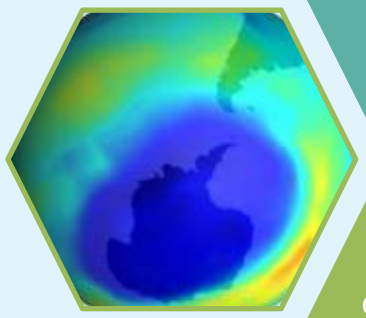
UN environment programme | ozone secretariat

The Montreal Protocol

How does the Protocol treat the e-waste issue?

Liazzat Rabbiosi | Ozone Secretariat |

What is the Montreal Protocol ?



Multilateral Environment Agreement

Controls 96 man-made chemicals

5 Amendments

Financial Support to 144 developing countries

Protects the ozone layer and mitigate climate change

Examples of refrigerant uses

in refrigeration, air-conditioning, heat pumps, foam and other products






in fire-protection systems

In agriculture for pest control

in chemical processing

Environmental Characteristics

Table 2. Environmental Characteristics of Several Refrigerants
Source: (ASHRAE 2013)

ASHRAE Designation	Name or Composition	Chemical Formula	ODP	GWP	Atmos. Life (years)
Halocarbons: Chlorofluorocarbons (CFC)					
R-11	Trichlorofluoromethane	CCl_3F	1.00	4750	45
R-12	Dichlorodifluoromethane	CCl_2F_2	0.820	10900	100
R-13	Chlorotrifluoromethane	$CClF_3$	1.00	14400	640
Halocarbons: Hydrochlorofluorocarbons (HCFC)					
R-22	Chlorodifluoromethane	$CHClF_2$	0.040	1790	11.9
R-123	2,2-dichloro-1,1,1-trifluoroethane	$CHCl_2CF_3$	0.010	77	1.3
Halocarbons: Hydrofluorocarbons (HFC)					
R-23	Trifluoromethane	CHF_3	0	14200	222
R-32	Difluoromethane	CH_2F_2	0	716	5.2
R-125	Pentafluoroethane	CHF_2CF_3	0	3420	28.2
R-134a	1,1,1,2-tetrafluoroethane	CH_2FCF_3	0	1370	13.4
R-143a	1,1,1-trifluoroethane	CH_3CF_3	0	4180	47.1
R-152a	1,1-difluoroethane	CH_3CHF_2	0	133	1.5

How it works

- To protect human health and the environment through **the control of the consumption** of ozone and climate harmful substances

Consumption = Import – Export + Production

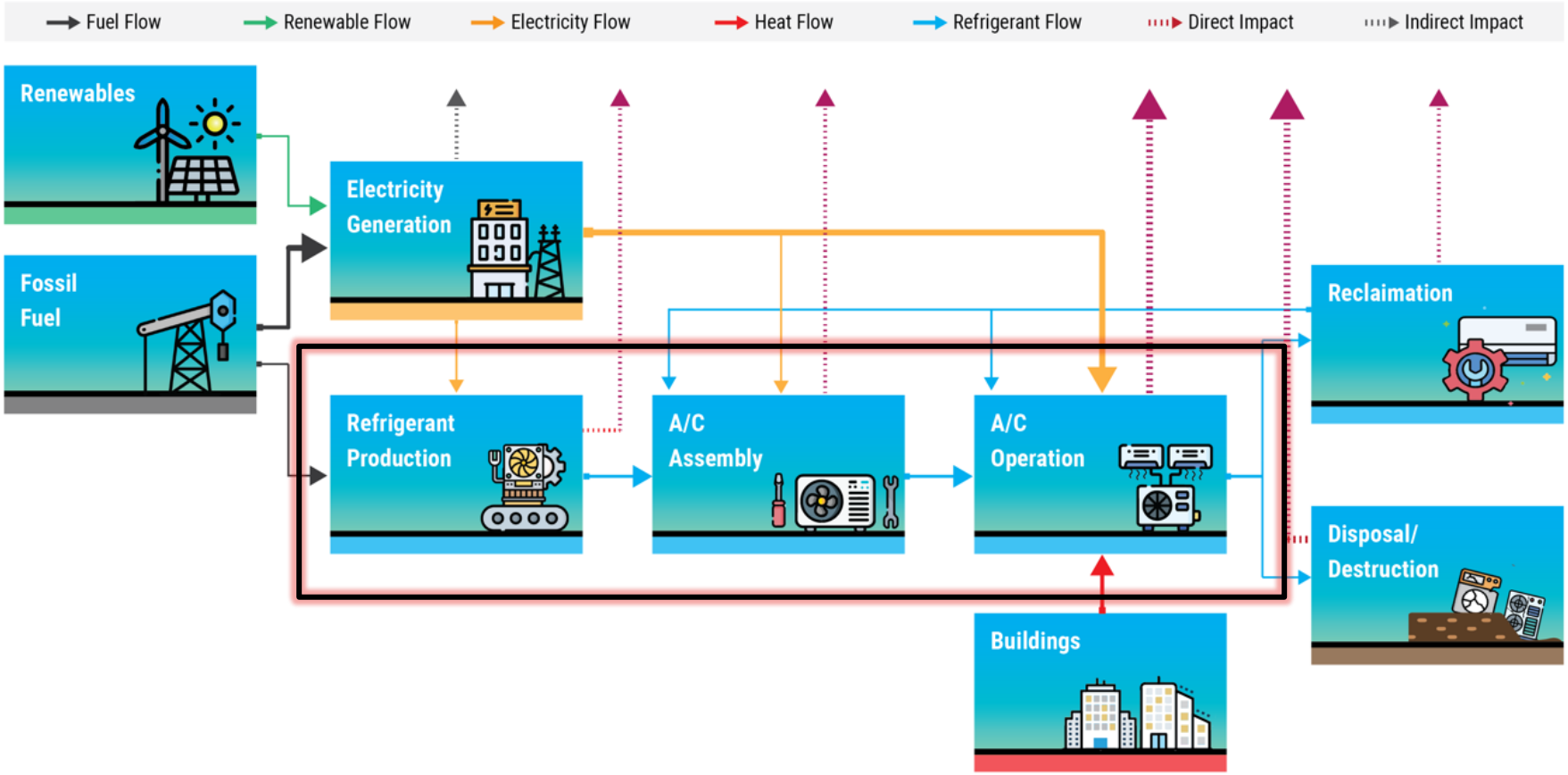
- Gradual phase out of pure substances and their blends (Article 2)
- Licensing systems for import and export of controlled substances (Article 4B)
- Mandatory reporting of annul statistical data of production and consumption of controlled substances (Article 7)
- Control of Trade with non-Parties (article 4A)

E-waste management under the Protocol

RACHP equipment as E-waste

- E-waste, also known as waste from electrical and electronic equipment (WEEE) refers to electronic products and equipment that have reached the end of their life cycle or have lost value to their current owners.
- includes refrigeration, air-conditioners, and heat pumps (RACHP) due to:
  - refrigerants and foam blowing agents they contain;
  - Also contain hazardous components such mercury, lead, chromium, cadmium, PCB PBB and PBDE in plastics
  - Metals and rare materials

Air Conditioner value chain



Decisions of the Parties related to e-waste

MONITORING PRODUCTS/EQUIPMENT CONTAINING CONTROLLED SUBSTANCES

(Decisions VII/32, IX/9, X/9, XXVII/8, XXXIV/4, XXXV/13)

USE OF RECOVERED, RECYCLED AND RECLAIMED SUBSTANCES

(Decisions IV/24, V/24, VI/19)

ENVIRONMENTALLY SOUND DISPOSAL AND DESTRUCTION OF SUBSTANCES

Dumping of inefficient equipment containing controlled substances

Concerns over Environmental Dumping

Environmental dumping of is the practice of exporting to another country or territory of products that:

1) contain hazardous substances;

2) have lower environmental performance than in exporting country;

3) can undermine the ability of the importing country to fulfil international commitments.

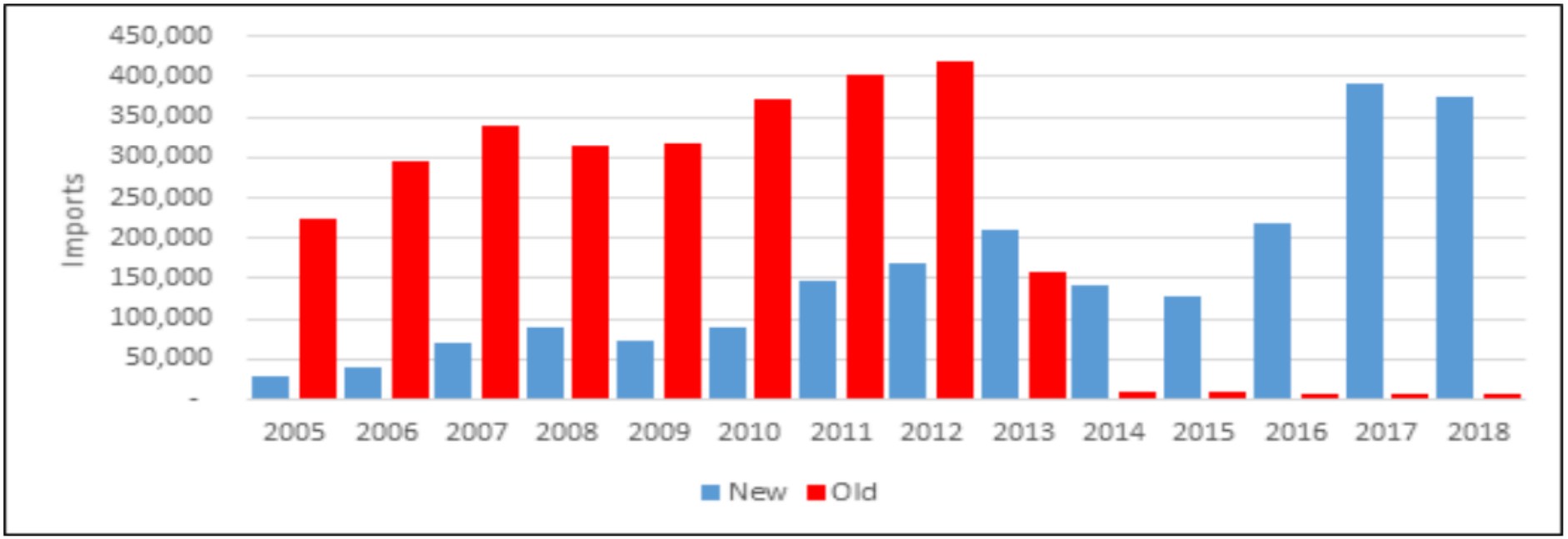
Happens due to

- Limited implementation and enforcement proactive anti-dumping policies
- Energy efficiency policies, such as MEPS, lag behind the innovation in RAC technology and the policies of other mainstream countries

Options for dealing with dumping based on other sources based on the concept of shared responsibility

- **Export countries**
  - ensure exports meet the exporting country's domestic requirements
  - remove loopholes or exemptions that allow such exports and promote other policy mechanisms, agreements and cooperation with key stakeholders that will disincentivize export of low-efficiency RACs using high-GWP refrigerants.
- **Import countries**
  - Adopt regulations in line with the Kigali Amendment to facilitate phase out high-GWP refrigerants.
  - Adopt MEPS consistent with their major trade partners
  - Introduce preferential import policies and incentives to promote high efficiency RACs
  - Design incentive programs for producers to produce and consumers to buy more efficient RACs.

Number of new versus second- hand fridges imported into Ghana



- In 2008 Ghana passed a ban for import of second-hand RAC equipment to restrict the flow of appliances that contained controlled substance and not meeting MEPs
- Enforcement of the ban in 2013, enhanced border control and cross agency collaboration (Energy Commission and Customs and Border Control Agencies)
- Implementation of Minimum Energy Efficiency Standards

(based on CLASP report '[Environmentally-harmful dumping of inefficient and obsolete air conditioners in Africa]')

End-of-life management of banks

End-of-life management: RRR and/or destruction technologies

There is a significant inventory in active (equipment in use) and inactive bank (e.g., landfills) – equivalent to 16 $GtCO_2e$ in 2022, **not yet released to the atmosphere**

The transfer from active to inactive bank at the end of life is a decision-making about either final disposition or reuse.

Destruction is not mandated by Montreal Protocol; but needs to be reported to the Secretariat under Article 7 reporting framework

Promoting the reuse of controlled substances

- **Exclude** used controlled substances from a country's calculated level of consumption, contingent on reporting such trade to the Secretariat
- **TMB of substances/equipment** according to appropriate the Basel Convention's provisions and make policy decisions that support the goals of both Conventions
- Exporting parties to ensure **documentation** (**source of the used controlled substance and its recovery, recycling, or reclamation status**), **correct labeling** and the nature of the exported substances and report to the Secretariat
- **to report to the Secretariat** the list and capacities of reclamation facilities for info sharing

Reuse of controlled substances prevents leakage of harmful substances and delays the generation of e-waste

Destruction, disposal and management of banks

Promote environmentally sound destruction of controlled substances:

- use of relevant technologies for destruction and code of good housekeeping (regular revision and recommendation of destruction technologies by the Technology and Economic Assessment Panel)
- proper recovery of substances
- develop national and regional strategies for the management of banks

Lessons learned

- The Multilateral Fund for the Implementation of the Montreal Protocol has been providing funding for banks management for demonstration projects.
- A new ongoing funding window for the ODS banks inventory and management plans

➢ Lessons learned for long-term sustainability:

- ✓ Awareness on the importance of developing concrete procedures for the management and disposal of ODS waste
- ✓ regulatory (such as market quotas for new refrigerant, levies, extended producer responsibility) and institutional support, including policies for destruction
- ✓ Co-financing, e.g. carbon finance, carbon credits
- ✓ Sustainable business model with complex coordination arrangements with various stakeholders, and private sector commitment
- ✓ International cooperation through public and private sector partners.
- ✓ Transboundary movement in line with the international conventions and standards

Life-cycle Refrigerant Management

What is Life-cycle Refrigerant Management

Leakage prevention through regulation and promotion of good practices

Supply: Supply of reclaimed refrigerant to reduce the need for virgin product

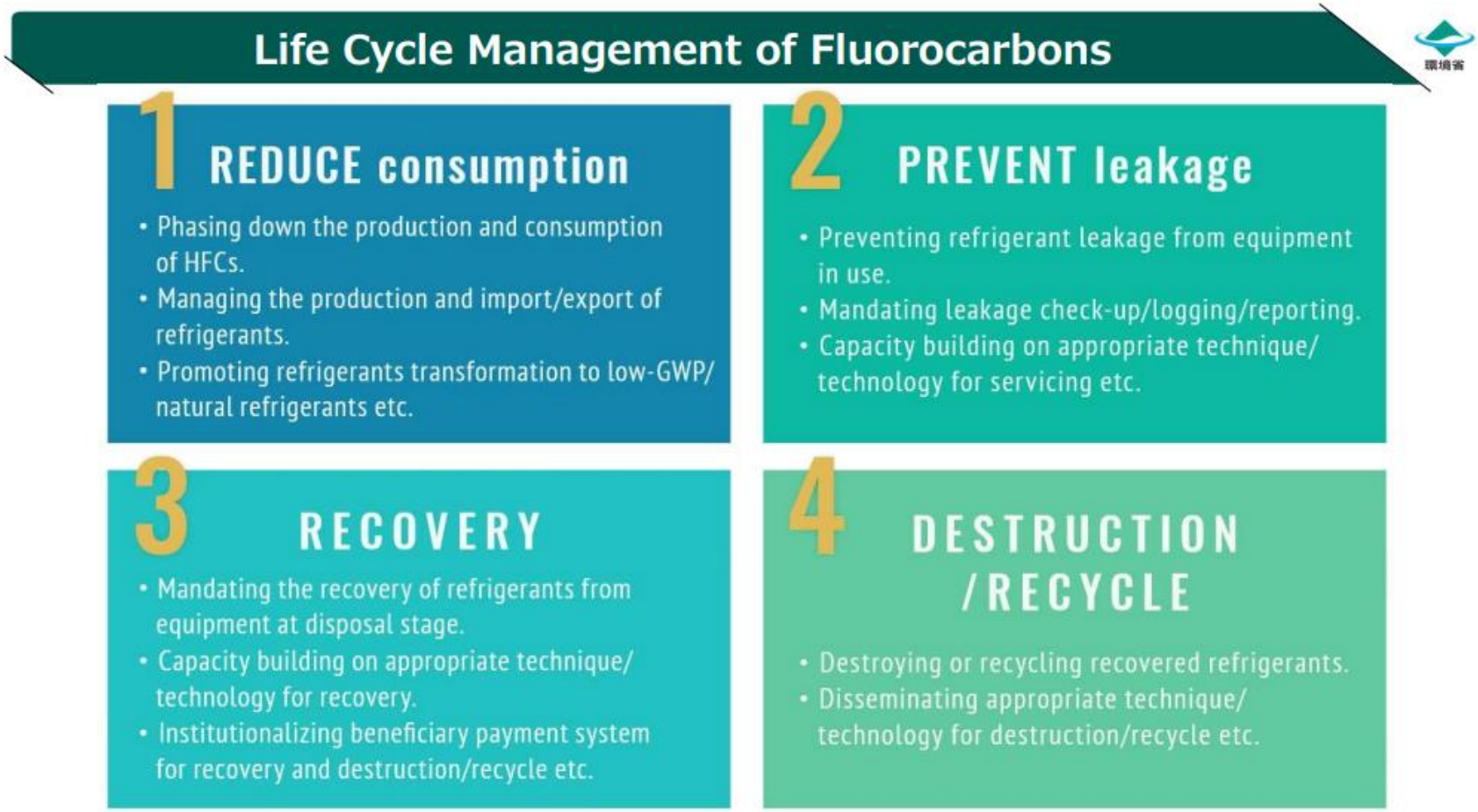
Recovery: Recovery of refrigerants from existing systems in a safe and compliant manner to avoid the release to atmosphere.

Reclamation: Oil and Moisture removal/Separation of mixed refrigerants

Destruction: Destruction of ‘End of Life’ gases (where no re-use is possible, or by customer choice) using a TEAP approved destruction technology.

Japan: Robust regulatory framework

comprehensive legislation on refrigerant management for all sectors that target the different lifecycle stages of refrigerant management



Japan: a sector-based approach

- Law on Recycling End-of-Life Vehicles
- Automobile manufacturers and importers are required to collect and dispose of HFC gas recovered during the treatment of the end-of-life vehicles under the extended producer responsibility principle, which is included in this statute.
- Recycling fees are charged to the car owner at the time of the purchase of a new vehicle

Practices on LRM

- **Norway: Tax and refund scheme**

  - Financial inducements are thought to boost the returns of refrigerants for destruction in Norway.

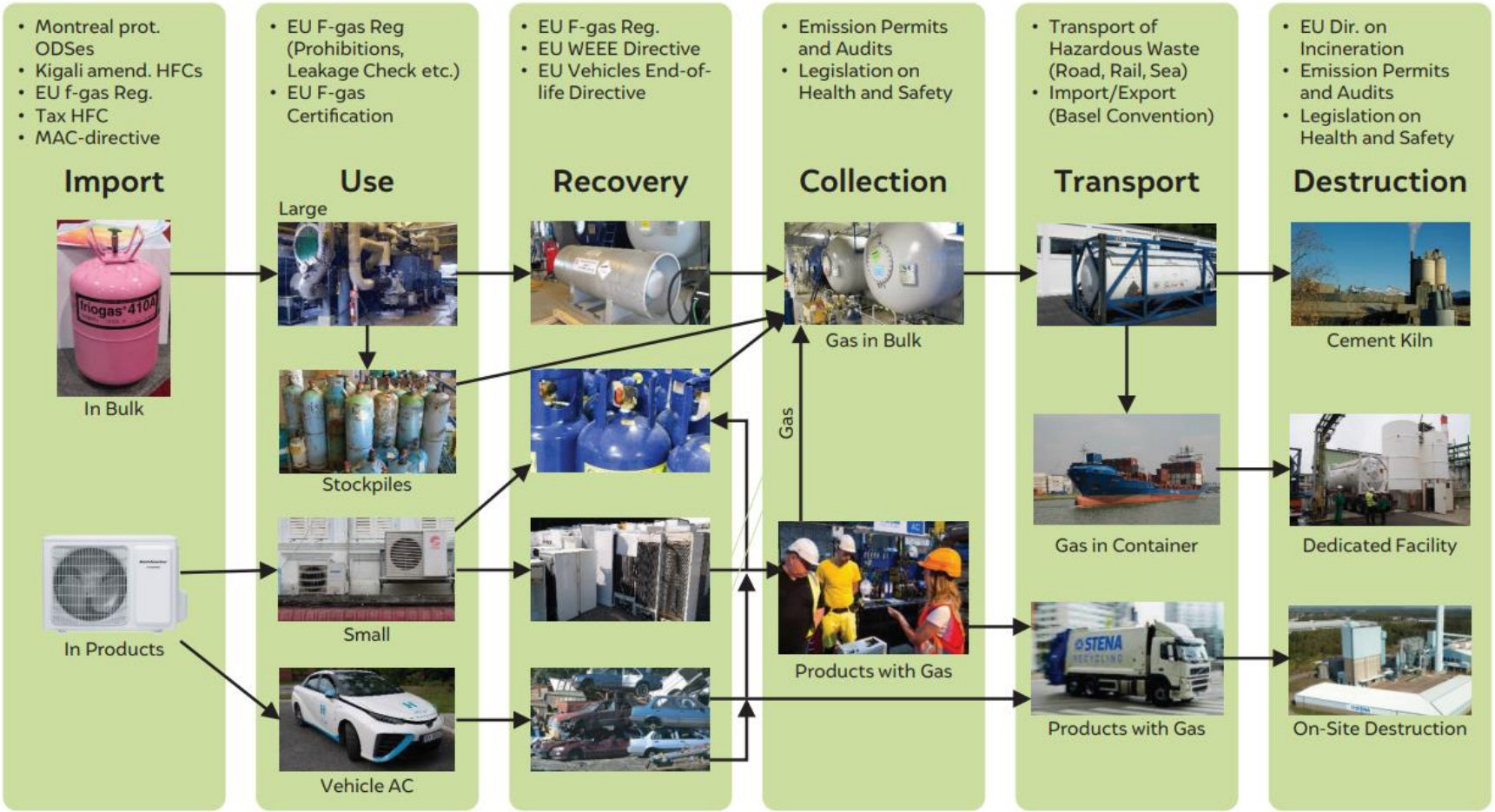
  - Norway has implemented a method for tax refunds if the refrigerants are delivered for destruction due to high import duties.

  - The gas is analysed before being destroyed to guarantee proper refund and paperwork because the tax rate relies on the GWP of the gas

✓ **Extended Producer Responsibility (EPR)**

  - It requires that **all importers and producers** of relevant products must be a member of a producer responsibility organisation, which is responsible for establishing and operating a system for the **collection and treatment of waste electric or electronic products (WEEE)**.

Figure 1 Refrigerant lifecycle management mechanism in Norway from a cradle-to-grave perspective



Thank you

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