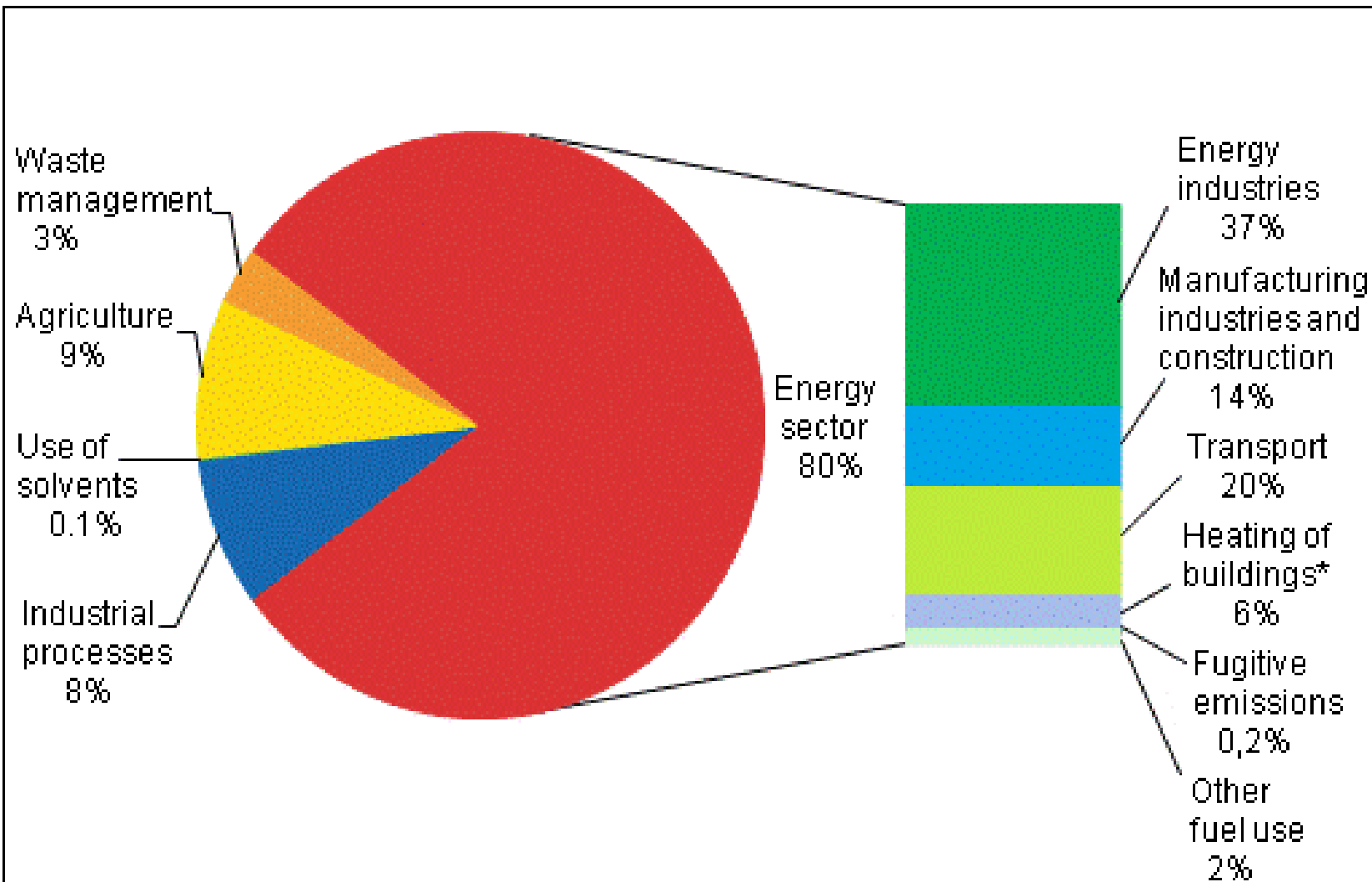
The emissions of F-gases have increased over twelve fold during 1990-2010. A key driver behind the trend has been the substitution of ozone depleting substances (ODS) by F-gases in many applications. In Table 2.2-1 the development of emissions of F-gases during 1990-2010 is presented by gas category.



Development of greenhouse gas emissions by sector in Finland in 1990-2011



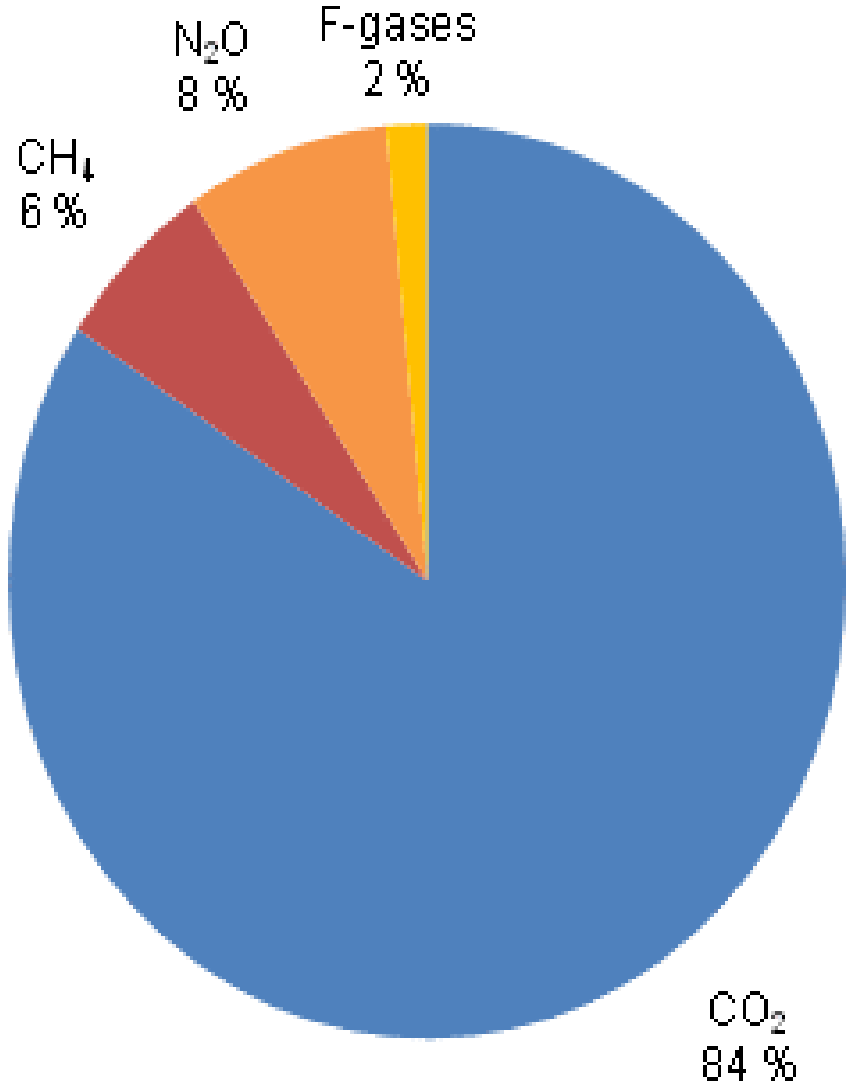
Greenhouse gas emissions in Finland by sector in 2011



* includes also emissions from machines used in agriculture and forestry and from fishing boats



Greenhouse gas emissions in Finland by gas in 2011



Finland's current methane and GMI-related activities *in developing countries supported by development co-operation funds:*

Energy and Environment Partnership Programmes (EEPs)

Most of Finland's development co-operation funds in the energy sector are channeled through five regional **Energy and Environment Partnership Programmes** that currently cover 32 countries in Central America, Andean region, Southern and Eastern Africa, Mekong region and Indonesia. The programmes provide grants to project developers through competitive calls for proposals. They support the preparatory phases of sustainable energy investments and piloting of business models to increase energy access. Based on demand, a vast majority of support has been granted to biomass and biogas projects.

The biogas projects include support for household-level small-scale biogas plants utilizing agricultural and domestic biowaste and for larger industrial-scale biogas plants utilizing landfill-methane, wastewater sludge, livestock biowaste, agricultural residues as well as other feedstocks, like water hyacinths on Lake Amatitlan in Guatemala. Together with other donors (Austria, United Kingdom, **Nordic Development Fund**) the total funding for the programmes is around 100 million euros, of which an **estimated amount of 30 million is used for GMI-related activities.**



Concessional Credits

In addition to EEPs, **Finland's bilateral funds** have supported *concessional credits to Finnish exporters for climate-related projects in developing countries*.

Although this funding instrument is going to close in its current form, some of the last projects include support to **Sludge Treatment Project in Kuming City, Yunnan Province, China**. The project **budget is about 25 million euros** and **7.5 million euros of Finnish ODA** has been budgeted for the credit subsidies.



MFA of Finland's ODA supported Sludge Treatment Project in Kunming City, Yunnan Province, CHINA

- Kunming city area has seven waste water treatment plants without proper sludge treatment processes. After a several studies the MFA of Finland decided to support and partially finance the project from its ODA funds.
- The objective of the project is to reduce pollution and sludge volume by constructing a sludge treatment facility to stabilize, reduce and re-use the excess sludge generated in the seven wastewater treatment plants.
- The main process units of the plant are anaerobic digestion, dewatering and thermal drying (the process is called High Loaded Anaerobic Treatment).
The final product is digested and sterilized dry sludge. Generated biogas is planned to be used as a heat source in the thermal drying stage.



MFA of Finland's ODA supported Sludge Treatment Project in Kunming City, Yunnan Province, CHINA

- Positive environmental impacts of the project are identified as:
 1. Reduction of sludge volume
 2. Reduction of methane emissions
 3. Raw sludge is not any more transported to landfill (pollution risk caused by raw sludge is eliminated)
 4. Stabilized and dried sludge is used mainly in landscaping of green areas but possibly also as cover soil in landfills or fertilizer
- In the tender process MK Protech Oy, a Finnish engineering company was selected to deliver the project and the project started in the end of the 2012. The plant is will be operated by the municipal owned Kunming Dianchi Investment Co. Ltd. The project budget is about 25 million euros and 7,5 million euros of Finnish ODA has been budgeted for the credit subsidies



Project Site in Kunming City



- **Finnpartnership and Finnfund**

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- Finland's bilateral funds also support *methane-related commercial investments* through the Finnish Business Partnership Programme and the Finnish Fund for Industrial Cooperation Ltd. (Finnfund).

- Examples of projects supported through grants, loans and equity investments include

- **1) Thai Biogas Energy Company in Thailand**

- producing biogas from waste waters of starch mills in Thailand and

- **2) supporting a Finnish company to establish a joint venture in**

- **Vietnam to own and operate power plants utilizing methane gases from landfill sites.**

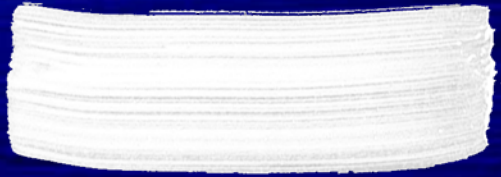
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- **Nordic Development Fund (NDF)**

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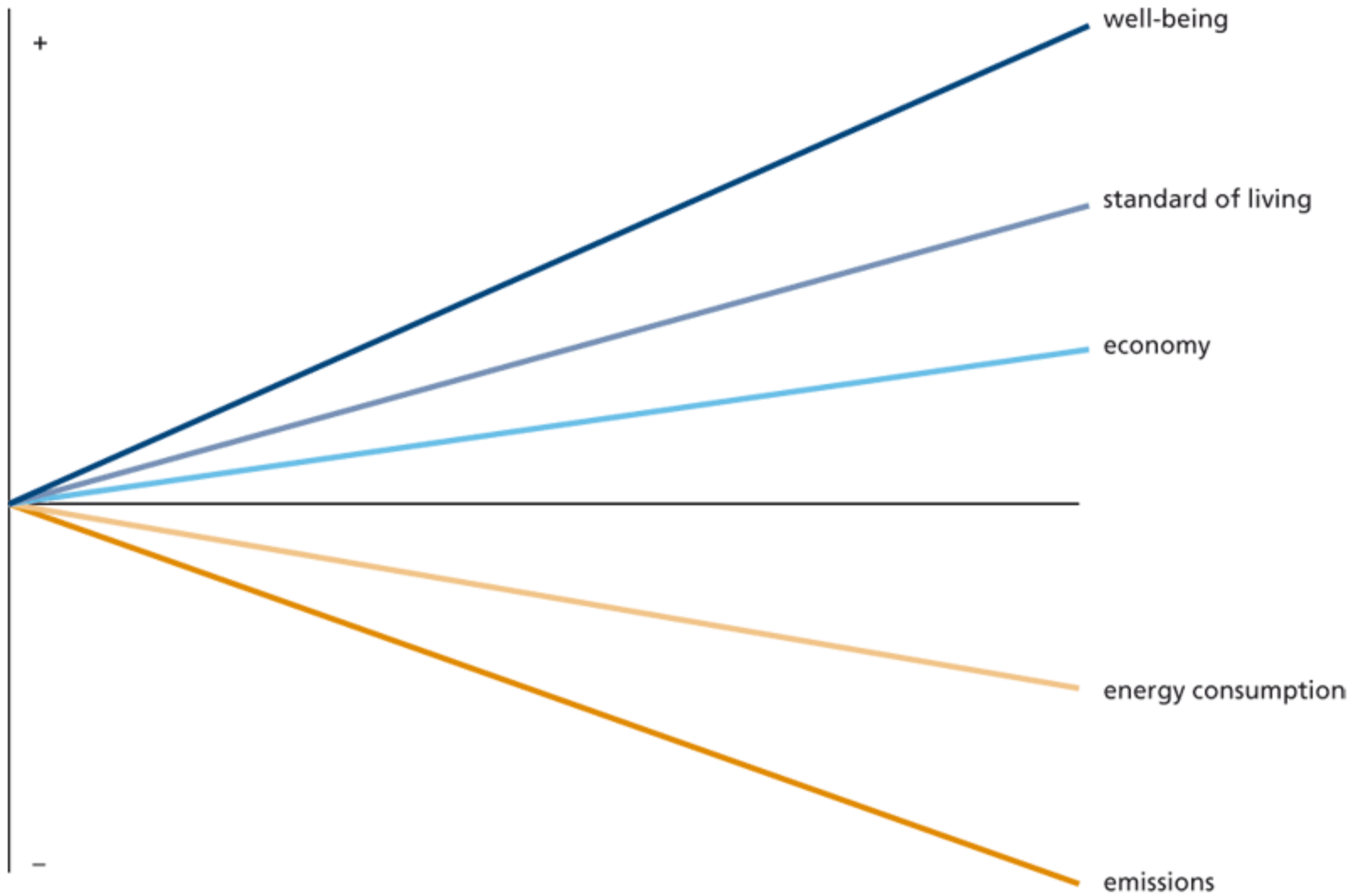
- In addition, Finland is contributing to the **Nordic Development Fund** that supports methane recovery and utilization projects, for example, in agricultural sector in **Ghana, Senegal and Nicaragua**, with a current project portfolio of **around 10 million euro**.

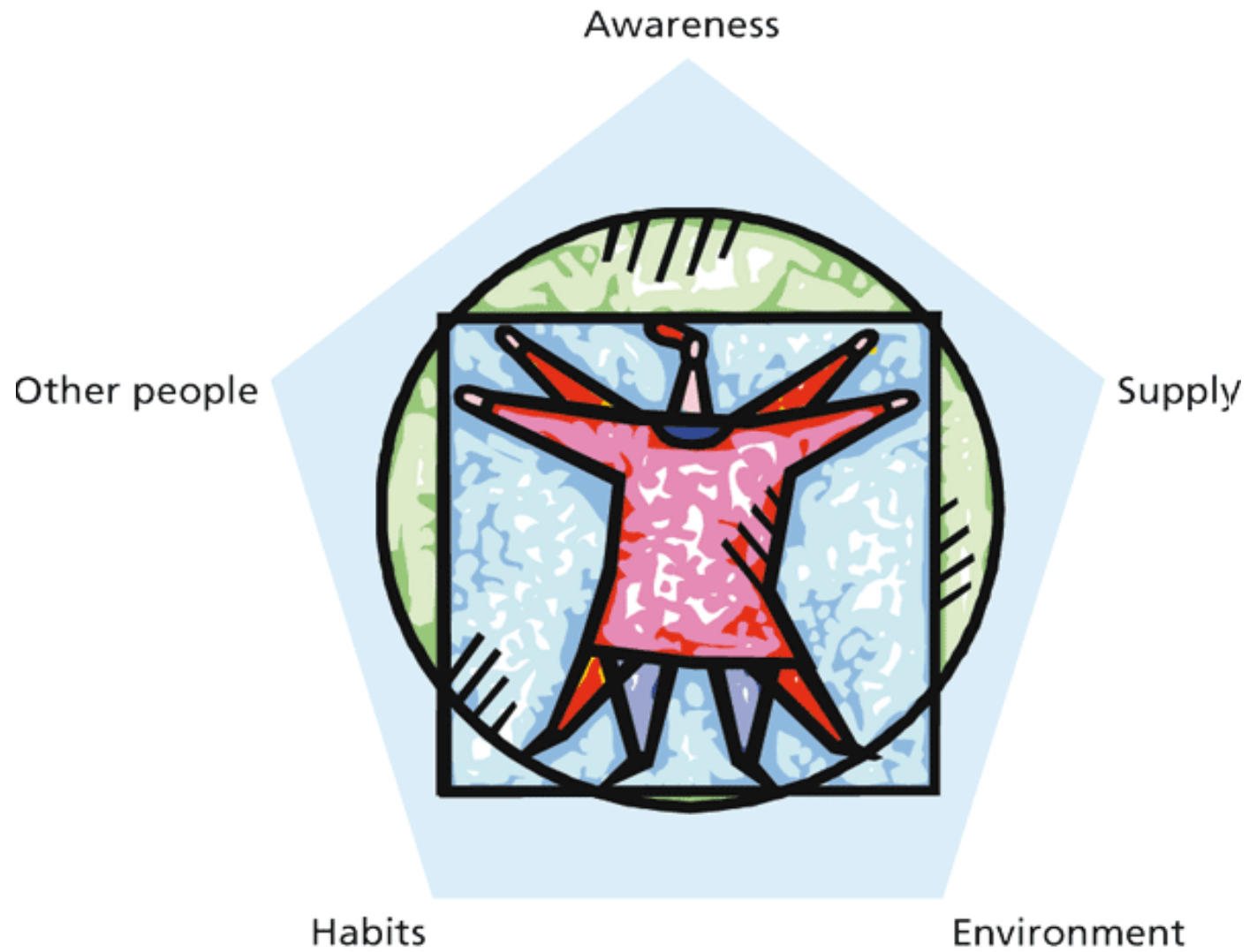




to conclude...







Roadmap to renewable methane economy

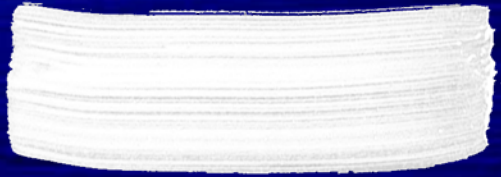
Extended summary





Ford truck refilling biogas at Rajasaari sewage treatment plant in 1943 (© Photo archive of Helsinki city museum).





Finland produces functional and sustainable solutions for the environment.



An aerial night view of a city, likely Copenhagen, Denmark. The sky is a deep blue, and a bright full moon is visible in the upper center. The city is illuminated by streetlights and building lights, with a prominent tall, thin spire on the right side. The sea is visible in the background.

Many thanks !

