

Argentina: Environmentally Sound Transport Management in the City of Buenos Aires

Partner Organisation: City of Buenos Aires
Project Period: September 1999 - June 2001
Financial Contribution: DM 350,000

Project Brief

Between twenty-five and thirty percent of CO₂ emissions world-wide are attributable to the transport sector. It is the only CO₂-emitting sector which is continuing to grow largely unabated – in contrast to the original assumptions made at the beginning of the 90s. For 2010, the IEA (International Energy Agency) is forecasting a 30% increase in transport-related energy consumption compared to 1993. The proportion of mineral oil products consumed by the transport sector is set to rise from the current 55% to 58%. Enormous growth rates will be seen in threshold countries, and even more so in developing countries. All the more reason to welcome Argentina's voluntary commitment to emission control, which is attracting attention in the international discussion on climate change. In Buenos Aires, the managerial staff in the municipal administration are eagerly pursuing a proactive approach: contributing to global climate protection within the framework of national objectives and supporting environmental protection efforts at local level. This commitment is also expressed through the project "Programa de Aire Limpio de la Ciudad de Buenos Aires", presented at the Fourth Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change in Buenos Aires in November 1998.



Practical experience with sustainable urban transport concepts has been in short supply in Argentina. Economic instruments are not being applied extensively enough, the use of environmentally sound technologies (for example city buses powered by CNG - Compressed Natural Gas) has made little headway, and the selection and evaluation of instruments for planning and managing the urban transport system are still in their early stages. The project in Buenos Aires aimed to address all these issues.

Substantial results of the project are: 1. Economic and fiscal instruments are discussed in the government of the city of Buenos Aires. 2. Adapted suggestions on the introduction of environment-friendly technologies are compiled (on the basis of the experience gained in pilot projects). 3. An emission control system is prepared for implementation. 4. Measures for planning and organising urban traffic are selected and evaluated. 5. The instruments and measures mentioned (results 1 - 4) are evaluated regarding their environmental effects.

Substantial recommendations of the project have been taken up by the city. In some fields of sustainable transport management the city of Buenos Aires remains interested in collaborating for further improvements.

Chile: Nationale CDM-Strategiestudie

Partnerorganisation: Comision Nacional del Medio Ambiente (CONAMA)

Projektzeitraum: Oktober 1999 - Juni 2002

Finanzierungsbeitrag: € 205.000

Kurzbeschreibung des Vorhabens

Die Kyoto-Mechanismen, vor allem der Clean Development Mechanism (CDM), könnten ein interessantes Instrument für Entwicklungsländer sein, in denen ein großes Potential zur Verringerung von Treibhausgas-Emissionen bestehen könnte. Dieses Instrument, mit dem durch Investitionsprojekte Emissionsreduzierungen erzielt werden, würde nicht nur zu einer Modernisierung bestehender Energie erzeugender und Energie verbrauchender Anlagen führen, sondern kann auch einen finanziellen Gewinn für das Gastland in Form von zusätzlichen Finanzflüssen bedeuten. Chile ist daran interessiert, sich den CDM zunutze zu machen.



Im Rahmen der Förderung von Marktinstrumenten zur Reduktion von Treibhausgasen unterstützte die Weltbank in enger Zusammenarbeit mit Partnerorganisationen, wie der GTZ, Entwicklungsländer, um die Möglichkeiten und den Nutzen einer Teilnahme am CDM auszuloten. Die von der GTZ geleistete Unterstützung Chiles im Rahmen des Nationalen Strategieprogramms umfasste, eine Studie anzustoßen und in Auftrag zu geben, in der mögliche nationale Strategien zur Reduktion von Treibhausgasen in allen Sektoren sowie die Möglichkeit der Absorption von Kohlenstoff in Senken-Projekten untersucht wurden.

In der Studie sollte dieses Ziel aus chilenischer Perspektive und unter ausgewogener Berücksichtigung zweier miteinander verbundener Aufgaben untersucht werden: Erstens wurden in der Studie allgemeine Aspekte analysiert, die Auswirkungen auf den zukünftigen Markt für Treibhausgas-Emissionsreduzierungen haben; zweitens wurden in der Studie eine kleine Anzahl von sorgfältig ausgewählten Einzelfragen, die von besonderem Interesse für das Partnerland sind, im Kontext der generellen Ziele angesprochen. Insbesondere wurden in der Studie Fragen wie Klimawandel und nationale Entwicklungsprioritäten, Bewusstseinsbildung für Klimapolitik und CDM, regulatorische, institutionelle und andere Kapazitäten für CDM in Chile, eine CDM-Projektpipeline und CDM-Methodiken behandelt.

Die Studie zeigt Strategien zur Reduktion von Treibhausgasen in allen Sektoren auf, sowie die Möglichkeit der Absorption von Kohlenstoff in Senken im chilenischen Forstsektor.

Colombia: Inventory and Mitigation of Greenhouse Gas Emissions

Partner Organisation: Ministerio del Medio Ambiente, Colombia; Academia Colombiana de Ciencias Exactas, Físicas y Naturales, Bogotá

Project Period: Phase 1: January 1995 - December 1996
Phase 2: October 1997 - July 1999

Financial Contribution: DM 750,000

Project Brief

The Preliminary Greenhouse Gas Inventory of Colombia identified the forestry sector as the main source of CO₂ emissions, followed by the energy sector. This study (Phase 1) was initiated in July 1995 as a co-operative scheme between GTZ and the Academia de Ciencias Exactas Físicas y Naturales in Bogotá. Additional technical assistance came from the Venezuelan Country Study Greenhouse Gas Inventory Team.



In the 2nd phase, the Colombian planning group sought to achieve the following objectives:

- A national mitigation plan with the appropriate participation of the key actors,
- An in-depth evaluation of priority mitigation technologies and identification of opportunities to promote technology diffusion and
- Support for implementation of the national mitigation plan through workshops and publication of results.

The action plan made use of the preliminary greenhouse gas emissions inventory that has been completed during phase 1 and relied mainly on the development of mitigation and response strategies. It contains concrete measures to reduce emissions and protect and enhance sinks.

As a continuation of the project, a study was conducted proposing a method for formulating CDM projects according to existing guidelines and preparing a generic portfolio of CDM-eligible projects for reducing emissions in Colombia's energy sector. On the basis of information obtained in the previous studies, four technologies were selected for evaluation: Wind power, cogeneration, photovoltaic solar power and fuel switching in industry. The study was part of an attempt to develop a national strategy for CDM projects.

COLOMBIA

MITIGATION OF GREENHOUSE GAS EMISSIONS IN COLOMBIA

Partner Organisation: Ministerio del Medio Ambiente
Academia Colombiana de Ciencias Exactas,
Físicas y Naturales, Bogotá

Project Period: October 1997 – December 1998

Financial Contribution: DM 450 000

BACKGROUND

The Preliminary Greenhouse Gas (GHG) Inventory of Colombia, compiled during an earlier phase of this project, identified land use change as the main source of CO₂ emissions in Colombia in 1990, followed by the energy sector.

Forest clearing was responsible for about 70% of all GHG emissions. In 1990, the country generated 166 million tonnes CO₂, of which only 30% was attributable to energy activities. The agricultural sector was the most

Forest Clearing



Global Fire Monitoring Center
<http://www.uni-freiburg.de/fireglobe>

important contributor to methane and nitrous oxide emissions.

Combustion of liquid fossil fuels emitted nearly 58% of all pollutants in the energy sector in 1990, the main source being gasoline-powered automobile engines. Biomass was responsible for about 33% of emissions, partially through the use of sugar cane bagasse and other agricultural residues by the industrial sector. Households in rural areas consumed 81% of fuel wood.

Mining and waste contributed about 7% to the country's CH₄ emissions. A large proportion of solid waste is still disposed of in open dumping, thus accounting for the relatively small number (30%) of landfills. Incidentally, these preliminary results show an average waste generation of 0.7 kg per capita and day.

The results of the first part of the project were to be expanded upon during the second part.

OBJECTIVE

The objective of the second part was to enable the government of Colombia to implement measures that will reduce GHG emissions.

MAIN ACTIVITIES

Project activities were conducted in two phases:

Phase 1: Building on the Preliminary Inventory, a scenario for energy use and GHG emissions through 2010 was developed.



Phase 2: Options for mitigation were put forward and evaluated.

SUMMARY OF FINDINGS

Phase 1: As a first step, the project team developed a **base case scenario** for the evolution of energy demand from 1998 to 2010. By 2010, Colombia will be consuming 1591 PJ of energy (excluding fuel wood). If fuel wood is added, consumption rises from 1134 PJ to 1827 PJ. The annual increase expected over the whole period under study (1996-2010) ranges between 4.03% and 3.35%.

To meet this demand, the Mining and Planning Energy Unit (UPME) of the Ministry of Mines and Energy published a plan in 1996 that presented four development strategies designed for the short, medium and long term to the various agents in the electric sector. For the long term (2001-2010), various combinations of gas, coal and hydro power plants were considered. UPME proposed four different strategies, identified as LP-1, LP-2, LP-3, and LP-4. LP-4 is the strategy with the largest component of coal-fired thermoelectric generation and thus the greatest amount of GHG emissions. It is therefore the one considered in the various emission-reduction analyses conducted in this study.

Structure of Energy Generation Capacity, 2010

Scenario	Hydro	Coal	Gas
LP-1	56.8%	7.6%	35.5%
LP-2	58.5%	11.4%	30.1%
LP-3	55.1%	10.1%	34.8%
LP-4	51.9%	13.7%	34.3%

Power-generation in Colombia is thus shifting from an expensive hydro-based (75.6%) but low-emission system in 1996, to a less capital intensive but higher-emission system by 2010 (see table above).

Diversifying its energy basket away from hydropower is very convenient for

Colombia. Coal is an important fuel for the country due to the existence of huge internal resources. In addition, coal-based energy generation adds reliability to an energy system fraught with uncertainties of its hydrological resources and operative problems of natural gas-fired power plants.

Of the energy to be generated by the LP-4 (highest emission) option, 57.2% will come from gas-fired plants, 27% from coal-fired plants, and only 15.7% from hydroelectric stations. The immediate consequence will be a decrease in capital costs from \$1,300 per installed kilowatt in a wholly hydroelectric system, to \$836 per installed kilowatt in the LP-4 mix, but with an increase in emissions.

In estimating emissions for the base case, the energy sector and the non-energy sector were considered separately. Total CO₂ emissions for the energy sector amounted to 66.4 million tonnes in 1996. They are expected to rise to more than 120 mio t by 2010, which means that by the end of the next decade, CO₂ emissions in the energy sector will be double the level they registered in 1990. The largest increase in emissions is expected to come from the electric sector. In 1996, the electric sector was responsible for 8% of total CO₂ emissions. By 2002, this share will be up to 14% and by 2008 as high as 22%.

Although emissions from the transport and industrial sectors will increase, their percentage shares of total emissions are expected to fall, owing to the electric sector's large increase. In 1996, their shares were 32% and 34% respectively, but by 2008 they will drop to 31% and 25% respectively. It is important to point out that the industrial sector's share of total emissions will fall from 34% to 25% mainly because of the penetration of natural gas in this sector. The percentage share of the residential-cum-commercial sector does not vary much over the period under study.



Out of total methane emissions in 1996 (146,000 tonnes), 75% consisted of fugitive emissions. This share is expected to rise to 82% in 2010 due to the expansion of coal mining and oil exploration.

The non-energy sector considered in the study consists of the forestry and farming subsectors. The main assumption with regard to the forest sector was that deforestation would proceed at a rate of 200,000 hectares per year until 2010.

As pointed out above, the energy sector's expansion from 1990 to 1998 also increased its CO₂ emissions from 52 mio t to 72 mio t. In contrast, the forestry sector's CO₂ emissions plunged from 111 mio t in 1990 to 60 mio t in 1998, as a result of tighter controls and policy changes at the national level in this regard. Over the period 1998-2010, CO₂ emissions will continue to fall in the forestry sector, down to 48 mio t by 2010, and to rise in the energy sector up to 126 mio t. Thus total emissions in 2010 of 174 mio t compared with the 1990 total of 167 mio t show an increase of barely 8 mio t in 20 years.

Phase 2: On the basis of the chosen technologies and their penetration to the year 2010, a scenario of **emission-reducing options** was developed.

The GHG mitigation programme under study envisages 24 options, 14 of which are listed in the table below. The total implementation cost amounts to \$17,344 million, whereas the reference option costs only \$1,623 million. The difference in cost stems from the fact that the reforestation projects are extensive and capital-intensive, making up 69.9% or \$12,139 million of total cost. The proposed new technology options involve an investment increment of \$5,204 million over the "business-as-usual" scenario.

The overall potential reduction in emissions by the year 2010 is 36 mio t of CO₂. **Forestry options** are prominent, because they result in most of the reduction in emissions: 24 mio t by 2010, representing over 66% of the total. The remaining 34% of reductions fall to the energy sector.

Colombia's Greenhouse Gas Mitigation Scenario

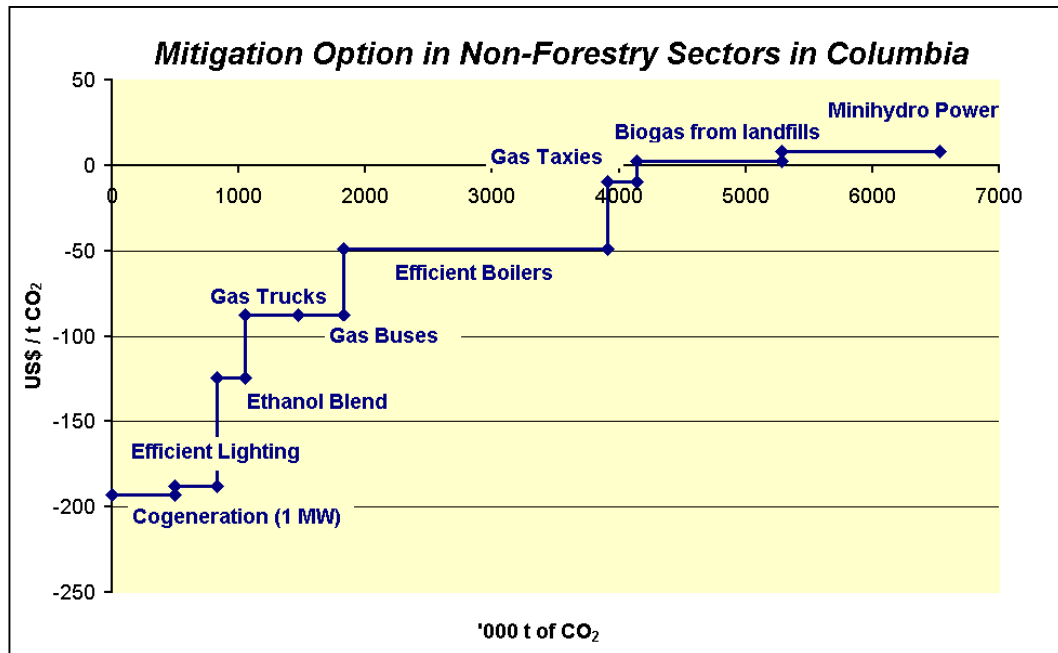
Reduction Option	\$/ton CO ₂	Unit Type	Emission Reduction t CO ₂ /unit	Units Penetrating in 2010	Reduction in 2010 mio t/year	Cumulative Reduc. 2010 mio t/year	Reduction in 2010
Cogeneration (1MW)	-87	1 MW	2,061	400	0.82	0.82	0.47%
Efficient Lighting	-69	1 Bulb	0.05	10,000,000	0.46	1.4	0.80%
Ethanol Blend	-51	1 Plant	111,923	10	1.12	2.52	1.44%
Efficient Boilers	-2	1 Boiler	4,164	500	2.08	4.7	2.69%
Gas trucks	-2	1 Small Truck	16	26,910	0.43	5.12	2.93%
Gas buses	-2	1 Bus	16	22,425	0.35	5.48	3.14%
Biogas from Landfills	1	1 Landfill	689,816	5	3.45	9.14	5.23%
Eucalyptus Afforestation	11	14 ha	252	30,000	7.56	16.7	9.56%
Protector Reforestation	18	1 ha	18	231,000	4.2	20.9	11.97%
Pine Afforestation	25	14 ha	252	30,000	7.56	28.46	16.30%
TECA-Afforestation	31	14 ha	161	30,000	4.84	33.3	19.07%
Minihydro Power	43	1 kWh	6.2	200,000	1.24	34.69	19.87%
Microhydro	101	1 kWh	1.1	1,000	1.24	35.94	20.58%
Gas taxies	149	1 Taxi	3.5	65,665	0.23	36.17	20.71%



Colombia is a middle-income country whose long-term economic performance has been average in the context of Latin America. However, in recent years the country has been experiencing signs of an economic slowdown, accompanied by a sharp rise in unemployment. In addition, the budget deficit has deepened in the nineties.

In this context, it is worth noting that

projects are fully consistent with the government's environmental intentions of restoring and conserving strategic eco-regions to improve the quality of life of the population, clean production, and upgrading the quality of urban life. Even more importantly, several of the identified options for mitigating GHG emissions could contribute to the peace process through investment and job creation in zones of social conflict,



particularly the mitigation options based on reforestation have a high domestic content. A first estimation indicates that these projects would generate some 186,600 direct jobs over the period under study, with a 100% domestic content. The new technology options have little domestic content and do not create many direct jobs compared with the forestry options. Implementation of all projects would require an annual expenditure estimated at around 1.7% of GDP. Execution of these projects, in particular the job-creating forestry projects, should be considered not only in the context of environmental concerns, but also as an important means of achieving the aims of the plan called "Changes for Building Peace". The

with the further benefit of decreasing migration to urban areas.

OUTLOOK

As a continuation of the project, a study was conducted proposing a method for formulating CDM projects according to existing guidelines and preparing a generic portfolio of CDM-eligible projects for reducing emissions in Colombia's energy sector. On the basis of information obtained in the previous studies, four technologies were selected for evaluation: Wind power, cogeneration, photovoltaic solar energy conversion and fuel switching in industry. The study was part of an attempt to develop a national strategy for CDM projects.

Projektkurzbeschreibung

Bezeichnung: Anpassung an den Klimawandel durch Katastrophenvorsorge in zwei Regionen

Auftraggeber: Bundesministerium für Wirtschaftliche Zusammenarbeit und Entwicklung (BMZ)

Land: Nicaragua

Politischer Träger: Autonome Regierung der Nordatlantik-Region (GRAAN)

Gesamtlaufzeit: November 2004 bis Juni 2005

Ausgangssituation

Der globale Klimawandel belastet die Bevölkerung Nicaraguas zunehmend. Betroffen sind vor allem Landwirtschaft, Energieversorgung, Gesundheitsbereich und Trinkwasserversorgung. Bereits heute erleiden die Bauern Ernteverluste durch zunehmende Stürme, Überschwemmungen, Hurrikane, Dürren und Unregelmäßigkeiten im Niederschlagszyklus. Das reduzierte Trinkwasserangebot führt zusammen mit Mangelernährung zur Verbreitung von Krankheiten. Damit trägt der Klimawandel in Nicaragua zum Fortbestehen und zur Verbreitung der Armut bei. Die nicaraguanische Strategie zur Armutsbekämpfung berücksichtigt das zunehmende Klimarisiko: ein wichtiges Element hierbei ist die Verstärkung des Katastrophen-Risikomanagements (KRM).



Ziel

Ziel der Maßnahme ist, dass ausgewählte ländliche Gemeinden im Südwesten Nicaraguas sowie in der autonomen Nord-Atlantik-Region ihre Fähigkeit zur Anpassung an den Klimawandel durch ein gestärktes Katastrophen-Risikomanagement verbessern und in ihre Planungsprozesse integrieren. Zudem wird die Bevölkerung in den ausgewählten Gemeinden umfassender auf Katastrophen durch Wirbelstürme, Überschwemmungen und Dürre vorbereitet. Dadurch sollen Verluste und Schäden durch Extremwetterereignisse, die durch den Klimawandel hervorgerufen werden, reduziert werden. Zudem ist vorgesehen, die im Zuge des Projekts gemachten Erfahrungen in Nicaragua und der zentralamerikanischen Region zu verbreiten.

Vorgehensweise

In den Projektregionen des Vorhabens „Programm Nachhaltiges Ressourcen-Management und Förderung unternehmerischer Kompetenzen“ (MASRENACE) verbessern die Gemeindeverwaltungen ihre Anpassungskapazitäten an den Klimawandel durch:

- Installation bzw. Verbesserung von Frühwarnsystemen;
- Integration von Risikoanalysen und deren Ergebnisse in die Flächennutzungsplanung;
- Aus- und Fortbildung von lokalen Fachkräften und Sensibilisierung der Öffentlichkeit sowie der politischen Entscheidungsträger.





Adaptation to Climate Risks in Nicaragua

Country/region:	Nicaragua
Project name:	Adaptation to climate change through disaster risk management in two regions
Partner:	Autonomous government of the North Atlantic Region (GRAAN) and the municipalities of Waspam, Bonanza, Rosita and Santa Teresa
Project duration:	November 2004 to November 2006

Scenario

Climate change is a bitter reality in Nicaragua, America's poorest country after Haiti. In the Pacific Region, mean temperatures are expected to rise by 0.9° C in 2010 and rainfall to decrease by 8.4%. By the end of the century, temperatures could rise by 3.7° C and rainfall decrease by a massive 36.6%. An additional reduction of aquifers of around 10% is also predicted.

Agriculture, energy supply, health care and drinking water supply are the sectors most affected. Farmers are already suffering harvest losses caused by increasing storms, floods, hurricanes, drought and irregularities in the rainfall cycle.

Increasing dryness, particularly in the Pacific West Coast region, is already exacerbating existing conflicts between the need for domestic drinking water and local food production, coffee and banana plantations for export, and hydroelectric power stations.

Reduced drinking water supply in some areas has – in combination with malnutrition – led to increased prevalence of disease.

Along the Atlantic East Coast, hurricanes, tropical rainstorms, floods and mudslides are taking an increasing toll on remote communities in the country's poorest and least developed regions.

Some communities have still not recovered from the centennial Hurricane Mitch in 1998, which directly affected 20 percent of the 5-million-strong population, killing more than 3,000 people and destroying 36,000 homes. Flood and hurricane disasters are a constant, massive threat to any family seeking to escape the vicious cycle of poverty in Nicaragua.

Providing advanced information to potentially affected communities and their leaders enables them to make immediate use of this information and to initiate well prepared emergency plans. Such information cannot stop the storms, floods and mudslides, but it can save lives, and makes a huge difference with respect to shelter and property losses, food and water supply and the prevention of epidemics.

Left behind by Hurricane Mitch



commissioned by:



A survivor leaves his village after the hurricane



Early warning by radio in Waspam

Preparing for the worst when building and maintaining houses, roads, bridges and other infrastructure can substantially reduce the impact of the disaster. Adapting land-use plans in agriculture and forestry to predictable extremes and changing weather conditions is indispensable when it comes to protecting food security and mitigating the losses of the rural economy.

Project

In 2004 GTZ started a first project entitled "Adaptation to Climate Change through Risk Management" with selected rural communities on the south-western Pacific coast and in the autonomous North Atlantic Region with the aim of improving their capacity to adapt to climate change by means of strengthened disaster risk management. The project also sought to integrate this capacity into their planning processes.

Climate and disaster experts may well be aware of general and specific risks for particular regions. However, success depends on whether those affected and those in charge at the community level are aware of these risks as well and have a plan and the means to manage them.

One part of the project was conducted together with indigenous Miskito communities along the Rio Tungky in the Autonomous Region of the North Atlantic. This area is plagued by hurricanes and extreme rainfalls. Floods have especially severe impacts due to the heavy contamination of some of the rivers by gold mining. Consequent mudslides are exacerbated by poor forest management and deforestation.

Impact

The most important tool to date has been the carrying out of a series of participatory risk analyses involving 550 citizens from five Miskito communities. These were facilitated by employees from the environmental unit of the municipalities of Bonanza and Santa Teresa, assisted by the local authorities. They had received special training on this new tool, which creates anticipation in order to ensure preparedness. In addition to several workshops in the communities, a contest of drawing local risk-maps was conducted and well received.

The next step, which is still to be completed, is the thorough integration of the identified risks into the local land management plans, plus the definition of the necessary steps to reduce them. Regional weather records are still evaluated with the help of the local gold mining company, which proved to have the only reliable rainfall records, dating back to 1939.

Early warning systems were improved and newly installed in the community of Waspam in the border region next to Honduras as well as in the pacific community of Puerto Cabezas, to allow for fast communication and information among a total of 70 radio stations. The activities included the installation of new equipment and a communication platform as well as hands-on training of about 150 persons on how to use a radio transmitter. The early warning systems substantially improved the preparedness and speed of evacuation measures during the 2005 hurricanes Wilma and Beta.

These pilot projects, which were discussed with the authorities at the national and regional level in bilateral meetings and in workshops, have been integrated into GTZ's long-term Programme for Sustainable Resource Management and Entrepreneurial Capacity Building (MASRENACE), which started in Nicaragua during the same period.

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Peru: Verbesserung der Energieeffizienz bei peruanischen Industriekesseln durch den CDM

Partnerorganisation: Ministry of Industry (MITINCI)

Projektzeitraum: Juni 2001 - Dezember 2002

Finanzierungsbeitrag: € 50 000

Projektbeschreibung

Diese von der GTZ unterstützte Studie hat die Umsetzbarkeit eines CDM-Projekts zur Verbesserung der Energieeffizienz von Industriekesseln in Peru untersucht. Ein herausragendes Merkmal des Projekts ist die Zusammenfassung von mehr als 100 kleineren Kesseln innerhalb eines CDM-Projekts. Dies erfordert einen umsichtigen Aufbau von institutionellen Vereinbarungen und Prozessen.

Aus der Studie lassen sich folgende Ergebnisse ableiten: Während eines Anrechnungszeitraumes von zehn Jahren wird das Projekt aufgrund von Investitionen in die Verbesserung der Energieeffizienz voraussichtlich eine CO₂-Reduzierung von etwa 165.000 Tonnen erzielen können. Weitere 225.000 Tonnen sollen, so die Abschätzung der Studie, durch gute Betriebsführung erreicht werden.

Die Energieeffizienz und die Arbeitsweise von peruanischen Kesseln unterscheiden sich sehr stark voneinander. Daher sind für das gebündelte CDM-Projekt spezielle Methoden zur Ermittlung des Referenzfalls sowie für den Monitoring-Plan erforderlich.

Ein spezielles Kreditbewilligungsprogramm, technische Beratung sowie der Aufbau von Kapazitäten für die teilnehmenden Firmen sind Schlüsselmerkmale für eine erfolgreiche Umsetzung.

