

NS-218 - Colombian NAMA for the domestic refrigeration sector

Colombia

NAMA Seeking Support for Implementation

A Overview

A.1 Party

Colombia

A.2 Title of Mitigation Action

Colombian NAMA for the domestic refrigeration sector

A.3 Description of mitigation action

Current emissions from the domestic refrigeration sector are in the magnitude of 4.5 Mt CO₂eq (2014) and are projected to double by 2030. Emissions stem from the use of high GWP refrigerants (~ 15%) and energy consumption (~85%). An in-depth preparation study over the past years highlighted the high level of possibility for transformation in this sector, with a reduction potential of 50% compared to BAU. Colombia has initiated advanced activities in this sector, thus it is predestined to start the transformational change.

This NAMA will address and support capacity building measures for (a) a ban of HFCs and the application of MEPS in the domestic refrigeration sector (b) production line conversions using hydrocarbon refrigerants instead of HFC and changed product design to improve energy efficiency (c) an innovative replacement program including a sustainable on bill financing mechanism with incentives for low-income households when old-inefficient appliances are returned and (d) implementation of a sustainable EPR scheme by which producers and importers are given responsibility for domestic refrigerators at the end of their lives. The NAMA scheme will be leveraged by national resources (public and private co-financing). This comprehensive and sustainable approach will serve as a prototype for replication in LA and other RAC subsectors in Colombia.

The phase-in of new fridges and the proper waste management within the project period results in emission reductions of 16.8 Mt CO₂eq over the lifetime of the equipment, an annual reduction of around 3.8 Mt CO₂eq by 2030 – which is a 50% reduction from the BAU scenario in this sector. Some of the co-benefits will be: (a) Increased education and employment (b) Increased economic competitiveness; (c) Reduced public expenditure in electricity subsidies; (d) Improved access to credit and efficient equipment for low income households (e) Decreased negative environmental impacts due to reductions in refrigerant and energy-related emissions.

A.4 Sector

- | | |
|---|---|
| <input type="checkbox"/> Energy supply | <input type="checkbox"/> Transport and its Infrastructure |
| <input type="checkbox"/> Residential and Commercial buildings | <input checked="" type="checkbox"/> Industry |
| <input type="checkbox"/> Agriculture | <input type="checkbox"/> Forestry |
| <input checked="" type="checkbox"/> Waste management | |
| <input checked="" type="checkbox"/> Other | <input type="checkbox"/> Energy efficiency |

A.5 Technology

- | | |
|---|--|
| <input type="checkbox"/> Bioenergy | <input type="checkbox"/> Cleaner Fuels |
| <input checked="" type="checkbox"/> Energy Efficiency | <input type="checkbox"/> Geothermal energy |

A.6 Type of action	<input type="checkbox"/> Hydropower <input type="checkbox"/> Wind energy <input type="checkbox"/> Carbon Capture and Storage <input type="checkbox"/> Land fill gas collection	<input type="checkbox"/> Solar energy <input type="checkbox"/> Ocean energy <input type="checkbox"/> Low till / No till
	<input checked="" type="checkbox"/> Other <input type="text" value="Natural refrigerants"/>	
A.7 Greenhouse gases covered by the action	<input checked="" type="checkbox"/> National/ Sectoral goal <input type="checkbox"/> Strategy <input checked="" type="checkbox"/> National/Sectoral policy or program <input type="checkbox"/> Other <input type="text"/>	<input type="checkbox"/> Project: Investment in machinery <input type="checkbox"/> Project: Investment in infrastructure <input type="checkbox"/> Project: Other
	<input checked="" type="checkbox"/> CO2 <input type="checkbox"/> N2O <input type="checkbox"/> PFCs <input checked="" type="checkbox"/> Other <input type="text" value="Ozone depleting substances"/>	

B National Implementing Entity

B.1.0 Name	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH Acting as Delivery Organization
B.1.1 Contact Person 1	Dr. Dirk Aßmann
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B.1.7 Phone	571 6381114
B.1.8 Email	tangmar.marmon@giz.de
B.1.9 Contact Person 3	
B.1.10 Address	
B.1.11 Phone	
B.1.12 Email	
B.1.13 Comments	

C Expected timeframe for the implementation of the mitigation action

C.1	Number of years for completion	5
C.2	Expected start year of implementation	2017

D Currency

D.1	Used Currency	<input type="text" value="AED"/> Conversion to USD: 1
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E Cost

E.1.1 Estimated full cost of implementation	121000000
E.1.2 Comments on full cost of implementation	<p>The estimated full costs of implementation are 121 Mio €, whereby 9 Mio € will be necessary to initiate the NAMA process (support needed). This amount will then be matched with national co-funding, which is 112 Mio EUR (leverage 12 fold).</p> <p>The costs are needed to reach the following outputs:</p>

Output 1: Policy framework for the transformation of the domestic refrigeration sector is established

Output 2: Producers are designing and producing climate friendly energy efficient refrigerators

Output 3: New for old replacement programme is established.

Output 4: Old fridges are returned and processed in a recycling scheme

Output 5: Cross sectoral capacity building.

To reach output 1, the amount of 1.8 Mio € will be necessary (0.75 Mio € support needed; 1 Mio € national co-funding), 22 Mio will be needed to reach output 2 and 4 (ca. 4.75 Mio € support needed, 17 Mio € national co-funding) and 98 Mio € for output 3 (3.5 Mio € support needed, 94 Mio national co-funding).

E.2.1 Estimated incremental cost of implementation 115000000

E.2.2 Comments on estimated incremental cost of implementation

Here, the incremental costs refer to the conversion of the production lines (output 2) and the replacement programme (output 3). Indeed the incremental costs per fridge (HFC-134a unit vs R-600a) are given with ca. 60 € per fridge. However, this needs prior conversion of the existing production lines and the set-up of a functioning replacement programme, so that the green fridges will enter the market.

Production line conversion

The conversion of the production lines to produce environmental friendly and energy efficient green fridges has been calculated with 14.5 Mio €. 11 Mio € in loans are disbursed to manufacturers for production line conversions. The necessary NAMA support is 2.8 Mio € as concessional loan contributions for converting the production lines; the manufacturers will have own investments of 2 Mio €. With the concessional loans, the manufacturers are able to cover high investment costs associated with the production line conversions.

Replacement programme

The costs of the replacement programme amount to 98 Mio €. Green new refrigerators are made available to low income households with an on bill financing scheme, i.e. end-users make repayments via the electricity bill. The mechanism has already been established for other Colombian products and shown to be particularly suitable for low-income households. Additional incentives increase the attractiveness for end-user. During the NAMA support project, 90 Mio € will be disbursed through the on bill financing scheme, with commercial banks cooperating with utilities, partially using established structures such as the "Easy credit line". There is particular interest from COLPATRIA/CODENSA to offer consumer credits for green fridges.

F Support required for the implementation the mitigation action

F.1.1 Amount of Financial support 9006000

F.1.2 Type of required Financial support

<input checked="" type="checkbox"/> Grant <input type="checkbox"/> Loan (sovereign) <input type="checkbox"/> Loan (Private) <input checked="" type="checkbox"/> Concessional loan	<input type="checkbox"/> Guarantee <input type="checkbox"/> Equity <input type="checkbox"/> Carbon finance
<input checked="" type="checkbox"/> Other Risk fund	

F.1.3 Comments on Financial support

The table below shows the different financial cost components. The largest part (point 3) is used so that Bancoldex and CAF can provide concessional loans for manufactures to convert their production lines. The second largest component (point 4) is used to seed fund the Green Replacement Fund, buffering the risk that end-user credits are not paid back. With this, consumer credits can be offered to a broader spectrum by of low-income households

1. Assignment of experts, advisory services	477,204
2. Travel expenses	25,116
3. Procurement of materials and equipment	3,000,000 ^[1]
4. Financial instruments, financial contributions (grant agreements, subsidies, others)	2,460,000
5. Other direct and indirect costs	43,680
Total	6,006,000

^[1] NSP concessional loan contribution for credits to convert the production line (2.8 Mio €), plus training and equipment material (0.2 Mio €)

F.2.1 Amount of Technological support

3,000,000

F.2.2 Comments on Technological support

The table below shows the different technological cost components. The largest part (point 1) is used for the assignment of experts and advisory services. This includes the following:

- Technical assistance for new, alternative technologies
- Strengthening management systems/ institutional strengthening (policy)
- Training for e-waste manager
- Awareness/ outreach/ Workshops

1. Assignment of experts, advisory services	2,392,575
2. Travel expenses	136,875
3. Procurement of materials and equipment	208,050
4. Financial instruments, financial contributions (grant agreements, subsidies, others)	
5. Other direct and indirect costs	262,500
Total	3,000,000

F.3.1 Amount of capacity building support

F.3.2 Type of required capacity building support

<input checked="" type="checkbox"/> Individual level
<input checked="" type="checkbox"/> Institutional level
<input checked="" type="checkbox"/> Systemic level
<input type="checkbox"/> Other <input type="text"/>

F.3.3 Comments on Capacity Building support

The costs for capacity building are included in the amount given under "Amount of Technological support". Capacity building takes place on all above indicated levels: individual (e.g. manufacturer technicians and engineers), institutional level (ministries for MRV, RED VERDE for EPR) and on the systemic level (learning of society by awareness raising with regard to environmental friendly products and proper waste management).

F.4 Financial support for implementation required

F.5 Technological support for implementation required

F.6 Capacity Building support for implementation required

G Estimated emission reductions

G.1 Amount

Total emission savings within NAMA: 16.8 MtCO₂e. Long-term emission savings projection: 3.8 MtCO₂e /Yr by 2030

G.2 Unit

G.3 Additional information (e.g. if available, information on the methodological approach followed)

The total emissions of a domestic refrigerator over its life time are 9.3 t CO₂eq (CFC-fridge), 6.6 t CO₂eq (HFC-fridge) and 3.2 t CO₂eq (green R-600a fridge).

Placing one green fridge on the market instead of an HFC-fridge (currently produced) will reduce emissions by 3.35 t CO₂eq over a life time (assuming life time of 20 years), which corresponds to 0.17 t CO₂eq per year.

Converting the entire sector to R-600a units, all HFC units that are currently sold in Colombia will be replaced, resulting in emission of 0.79 Mt CO₂eq within the project period of 5 years and 15.7 Mt CO₂eq accounting for the entire life cycle.

Over the next 10 years (beyond NAMA support phase), selling green fridges will result in 36.8 Mt CO₂eq (over life time of equipment). After the NAMA support phase only green fridges will be available in the country, low-income households will further benefit from attractive consumer credits.

The proper waste management of old CFC containing fridges will reduce emissions by 3.77 t CO₂eq per fridge. With the target to process 300,000 fridges within the NSP period, there are emission savings of 1.1 Mt CO₂eq

Processing all CFC fridges (beyond NAMA support phase) will result in 4.7 Mt CO₂eq emission savings.

Summary:

- Placing green fridges on the market: 15.7 Mt CO₂eq emission savings within the NAMA support phase
- Proper recycling of old fridges: 1.1 Mt CO₂eq emission savings within the NAMA support phase
- Total emission savings within NSP: 16.8 Mt CO₂eq
- Long-term emission savings projection: 3.8 Mt CO₂eq per year by 2030

H Other indicators

H.1 Other indicators of implementation

The Project will utilise the standardised Result-based Monitoring system used by GIZ and partners. This includes monthly PIU meetings, quarterly reports and half-year detailed progress reports – both technical and financial management. Besides, relevance/design, effectiveness, efficiency, sustainability and impact orientation, the M&E will also include annual review workshops with key partners and stakeholders, which will be fed into annual work plans. Besides internal monitoring and external steering structures (such as steering committee), the project will also undertake 1 or 2 mid-term reviews by external evaluators.

The information system implemented by RED VERDE will provide the number of replaced/managed/disposed appliances, and through cooperation with the Utilities it will be possible to evaluate the reduction of energy consumption and end- users.

Two main indicators will be used to monitor and report the reduction of greenhouse gases emissions: the number of refrigerators replaced, and the number of refrigerators that are managed by certified companies. The implementation of an anticipated recycling rate within

the Extended Producer Responsibility will ensure that environmental management is (financially) covered by the manufacturers.

Furthermore, manufactures will report the number of produced and sold R-600a fridges.

Additionally the committee of the National Green Replacement fund will report on private co-financing, e.g. contribution of the private sector but also about the credit volume disbursed under the NAMA.

For more detailed information please see the indicators under section K Attachments, split into the financial and technological component.

I Other relevant information

I.1 Other relevant information including co-benefits for local sustainable development

Sustainable development co-benefits

Social development

- Employment and education (high): Training and education enables managers, engineers, technicians and servicing personnel in the domestic refrigeration sector to stay up-to-date and work in accordance with international trends, regulations and standards. Certified training increases the chances of proper employment and a better income;
- Health (medium): Reliable cooling ensures safe food for the low-income households. Proper waste management of EOL equipment will reduce health risks;
- Low-income household energy costs that are associated with the energy consumption of domestic refrigerators are reduced by 50% (after repayment time).

Economic development

- Qualification and certification of local technicians (high): Creation of employment and skilled set of technicians through training measures (production, service and financial support sector);
- Raise sustainable competitiveness of producers (high);
- Reduced national expenditures for energy subsidies (reduced energy consumption due to higher efficiency) which can be used to promote green fridges and proper waste management;
- Availability allows for CSR (green brands) (medium);
- Low-income household energy costs that are associated with the energy consumption of domestic refrigerators are reduced by 50% (after repayment time)
- National savings on energy (high);
- The purchase of hydrocarbon refrigerants is cheaper than the purchase of HFC-refrigerants.

- Production and availability (medium): The production of natural refrigerants is less costly and consumes far less energy than the production of synthetic refrigerants. The handling of natural substances cannot be restricted by patents, so they can be processed and sold by any company in any country locally.

Environmental protection

- Emission reduction (medium): Using natural refrigerants reduces direct emissions of HFC, which harm the climate. Highly efficient refrigerators based on natural refrigerants have lower energy consumption and therefore reduce indirect emission (energy supply);
- Preservation of valuable raw materials (medium): unlike fluorinated substances which are produced from fluorspar, natural refrigerants do not deplete resources;
- Less pollution and toxic waste (high): Natural refrigerants do not produce persistent wastes in the atmosphere;
- Less food waste through better cooling.

National benefits

- Colombia to gain international recognition for setting the pace as best practice example to act on the domestic refrigeration sector, considering the entire life cycle;
- Colombia to gain international recognition as a frontrunner in South America for the phase down of HFCs;
- Colombia to reduce energy consumption with the introduction of efficient equipment, thereby achieving affordable and sustainable energy flows due to high energy efficiency;
- Monetary savings in the national budget due to reduced energy subsidies for low-income households.

J Relevant National Policies strategies, plans and programmes and/or other mitigation action

J.1 Relevant National Policies

The Colombian NAMA for the domestic refrigeration sector is part of the Low Carbon Development Strategy (LCDS) and the Program for the rational and efficient use of energy and unconventional energy sources (PROURE); and is aligned with the implementation of the Montreal Protocol and the Policy for Sustainable Production and Consumption, the Environmental Policy for the comprehensive management of hazardous waste and the Policy for the comprehensive management of electrical and electronic equipment waste (WEEE). Moreover, this NSP contributes to the green growth strategy with specific goals and measures proposed in the National Development Plan (PND) 2014-2018.

The NAMA for the Domestic Refrigeration Sector has been considered to be one of the options to contribute to the Colombian Intended Nationally Determined Contribution-INDC which aims to reduce greenhouse gas emissions 20 percent below projected business-as-usual (BAU) emissions by 2030.

The Colombian NAMA will initiate the transformation towards the use of low GWP refrigerants and high energy efficiency standards in the domestic refrigeration sector. Effective policy instruments such as MEPS and EPR schemes, but also regulations for high GWP refrigerants will be implemented, analogous to EU policy. Thus the domestic refrigeration sector will be a pioneer for the RAC sector in Colombia, the mechanism will be transferred to other products of the appliance sector.

The project builds on the preparatory work (2013-2015) conducted by CCAP, the Center for Clean Air Policy, on behalf of the Colombian

Ministry of Environment and Sustainable Development and financed by CAF, the Latin American Development Bank. The preparatory work included a sectoral study, assessing various policy options, an inventory in the domestic refrigeration sector and the determination of the mitigation potential. The inventory compilation and emission calculations were supported by GIZ, introducing the Tier 2 approach of the IPCC guidelines (IPCC, 1997) and applying the methodology for NAMA development in the RAC and foam sectors (IKI project under BMUB).

There are significant synergies with running projects, e.g. final destruction project co-funded by Multilateral Fund of the Montreal Protocol, an UNDP/GEF/UPME Standardization and Energy Efficiency Labelling Project, an USAID/UPME Energy Efficiency Project, the project "Sustainable Recycling Industries" - SRI of the State Secretariat for Economic Affairs of Switzerland – SECO and a global BMUB - IKI project on ODS bank management.

J.2 Link to other NAMAs

K Attachments

K Attachments

Title	Description
Annex_Indicators_Proposal UNFCCC_20151116.docx	Indicators for technical and financial components

K.1 Attachment description

K.2 File

L Support received

L.1 Outside the Registry

CAF, the Development Bank of Latin America, through its Organizational Unit of Climate Change, financed the preparatory study of this NAMA (conducted by the Center for Clean Air Policy, CCAP). Multilateral Fund for the implementation of the Montreal Protocol, through the Demonstration project on end of life ODS management and destruction (UNDP: COL/DES/66/DEM/82) supported the preparatory studies and the formulation of this NAMA. The project "NAMAs in the refrigeration, air-conditioning and foam blowing sectors". As part of its International Climate Initiative the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety funds innovative projects in partner countries which contribute to reducing GHG emissions or support adaption to the impacts of climate change. Under this initiative Colombia has received support with the development of a national strategy to convert the domestic refrigeration sector.

L.2 Within the Registry

Support provided	Support Type	Amount	Comment	Date
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