United Nations Development Programme

ODS Destruction

Montreal Protocol Unit / Chemicals
UNDP

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Drivers for CFC (ODS) Destruction

- CFC-based equipment are getting to the end of their life cycle;
- Governments are implementing early retirement programs to remove energy inefficient (and mostly ODS-based) refrigerators and air conditioning units;
- Bad practices in servicing sector that generates high quantity of contaminated refrigerants;
- Introduction of refrigerant commercial blends pose challenges for recovering/recycling/reuse; and
- Illegal seized cargo.

Steps listed in ExCom Decision 58/19

Collection

- The sources of the ODS?

- Process to Extract ODS From the source

- Dispersed, Work Intensive And costly

Not funded by demos.

Transportation

- Process of move Collected ODS.

What is the logistic involved in the ODS transportation?
-Training?
- Containers, tanks, cylinders?
- Legislation on waste transp.?
- Costs?

Storage

- All requirements for proper storage.

What is the logistic involved in the ODS storage?
- Equipment
-Training
- Legislation?
- Costs?

Destruction

Who and where are located the Incinerators?

What is the efficiency?

Do they comply with regulations and standards?

How much does it cost?

Sustainability

Ultimately: Who pays de bill?

How we make the whole process economically sustainable?

Destruction

Test and Verify the destruction facility

Verify baseline

Make adaptations to the current process

Feeding systems
Temperature of the kiln
Site preparations, etc.

Meet standards/destruction and removal efficiency (DRE)

Concentration of hydrogen chloride and fluorides in exhaust gas
Concentration of dioxins in the final exhaust gas
Content of Fluorides and hydrogen ions in effluent water

Perform trials

Certify destruction

Establish monitoring procedures

5mt = 5 to 10 days of qualification + time for certification

Destruction sites (in the Region)

USA
Canada
Mexico
Cuba (MLF Project)
Colombia (MLF Project)
Brazil (MLF Project submitted)

<u>Other sites</u>:
Europe (Finland/Sweeden)
Japan
Georgia (MLF Project in preparation)
~~Ghana~~ (MLF Project = Export)

UNDP Projects in the Region

CUBA:

- Approved in the 66th ExCom;
- Technology: Cement Kiln (wet);
- Baseline:
  - adaptation of the kiln
  - trials
  - establishment of incineration limits and performance
  - destruction of contaminated CFCs
- Status: on going, adaptation of the oven being finalized.

UNDP Projects in the Region

COLOMBIA:

- Approved in the 68th ExCom;

- Technology: Rotary Kiln (hazardous waste treatment facility)

- Baseline:
  - adaptation of the kilns
  - trials
  - establishment of incineration limits and performance
  - destruction of contaminated CFCs

- Status: on going, incineration facilities selected. Contracts in place. Oven adaptation in progress. Trials expected between August/September

UNDP Projects in the Region

BRAZIL:

- Submitted to the 72nd ExCom;

- Technologies that exist in Brazil:
  - Cement Kiln (prohibits halogens incineration by Law);
  - Rotary Kiln (hazardous waste treatment facility),
  - Cracking Reactor
  - Argon Plasma Arc
  - Chemical Reaction with H2 and CO2 (in de-manufacturing facilities).

- Main challenge: logistics (due to the size of the country).

Applicability and Projected Costs

Country/Region	Technology	USD/kg	Substance
North America	Thermal Oxidation processes	1.50 to 3.00	CFC-12
Europe	Thermal Oxidation processes	4.50	CFC-12
Eastern Europe	Thermal Oxidation processes	1.50 to 2.00	POPs
Ghana*	Cement Kiln	6.00	CFCs
Brazil	Chemical Reaction	6.00 to 9.50	CFCs
Brazil	Thermal Oxidation processes	3.80	CFCs
Latin America**	Portable Plasma Arc	22.8 to 25.9	-

Source: UNDP survey for project preparation, baseline 2013prices. Prices may change.

**estimative in the beginning of the project – export to EU*
***according to the manufacturer, without phase-in costs*
Transport, consolidation, collection and storage costs not included.

PS: Portable plasma arc equipment from ASADA costs about USD 156,000 (without installation costs) as per quoted in Dec/2011

Applicability and Projected Costs

FINAL REMARKS:

- Tracking of recovered CFCs (needed for US-based incinerators, as per EPA requirements)

- Limitation on trans boundary movements due to the specific norms under the Basel Convention set by each country (sender and receiver);

- Operational Costs related to storage and transportation;

Implications for the Caribbean Countries

- Physical structure to collect, store and transport is in place (?);
- Have proper authorizations and insurance for transport in place ($)
- Transportation ($)

Export as solution (?): limitations, including under Basel Convention;

- **USA:** Polar (Puerto Rico) as main reference – issues on tracking sources;
- **Canada:** unknown, need further survey;
- **Mexico:** recent plasma arc introduced. Acceptance of waste and costs not clear;
- **Colombia**: does not accept ODS waste (Basel)
- **Brazil**: does not accept ODS waste (Basel)
- **Cuba:** need first finalize the demo qualification in order to define further steps;
- **Europe**: EUR 3.50/kg, excluded transactional and transportation costs;
- **Japan:** need more information, but distance may be limitation factor.

THANK YOU!

Comments, suggestions and questions are welcome!

http://www.undp.org/chemicals/montrealprotocol.htm

anderson.alves@undp.org

(+507) 302-4640