



Explanation of Fluorocarbons (F-gas) Reclamation



Dissemination and demonstration project of creating Fluorocarbons (F-gas) recovery, reclamation and destruction industry to contribute to ozone layer protection and measures against climate change

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Development needs of Malaysia

- A solution to the lack of a cost-bearing mechanism for the recovery, reclamation and destruction of F-gas.
- Improving understanding of related businesses regarding the prohibition of F-gas from being released into the atmosphere.
- Improving skills of refrigerant handling engineers who are in charge of maintenance of equipment such as air conditioners.
- Creation of F-gas recovery/reclamation/destruction industry model that matches the local situation.

Details of the dissemination and demonstration project

- Promoting system studies such as F-gas regulations and provision of guidelines.
- Implementing promoting activities to improve refrigerant handling technologies.
- Developing human resource.
- Conducting demonstration activities using necessary equipment such as reclamation machines.

Technologies and products of the proposing company



Names of technologies and products

- (1) Reclamation machines for recovered F-gas
- (2) F-gas collection machines
- (3) Refrigerant analyzer
- (4) Collection containers (10kg and 100kg)
 - A business that caters to compliance-oriented customers with a comprehensive management system which covers from recovery, reclamation to destruction of F-gas.
 - Because we have a consistent system, it is possible to maximize the reclamation amount of F-gas.

Expected results in Malaysia

- Preparation of reports for reviewing the framework for improving understanding of regulations by government officials.
- Promoting understanding of F-gas regulations and reclamation business.
- Improving practical skills of refrigerant handling engineers.
- Creating good practices and local adaptation of equipment specifications, etc.
- Formulating business development plan and making business model proposals.

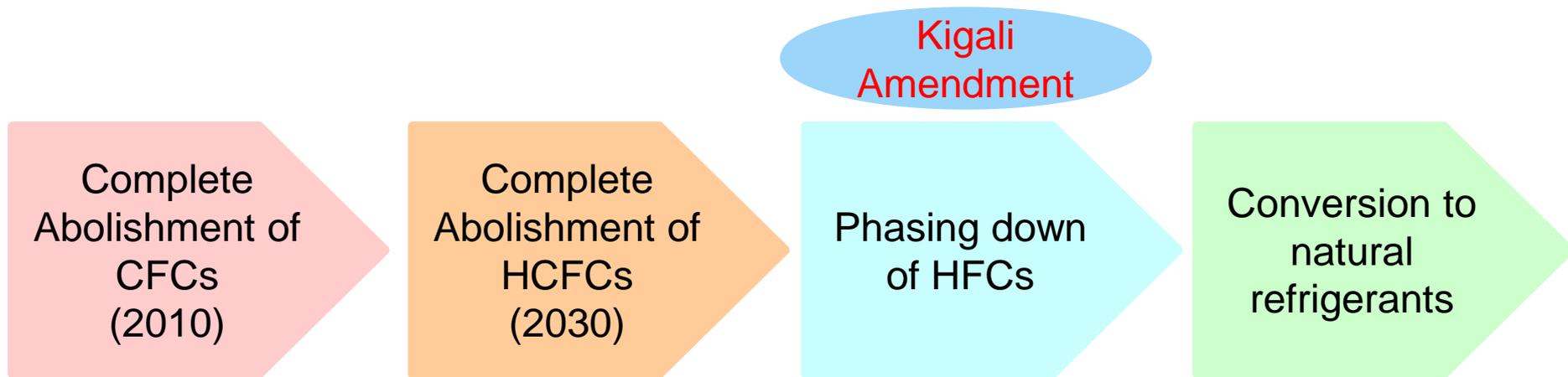
Achievements of Japanese companies

- Addressing the commercialization of reclamation and planning to develop product sales business.
- Considering roll out to neighboring countries.

Current situation under F-gas regulations

F-gas regulations in developing countries

- Production and consumption of F-gas, which is ozone-depleting substance (ODS), and at the same time, a greenhouse gas (GHG), is required to reduce under the Montreal Protocol.



[Current status]

For equipment to be newly installed, the mainstream is HFC-based equipment, however, many CFC and HCFC-based refrigeration and air-conditioning equipment are still used today.

Current situation under F-gas regulations

Concerns involving the reduction of HFCs (Kigali Amendment)

- Insufficient fund to replace equipment using natural refrigerants instead of F-gas
- For some types of air conditioners (multi-air conditioners for large buildings, household air conditioners, etc.), no equipment which uses natural refrigerant has not been developed.

Expected problems

Reduction of production and consumption of HFCs

Decreased amount of F-gas distribution

Failures, damages or accidents caused by filling equipment with flammable hydrocarbon refrigerants or gases which are not usable by the equipment

Reclamation and destruction of F-gas

Advantages of reclamation of F-gas

Reclamation is to remove impurities from recovered F-gas, adjust the components, and then make F-gas that can be used again.

Reclamation

- Compared with newly produce F-gas, reclamation process consumes less resources and energy.
- Compared with destruction, reclamation process consumes less energy.
- Reclaimed F-gas can be sold, therefore, it is easy to commercialize.

Destruction

- For destruction (detoxification), there are many cases where **costs are incurred**.
- ➔ **Sometimes users release F-gas to the atmosphere when repairing or disposing of equipment.**

Supporting both reclamation and destruction

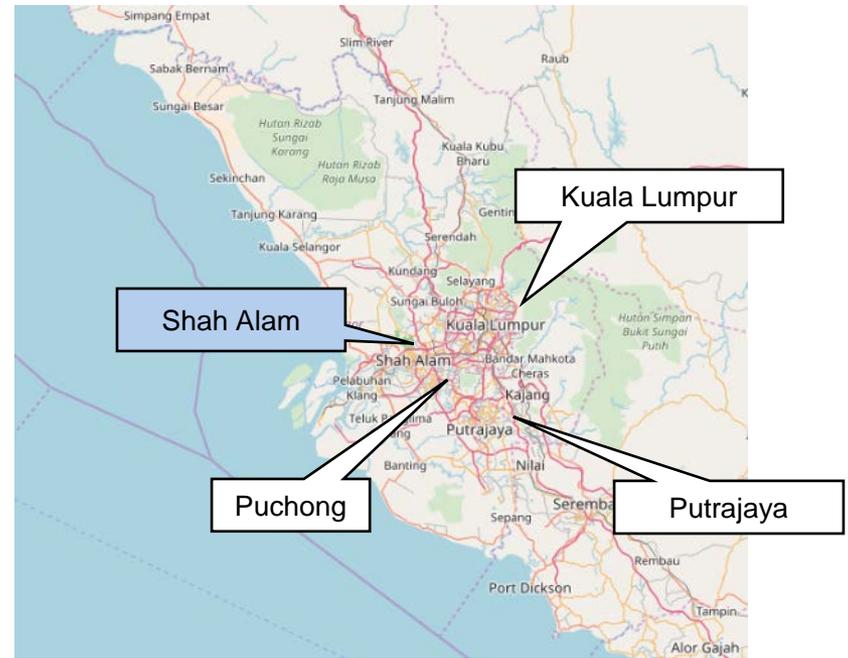
F-gas, which is ODS and GHG, will eventually need to be destroyed. However, first of all, there is an urgent need to prevent leakage of F-gas by improving installation skills, and to reliably recover and prevent the release of F-gas into the atmosphere.

- **Provides education to help improve F-gas recovery technologies.**
- **Build a system for reclamation companies to purchase the recovered F-gas.**
- **This will improve recovery rate and prevent releasing into atmosphere.**
- **Reclamation companies will use the funds obtained from selling the reclaimed F-gas and destroy nonrenewable low-quality recovered F-gas one by one.**

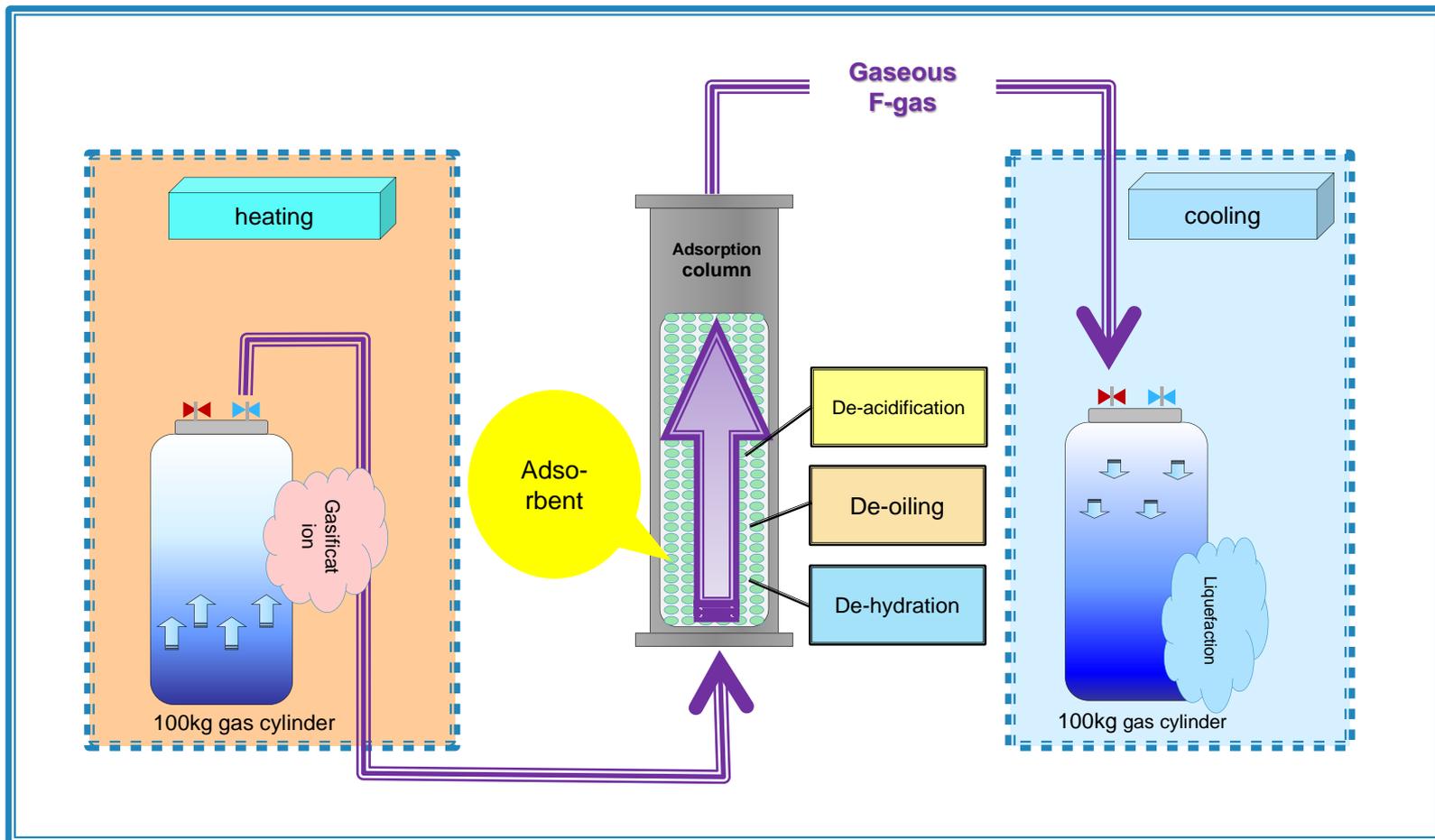
Installation location

WESTECH CHEMICALS SDN BHD

5, Jalan Pelabur 23/1, 40300 Shah Alam,
Selangor, Malaysia.

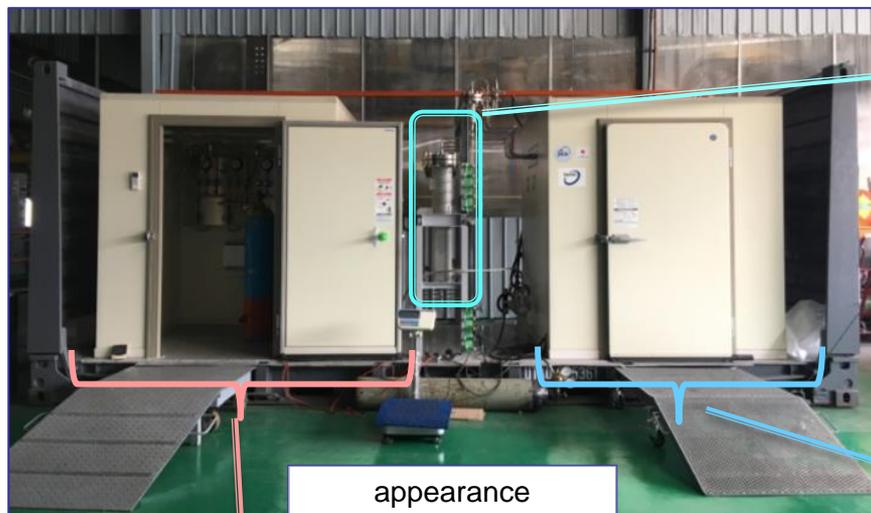


Reclamation Machine



Component	Hearing Room (35°C)
	Adsorption & Filtering Unit (5 units)
	Cooling Room (10°C)
Size	6058Wx2438Dx2591H
Weight	1400kg
Reclaimable refrigerant	R12, R22, R134a,R410A,R407C,R32

Fluorocarbons reclamation machine



Five lines of adsorption column



Heating side

Attach a belt heater to the container filled with recovered gas

Cooling side

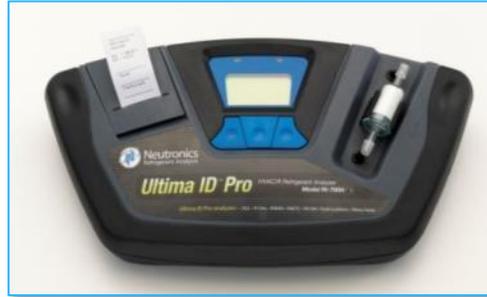
Set the vacuum container to be filled with reclaimed gas



Receiving of recovery cylinders



Receiving Inspection



Receiving Inspection



Recovery Gas

A gas that fails to meet the specification is sent to destruction.

From Receiving of Recovered F-gas To Sale of Reclaimed F-gas

Reclamation Gas

Lab Analysis

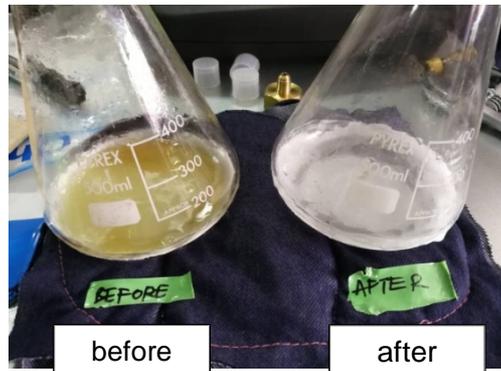


R12,R22
R134a

Mixed Gas
R410A
etc



Comparison of before and after



Reclaim F-gas



Difference of Reclamation and Recycle

Reclamation

- ◆ Quality of gas reclaimed by reclamation machine is as same as the one of virgin gas.
- ◆ To obtain the above quality, quality of recovered refrigerant should meet certain criteria.
- ◆ Reliable evidence can be obtained by using highly accurate analyzer.
- ◆ High quality reclaimed gas would become important, since it will become difficult to obtain fluorocarbons from the market.

Recycle

- ◆ Recycle is to reduce contaminants of recovered gas by simple equipment and reuse.
- ◆ For example, recycle machine used for maintenance of car AC reduces contents of oil and moisture, etc. of recovered gas simply and returns to the same car AC.
- ◆ Therefore, it is difficult to sell recycled gas again in the market.

Reclamation

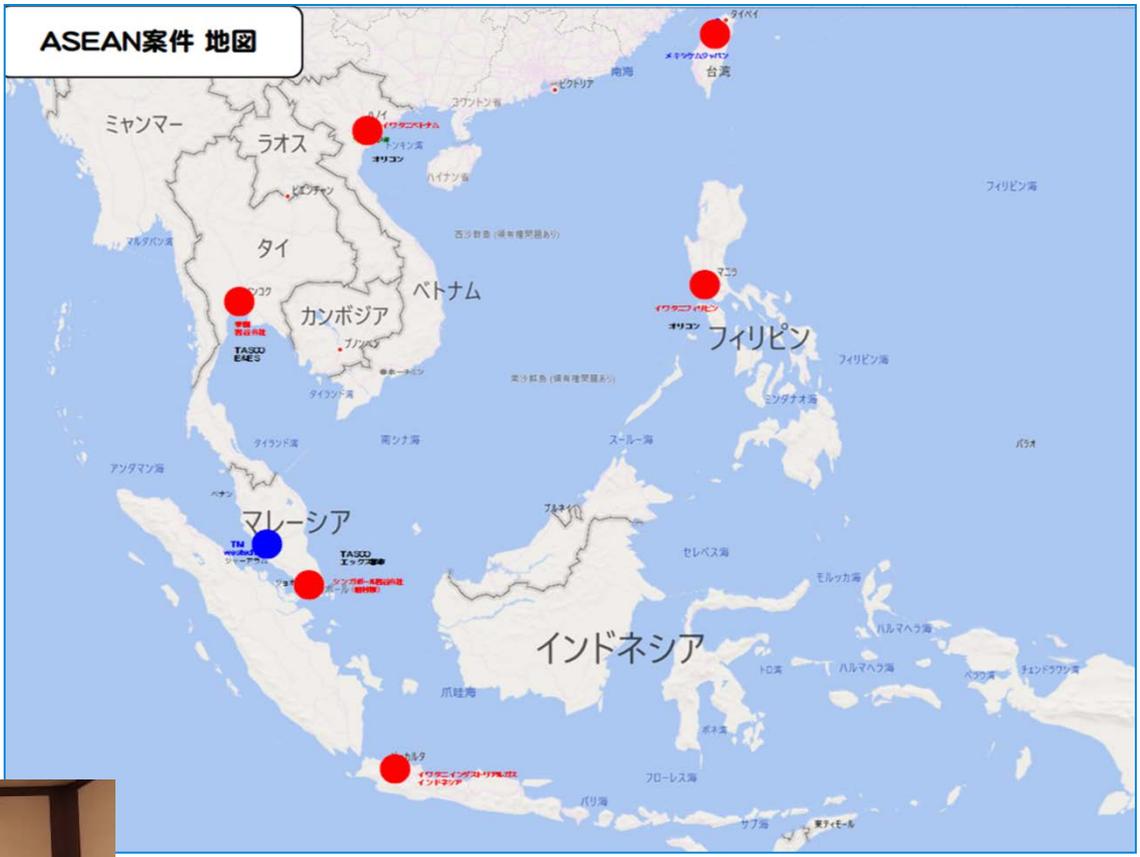


Recycle



Current activities

Together with several Japanese partner companies and related local subsidiaries participating in the reclamation project, we are rolling out recovery and recycling business of F-gas for big Japanese companies located in major cities in ASEAN.



Seminar in Malaysia (Nov. 14, 2021)

We continue to support education and training for mainly companies which we worked with during JICA projects.



Thank you for your listening.

