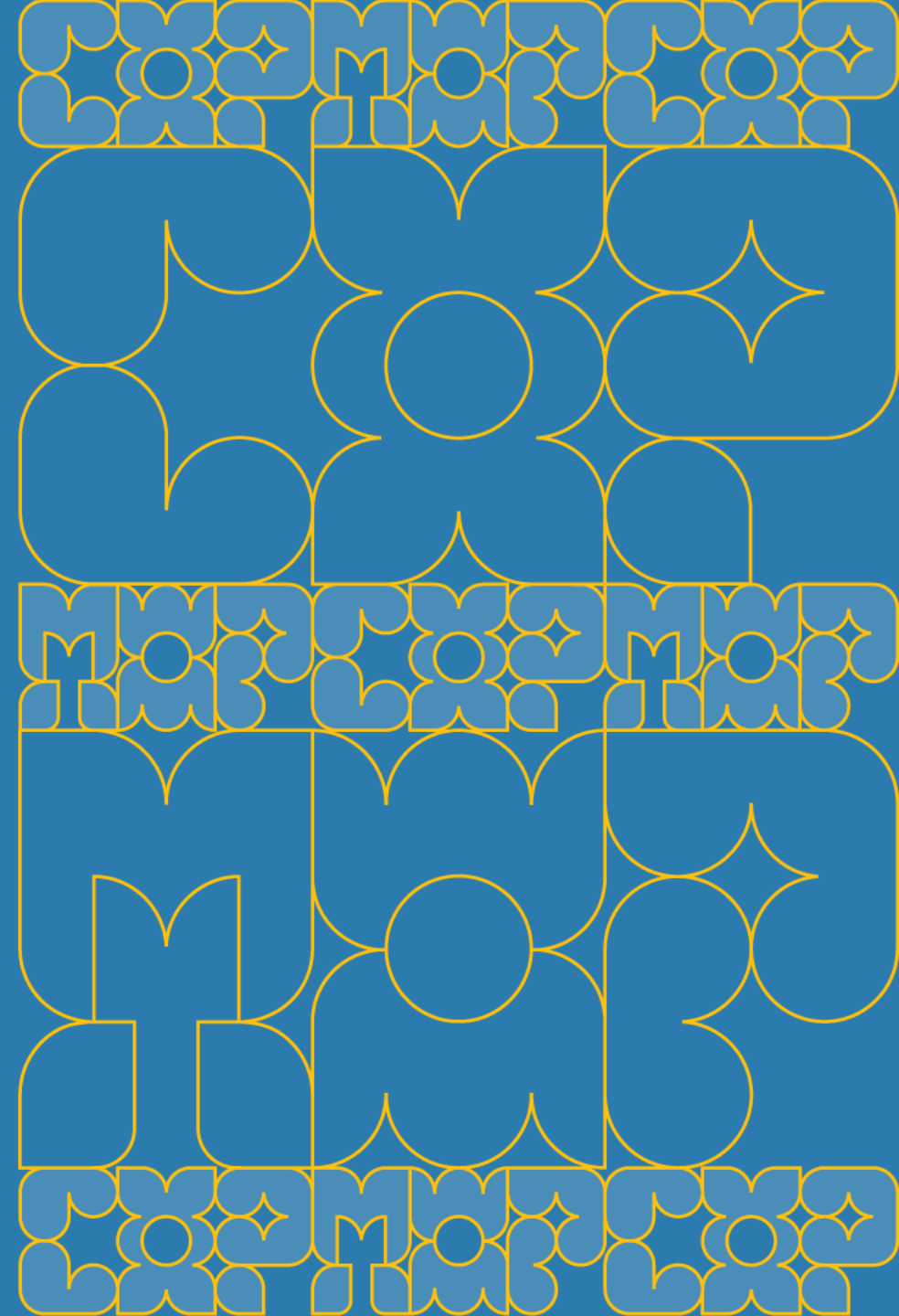


Destruction of refrigerants

Kylie Farrelley – TEAP Task Force



What is Destruction?



- Crucial and final step in mitigating refrigerant emissions
- Defined as a process, when applied to controlled substances, results in the permanent transformation, or decomposition of all or a significant portion of such substances
- The destruction process involves breaking down the chemical constituents whilst effectively managing any harmful by-products



Destruction Technologies



The Montreal Protocol has established a list of approved destruction methodologies for the purpose of production data reporting



Some parties and subnational jurisdictions require use of Montreal Protocol approved destruction technologies even when controlled substances are not credited to production.

Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer

Fourteenth edition (2020)

UN 
environment
programme
Ozone Secretariat



LIFE-CYCLE REFRIGERANT
MANAGEMENT WORKSHOP
BANGKOK



Vienna Convention
MONTREAL PROTOCOL

Destruction Technologies



- **Thermal oxidation (Incineration)**

- liquid injection incineration
- gaseous flume oxidation
- porous thermal reactor
- reactor cracking

- **Plasma technologies**

- Argon plasma
- Nitrogen

- **Cement Kiln**



LRM Infrastructure

Training

Leak detectors

Cylinders

Recovery equipment

Recycling equipment

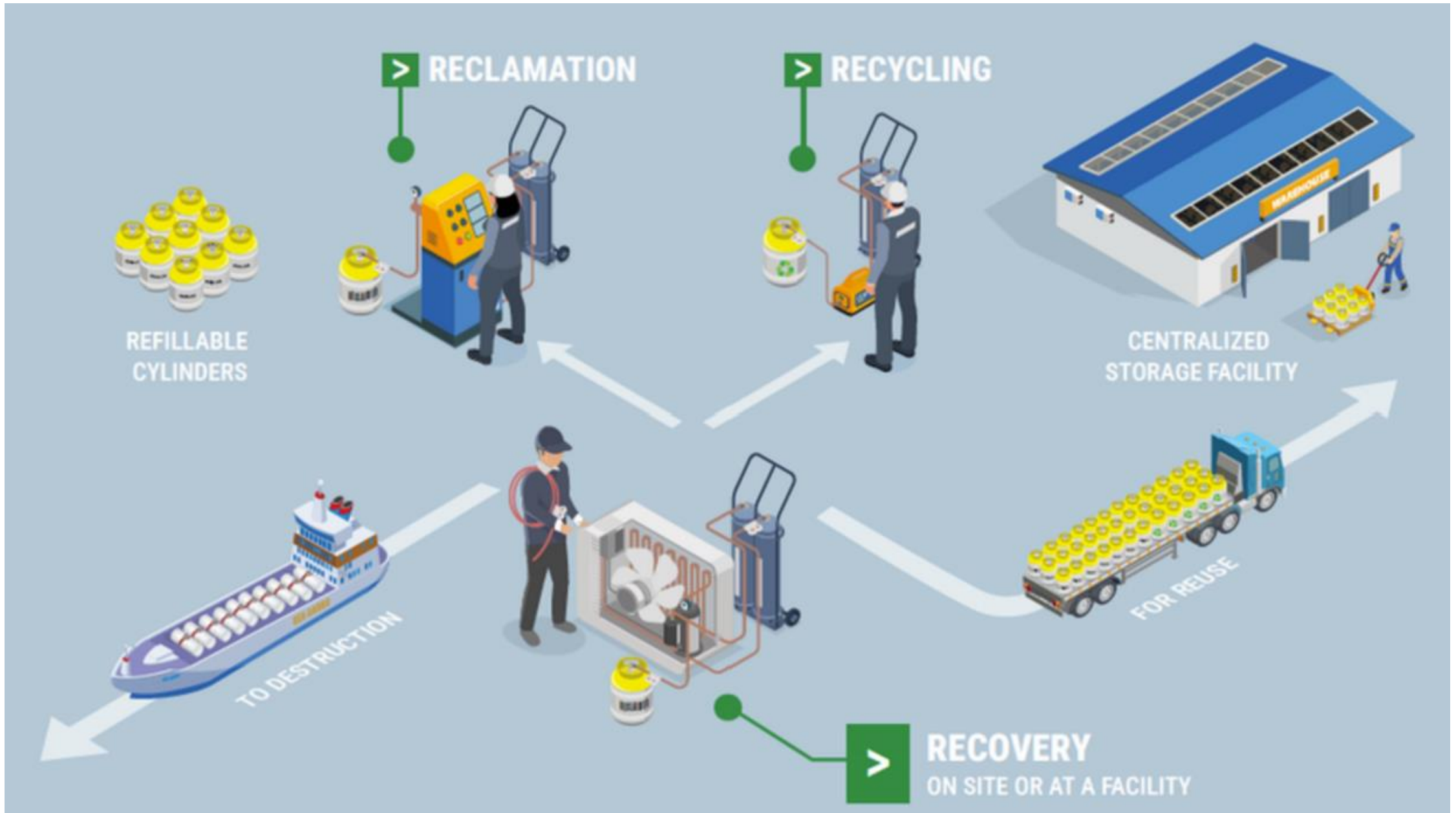
Testing and analysis equipment

Centralised Reclamation facilities

Destruction facilities



Reverse Supply Chain

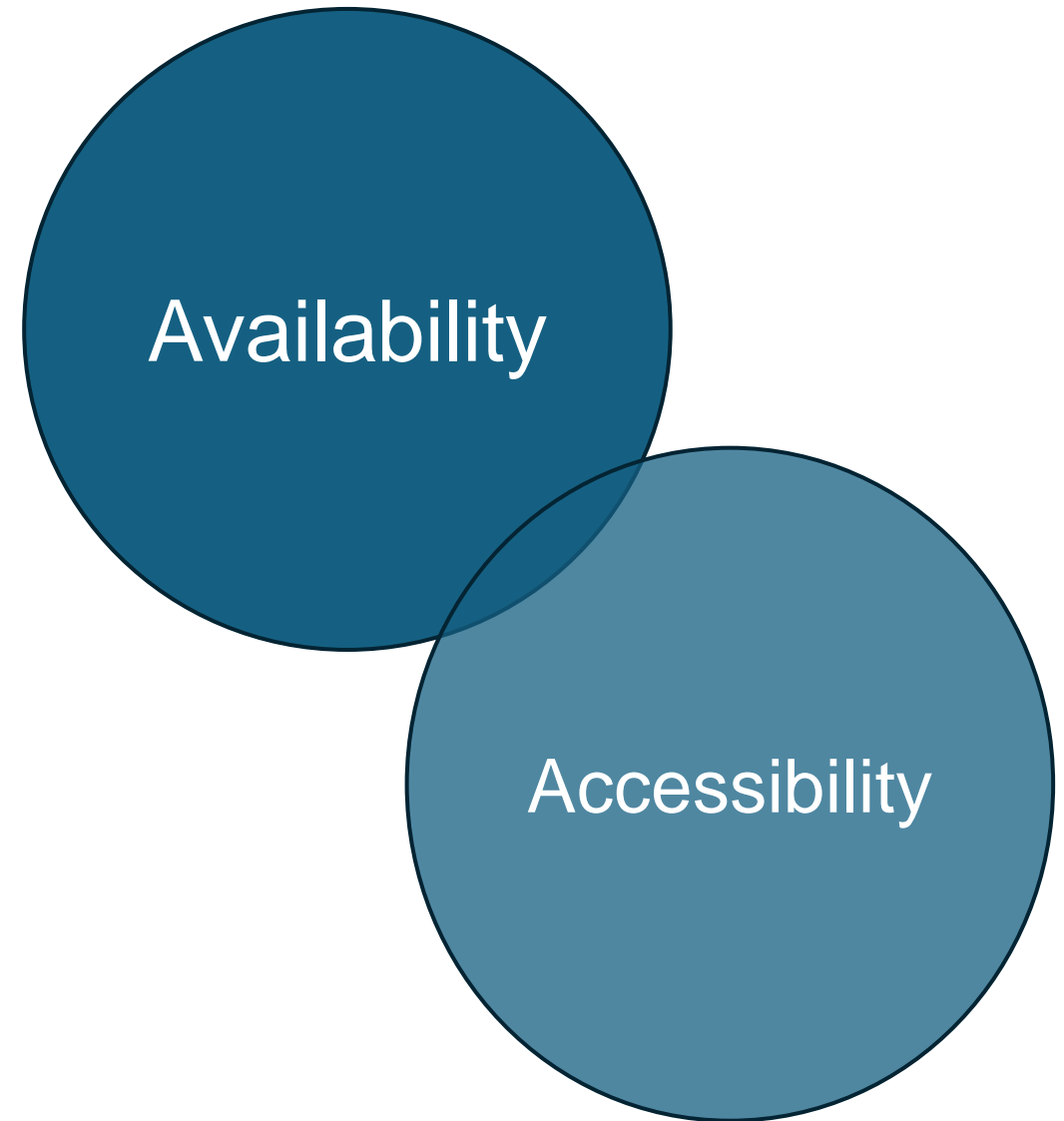


Challenges

- A5 parties and especially LVCs lack or have inadequate LRM infrastructure
- While some larger industrialized A5 parties may have more developed infrastructure, they often require upgrades or replacements for their existing tools and equipment to improve LRM.
- The primary constraint in destroying refrigerant is economies of scale
- Transboundary movement of waste (Basel Convention) is burdensome



- There is adequate global capacity for destruction, but it is unevenly distributed between nA5 and A5 parties
- It can be anticipated that destruction technology may improve in cost, scalability, mobility and efficiency in the future



Destruction Costs

- Retrofitting existing facilities
 - rotary kilns
 - cement kilns
- ~ US\$50,000 – \$100,000

- New dedicated facility
 - - small rotary kiln ~US\$3 million
 - - plasma arc facility ~US\$.4.2 million

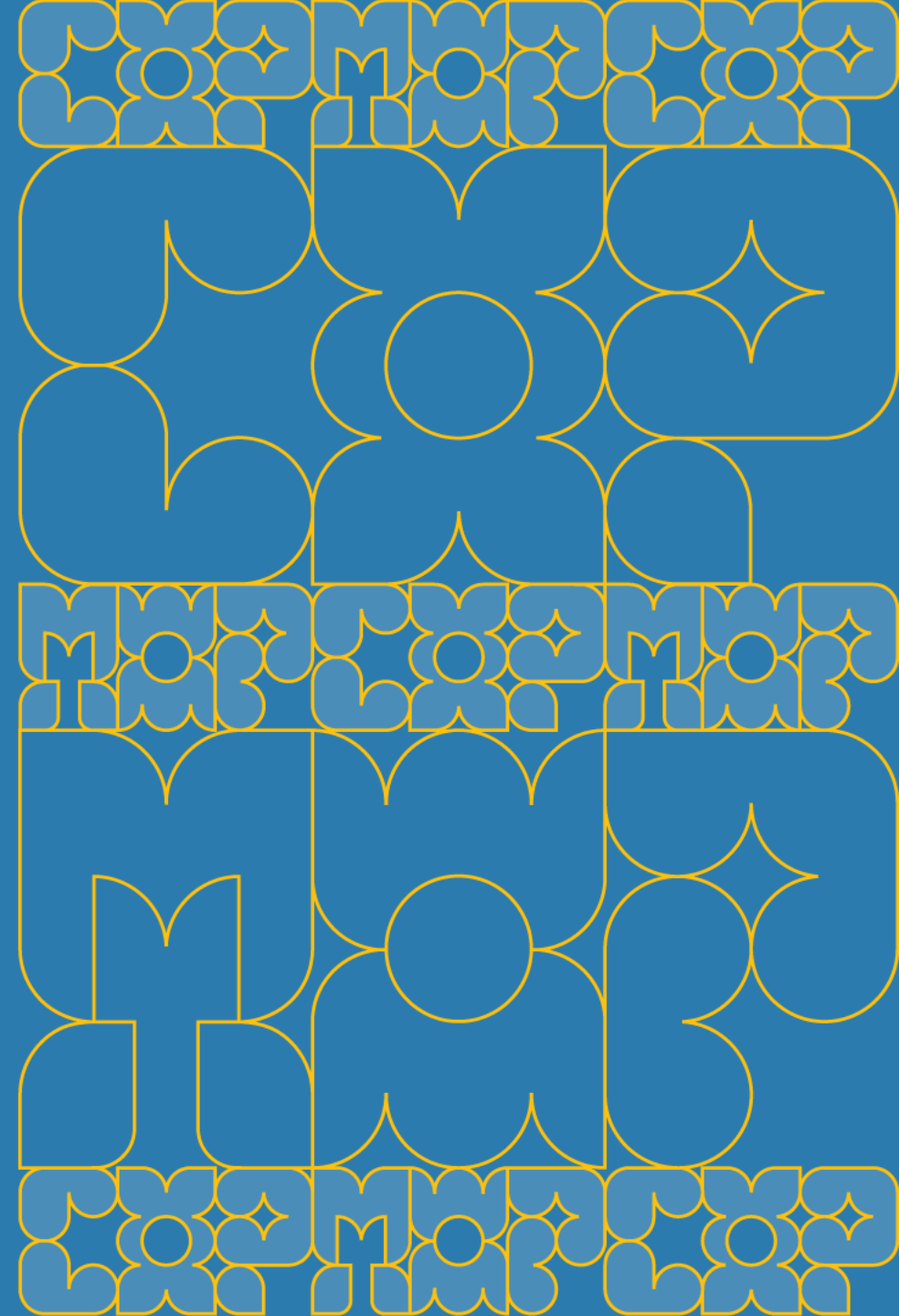


To Conclude

- Looking forward, accessibility of destruction technology may improve
- Significant benefits could arise from A5 parties working together in regional groups to set up capital intensive integrated reclamation and destruction infrastructure
- Cement kilns offer a cost-effective method for destruction.
- Transboundary movement could be done more efficiently and cost-effectively, while potentially reducing emissions.



Thank you!



Appendix: Policy example : when is recovered refrigerant waste?

The definition of “waste” influences the logistic and administrative burden for RACHP technicians and for the transport & storage of recovered refrigerants, both within and across borders.

