

Norwegian Regulation on HFCs and Incentives on Alternatives

Presentation at ATMOsphere 2016 “Natural Refrigerants - Solutions for Europe”
Torgrim Asphjell, April 19, 2016



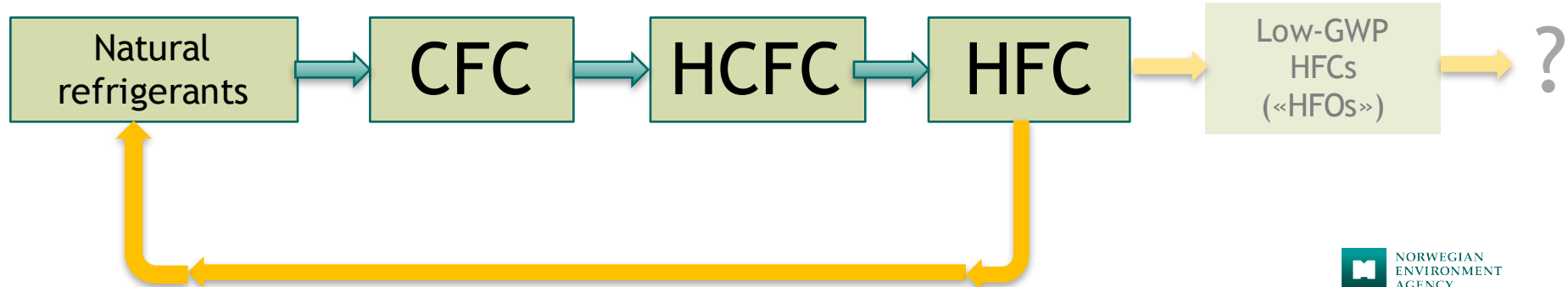
Norway

- No EU member, but EEA agreement with EU
- No production of F-gases
- Some production of large refrigeration equipment
- Smaller hermetically sealed equipment all imported (heat pumps, cars)
- CO2 tax on fossile fuels

General Approach

- **Intention:**

- Short term: **Curb growth in HFC emissions**
- Medium term: **Phase-out use of (strong) HFCs**
- Long term: **Natural refrigerants**

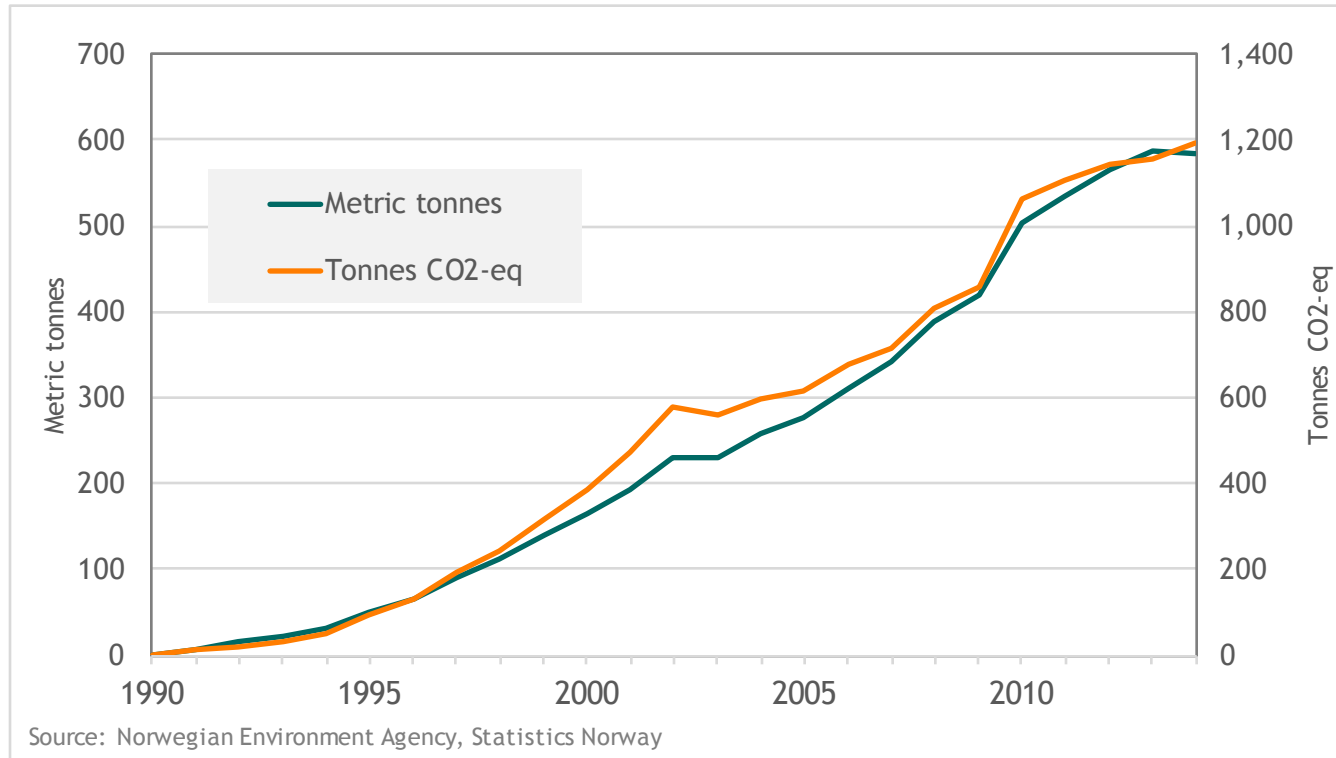


HFC Regulation and Measures in Norway

- Regulation:
 - **EU regulation** (Currently No 842/2006, No 517/2014 in preparation)
 - **Tax and refund scheme** for HFC-gases
 - HFCs defined as harmful waste in **waste regulation** (collection and safe destruction obligatory)
- Measures:
 - **Use low- GWP HFCs**
 - **Minimize emissions** through technical and administrative measures
 - **Collect and destroy gas**
 - **Use natural refrigerants** or alternative technology

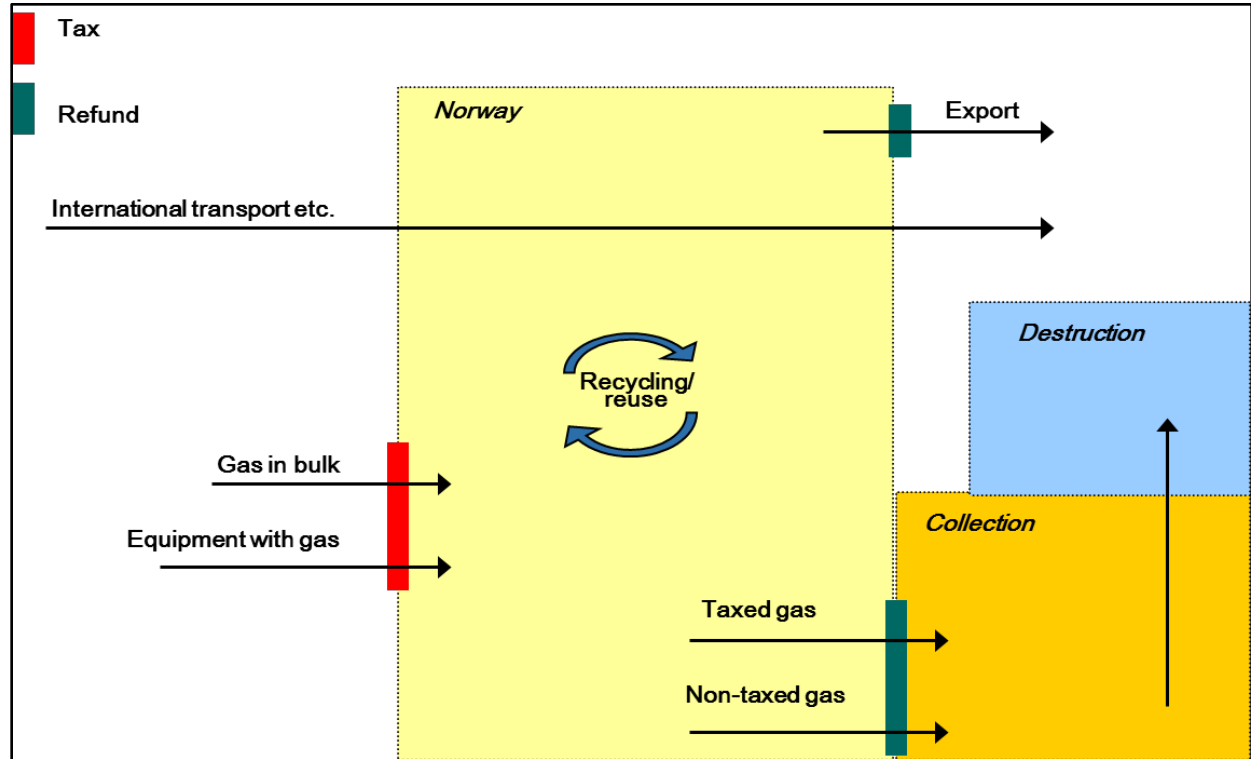
Emissions of HFCs

Norway 1990-2014

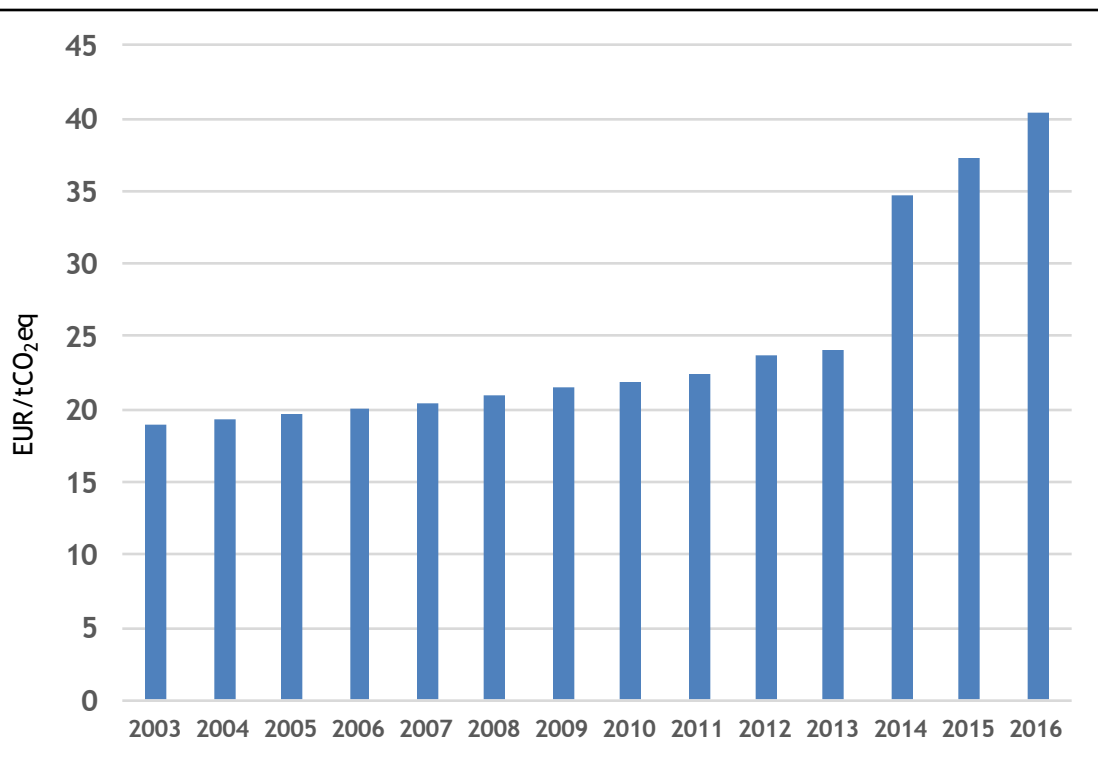


Tax and Refund Scheme

- Tax of 383 NOK (approx. 40 Euro) pr GWP-tonnes of HFCs imported in bulk or products
- Refund equal to tax if used gas is recovered and destroyed (regardless of if tax actually has been paid on that particular amount of gas)
- Equals, over time, a proxy CO2-tax on emissions of HFCs



Taxation Level



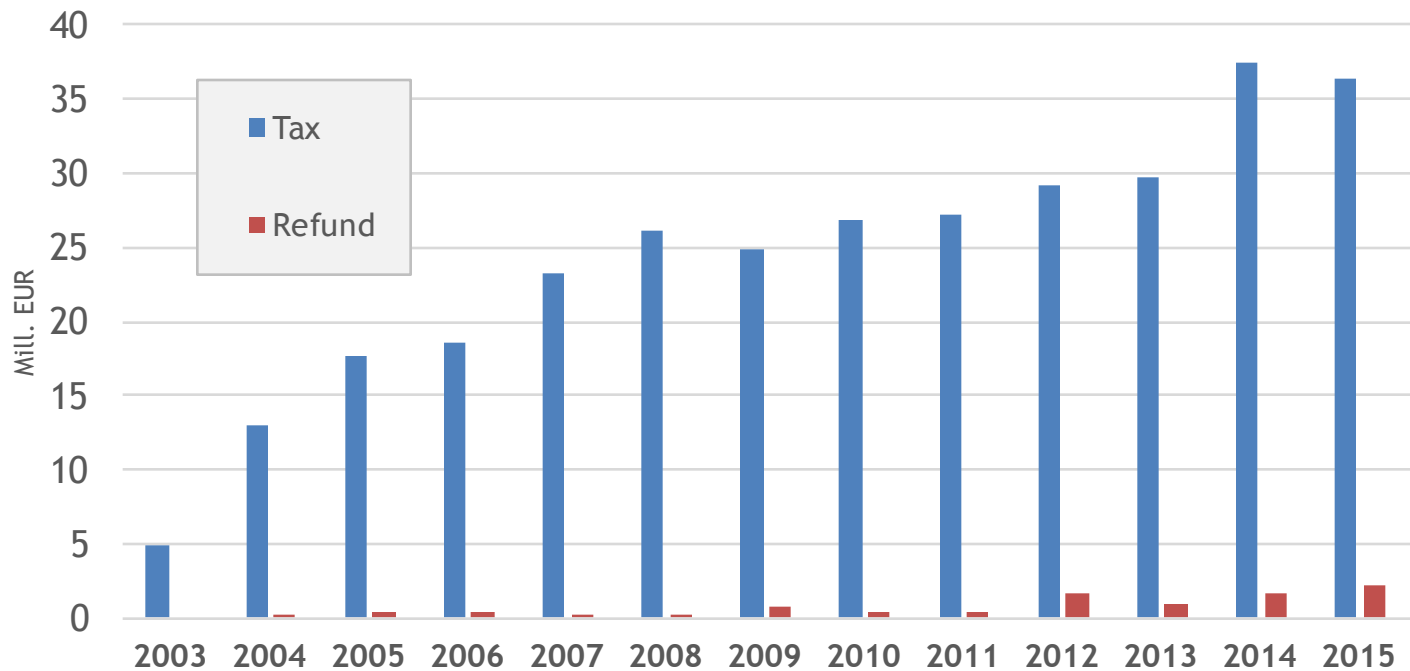
Source: Norwegian Tax Administration

1 EUR = 9,5 NOK

Prices before and after tax (in Euro, example)

Gas	Price before tax	Tax	Market price
R-32	46	27	73
R-134a	25	58	83
R-410a	28	82	110
R-507	32	161	192

Tax and Refund - Totals



Source: Norwegian Tax Administration, SRG

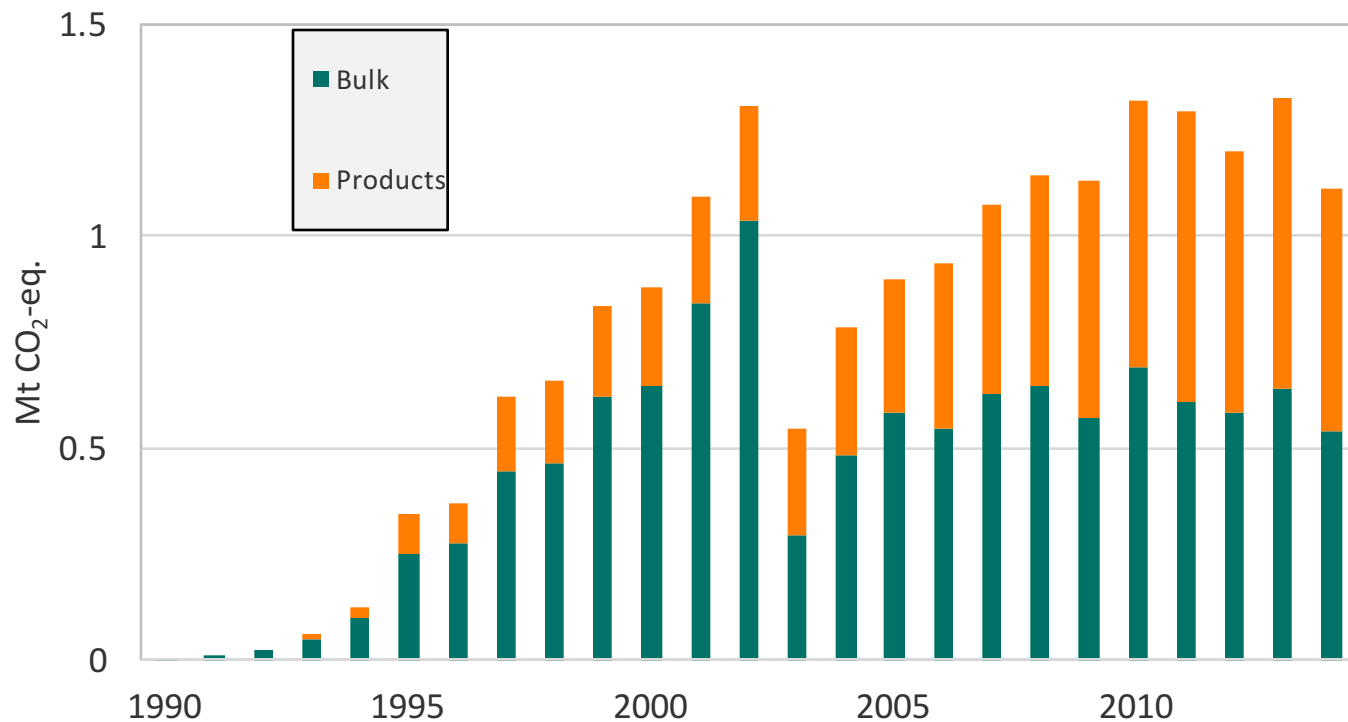
Main Results

- Reduced leakage rates (due to tax and EU regulation)
- More low-GWP HFCs and natural refrigerants in larger systems (mainly due to tax) - however, limited effect on smaller mass-produced equipment
- Less emissions of used gas (due to refund)
- increased focus on alternatives (due to tax and EU regulation)

Result: Slower growth in emissions of HFCs and possibly decline in the future

Side effect: Technological innovation and new business opportunities

Import of HFCs to Norway



Source: Norwegian Tax Administration, Statistics Norway

Co-operation Projects

Two Norwegian co-operation projects with India under preparation:

- Project on incentives and regulatory approaches to assist a move towards low-GWP HFCs and natural refrigerants
- Use of CO₂ as refrigerant in refrigeration and air-conditioning in supermarkets (technology transfer, research- and industry-partners from India/Norway (SINTEF)/EU, focus on high ambient temperatures)

Other Issues

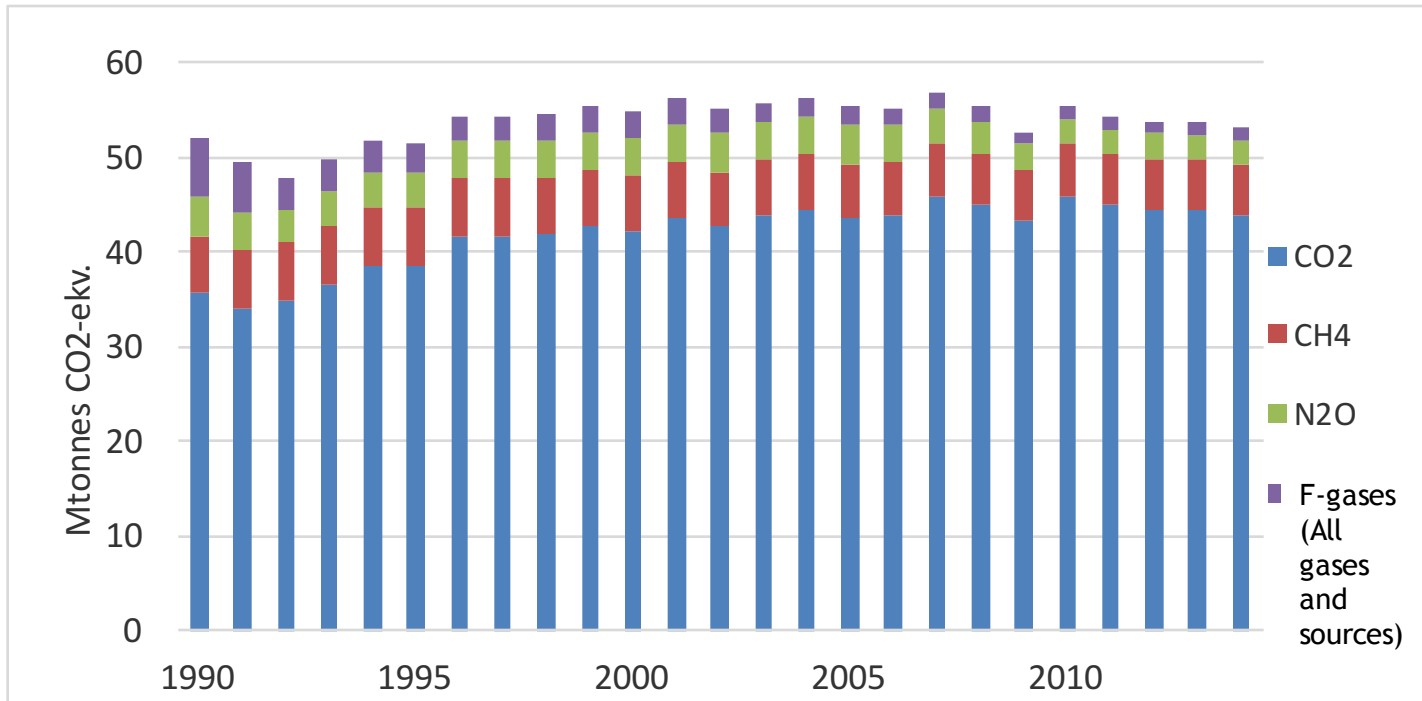
- Norwegian Directorat for Civil Protection are following up on safe use of natural refrigerants (CO₂, NH₃ and HCs)
- The Norwegian Water Resources and Energy Directorate has focus on issues related to energy efficiency
- Norway has, together with Nordic colleagues, produced fact sheets on natural refrigerants:

<http://norden.diva-portal.org/smash/record.jsf?pid=diva2%3A715185&dswid=9647>

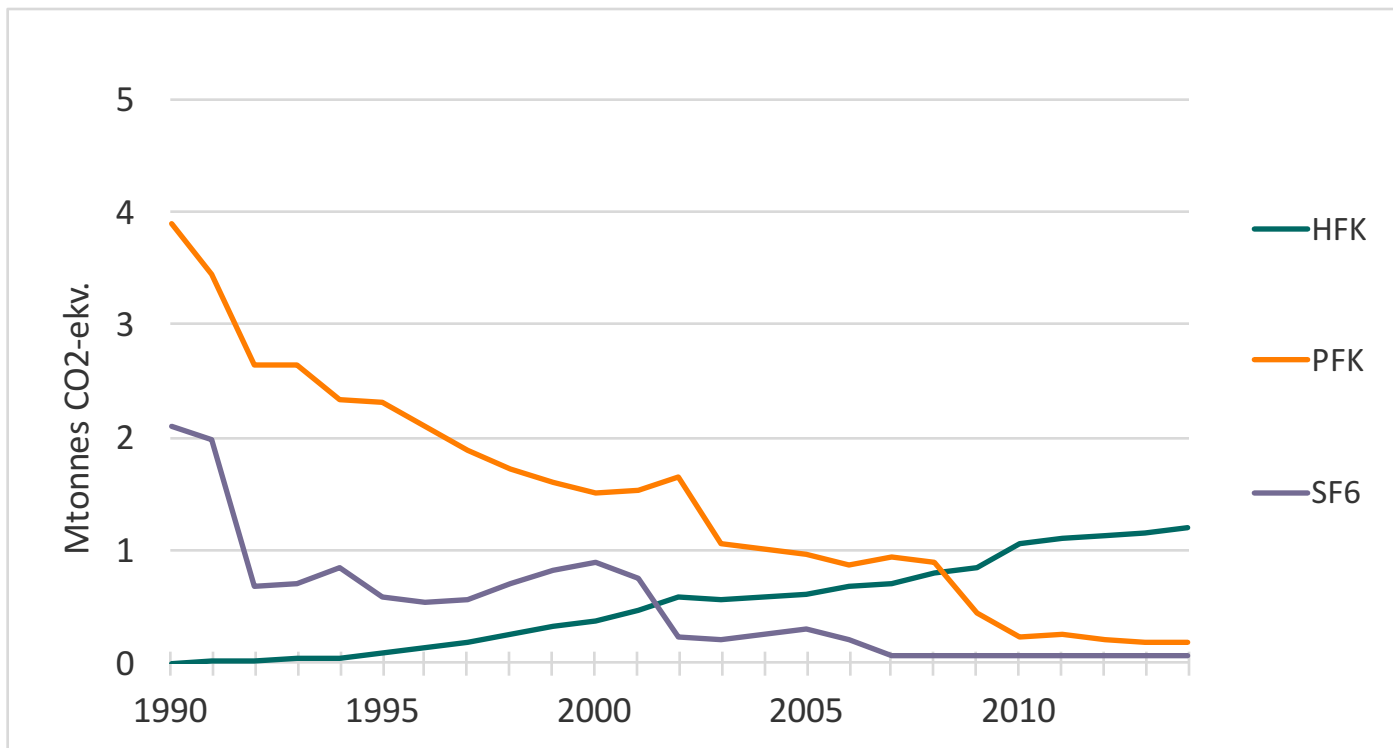


www.miljodirektoratet.no

Greenhouse Gas Emissions from Norway

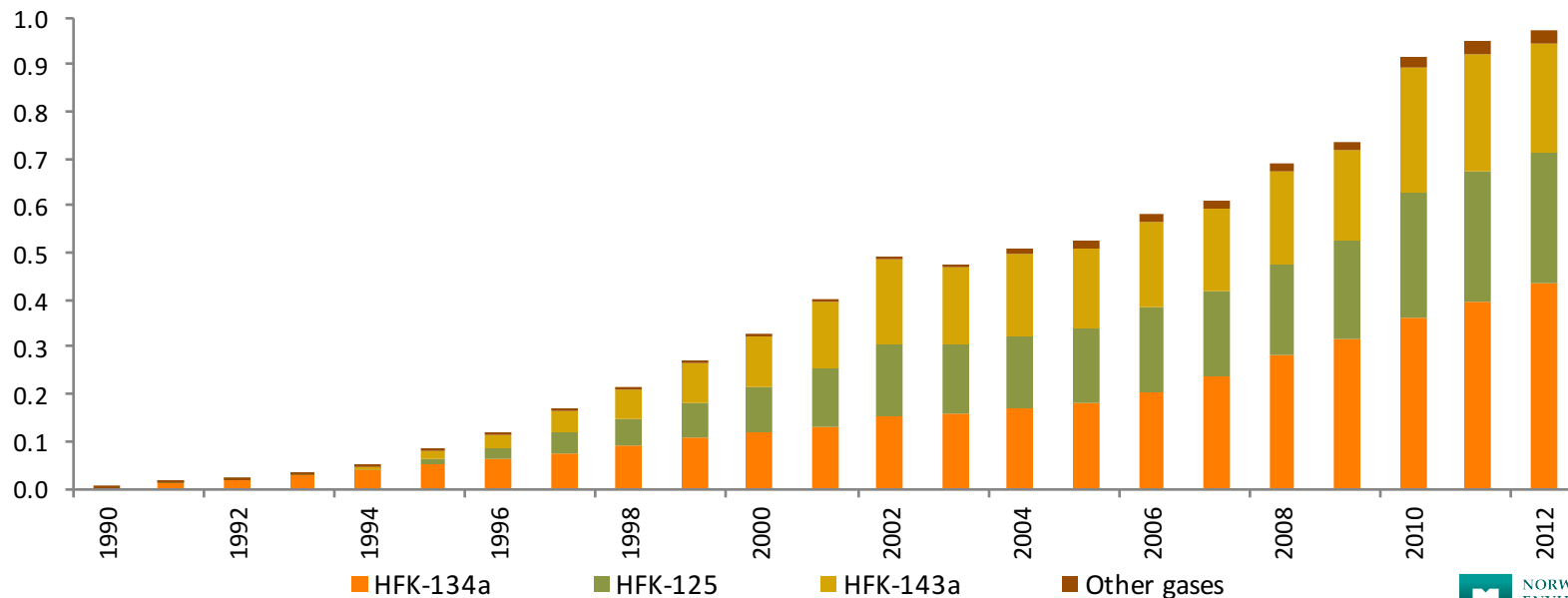


Emissions of f-gases



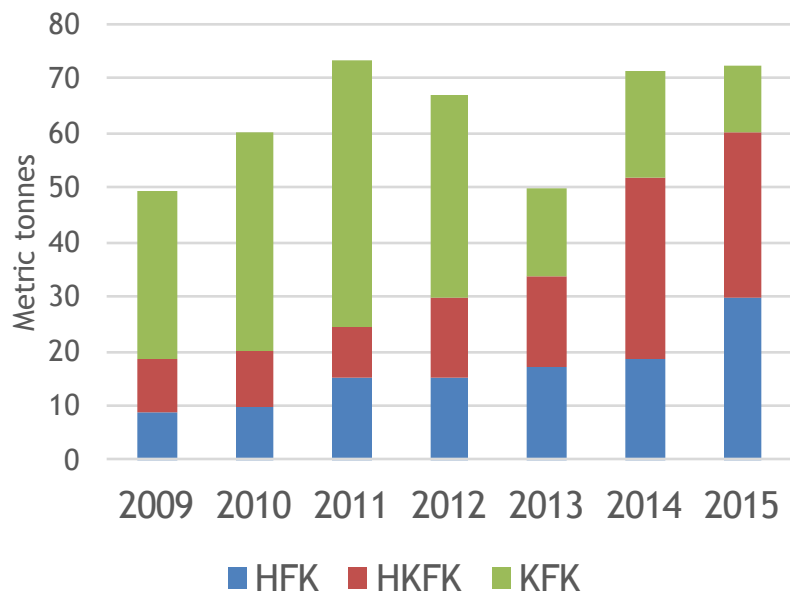
HFC Emissions from Norway

(MtCO₂-eq)



Refund

Collected Refrigerants



Refund paid (1 NOK = appr 9,5 Euro)

