

Development of Baseline and Mitigation Strategy for the Thai Refrigeration and Air-Conditioning Sector

Project Overview

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Background: GIZ Proklima – Where do we come from?

About the Project: Mitigation action in the Thai RAC and foam sector

Working plan & present status

Content and objective of this workshop

Background: GIZ PROKLIMA – Where do we come from?

- Montreal Protocol: Implementation of the German bilateral quota (20% of the German contributions to the Multilateral Fund)
- Policy advice: Support governments of partner countries on drafting regulations and setting policies that comply with international environmental agreements
- Technology transfer: Support of ozone layer & climate friendly technologies in RAC and foam sectors
- Emission reduction: Reducing the consumption of industrial gases with negative climate impact and improve energy efficiency in RAC and foam sectors
- Operationalizing cross-conventional strategies and realizing synergies with other multilateral environmental agreements (e.g. Basel, Kyoto, Rotterdam, Stockholm)

Our partners

GIZ Proklima co-operates with a variety of private and public partners:

- multilateral organisations, eg.g United Nations
- Governments in partner countries in Africa, Asia and Latin-America;
- Bilateral agencies (AFD, SDC, ...)
- Associations representing industrial sectors;
- Vocational training institutions;
- Individual companies in the production and service sectors

GIZ PROKLIMA at a glance:

- 16 years global activities
- > 240 projects
- > 40 countries
- > 10.000 ODP tons reduced
- ~ 100 Mio t CO₂-eq. reduced



Focus on

- natural refrigerants with low GWP and high energy efficiency
- Sustainable solutions for AC and refrigeration

International Climate Initiative (ICI):

ONE WORLD. ONE INTERNATIONAL CLIMATE INITIATIVE.

The International Climate Initiative (ICI) has been financing climate protection projects in developing and newly industrialising countries and in transition countries in Central and Eastern Europe since 2008. The International Climate Initiative receives funding from emissions trading and thus represents an innovative financing mechanism to support partner countries in the area of climate protection. With this new form of cooperation the Federal Environment Ministry supplements the existing development cooperation of the German government.



<http://www.bmu-klimaschutzinitiative.de/en/theme>

Baseline and Mitigation Strategy for Thai RAC and Insulation Foam

Cool and sustainable

Proklima projects within the International Climate Initiative



On behalf of

Demonstration projects

- **Solar cooling:** Installation and operation of solar cooling systems with natural refrigerants – Jordan (SCIC), Southern Africa (SolarChill)
- **Air-conditioning systems:** Production of room air-conditioners using the natural refrigerant R290 (propane) – China (Gree), India (Godrej & Boyce)
- **Refrigerator production:** Converting the production of refrigeration equipment from fluorinated gases to natural refrigerants – Swaziland
- **Refrigerator recycling:** Introduction of a comprehensive refrigerator recycling programme – Brazil
- **Supermarkets** Conversion of supermarket refrigeration from fluorinated gases to natural refrigerants – South Africa (Pick n Pay)
- **Foam:** Introduction of production lines for XPS foam with environmentally friendly CO₂ as blowing agent – China

Conversion of supermarket systems (South Africa)

- Replacing conventional centralised supermarket systems (HCFC22 and HCFC 404a) with R744 (carbon dioxide) and 744/R717 systems
- Project avoids emissions of high-GWP, ODS refrigerants
- Meets all safety requirements of European safety standard
- 20-25% higher energy-efficiency
- Return on Investment ca. 3-4 years
- System life expectancy is at least 5 years longer than traditional supermarket systems



SolarChill (Swaziland, South Africa)

- Preserve medicine food & beverages at high ambient temperatures (48°C)
- Using solar energy without the use of chemical storage batteries
- Set-up of a production line at the local manufacturer
- Excess energy is stored in a ballast load and is used during low light conditions
- Refrigerant 600a (isobutane)



Room air-conditioners using the natural refrigerant R290 (propane) – China (Gree), India (Godrej & Boyce)

- Developed very high efficiency split AC models on propane basis
- Achieve Indian Bureau of Energy Efficiency (BEE) five-star (highest) rating, China: up to 15% compared with conventional appliances
- India: Expected emissions reduction 500,000 tonnes CO₂ per year
- 18 of the 32 air conditioning production lines in China will be converted to R290



Converting XPS foam production from F-gases to climate-friendly CO₂ technology (China)

- Installation a new production line for XPS foam with environmentally friendly CO₂ as blowing agent instead of fluorinated gases
- Insulation foam based on European standards and adapted to Chinese conditions and regulations
- Avoidance of ca. 1.6 million tons CO₂eq direct emissions
- 80% of ca 500 companies in the sector to be converted in the next years: 40-50 production lines till 2015



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Global Mitigation Project in the Refrigeration, Air Conditioning and Foam Blowing Sectors (RAC&FB)

■ **Content:**

- Support non-Annex I countries in building HFC inventories according to UNFCCC guidelines for their National Communications
- Establishing RAC&FB Greenhouse Gas Emission Baseline and Business As Usual (BAU) emissions projections
- Identifying emission mitigation scenarios and technical options for the implementation of a Nationally Appropriate Mitigation Action (NAMA)
- Support for the submission and implementation of a NAMA (including seeking financial support & MRV) in one or more sub-sectors
- Handbook and tools as guideline for implementation

■ **Partner countries:** India, Mexico, Thailand, South Africa

■ **Partners & Beneficiaries:** Decision makers in Government & Industry

Outcome of the stakeholder workshop in July 2012

- **Date:** 26th and the 31st of July in Bangkok
- **Organizer:** DIW, TGO and GIZ PROKLIMA
- **Participants:** stakeholders from relevant industries, research organizations, associations and ministries
- **Content:** Presentation of the concept of Nationally Appropriate Mitigation Actions (NAMA) and the need for Monitoring, Reporting and Verification (MRV); session on technical options; session on servicing and maintenance
- **Outcome:** there seems to be a high potential for emission reduction in the RAC sector, which is also cost-effective (e.g. energy savings)

NAMAs in the refrigeration, air-conditioning and foam blowing sectors

- **Objective:** Establish tools and methodologies for NAMAs in refrigeration, air conditioning and foam sectors (incl. MRV)

What is a NAMA?

- The concept of NAMAs was introduced in the **Bali Action Plan 2007** as: *„nationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner.“*

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Towards RAC NAMA Implementation in Thailand

STEP 1 „Baseline“

- Establish Inventory/ Data Collection
- Direct and indirect emissions
- Baseline and BAU Emission
- Mitigation potential

STEP 2 „Selection“

- Sub-sector overview
- Criteria for sub-sector selection
- Shortlist of 2-3 possible sub-sectors
- Analysis of specific policy, technology options

STEP 3 „Action“

- Outline of applicable policy instruments, technologies and incentive mechanisms → Proposal
- Seeking Financial Support

Workplan:

Part I: Inventory/ Stakeholder Engagement	Step 1	Stakeholder (Industry) Engagement	Institutional development and stakeholder engagement
	Step 2	Establishment of Inventory	
Part II: Preparing NAMA Description Document (NAMA-DD)	Step 3	Defining Sector BAU and Mitigation Scenarios	
	Step 4	Identification of Subsectors for Mitigation Action	
	Step 5	Alternative Technologies + Barrier Removal	
	Step 6	Policy and Financing	
	Step 7	Roadmap	
	Step 8	Upload NAMA – DD for Registration	
Part III: NAMA Implementation	Step 9	Enabling implementation of measures	
	Step 10	NAMA support framework	
	Step 11	NAMA Progress and verification of emission reductions	

Removing Barriers

- Reliable data missing
- ✓ Baseline data/ HFC inventory available)
- Decision makers cannot estimate emission reduction potentials of climate friendly alternatives to HFCs
- ✓ mitigation scenarios are developed
- Transparent information & know-how on alternative technologies still needs to be made publicly available
- Preparation of a NAMA in one of the sub-sector (including relevant funding mechanisms, strategies and road maps)
- Institutional framework for NAMAs not yet fully established
- Preparation of a mitigation strategy

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Next steps:

- **Identify potential actions** and select an action which is cost-efficient and contributes to long-term sustainable emission reductions.
- **identify reduction potential and development gains** and to plan for concrete activities. Discuss criteria for good and ambitious mitigation action.
- **Prioritize sectors and actions** for potential NAMAs, considering the best available options and ones that are realistic for implementation.
- **Evaluate** financial and political **feasibility**.
- **Identify and involve** potential financiers, discuss planned NAMA and potential NAMA implementers with them .

Thank you for your kind attention!

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www.giz.de/proklima

Info and Training Material

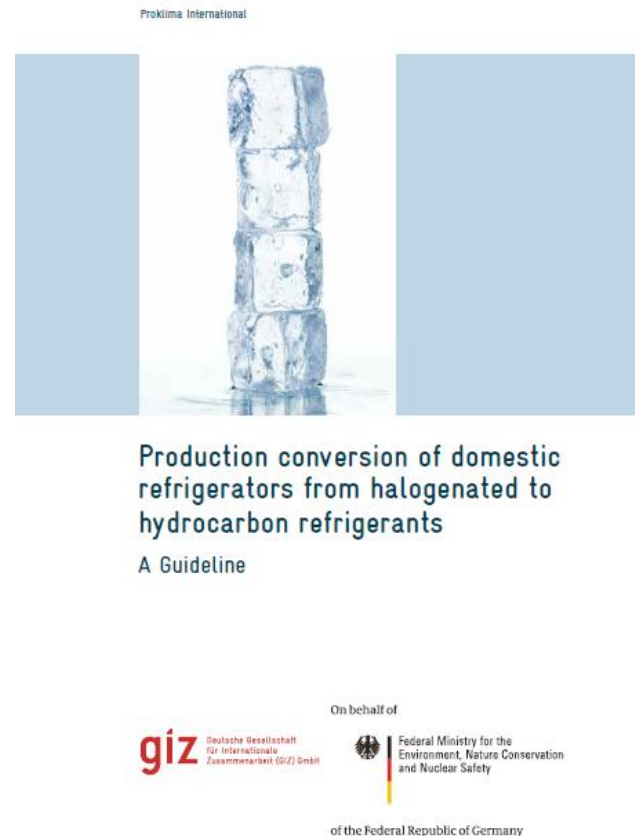
- Natural Refrigerants, 2008
- Natural Foam Blowing Agents, 2009
- Overview for NOUs, 2011
- GREE HC AC appliance installation, commissioning and service manual, published in 2011
- Best practices in refrigeration (GIZ PROKLIMA, 2010)
- Conversion guidebook for split air-conditioning systems, 2011
- Conversion of the production of XPS Foam to climate-friendly blowing agents, 2011



Operation of split air conditioning systems with hydrocarbon refrigerant
A conversion guide for technicians, trainers and engineers

Info and Training Material

- Guidelines on the safe use for HC refrigerants (GIZ Proklima and Tüv Süd), 2010
- Production conversion of domestic refrigerators from halogenated to hydrocarbon refrigerants, 2011
- Whitebooks with TÜV: Conversion of the production line of airconditioners to R290, 2011
- More currently under development



Download from www.giz.de/proklima

Movies about PROKLIMA projects

- **Environmental friendly air-conditioning in India:**
<http://www.dw.de/eco-friendly-cooling/a-16036590-1>
- **Green refrigerators in Swaziland:**
<http://www.dw.de/green-refrigerators-in-swaziland/a-5609664-1>
- **Recycling refrigerators in Brazil:**
<http://www.dw.de/recycling-refrigerators-in-brazil/a-14749211-1>
- **Green supermarkets in South Africa:**
<http://www.dw.de/cape-towns-greener-grocer/a-5978571-1>