



## UNDP Project Document

Government of Mexico

United Nations Development Program  
United Nations Environment Program

### 00063034 The Country Program of Mexico under the Global Solar Water Heating Market Transformation and Strengthening Initiative (PIMS 3611)

As a part of the UNDP/UNEP/GEF Global Solar Water Heating Market Transformation and Strengthening Initiative, this country programme of Mexico aims at accelerating the market development of solar water heating in Mexico with an objective to reach total capacity of 2.5 million m<sup>2</sup> of installed collector area by the end of the project (2013); and expected continuing growth to reach a target of 23.5 million m<sup>2</sup> of total installed SWH capacity by 2020. This has been estimated to correspond to an estimated cumulative GHG reduction potential of over 27 million tons of CO<sub>2</sub> by 2020.

The goal of this country programme of the global UNDP/UNEP Solar Water Heating Market Transformation and Strengthening Initiative is to accelerate and sustain the solar water heating (SWH) market growth in Mexico and to use the experiences and lessons learnt in promoting a similar growth in other countries. By co-operating with and supporting Mexico's National Solar Water Heater Program (known as PROCALSOL), it will develop a enabling regulatory environment and helps to build up the market demand and strengthen the supply chain with the aim to reach the total capacity of 2,500,000 m<sup>2</sup> of installed SWH systems in Mexico by the end of 2013. The focus will be on: i) enhancing the awareness of the key stakeholders on the use of SWH systems; ii) supporting the establishment of a enabling regulatory environment for sustainable development of the SWH market in Mexico, including a voluntary quality control and certification of SWH systems; iii) building the capacity of the supply chain; and iv) supporting the establishment of attractive consumer financing mechanisms in co-operation with the local financing institutions. By this, the project seeks to facilitate continuing sustainable growth of the market even after the project to reach the target of 23.5 million m<sup>2</sup> of installed capacity by 2020.

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## List of Acronyms

AEAE	Association of Companies for Energy Savings in Construction
ANES	National Solar Energy Association
APR	Annual Project Review
AWP	Annual Workplan
CANACINTRA	National Chamber of Industry of Transformation
CFE	Federal Electricity Commission
CMIC	Chamber of Construction Industry
CNEC	National Chamber of Consultancies
CO2	Carbon dioxide
CONCAMIN	Confederation of Industrial Chambers
CONACYT	National Council for Science and Technology
CONUEE	National Commission for Energy Efficiency (Formerly CONAE)
CONAVI	National Housing Commission
CRE	Energy Regulatory Commission
CTA	Chief Technical Advisor
DF	Distrito Federal
FIDE	Electricity Savings Fund
FONACOT	Instituto del Fondo de Fomento y Garantía para el Consumo de los Trabajadores
GEF	Global Environment Facility
GEFSec	Global Environment Facility Secretariat
GIS	Grupo Industrial Saltillo
GPMU	Global SWH Program Management Unit
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
HQ	UNDP headquarters
HVAC	Heating, Ventilation and Air Conditioning
IaDB	Inter-American Development Bank
ICA	International Copper Association
IMEVI	Mexican Institute for Home Furnishings
IMSS	Mexican Social Security Council
INE	National Ecology Institute
INFONAVIT	Institute of the Nacional Workers' Housing Fund
IW	Inception Workshop
LAEFERTE	Law for the Use of Renewable Energy and Financing of the Energetic Transition
LASE	Law for the Sustainable Use of Energy
LPG	Liquefied petroleum gas
LyFC	Central Light and Power [Distribution company serving Mexico City]
M&E	Monitoring & Evaluation
MMBTU	British thermal unit
NAFINSA	Nacional Financiera SA
NEX	National execution modality
PEMEX	Petróleos Mexicanos
PIR	Project Implementation Review
PMT	Project Management Team
PND	National Development Plan

PSC	Project Steering Committee
PSE	Sectoral Program for Energy
RCU	Regional Coordinating Unit
SCT	Ministry of Transportation and Communications
SE	Ministry of the Economy
SEMARNAT	Ministry of Environment and Natural Resources
SENER	Ministry of Energy
SEP	Ministry of Public Education
SHCP	Ministry of Public Finance and Credit
SHF	Sociedad Hipotecaria Federal
SUTERM	Union of Electric Workers of Mexico
SWH	Solar water heater
TA	Technical Assistance
TPR	Tripartite Review
TTR	Terminal Tripartite Review
UdG	University of Guanajuato
UNDP	United Nations Development Programme
UNDP-MX	United Nations Development Programme Country Office
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	U.S. Agency for International Development

## SECTION I - PROJECT CONCEPT

### SECTION I: PROJECT DESIGN

#### Part I: Situation Analysis and Problem Statement

##### *Climate*

1. Mexico offers excellent conditions for the use of solar water heaters due to its climate, with conditions varying from tropical to desert, and many major population centers located at elevations in excess of 1,000 m above sea level. According to Mexico's Energy Balance 2005 and National Solar Energy Association (ANES), average solar radiation is 5.2 kWh/m<sup>2</sup> per day (18.8 kJ/m<sup>2</sup> per day). Annual heat generation from SWH systems is 975,780 MWh (3.51 Petajoules) from 742,992 m<sup>2</sup> in installed capacity.

##### *Energy*

2. Energy conservation and promotion of increased use of renewable energy resources have been priorities in the national strategies of Mexico for more than 15 years, as the creation (and resulting actions and programs) of the National Commission for Energy Efficiency (Formerly CONAE) and the Electricity Saving Fund in 1989 and 1990 demonstrate.

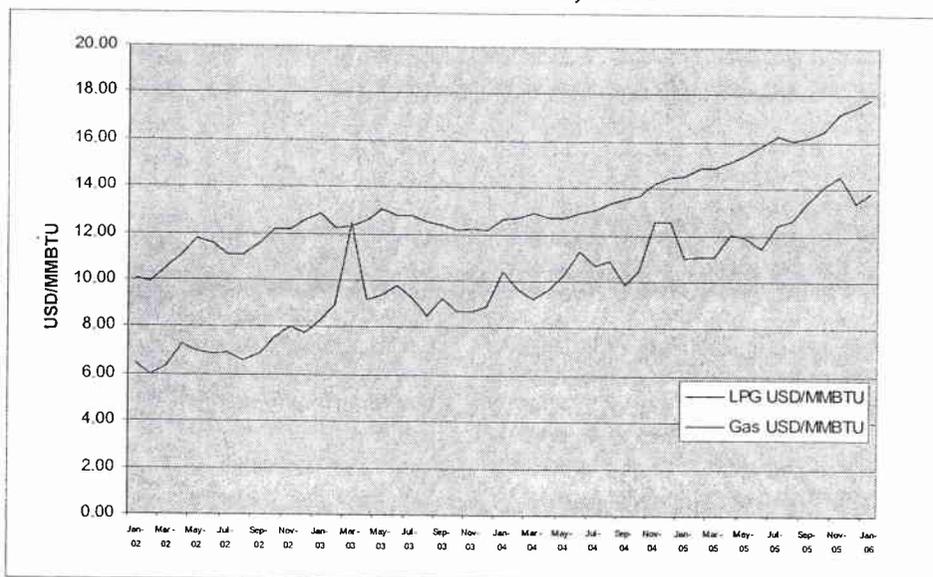
3. Demand for water heating with commercial fuels (not including fuelwood) is a significant component of national energy consumption, accounting for approximately 8% of total demand in Mexico, with similar contributions to national CO<sub>2</sub> emissions. Of the total energy demand of buildings, the share of sanitary hot water preparation has been estimated to be 33 % in Mexico.

4. The SWH sector in Mexico can be classified as an emerging market, which by the end of 2005 had reached an estimated penetration rate of 6.9 m<sup>2</sup> per 1000 inhabitants. As such, it belongs to the group of countries where positive market development has already started, though it will be important that this development be sustained and, as possible, accelerated. This goal is envisaged to be reached by attracting new customer groups in addition to those considered to be the most accessible in early market development phases, as well by ensuring full customer satisfaction with the operational performance of the systems installed, thereby promoting the image of SWH as a reliable, cost effective technology for water heating. Of particular importance for Mexico is the development of the residential segment, since it currently accounts for no more than about 10% of the SWH market. The success stories, experiences and lessons learnt from these emerging developing country markets are expected to accelerate the market transformation also in those countries, in which the SWH market has not yet taken off.

5. On the basis of a number of studies completed in Mexico over the last five years, the key barriers to accelerating and sustaining the SWH market growth are: i) high up-front costs of SWH systems; ii) lack of consumer awareness, iii) lack of quality control and trust on product quality and installations; and iv) lack of suitable and attractive financing mechanism to alleviate the higher up-front costs of SWH systems.

6. At this point in time, the main drivers for the purchase of a residential SWH are the high energy costs (mainly LPG and natural gas) and, to a lesser extent, increased environmental awareness. The figure below shows the trend of natural gas and LPG prices over the last several years.

Figure 1: Natural Gas and LPG Consumer Price Trends, 2002-2005



Source: SENER

7. While rising fuel prices have increased demand, the rate of growth has been held back by the lack of financing mechanisms suitable to deliver immediate savings to end-users, as well as lack of public awareness of SWH systems as a reliable alternative or complement to thermal water heaters. At the same time, expanding SWH sales are supported by market drivers including growing environmental awareness in Mexico and “high-tech status” that some of the fancier systems may give to some of the wealthiest population.

8. Another constraint to the market is the lack of fully operational technical standards or quality control of the systems and their installation, with the associated risks to positive market development in the future. Quality control for product and system installation is a major issue in the development of the residential, commercial and industrial sectors’ markets.

### ***Institutional Framework***

9. The Secretaría de Energía (SENER), Mexico’s Ministry of Energy, is responsible for the overall development of the energy sector, including the promotion of alternative energy technologies, and guarantees a competitive, sufficient, high quality, economically viable and environmentally sustainable energy supply for the country’s development needs. SENER has promoted the creation of sustainable energy policies, and has developed financial instruments and mechanisms contributing to the realization of such policies. On the 28<sup>th</sup> of November of 2008, the Mexican Congress passed two laws, transcendental to the development of a sustainable energetic sector; the Law for the Sustainable Use of Energy (LASE), and the Law for the Use of Renewable Energies and Financing of the Energy Transition (LAEFERTE). These laws

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develop instruments promoting RE technologies, such as the creation of a trust fund that will allow renewable energy resources to make up a significant part of Mexico's total energy generation by 2012. The LASE and the LAEFERTE, modify Mexico's approach to the sustainable use of energy as well as to energy efficiency. The LASE, modifies the preexisting CONAE, and transforms it into the new CONUEE (Comisión Nacional para el Uso Eficiente de la Energía) which will play a central role in developing national policy regarding sustainable use of energy.

10. The Congress recently approved the law, after the Senate reviewed and amended it. Some of the most relevant aspects considered in this law are: 1) creating an enabling environment for the development of renewable energy projects in the next 10 years; 2) developing methodologies to evaluate the economic benefits of such technologies; 3) increasing access to equitable utilization of renewable energy source; and 4) creating a trust fund to cover the use of renewable energy sources, among others. SENER will assume a key role in the implementation of this law.

11. The National Commission for Energy Efficiency (CONUEE) was established with the express purpose of promoting energy conservation and energy efficiency measures in Mexico, and fostering the sustainable use of energy. Derived from the LASE, CONAE's functions were transmitted onto CONUEE, and continues to operate as an independent agency within SENER, and is technically and operationally autonomous. The LASE has strengthened the role of the CONUEE, generating new responsibilities specially with the promotion of sustainable energy use. CONAE now CONUEE has included promotion of SWHs in its program of activities since 2001, and is the agency charged with promoting the development of standards for the energy sector. In august 2007, CONAE launched the National Solar Water Heater Program, known as **PROCALSOL**, to continue its efforts to promote SWH use in the country. This policy will be further developed and implemented by the CONUEE. Among other objectives, this program is intended to complement the implementation of the UNDP/UNEP Solar Water Heating Market Transformation and Strengthening Initiative.

12. The Federal Electricity Commission (CFE), which was established in 1937, is a vertically integrated state-owned utility that generates the bulk of electricity consumed in Mexico and distributes electricity to all areas of the country outside the central region around Mexico City, which is served by Central Light and Power (LyFC), which is primarily a distribution company. CFE serves approximately 24.8 million clients, generates approximately 80% of Mexico's energy and controls 91% of the national transmission grid.

13. The Energy Regulatory Commission (CRE), which was established in 1993, regulates Mexico's natural gas and electricity industries. CRE grants permits for energy generation, approves umbrella contracts for the provision of energy, and provides the methodologies to calculate applicable rates for private energy suppliers. CRE's principal responsibilities as defined in the *Ley de la Comisión Reguladora de Energía* (1995) are as follows:

- The supply and sale of electrical energy to end-users;
- The generation, export and import of energy;
- The acquisition of electrical energy for use by end-users; and
- The sale and distribution of natural gas and LPG.

14. The Ministry of the Environment and Natural Resources (SEMARNAT) establishes national policies on environmental protection and coordinates activities related to the commitments of Mexico to the United Nations Framework Convention on Climate Change (UNFCCC). SEMARNAT works in collaboration with the energy, transport, economy, agriculture, social development and foreign affairs sectors. The National Ecology Institute (INE), is a specialized agency within SEMARNAT in charge of developing research and analysis to support environmental policymaking.

15. The Ministry of the Economy (SE) houses the General Bureau of Standards, which deals with the establishment of standards and norms related to metrology, national and international standardization and conformance assessment. SE will be the authority over the implementation of SWH standards at the national level in Mexico.

16. PEMEX is Mexico's state oil monopoly, in charge of with maximizing the economic value of Mexico's hydrocarbons industry and its derivative products. PEMEX is one of the world's largest oil companies, with reserves estimated at about 13.7 billion barrels at year-end 2005. It is taxed heavily, contributing about 40% of the federal budget, making it the largest single source of revenue for the federal government. However, because it does not have administrative autonomy over its budget - Congress oversees this - and because of other limitations, it is underinvesting in future production and the maintenance and operation of its existing infrastructure. PEMEX controls prices at the wholesale and consumer ends while private distribution companies are paid to transport fuel. Low volume consumers are charged below market value.

17. The Electricity Savings Fund (FIDE) was established in 1990 to promote actions that induce and support savings from and the rational use of electricity. FIDE's technical committee is made of members from CFE, Luz y Fuerza del Centro (LFC), the Union of Electric Workers of Mexico (SUTERM), CONCAMIN and CANACINTRA (industrial chambers, see below), the Chamber of the Construction Industry (CMIC), the Chamber of National Consultancies (CNEC), and CONUEE. FIDE has implemented various projects to demonstrate the technical and economic viability of proposed energy efficiency and savings activities to Mexico's electricity customers. Past FIDE projects and programs have provided support to municipalities, industry, commercial enterprises, and the residential sector.

18. The Confederation of Industrial Chambers (CONCAMIN) represents the interests of 65 chambers of industry and 43 industrial associations for different sectors. The National Chamber of Industry of Transformation (CANACINTRA) was formed in 1941 and currently has representation in 80 Mexican cities and represents the interests of the manufacturing sector. CONCAMIN and CANACINTRA are two of the principal interlocutors in the business sector in Mexico specifically identified in the Law on Chambers. More specifically, CANACINTRA and the National Solar Energy Association (ANES) are part of a SWH standards committee that has issued a voluntary flat-plate collector standard.

19. The National Housing Commission (CONAVI), formerly known as the National Commission for Housing Promotion or CONAFOVI, is the agency charged with developing policies for the housing sector pursuant to the 2006 Housing Law. CONAVI is actively evaluating possible sustainable design mandates for the housing sector through a program, funded in part by the Government of Canada with support from the Canada Mortgage and Housing Corporation, which included

construction of model housing units in various areas of the country. Some of these demonstrations have included SWHs. Furthermore, CONAVI is interested in developing a model building code which may be adopted by states or municipalities in Mexico.

20. The Fondo de Fomento y Garantía para el Consumo de los Trabajadores (FONACOT), created in 1974 to support the living conditions of Mexican workers, recently inaugurated its own credit card in the context of its strategy to expand its sales channels, numbers of products and services covered, and volume of financing. FONACOT financing is available to Mexican workers registered with social security, and whose salaries are between one and 25 times the national minimum wage. Credit issued by the organization is offered at a lower rate than commercial banks, and repayment is collected via workers' payrolls. FONACOT maintains a published list of goods and services that can be purchased using FONACOT credit.

21. The principal financial institution in Mexico's mortgage market is INFONAVIT (Instituto del Fondo Nacional Para la Vivienda de los Trabajadores). Much like FONACOT financing, INFONAVIT mortgage loans are available to workers registered with social security, and repayment of the loan is made through workers' payrolls. The terms offered by INFONAVIT are more attractive than mortgages private banking institutions, usually at a 12% interest rate with terms lasting as long as 25 years. The average size of mortgages offered by the Institute is 200,000 Mexican pesos.

22. Mexico's development bank for the private sector, Nacional Financiera SA (NAFINSA or NAFIN), typically acts as the intermediary agency for international development finance programs, such as the IDB's loans for electrical energy efficiency, implemented by FIDE. CFE delegates activities in demand-side management to FIDE. NAFINSA is also acting as manager for GEF funds in the context of other activities, and has considerable experience with execution of this type of activity; it has implemented a number of GEF projects, and has been the financial agency for over 14 World Bank-financed projects.

### *National Policy Framework*

23. The National Development Plan for 2007-2012 (PND) identifies sustainable development as a central axis for the formation of public policy in Mexico. The PND specifically states that quality growth will only be achieved through the creation of the proper conditions necessary for sustainable development, the modernization of environmental and natural resources management, as well as the incorporation of an effective scheme for the protection of the aforementioned. At the same time, the PNU's strategies encourage the implementation of clean technologies (including renewable energy) for energy generation and promote the efficient use of energy in industrial, services, domestic and agricultural sectors.

24. Similarly, the Sectorial Program of Energy 2001-2006 (PSE) mandates the addition of at least 1,000 MW of renewable energy sources to the country's installed generation capacity by 2006. In order to achieve this goal, the PSE proposes the establishment of necessary actions that allow the public and private sectors to participate in the development of new renewable energy projects, with the following technologies: solar; wind; geothermal; small hydropower; biomass and biogas. According to the National Energy Balance 2006 document, the production of primary energy was made up primarily of Hydrocarbons, which accounted for 90.0% less than in 2005 (90.3%). Primary electricity (nuclear, hydropower, wind power, solar and geothermic)

accounts for 4.6% of the total in 2006, compared to 4.4% in 2005. The National Energy Balance 2006 also informed that 13% of the total energy used by the government and public offices in 2006 came from renewable energy sources.

Finally, withing the Sectorial Program of Energy 2007-2012, the National Program to Develop Renewable Energy promotes the installation of solar water heaters in housing programs that are supported by the Federal Government.

25. CONUEE has supported a range of activities to promote the use of SWHs since 2001. In 2002, CONUEE oversaw a survey funded by the U.S. Agency for International Development (USAID) on end-user opinions on SWHs. The survey resulted in 36 responses, augmented by interviews with approximately 20 individuals, and noted that the major obstacles to wider utilization of SWHs were limited public awareness, concern on the part of those that were familiar with SWHs with the quality of locally available products, and access to financing. CONUEE has also been providing extensive information on SWHs on its website ([www.CONUEE.gob.mx](http://www.CONUEE.gob.mx)) with a system for interested customers to obtain information on manufacturers and distributors of SWHs, and for SWH companies to obtain market information. CONUEE has also been working on the development of the website of the PROCALSOL ([www.procalsol.gob.mx](http://www.procalsol.gob.mx)), which will be ready at the beginning of 2009. In 2005-2006, CONUEE oversaw a study funded by GTZ on potential mechanisms for supporting purchases of SWHs. This study deliberately did not consider grant or new financial resources in its analysis; it focused on those sources of financing already available to end-users in Mexico at the time. Finally, in 2007, CONUEE announced the launching of PROCALSOL with support in part from GTZ.

26. The Law on Measurements and Standardization, passed in 1998, establishes the mandate to implement technical mandatory standards that define “the characteristics and/or specifications that products or processes must meet in the case they may constitute a risk to human safety or could endanger human, animal or vegetable health, overall or working environment, or for natural resources preservation.” Article 53 specifically states that every product, process, method, installation, service or activity must comply with Official Mexican Standards, even if the product or process is imported. In order to be in compliance, manufacturers, traders or importers will have to be in possession of a compliance certificate issued by the corresponding office regulating that particular product or service.

27. Two energy-efficiency building standards exist in Mexico, both applicable to commercial buildings. One concerns the power density of lighting systems. The lighting standard limits the power density allowed and is enforced by making it as a requirement for obtaining a new contract with the power utility. Enforcement of this standard has been successful. The second standard applies to the actual “building envelope,” and intends to reduce heat gains to buildings and reduce the use of air conditioners. The enforcement of the standard depends on making it a requirement for a building permit by municipal authorities, and must therefore become a part of the local building code. This has not yet been realized in a great majority of Mexican cities, and the standard remains more of a reference than a clear mandate. The two standards are NOM-007-ENER-2004, and NOM-008-2004, respectively (“Eficiencia energética en sistemas de alumbrado en edificios no residenciales” and “Eficiencia energética en edificaciones, envolvente de edificios no residenciales”). A number of additional energy efficiency standards and norms are available through CONUEE, including one regarding NOM-003-ENER-2000 (Eficiencia térmica de calentadores de agua para uso doméstico y comercial:

límites, método de prueba y etiquetado). The Association of Companies for Energy Savings in Construction (AEAE) has also established a standard to the "R factor" of buildings, which affects the permeability of a building's envelope to radiation from the sun.

28. In April 2006, the Federal District (DF), which encompasses the central and southern parts of Mexico City, passed into law a municipal code mandating that all new businesses located within the boundaries of the DF secure 30% of their hot water through solar energy. The new code applies to public-use buildings employing over 50 people. USAID supported the preparation of the standard and is preparing work on a proposed standard for the residential sector in the DF. Targeted businesses have thus far been restaurants, public pools, health clubs, laundromats and dry cleaners. So far, the Government of the DF has publicized the code and trained municipal officials in its application via construction permits, hence relatively little information exists on its actual or projected impact. There is interest in widening the application of codes to cover other cities in Mexico, although institutions currently lack the manpower to be able to do so.

29. To date, a test standard for efficiency and functionality of SWH and standards for terminology have been approved through NORMEX. Work is underway on installation systems. Further progress on the application of standards and tests for SWH is currently being stalled by a number of barriers. The first is a political one, in that some Mexican SWH manufacturers have resisted mandatory certification standards, while mainly importers of equipment that meet international standards are more supportive of them. Second, SWH manufacturers and other observers argue that the current cost of certification for SWHs in Mexico to meet the voluntary standard (approximately US\$ 3,600/ year per model) is prohibitive. The actual certification test costs US\$ 3,600 which is carried out only by the new facility at the University of Guanajuato. The capacity of this lab is limited which leads to the current low volume of testing.

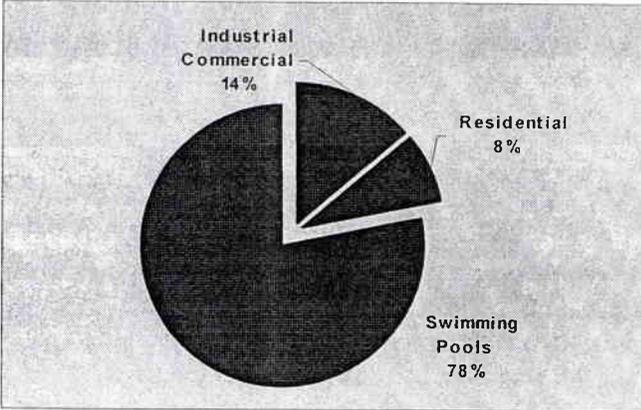
30. It is likely that other laboratories will open in the course of the next two years; water heater manufacturer Cal-o-Rex's parent company, GIS, currently has a lab to support its own R&D efforts, and would likely to open it to others in the same way that its thermal heater laboratory is open to any company in the sector for testing. The test standard is for panels only, which presents a problem for thermosyphon systems since their performance is dependent on geometry and panel tilt. A longer test period is required to get a range of performance values, whereas pumped systems have controlled flow rates. The certification side, which involves independent sampling in the market place and inspection up to the level of destructive testing to ensure compliance on a yearly basis deserves some scrutiny especially with respect to bringing the small scale manufacturers up to a common and possibly optimum level of quality. This may include group certification for prescriptive product, inter-annual self certification and less cost product verification.

### ***Technology Introduction and Supply Chain***

31. According to ANES, the total installed surface area of SWH was approximately 839,686m<sup>2</sup> by year-end 2006. Installations are distributed among three principal sectors: swimming pools; industrial and commercial buildings; and the residential sector. Swimming pools currently account for the bulk of installed SWHs (78% of total installed capacity), followed by the industrial/commercial sector, which accounts for 14% of total installations in Mexico. Another

source states that approximately 75,000 homes in Mexico are equipped with SWHs, which would imply a total installed surface area greater than that estimated by ANES. The table below presents the size and segmentation of the Mexican SWH market.

**Table 1: Size and Segmentation of Mexico SWH Market**

New Installations in 2006 (m <sup>2</sup> )	Total Installations	
	Year	Area (m <sup>2</sup> )
 <p>A pie chart illustrating the segmentation of new SWH installations in 2006. The chart is divided into three segments: Swimming Pools (78%), Industrial Commercial (14%), and Residential (8%).</p>	1997	260,000
	1998	290,000
	1999	328,212
	2000	373,095
	2001	447,704
	2002	498,615
	2003	573,919
	2004	643,000
	2005	742,992
	2006	839,686

Source: ANES

32. According to conversations and interviews with SWH manufacturers and distributors, national sales are expanding, with increasing interest coming from commercial and light industrial users of hot water and, to a lesser degree, residential users. The most likely explanation for this trend can be found in rising costs of fossil fuels. Even so, SWH manufacturers and distributors brought attention to the various barriers and trends that currently define the national SWH market in Mexico. The main barriers relate to the high initial cost of SWHs, which many developers see as prohibitive for the majority of their customer base, which make up the lower level income segments in the country. The lack of a financial mechanism and/or financial incentives or mandates enforcing the use of SWHs in homes makes this type of equipment largely unaffordable. Furthermore, developers and distributors cited the absence of a major public information campaign advertising the technology, and the resulting lack of public knowledge, as a significant obstacle to the promotion of SWHs in the country.

33. Despite significant barriers that need to be addressed in order to convince Mexico's real estate developers to install SWHs on new homes, the benefits of the technology are not unknown, and some developers do in fact demonstrate a knowledge of the energy savings that

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SWHs could bring to their customers. Some of the main drivers of SWH promotion cited by developers include the energy efficiency and economic savings derived from use of the technology, as well as the improvement of environmental conditions at the local, national and even global levels. Furthermore, the recognition of rising fossil fuel prices will be an important driver in demonstrating the economic benefits of SWHs.

34. In 2002-2003, a survey of 36 homes was carried out to support CONUEE in its on-going study on SWHs. The following conclusions were drawn from this survey:

- Once SWHs have been adequately installed, the technology's benefits are generally accepted. On the other hand, faulty installations led to negative attitudes on the part of end-users towards SWHs manufacturers and distributors;
- After-sale service offered by manufacturers was qualified as adequate, although poor service resulted in dissatisfied customers in a number of cases;
- SWHs are purchased in cash in most cases, and various survey respondents expressed that they were not aware of the possibility to purchase SWHs on credit. This would suggest that the establishment of a financial mechanism with local financial institutions would help to stimulate sales;
- The objective of a SWH purchase is ultimately to save money, although in certain cases respondents indicated that their purchase was also environmentally motivated;
- The most important way to promote sales of SWHs is through the recommendation of a friend/family member, which underscores the importance of maintaining customers satisfied.

35. According to a telephone survey completed in February 2006 as part of a market study under preparation for the International Copper Association (ICA) on residential SWH systems, prices for a 2 square meter (2m<sup>2</sup>) system ranged from US\$ 650 (low-end system cost) to US\$ 950 (high end system cost). Imported SWHs make up a significant portion of total sales in Mexico, due to the relatively small-scale of production that exists domestically.<sup>1</sup>

36. The major SWH manufacturers contacted over the course of a site visit in November 2006 included: BUTESCA, Módulo Solar, Heliocol and USOL. The major new development in the water heater market is that of a hybrid thermal-solar water heater under development by Cal-o-Rex, Mexico's major gas water heater manufacturer. Cal-o-Rex, which is part of Grupo Industrial Saltillo (GIS), has approximately 80% of the national thermal water heater market and has been working extensively on a hybrid design, utilizing research conducted at its own research facility. According to Cal-o-Rex engineers, the product will come in three versions, including one for the high-end market. Production of 700 units per month is expected by the end of 2008, with half going to the high-end version and the remaining 50% divided between a low-end and a mid-range model.

37. Although Mexico's industrial base produces all of the raw materials required for domestic manufacture of SWHs (glass, plastics, copper, steel and fiberglass), several local producers rely on imported materials and components. It is possible that the relatively small scale of the

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<sup>1</sup> The sample may be biased since the sample includes more evacuated tube systems and thermosyphon systems compared to the sample of pumped system

national sector has made it difficult for local manufacturers to attract the attention of the largest materials producers which would, by virtue of economies of scale, offer the lowest prices. Some major manufacturers have identified energy efficiency and renewable energy in the housing sector as a potential growth area. Owens-Corning's Mexico subsidiary, for example, supplies insulation for home building, and could become interested in supporting efforts to build up local production of insulated storage tanks and piping for SWHs to expand its market for fibreglass. Similarly, ICA's Mexican affiliate, ProCobre, is participating in the program to support increased consumption of copper. Glass evacuated tube providers should also carry some share of costs and benefits.

38. SWH manufacturers in Mexico remain relatively small, undercapitalized firms with limited marketing capacities. Given their limited capitalizations and lack of access to capital markets, the capacity of SWH manufacturers in Mexico to expand production is severely constrained. In contrast, there are numerous companies in the market (some well established while others have recently entered the market) that seek to build market share through import of increasing numbers of units. Since there is no regulation of the market at present - the only existing standard is a voluntary test standard - there are few barriers to entry and limited assurance to the end-user of product quality. Installation standards are also lacking. In view of this situation, there appears to be general agreement that the sector urgently needs to develop product standards, although there is some debate among companies in the sector on how this should be achieved, and opposition from some, including minor importers, because they feel their ability to sell locally manufactured SWHs or cheap imports would be threatened. In general, all SWH manufacturers and importers support mass-market campaigns to publicize SWHs as a viable option for providing home hot water, as well as the implementation of financial mechanisms to facilitate the purchase of SWH units. One of the strongest drivers for quality assurance standards will be availability of finance. The project and partner agencies would only recognise certified product and may require at least a 10-year warrantee - which relates to the durability certification.

***Mexican Housing Market and Housing Developer Perspectives***

39. An analysis of the possibilities of creating a financial mechanism for the promotion of SWHs in Mexico must take into account the characteristics of the housing and housing development sectors in the country. To this end, interviews were scheduled with selected housing developers. In 2005, between 700,000 and 800,000 homes were built in Mexico, a little less than half of which were constructed by homeowners themselves. The remainder of the market (about 400,000 homes) makes up the "formal sector," or the sector belonging to actual developers and promoters. Over the last few years, this latter segment has grown significantly, and studies have demonstrated that the number of housing developers has grown by 45% between 2001 and 2004. The tables below present data on segmentation in the housing market in Mexico, with respect to price ranges, square meters, and construction trends.

**Table 2: Segmentation of the Home Construction Market, 1997-2004**

Housing Categories	Price range (pesos)		Price range (dollars)		Area (m <sup>2</sup> )	Annual incomes (US\$)	
Minimal		82,000		8,000	30		3,000
Social (S)	82,000	220,000	8,000	20,000	45	3,000	8,000
Economical (E)	220,000	412,000	20,000	38,000	50	9,000	20,000

Medium (M)	412,000	1,030,000	38,000	100,000	100	18,000	50,000
Residential (R)	1,030,000	2,300,000	100,000	210,000	200	42,000	100,000
Residential Plus	2,300,000		210,000		350	100,000	

Source: Softec, Mexican Housing Overview, 2005

**Table 3: Trends in the Home Construction Market, 1997-2004**

	1998	1999	2000	2001	2002	2003	2004
<b>Homes constructed by real estate developers (number of units)</b>							
Social (S)	74,440	103,576	94,548	65,530	75,972	76,061	91,403
Economical (E)	70,233	126,828	170,741	160,093	223,378	266,635	248,636
Medium (M)	6,670	7,476	11,899	21,168	35,762	43,327	51,661
Residential (R)	2,456	2,403	3,176	4,759	8,407	9,412	13,363
Residential Plus	1,554	1,813	2,033	2,508	3,570	4,997	8,699
Total	155,353	242,096	282,397	254,058	347,089	400,432	413,762
<b>Average home prices (thousands of pesos)</b>							
Social (S)	125	144	159	173	171	170	179
Economical (E)	174	205	236	245	265	278	296
Medium (M)	483	549	531	572	591	627	649
Residential (R)	1,051	1,214	1,223	1,320	1,423	1,385	1,451
Residential Plus	2,466	2,880	3,008	3,135	3,830	3,019	3,331

Source: Softec, Mexican Housing Overview, 2005.

40. The volume of mortgages authorized and issued was approximately 1,000 in december 2008, that represents \$257 million pesos in loans . These loans were for the most part issued for the purchases of new homes, which indicates that the secondary home market in Mexico is relatively insignificant. The value of mortgages issued in 2007 for existing homes (second-hand homes) was estimated to be only 25% to 30% of the total.

41. The following conclusions were drawn from interviews with housing developers in Mexico in December, 2005 and January, 2006, and suggest important trends and perspectives that should be taken into account in the development of a SWH promotion program in the country:

- Real estate developers have manifested their interest in energy efficiency and the use of renewable energy in housing, although they have not managed to achieve concrete results as of yet. The principal factors driving this interest are: (i) benefits in terms of reduced development costs as a result of lesser investments in infrastructure; (ii) increased home sales rates where natural gas or electricity connections are not necessary; and (iii) consumer demand for clean energy. In fact, some developers are already collaborating with associations such as the AEAEE. The AEAEE has limited the focus of its activities at this time to building-envelope technologies, but could expand it to cover SWHs in the future.
- CONAVI is implementing a program to demonstrate the results of incorporating energy efficient technology in homes currently under construction in Mexico. This includes a series of pilot projects, in which developers incorporate different design elements and/or equipment to various developments. The pilot project affects 2,200 homes in seven representative regions in Mexico. Construction has already commenced, and SWHs

have been installed on some homes. The purpose of the project is to create real case studies that will make it possible to evaluate the results of energy efficient technology on homeowner energy savings.

- The housing sector in Mexico is becoming increasingly competitive, which has created a drive on behalf of developers to find new ways to distinguish their products from the rest. These efforts to seek out competitive advantages in the housing sector will be an important driver for the SWH market in the country.

42. Housing developers have expressed their interest in the possibility of becoming part of a SWH program, should a financial mechanism to promote the technology be developed. The main concern for developers was the up front cost of the SWH, which they generally view as prohibitive for the majority of their customers. The cost of a SWH system represents approximately 4% of the average mortgage offered by INFONAVIT, the principal financial institution in Mexico's mortgage market. Another main concern was the lack of information regarding the technology, and the impression that customers may be unwilling to purchase a home with an installed SWH should they not be aware of the benefits of such a system. However, housing developers did recognize that once information regarding the energy efficiency savings generated by SWH is disseminated to the broader public, it is likely that the technology will become attractive to home buyers. The most attractive financing option to the home owners interviewed involves incorporating the SWH cost into the home mortgage. This option will be discussed below in the "SWH Financing Environment" section of this document.

43. Real estate developers consider that the best option to develop the market is to target new housing, as the mortgage interest rates are lower and the cost of the actual SWH system may be lower, considering that the purchases would be wholesale purchases and could potentially be massively installed. Developers agree that the quality of the systems and their installation will have to be guaranteed, and therefore express the need for standards and certification facilities. Since they are in a first-cost competitive market some would prefer that mandatory SWH installation be enacted and financing adjusted to cover this cost for low cost homes. Based on one builder's experience in a CONAVI demonstration, SWH homeowners have about 40% lower bills, and some have gone so far as to remove and sell their gas back-up systems.

### ***SWH Financing Environment***

44. Several financing sources and mechanisms already exist for the promotion of SWH technology in Mexico. The best option for a financial mechanism to promote SWH use is to include the cost of the equipment as part of a low-income home mortgage issued by INFONAVIT. If the monthly mortgage payments including SWH costs are compared to monthly mortgage payments including utility bills for gas (used to heat water), results show that the former are significantly lower. Technical assistance and quality assurance are critical to demonstrate this opportunity. Other possible financing options were identified in the analysis, namely rolling the cost of a SWH into consumer loans, and the purchase of a SWH using FONACOT worker's payroll credit. The latter two schemes present viable options for financing SWHs, in the SME and high-income segments. The results of each of these three scenarios is presented in the table below.

**Table 4: Alternative Mechanisms for SWH Financing**

Financing Option	SWH Installed Cost <sup>1</sup> (pesos)	Annual Payment (pesos)	Payment Term (years)	NPV, 10 years (pesos)		Simple Investment Payback Period (years)	
				LPG	Gas	LPG	Gas
INFONAVIT mortgage (20 years at 11%)	9,200	936.75	20	2,594	229	4.5	9.5
	6,613	673.27		3,969	1,604	2.5	4.5
Commercial mortgage (20 years at 15%)	9,200	1,150.28	20	1,662	-703	6.5	9.5
FONACOT (5 years at 20%)	9,200	2,307.22	5	-43	-2,408	7.5	9.5
	6,613	1,658.31		2,073	-292	5.5	7.5

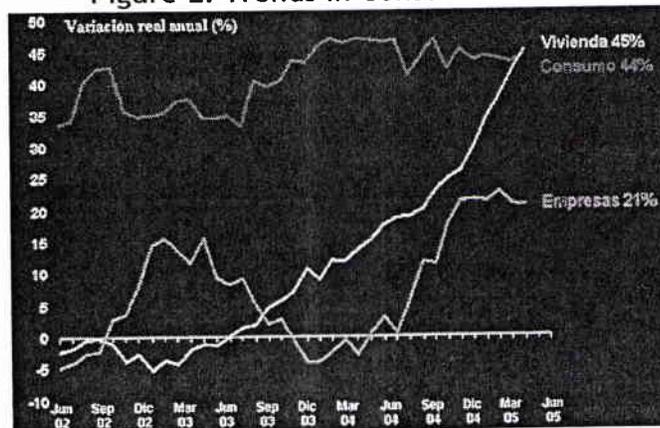
<sup>1</sup>Includes 15% VAT tax.

Source: Econergy

Private Bank Loans

45. The consumer finance sector in Mexico has grown substantially, thanks to macroeconomic stability that has spurred economic growth since 1996 and a wave of acquisitions by foreign banks that has strengthened the banking sector. Upon the issuance of an increasing number of credit cards, consumer access to credit has increased over the last several years, and consumer debt levels have surpassed levels recorded in the past. The figure below demonstrates how consumer credit levels have maintained high growth rates (exceeding 35% annually) within the last three years. It is important to also note that the figure depicts a growth in mortgage debt.

**Figure 2: Trends in Consumer Credit**



Source: Banco de Mexico (Banxico)

46. Growth in Mexico's consumer finance sector has contributed to a downward trend in interest rates offered to consumers, although these are still relatively high if compared to other markets. While a U.S. consumer might pay between 10% and 20% annually, Mexican consumers are subject to rates ranging from 22% to 47%. This situation is due to several factors, including higher transaction costs, high perception of credit risk, and the simple fact that the Mexican market remains relatively small and uncompetitive in comparison to U.S. and EU

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markets. The lowest interest rate offered is the FONACOT rate, which was quoted at ranging from 18% to 25% by FONACOT representatives in November 2006. The highest rates are offered by commercial credit cards and lie around 47.6%. Rates are continuing to drop as competition in the banking sector increases.

47. With respect to the SWH sector, private banks for the most part do not demonstrate the same degree of awareness of SWH technologies and interest in developing a financial mechanism to promote SWH sales as do public financial institutions. For instance, the consumer credit director at Banamex said that existing financial products could be used to purchase SWHs, and indicated that the bank did not see significant business in developing a different financial product. Similar views were expressed by the director of mortgage finance and consumer credit of Scotiabank with respect to consumer loans and credit cards. With respect to mortgage finance products, however, the Scotiabank executive indicated that his bank would likely have no problem endorsing a SWH through a mortgage. Scotiabank currently has a 20% share in Mexico's mortgage market, and is the only bank to offer the option of a zero down payment on a new home. Average mortgages issued by Scotiabank are US\$ 100,000, with a term of up to 20 years at an average interest rate of 10.9% to 13.9%. Both Banamex and Scotiabank also noted that SWH suppliers could refer consumers to private banks for consumer loans, with credit review taking on average two days.

#### National Development Banks

48. NAFINSA officials indicated their openness to supporting the SWH sector, providing loans for investment in productive capacity, working capital, factoring services to consolidate revenue growth and, through subsidiary agencies and investment funds, risk capital. As applicable, technical assistance can be provided to NAFINSA to manage the GEF grant funds deployed in the financial mechanism. While due diligence has already been performed on NAFINSA by World Bank, UNDP and IDB, UNEP will execute a standard review of operating procedures and control structures to evaluate the final feasibility of the suggested arrangement.

#### FONACOT (and IMEVI)

49. Repayment of debt acquired through FONACOT is collected directly through workers' payrolls, which significantly reduces risks associated with default. Credit terms are typically 36 months, with interest rates around 20%-25%. FONACOT is one of the most important sources of consumer credit in Mexico; the institution offers financial services to workers affiliated with Mexican Social Security Council (IMSS), which represents a massive market segment with individual salaries ranging from one to 25 times the minimum wage (approximately 1,000 to 36,000 pesos monthly). FONACOT is able to raise money on the international capital markets, thereby channeling low-cost credit to its borrowers.

50. The FONACOT credit card interest rate was quoted as 19% (CNBV, November 2006), which is one of the lowest offered in Mexico. Credit obtained by eligible consumers can be applied to the acquisition of goods and services, as long as these are in line with stated FONACOT missions and values that seek to improve the well being and quality of life of Mexican workers. While SWHs are not yet included in the list of household items eligible for purchase with a FONACOT credit card, representatives did not see a problem with adding this piece of equipment to the list of eligible items.

51. FONACOT is currently participating in a joint initiative with the Mexican Housing Institute (IMEVI), which seeks to promote the sale of packages of home furnishing equipment. These packages are offered at reduced prices (10% discount) and are based on agreements with relevant suppliers and manufacturers. Credit offered through FONACOT is on a 60-month term, and qualifies for an additional 10% discount of the interest rate (for certain products only). Product selection is generally carried out through a solicitation, an inspection visit performed by IMEVI and the compliance of each product to a set of norms defined by the Institute. The main advantage for manufacturers is access to credit and the resulting working capital that can be directed towards the production of packages approved by IMEVI. The Institute has expressed interest in incorporating SWHs into its approved packages. IMEVI has also received a request from National Fund for Workers' Housing (INFONAVIT) to create a "sustainable home" package for inclusion in its own program (see below). Beyond technical cooperation to assist in developing the package, IMEVI's role could also be to assess financing purchases of SWHs.

52. Providing technical assistance to FONACOT to develop a financial mechanism for SWHs could involve the standard FONACOT consumer loan, collected in a payroll deduction, of three years at interest rates below those prevailing in the commercial sector, or through IMEVI home furnishing packages, as described above, which qualify for loans of up to five years, also at discounted interest rates (in addition to discounted costs).

#### Mortgage Financing

53. The Mexican mortgage market is increasing rapidly, thanks to lower interest rates and efforts on behalf of certain actors to increase lending to the housing sector. In addition to an increase in liquidity in the mortgage market, the "mortgage-backed security" concept has been imported to Mexico from the U.S., and has contributed to rapid growth in the sector since 2003.

54. Certain limits and requirements exist with respect to housing costs in order to obtain designation as a "social interest" level home. Valuations of homes are carried out by Sociedad Hipotecaria Federal (SHF), which has determined that homes falling under the "social interest" category (lowest housing category) must not exceed amounts in the 220,000 to 380,000 pesos, depending on the region of the country (values for Mexico City, for instance, are higher than elsewhere in the country). Should a home exceed this limit, it loses certain privileges and administrative costs associated with the sale-purchase of the home increase accordingly. Incorporating the cost of a SWH into the mortgage of a home will therefore increase the overall cost of the home by approximately 4%, which has been an area of concern for certain developers. This fact will be taken into account by the banks in the development of a financial mechanism involving mortgage finance. Homes not falling under the "social interest" category are unlikely to face this problem.

55. The average lending rate for mortgage loans secured through INFONAVIT is 12%, over a 20 year term, which can be extended to 25 years. Mortgage payments are made through workers' payrolls, which, similarly to the FONACOT program, significantly reduces the risk of default. The average loan size for INFONAVIT mortgages is 200,000 pesos. Average repayment terms are 15 years.

56. According to discussions with technical directors at INFONAVIT, several housing developers have already expressed interest in participating in INFONAVIT's pilot green mortgage program. It is expected that a significant number of additional developers will be interested in participating once the results of the pilot program are publicized. The green mortgage program developed by INFONAVIT and CONUEE will be designed to include the installed cost of energy efficiency technologies (such as efficient lighting schemes, improved insulation, energy efficient windows, SWHs, etc.) in housing financed through an INFONAVIT mortgage. CONUEE will conduct energy audits in the new housing developments to measure energy efficiency savings generated by the installation of these technologies.

57. INFONAVIT, as well as other financial institutions have expressed interest in the possibility of including SWHs into mortgages, primarily for new housing. The organization has been contemplating its strategy with respect to presenting itself as a socially responsible institution, and the topic of energy efficiency has been considered a principal element in moving forward. INFONAVIT is the best positioned to contemplate this, as demonstrated by its board's approval of the proposed green mortgage program described above. INFONAVIT's technical team responsible for the implementation of the program will be working on the detailed design in collaboration with UNDP/UNEP team on incorporating a SWH component into the program within the PROCALSOL framework.

#### Subsidy Policy (CFE and PEMEX)

58. CFE has developed programs to reduce outlays for subsidies to its own workers as well as to the general public, with FIDE as the implementing agency for these activities. FIDE has even implemented a SWH program for CFE employees, although this was not successful (only 300 SWH were installed over 3 years), essentially because it presupposes that CFE employees will pay for a SWH with FIDE financing when in fact they already receive electricity at highly subsidized rates. FIDE also implemented a project involving the replacement of old, inefficient refrigerators with new efficient ones for CFE customers by offering a loan, the repayment of which is made via the employee's electricity bill. The resulting default payment has been very high because customers kept both refrigerators, and have retained the right to pay the section of their bill that reflects their electricity consumption. The portion of the bill reflecting the repayment for the new refrigerator is largely ignored. Electricity cannot be disconnected in case of default on the SWH debt.

59. In the case of the proposed SWH initiative, a similar program could be envisaged for PEMEX employees, who now receive highly subsidized natural gas for water heating, much like CFE employees receive subsidized electricity. In meetings with PEMEX, it was clear that the company recognizes that it could reduce the costs of these subsidies to workers in "petroleum neighborhoods" (*colonias petroleras*) near their refineries. PEMEX currently has six refineries and ten gas processing facilities, as well as production and other facilities. The exact level of subsidization varies according to location.

60. PEMEX officials interviewed indicated that they were interested in the possibility of savings on their gas subsidy by providing subsidised SWHs. This would have to be beneficial to the employee to be workable. Depending on the level of subsidization, the workers' energy savings generated by SWHs could effectively be higher than the savings created through subsidized natural gas, which would avoid a possible reproduction of the problems encountered by CFE in

the context of the FIDE program. Nonetheless, it will be important for PEMEX to communicate to its workers the benefits of reducing subsidies on fossil fuel consumption, so that the benefits of SWH within the *colonias petroleras* are internalized. This would represent a small portion of the Mexican market but symbolic in nature and useful as a market launching effort for those manufacturers that certify product. PEMEX was encouraged to consider also providing an SWH subsidy equivalent to gas price discounts for low consumers but this would not be likely given their relationship with the gas distributors. The opportunities for co-operation with PEMEX will be further clarified during the implementation of the project.

### ***Other Planned or Ongoing Projects***

61. A pilot project of CONAVI to install SWH in new housing in five locations in Mexico. The organization is also evaluating possible sustainable design mandates for the housing sector through the abovementioned program, funded in part by the Government of Canada with support from the Canada Mortgage and Housing Corporation.

62. CONUEE and INFONAVIT recently approved a pilot program that will focus on the implementation of green mortgages, and plan to include the installation of SWHs in the program. INFONAVIT has already approved the 2007-2012 financing plan. The base scenario is to provide 800 000 credits by 2012 for a total investment of 258 thousand million pesos (app. USD 23,7 billion), out of which, according to INFONAVIT, a large amount is sought to be lended as green mortgages. The scheme will operate on a temporary basis until the market for SWH develops and INFONAVIT will seek additional financial support in order to be able to target housing developers in particular, as opposed to focusing solely on home owners. The idea is to incorporate the cost of SWH directly into the mortgage until the market develops enough to allow developers to independently include SWH into new housing developments. CONUEE provide data on energy savings generated from the installation of SWHs, which serve as justification for increasing the size of the mortgage.

63. CONUEE has been promoting the National Solar Water Heater Program with financing from GTZ. Various studies have been undertaken under the auspices of this program, and a decision was recently made to request additional funds from GTZ in order to effectively complete all of the tasks associated with the National Program. The additional funds will be used to elaborate the Programa para la Promoción de Calentadores Solares de Agua (PROCALSOL), the goal of which will be the development of uses for SWHs in the residential, commercial and industrial sectors in Mexico, as well as the identification and design of adequate support mechanisms for the distinct market segments. The creation of synergies between the CONUEE-GTZ cooperation and the GEF program will serve to strengthen both projects and avoid the duplication of efforts.

64. There is interest in applying SWH codes similar to that already passed in the DF of Mexico City in other cities in Mexico, although manpower is currently lacking to undertake such a project.

65. The envisaged coordination and cost-sharing agreements with the projects listed above are discussed in further detail in sections "Project Financing" and "Project Management Arrangements."

## Programatic Framework of UNDP

### Millenium Development Goals

This project directly supports the progress of the 7th Millennium Development Goal: Ensure environmental sustainability.

Mexico has made progress in meeting environmental goals in the past few years and has created innovative policies and programs which include the payment for environmental services, and energy efficiency programs.

In relation to the target 9: "Integrate the principles of sustainable development into country policies and programs and reverse loss of environmental resources", indicators of carbon dioxide emissions per capita and energy use per unit of GDP show positive advancement. These advances have led to nearly 2 million tons of CO2 emissions avoided in Mexico City and its metropolitan area alone. Nevertheless there's still significant potential for improvement in terms of more efficient use of energy and renewable energy such as solar, bioenergy, wind, geothermal energy, and among others.

### 2008-2012 United Nations Development Assistance Framework

Through the 2008-2012 United Nations Development Assistance Framework (UNDAF), the United Nations System in Mexico completed the process of programatic harmonization, in accordance to the United Nations reform agreement and presented the government a joint proposal for the years 2008-2012.<sup>2</sup>

This Project is linked to Outcome 3.1 of the UNDAF, "Principles of sustainable development incorporated in national and regional programmes, including the promotion of equity in the use of natural resources and the distribution of environmental costs and benefits".

In addition, it has a direct effect on the following priority of "Institutional and individual capacities strengthened to stop and/or reverse environmental degradation, support natural resources conservation, encourage participatory management, natural resources governance and promote human development through policies and programmes for sustainable development". More specifically, this direct effect is related to 3.1 "Sustainable development principles incorporated to the national and regional programmes, including equity and fairness in the use of natural resources as well as the distribution of environmental cost and benefits" and product 3.1.5 "Capacities strengthened for the ecological zoning of the territory and the ecosystem approach in integrated agricultural, livestock, forestry, fisheries, water resources and energy, including the sustainable management of fertilizers, pesticides and other productive inputs with negative impacts on the environment and human health, as well as the transition to the use of bio-fuels and renewable sources of energy".

### UNDP's 2008-2012 Country Programme Document

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<sup>2</sup> This document has been approved by the Mexican government and presents a articulated, coherent and strategic cooperation framework of the United Nations activities in Mexico.

The 2008-2012 Country Programme Document (CPD) of UNDP Mexico recognizes that climate change mitigation and adaptation is an urgent matter of economic survival and social development. The political model implemented until the nineties do not incorporate environmental sustainability criteria, so that the country lags in controlling pollution, waste management, protection of its extraordinary biodiversity and the sustainable use of water sources energy and forestry resources.

For this reason UNDP offers technical assistance in the compliance of the international commitments of Mexico and to strengthen national and local capacities to improve its strategies of mitigation and adaptation to climate change.

### **UNDP Strategic Plan**

The Project is identified under service line "Mainstreaming environment and energy". UNDP will support capacity development for countries to ensure that environment and energy are taken into account in drawing up and implementing national policies, strategies and programmes, also considering the inclusion of multilateral environmental agreements. Such capacity will include the ability to conduct environmental and energy assessments and ensure broad public participation in policy articulation.

### **Rationale for UNDP involvement and assistance**

UNDP's misión is to support government in reaching a sustainable human development. Energy is central to sustainable development and poverty reduction efforts. It affects all aspects of development -- social, economic, and environmental -- including livelihoods, access to water, agricultural productivity, health, population levels, education, and gender-related issues. None of the Millennium Development Goals (MDGs) can be met without major improvement in the quality and quantity of energy services in developing countries. UNDP's efforts in energy for sustainable development support the achievement of the MDGs, especially MDG 1, reducing by half the proportion of people living in poverty by 2015. Through an integrated development approach, UNDP works to help create enabling policy frameworks, develop local capacity and provide knowledge-based advisory services for expanding access to energy services for the poor.

To achieve this goal, UNDP makes its installed capacity available to governments, in terms of human and technical capacity as well as its relations with other development institutions, both national and international. This support is aimed fundamentally towards those programs and policies defined as priority by each national, state or municipal government.

### **Part II: Strategy**

#### **Baseline**

66. The baseline scenario is that in the absence of the project, the market development will not accelerate from its current level to reach the stated target of 2,500,000 m<sup>2</sup> of installed SWH capacity by the end of the project (2013). On the basis of the average growth rate of 14 % (in total capacity) over the past few years, the total installed SWH capacity (encompassing pools, industrial and commercial and residential users) would reach 1,600,000 m<sup>2</sup> by the end of

2013, with associated risks of market slow down due to the lost of consumer confidence in product quality and unoptimal use of the resources in general.

### ***Project Goal and Objective***

67. The objective of the project is to accelerate and ensure a sustainable growth rate of 25-30% (in total installed capacity) of the SWH market in Mexico and reach a target of 2,500,000 m<sup>2</sup> of installed SWH capacity by the end 2013, with increasing sales in the industrial, commercial, services and residential sectors of the economy, with proportionately faster growth in the residential sector. This will ultimately lead to a higher share of residential systems in the total installed capacity with a target of 14 % by the end of the project.

68. In addition, the project is designed so as to allow for the development of future initiatives targeting additional market sectors (namely commercial and industrial) and varying applications of SWHs in the hopes of extending its focus and magnifying its impact on the broader Mexican SWH market.

69. The project will be implemented in co-operation between the Comisión Nacional para el Uso Eficiente de la Energía (CONUEE), the Copper Association (ProCobre) and Mexico's Solar Energy Association (ANES).

### ***Project Outcomes and Outputs***

70. The project objective is envisioned to be achieved by means of:

- Enhancing the awareness of the key stakeholders, including local architects, housing developers, engineers and other professionals and unions as well as actual consumers on the advantages and proper use of SWH systems for water heating as well as on the existing regulatory environment, product quality control and incentive mechanisms;
- Improving the legal and regulatory environment for encouraging the installation of SWH systems, including possible incentives and/or other regulatory measures such as a nation wide extension of mandatory installation of SWH systems in new commercial and industrial buildings; commercial soft loans with government support, etc;
- In association with the above, strengthening and widening the adoption and enforcement of SWH system performance and quality standards and a proper labeling and certification system that follows international best practices, including adequate testing proceedings and facilities;
- Training the installers and developing and facilitating the adoption of an associated certification system for installers;
- In co-operation with the local supply side entities and financing institutions, developing and sharing the initial risks of suitable financing mechanism to cover the higher upfront costs of SWH systems for less solvent consumer groups;
- Building the capacity of local SWH manufacturers, distributors, installers and financing sector to offer products, delivery models (including financing), installation,

after sale and financial services that are conducive to the overall market transformation goals of the project;

- Compiling and disseminating the project results and lessons learnt; and
- Adhering to a certain amount of flexibility with respect to the scope of the project so as to allow for the future elaboration of additional initiatives in sectors beyond the residential sector, and to target a wider variety of applications for SWH.

**Outcome 1: Enabling legal and regulatory framework to promote a sustainable SWH market (policy)**

71. The outputs and policies under this subcomponent will raise the awareness of key national policy makers on the benefits of SWHs and facilitate the development and adoption of a legal and regulatory framework conducive for sustainable development of the SWH market in Mexico.

72. Typical policy instruments to promote the SWH market include: (i) obligations to use SWH in certain types of buildings, as has already been implemented in the DF; (ii) general energy performance requirements in building regulations, which can create a solid basis for SWHs (CONAVI is contemplating the promotion of housing norms/codes of this sort that could be implemented in specific municipalities); (iii) a regulatory framework for quality control and certification; and (iv) different direct or indirect financial and fiscal incentives, as discussed earlier in this document. While international experiences have for the most part demonstrated that mandatory regulation pertaining the SWH installation has been the single most effective tool to rapidly accelerate the SWH market, the feasibility and political acceptance of such mandatory regulation needs to be assessed on a country-by-country basis.

73. By building on the earlier discussion about the existing legal and regulatory framework in Mexico, the specific laws and regulatory measures relevant to the development of a SWH market in the Mexican context include:

- The LASE and the LAEFERTE, are regulations which recently passed in the Mexican Congress, defining Mexico's intent for a transition towards a sustainable energetic sector. Within the LAEFERTE, a Trust Fund for the Energetic Transition will be established, which will promote and finance the development of projects dealing with renewable energies as well as the sustainable use of energy. Solar thermal energy is one of Mexico's renewable resources which will attain a considerable importance in the energetic portfolio.
- New trust funds have been developed in order to promote research dealing with sustainable energy use, identifying specific requirements to develop the energetic sector in Mexico. Special attention was given to projects dealing with the use of solar energy involved in all processes including solar water heating.
- A review of the Normas Oficiales Mexicanas de Eficiencia Energética (Official Energy Efficiency Norms of Mexico) will be necessary to assess where specific additions can be made with respect to SWHs. These include NOM-001-ENER through NOM-022-ENER. See for a complete list of energy efficiency standards published by CONUEE:

[http://www.CONUEE.gob.mx/wb/CONUEE/CONA\\_1002\\_nom\\_publicadas\\_vigen](http://www.CONUEE.gob.mx/wb/CONUEE/CONA_1002_nom_publicadas_vigen)

- In 2008, a regulatory instrument was developed called the Dictamen de Idoneidad Técnica, DIT. This document specifies the minimum requirements of a solar water heater system and is currently being updated in order to achieve the voluntary standard category. At the moment, there are 40 certified systems which are being distributed in new home developments, and this number is expected to rise even more.
- Additional support should be provided to the Distrito Federal for the adequate monitoring and evaluation of its municipal code requiring that all new public-use buildings heat 30% of their annual hot water consumption using solar thermal technology. The DF's proposed efforts to promote the SWH code to other municipalities should also be supported. Several municipalities would likely be receptive to the code: Aguascalientes, Tijuana and Mexicali, Monterrey, Gualajara, etc.

74. The feasibility of other complementary or alternative measures can be explored, such as:

- Permission to start the construction of a new building should be granted only after an assessment of the potential use for renewable energy sources in that building has been completed;
- Obligation to install piping for hot water up to the roof of new buildings and on buildings undergoing a major renovation. This increases only marginally the costs at the time of construction/renovation, but makes it easier and cheaper to install a SWH later on;
- Abolition of regulations hampering the diffusion of solar thermal, to the extent that these exist. In some areas, it might be necessary to ask permission before installing a solar system on the roof of a building, a procedure which might discourage potential users. The permissions may not be granted due to aesthetic restrictions, for example;
- Household applications (dishwashers, washing machines, etc.) compatible with solar thermal systems (adapted to get hot water from pipes) should be made widely available on the market. An "A" label should be given to these appliances, and consumers should be explicitly and clearly informed of the labelling procedure; and
- Most hot water storage tanks sold in the market should be compatible with solar thermal technologies. Consumers should be explicitly and clearly informed, should this not be the case.

75. The institutional design of the program ensures flexibility for the consideration of other future initiatives that not been identified as of yet, and so as not to fully restrict the scope of the program to the household/domestic market in Mexico. Future initiatives implemented in the context of this initiative as well as PROCALSOL would encompass the following sectors and Ministries, and might include activities such as:

- The agricultural sector: Solar hot water systems can be a great benefit to farm installations, whose hot water requirements can reach 7,500 liters per day. Reduced costs for heating water as a result of SWH installation will generate significant energy savings in the agriculture sector, and ultimately enhance the economic performance of farms in Mexico.

- The commercial sector: The installation of SWH in hotels, restaurants and other commercial buildings (especially in the tourism industry) has the potential to greatly increase the size and impact of the SWH market in Mexico. Hotels have the potential to generate between 60% and 70% of their hot water using SWH. It will required a close interaction with the Turism Ministry at the federal level will be impulsed as well as their similar offices at the state level.
- The industrial sector: In the textile industry alone, a medium-sized plant requires between 10,000 and 60,000 liters per day of hot water. The use of SWH has in this industry has the potential to generate a substantial amount of CO<sub>2</sub> emissions reductions, as well as generating significant savings from reduced energy costs for the plant.
- SWH technology can be applied to a wider variety of processes beyond water heating, such as:
  - Regulating temperature in interior spaces in hotels, offices, restaurants, etc.;
  - Moderate refrigeration for the preservation of fruits, vegetables, seafood, etc.;
  - Vapor production in industrial processes;
  - Grain drying, etc.;
  - Linkage between hot water production via SWH and integrated heating systems (as demonstrated in European experiences);
  - Centralized hot water systems (Brazil case study);

**Outcome 2: Enhanced awareness and capacity of the targeted end-users, housing developers and other key stakeholders to facilitate the integration of SWH into new housing developments and into other promising new market segments (*information*)**

76. In most countries, solar thermal is not yet perceived as a standard option. Building the trust and raising awareness among targeting end-users, building developers, architects, mechanical and HVAC engineers, plumbers, local governments and decision makers in the business sector about the technical feasibility and the environmental costs and benefits of SWH technology is, therefore, essential for positive market development.

77. The Steering Committee will define the communication strategy and review it regularly to disseminate the benefits of the SWH systems to end users as well to other targeted consumers. It will also promote the dissemination of lessons learned and best practices in the implementation of project activities. The committee will also determine the adjustments to the project budget to accomplish this goal. In the *Learning and Knowledge Sharing and Communication Strategy* section, a more detailed strategy is described.

78. The project will seek to create strategic alliances and coordination with producers and distributors of SWH, as well as Ministries and chambers of industry to disseminate a similar message to end users of these systems Likewise, the dissemination strategy should take into consideration the campaigns and promotion activities that are already being implemented by producers, distributors and other public organization such as: the demonstration of solar water heaters in specialized stores such as Home Depot; in specialized magazines, radio and television programs, etc..

79. The outputs and activities under this subcomponent will be coordinated and complement the marketing efforts of the private sector by raising the awareness of the targeted end-users on the benefits, economic feasibility and other characteristics influencing a positive purchasing decision. The SWH industry in most countries consist of relatively small, SME-type enterprises, which have difficulties launching systematic and effective promotion campaigns themselves. As a neutral and independent actor, the project may also be in a better position to provide impartial and better trusted information to the targeted end users about the characteristics, financial and environmental benefits of the technology, the available suppliers and installers and public support available.

80. Existing learning and training materials from other countries will be made available and will be translated and revised to the Mexican situation. The “train the trainer” and “learn by doing” approaches will be used to the extent possible. Aside from addressing the integration of solar systems into building design and into the heating and cooling installations, the technical engineering of larger commercial solar systems will also be addressed.

81. In order to fulfill their purpose, the campaigns and information mechanisms and channels to be used need to be carefully designed to reach the actual design makers. This can be either in a specific market segment (single-family home owners, hotels, larger public sector buildings, industrial facilities, etc.) or a geographical area, in which the built environment, the climatic conditions, the solar thermal market structure, as well as the psychological and economic preferences (or other priorities and decision making “drivers”) of the targeted clients need to be taken into account. In areas where solar thermal is not yet widely used, demonstration projects can also be a useful tool to support awareness and promotion campaigns.

82. Guanajuato State for example, has already supported a publicity campaign on television and radio stations linked by the state. Some future publicity and communications campaign are also planned to be implemented with support from ProCobre. Content and media used in both campaigns could be utilized in the context of a national campaign in order to meet the objectives of the Initiative.

83. Television would likely deliver the greatest impact based on the notion that persuading consumers that solar energy is a viable campaign for meeting their day-to-day needs requires them to actually see it in action. Radio, which is highly developed in Mexico and provides a parallel vehicle for leading commentators and opinion leaders, could also be used. Although a campaign on television would inevitably be more costly than a print campaign, certain cost savings could be achieved through the following activities:

- Exploring the potential interest of the commercial (Televisa, Azteca) and non-commercial (IPN’s Channel 11 and state-affiliated channels) media alike in solar energy as a news item;
- Securing lower costs through the involvement of non-commercial channels in the preparation of public service announcements.

Both options could be complemented by billboards, posters for public buildings, and print advertisements established in the global communication strategy. Additional co financing from other actors will be searched, such as Fundación Televisa, Fondo Cultural BANAMEX and others,

to provide cofinancing for the campaign. Foundations associated with banks should show greater interest in supporting the campaign given the potential to generate additional financing activity.

The activities will be coordinated by the PMU along with the implementing team of PROCALSOL, who will seek to establish contacts and enter into cooperation agreements with various information channels and programs formats in television and radio networks and printed information sources in Mexico (as described above). The design of the marketing campaign should be supported by professional market research and marketing companies.

84. Although the communications activities should probably lag behind the full implementation of the certification activities (as described in Outcome 4 below), they should precede the full implementation of the financial mechanism (Outcome 3) in order to create consumer awareness about SWHs and solar energy more generally.

**Outcome 3: Increased demand for SWH systems based on the availability of attractive end-user financing mechanisms (*finance*)**

85. Outcome 3 is designed to generate demand for SWH technology through applicable consumer financing and, as applicable, financial support schemes with an objective to leverage directly at least US\$ 100 million (about 10% of total investment needs) from new financing sources by the end of the project in order to meet the set target of the installation of 900,000 m<sup>2</sup> of additional SWH capacity by the end 2013, compared to the expected baseline development.

86. While the general financing environment and overall banking sector has rapidly developed and matured in Mexico over the last several years, financing of SWH investments continues to be an area where the banks have not collected much experience and may need some marketing support. According to a survey of the SWH market in Mexico, options for financing of SWH are limited to terms offered by actual manufacturers, or through credit card purchases. The terms available to consumers through these two options do not provide the consumer with sufficient savings to make purchase of a SWH financially attractive.

87. By building on the outcome of the market survey, alternate financial mechanisms have been identified that could be utilized to finance SWH in such a way that will make the investment financially viable to consumers, such as mortgage financing and SWH purchases with credit issued through FONACOT. These financial mechanisms would effectively stimulate the market and could be offered to consumers as a part of the overall SWH marketing campaign. In this respect, the project seeks to raise the awareness and build the capacity of local financial institutions such as INFONAVIT and FONACOT (as well as some private commercial banks), as well as other key stakeholders including local housing developers and SWH vendors, to structure and introduce new financing products or other delivery models that are expected to be attractive for the targeted end users and thus promote demand.

88. The initial project focus (as a part of PROCALSOL) will be on supporting the use of INFONAVIT's green mortgage program for accelerating the SWH market for residential buildings. INFONAVIT has determined its financing plan for 2007 - 2012, with the aim to finance 800,000 credits with a total investment of USD 24 billion, out of which a big amount is,

according to INFONAVIT, sought to be given as green mortgages. For further details, please see the letter of INFONAVIT presented as an Annex to this project document

89. In addition to technical assistance, it has been proposed to use the GEF funds for a complementary financial incentive to encourage both INFONAVIT and the targeted clients to test the concept for SWH financing. This financial incentive would be equal to the payment of the first year loan costs of the SWH component of the mortgage, which support would correspond to about 5 % of the total SWH investment costs. The client would be responsible for the remaining payments in conformity with INFONAVIT's normal lending practices. The technology risk would be reduced by limiting the support to certified SWH models with efficiencies in excess of an established minimum efficiency or a cost - engineering study showing equal or better benefits.

90. As the INFONAVIT's green mortgage program has just started, the proposed financial incentive will be discussed and evaluated in further detail with the parties concerned at the outset of project operations by taking stock of the experiences with INFONAVIT's green mortgage program by then. Should the residential sector be adequately covered by this green mortgage program alone, the GEF resources allocated for the financial component (USD 750,000) can be used as a similar incentive to leverage other financial resources for SWH lending and for other sectors such as agrobusiness. Other potential sectors include tourism (hotels, especially for ecotourism), health (hospitals), textile and bottling industries. In this context, the possibilities for additional CDM financing can also be explored.

91. A complementary area to work with is to study the long-term benefits of redirecting subsidies for natural gas to SWHs, in particular with respect to evaluating how increased SWH use would impact end-use consumption and hence the overall subsidy levels on residential gas consumption.

92. This last activity, in particular, will be important for creating support on the part of policymakers for expanding the state resources dedicated to the Initiative (especially in the context of the new administration's national development strategy), thereby facilitating the program's evolution to a sustainable program that is firmly grounded as part of the government's effort to reform energy subsidies and contribute to strengthening the government's financial situation.

**Outcome 4: An effective and affordable certification and quality control scheme applicable for all SWH systems manufactured and/or installed in Mexico, and enhanced capacity of the supply chain to offer products and services promoting a sustainable SWH market (technology and standards)**

93. In parallel to creating a demand for the technology, Outcome 4 is critical in ensuring that consumers retain a satisfactory experience with said technology. Certification and quality assurance contribute to the trouble-free use of solar water heating and subsequently increases consumer confidence in and demand for the technology.

94. A quality control scheme typically consists of the following elements:

- Product standards for safety, performance and durability of the system components (such as collectors, tanks, etc.) as well as the system as a whole (i.e. configuration of the components);
- A methodology for testing; and
- A certification procedure (basically a surveillance system that guarantees constant quality).

95. Given the current level of maturity of the Mexican market, the quality control system is expected to start as a voluntary system driven by the supply side - i.e. the responsibility for the certification will be placed upon the representatives of the supply side of the market until the consumer side itself is made aware of the SWH market through information campaigns (see below). The supply side would need to submit their products for independent testing before applying a label to their products. All the test documents will be made available to the selected institute for verification, which will then issue certificates for products meeting the agreed upon standards.

96. A test standard for efficiency and functionality of SWHs has already been approved in Mexico by ANES. Given this and ProCobre's ongoing support for the development of SWH standards, as well as its offer to subsidize the testing and certification of SWH models using the existing efficiency and functionality test standard, the use of additional resources must be calibrated to address the remaining obstacles. Three possible areas have been identified in this domain:

- Funding the improvement of existing laboratories;
- Funding the creation of new laboratories. This new laboratories would help to reduce the overall testing and certification costs;
- Ensuring access to a certification subsidy for all SWH manufacturers and distributors in Mexico,

97. The proper functioning of a standard and certification scheme will greatly depend on its full acceptance by the key supply-side stakeholders in Mexico. The adequate consultations will, therefore, be essential. For this purpose, the supply side will be encouraged to establish a specific committee and/or appoint a representative for these consultations, which can later, as applicable, form the basis for the establishment of a specific industry and/or trade association.

#### *Recognition of SWH Installers*

98. For the installation part, a set of criteria will need to be developed for demonstrating the know-how and capacity of SWH installers to install units at an acceptable level. Work is already progressing in Mexico on this front: According to ProCobre, an installation standard has been drafted, though not implemented, by a SWH standards committee that includes the participation of ANES and CANACINTRA. Although CONUEE and CONOCER elaborated a technical norm of laboral competence (NTCL), to assure the proper installation of SWHs in Mexico, the standards committee would like to see this translated into an official standard. The University of Guanajuato has published an installation manual, but has not yet disseminated it to the broader public. Training courses have been given by the University (and possibly by other institutions as well), with a relatively small number of installers trained so far. In addition, the government of the DF of Mexico City has organized various seminars on SWH installation as part

of its awareness campaign for its newly implemented SWH code. Although these activities do not equate to a training program per se, they do constitute outreach efforts, on which new training programs can be built. The continued and enhanced training of installers will be very important to ensure good quality of installation - in many situations, installers play a decisive role in marketing solar thermal systems due to their strong influence over their customer base. Installers who are experienced with solar thermal technology are likely to be more motivated and to recommend SWHs to their customers, while installers who have not yet acquired the necessary skills with respect to solar thermal systems will be more likely to advertise and install conventional systems.

99. For the introduction of a recognition scheme for SWH installers, the activities under this component will support the development of a course and examination for SWH installers. Each installer passing the exam will be recognized as a "trained solar installer" and will be able to display a quality logo to advertise the quality of their product. The names of solar-trained installers will be included in a publicly accessible list and included in the project's information awareness campaigns. The materials to be made available through the knowledge management component of the global SWH project will be utilized to the extent possible and adapted to Mexican conditions.

#### *Other Capacity Building and Local Supply Chain*

100. The establishment of the quality control/improvement scheme discussed above will be complemented by technical assistance to the local SWH supply chain to meet the requirements and to improve the quality of their products and services more generally. This technical support will not be limited to local manufacturers, but can also facilitate access into the Mexican market for international manufacturers, either alone or through joint ventures, so as to promote competition and, as applicable, technology transfer.

101. In addition to the training activities already discussed above, the specific forms of technical assistance to be offered to the local supply chain are expected to consist of:

- Support for local supply side entities in obtaining certification for products and installers. At the initial phase, this support can be facilitated by the project free of charge (each supplier can ask for technical assistance for a limited time in order to improve his product or installation design), but should grow into a self-sustaining and recognized center of solar expertise, with support from existing institutions involved in the SWH industry such as ANES, CANACINTRA and CONUEE, as well as housing institutions such as CONAVI that are pushing for the development of energy efficiency standards in buildings.
- Study tours, match-making missions and trade seminars can be organized for local SME's interested in the import or manufacturing of SWHs, in order to benefit from foreign suppliers' experiences and lessons learned and ultimately facilitate technology transfer. The opportunity for contact with foreign partners can focus on those countries that are well developed with respect to the solar market, namely Israel, Spain and Barbados. A spin-off effect of these missions can be that companies with the same interests can meet and, as applicable, form a basis for a national SWH industry or trade association;

- A series of solar seminars in Mexico can transfer know-how among the various target groups: producers, importers, plumbers, planners, architects, mechanical and HVAC engineers, builders and housing associations. Seminar programs will be compiled from product knowledge, knowledge of improved thermosyphon systems, theoretical backgrounds, costs, quality systems and other outcomes of the project all prioritized towards the target groups. Technical materials, syllabi, etc. will be prepared, distributed and made available through the internet.

102. With respect to the timing and sequencing of activities making up the Initiative, the standardization and certification activities are the most urgent and should precede those of the communications and assistance to the banks to develop financial mechanisms. The financial mechanism will require that participating products be certified, reinforcing the incentive to improve product quality and providing the customer and financier with greater certainty regarding product quality and performance. This is essential to avoiding losses in consumer confidence.

**Outcome 5: The provided support will be institutionalized and the results, experiences and lessons learned will be documented and disseminated (including monitoring, learning, evaluation and other feedback for adaptive management).**

103. This component is designed to ensure the continuing monitoring and promotion of the SWH market in Mexico after the project has ended, and to support next generation project designers and governments with experience and recommendations from the project by compiling and disseminating the project results and lessons learned. The component will thereby also serve the knowledge management component of the global SWH project.

104. While the required follow-up actions on the policy side are expected to be addressed under Outcome 1, the outputs and activities under Outcome 5 will focus on facilitating the required follow-up activities that involve further capacity building, market promotion, supply chain strengthening and financing needs, including support for the establishment of sustainable institutional structures to address these issues. The budget for this component will also include the activities elaborated in greater detail in the project's Monitoring and Evaluation Plan (See Part IV).

105. The national level activities listed above will be supported by and implemented in close co-operation with the parallel global knowledge management and technical backstopping component elaborated in a separate document of the "Global SWH Market Transformation and Strengthening Initiative."

### ***Project Indicators, Risks & Assumptions***

106. Key indicators of success of this project include the following: surface area (in m<sup>2</sup>) and numbers of units sold in Mexico (as measured by ANES); volume of local manufacturing of SWHs and imports (as reported by ANES); number of models certified (as reported by NorMex and other organizations); number and amount of green mortgages originated (as reported by INFONAVIT); number of SWH purchases financed (as reported by FONACOT); number of radio,

television, print media and billboard markets where announcements and advertisements for SWHs appear.

107. The main risk of the project is that in spite of the available technical and financial assistance, the SWH market cannot be accelerated at the expected rate. The project tries to avoid this risk by proper project planning and market research so as to reflect the customer expectations and preferences. The Mexican government has already started working on a regulatory framework alongside important stakeholders (namely the manufacturers, Mexico City's government and the national solar energy association as well as the academic sector) and will be further reinforced by proper stakeholder consultations prior to starting the actual implementation of the project. The project will also take stock on the experiences and lessons learned on promoting solar water heating in other countries.

108. A further issue that will arise despite the financing already being in place is the lack of experience among the targeted end-users to apply for this financing. By supporting the growth of this experience, the project seeks to enhance the sustainable demand for new and innovative banks' financing mechanisms to support SWH investments.

### ***Global and National Benefits***

109. The cumulative, direct GHG reduction resulting from an additional increment of 900,000 m<sup>2</sup> of installed SWH capacity and a final target of approximately 2,500,000 m<sup>2</sup> of total installed SWH capacity by 2013, as compared to the estimated baseline of 1,600,000 m<sup>2</sup>, has been estimated at 3 million tons of CO<sub>2</sub><sup>3</sup>. The cumulative GHG reduction potential, including both direct and indirect post-project GHG reduction by reaching the target of approximately 23,500,000 m<sup>2</sup> of total installed SWH capacity has been estimated at over 27 million tons of CO<sub>2</sub> by the end of 2020<sup>4</sup>.

110. The main national benefits are expected to be:

- Energy savings generated by reduced fossil fuel consumption will improve household economies in the rural and peri-urban sectors of the Mexican population, whose members will benefit from the financing program and the increased availability of SWHs.
- To the extent that the program will affect rural and peri-urban populations, it will provide increased access to hot water to households who are currently facing financial or other barriers preventing them from heating water.
- To the extent that the program will affect rural and peri-urban populations currently using fire wood for water heating purposes, the program will reduce the demand for wood by increasing access to SWHs.
- Reduced costs of hot water consumption for the population;
- Economic cost savings at the national level and reduced dependency and expenditures on natural gas and LPG;
- Reduced environmental pollution produced by conventional energy sources;

<sup>3</sup> Calculated over 15 years lifetime of the systems and the share of 90% of LPG and 10 % of natural gas used for water heating in the baseline.

<sup>4</sup> Calculated as a sum of the annual GHG reductions achieved by the envisaged "alternative" market development between 2008 and 2020.

- Enhanced employment opportunities and development of the country's SME sector in the SWH field, including increased export opportunities; and
- Enhanced product quality.

### ***Country ownership***

111. According to the Instrument for the Establishment of the Restructured Global Environment Facility, Mexico qualifies for GEF financing on the following ground:

- It has ratified the United Nations Framework Convention on Climate Change on September 7<sup>th</sup>, 2000;

### ***Country Drivenness***

112. Mexico has several institutions and a set of measures in place for energy conservation. One of these is CONUEE including refrigerators, motors and AC units. It has also developed the DIT (a local voluntary standard) for solar water heaters, which is being currently revised to become a Mexican Norm.

113. There are no targets or large programs for renewable energy implementation. However, there is a combination of initiatives that demonstrate Mexico's drivenness towards greater use of SWH systems:

- Energy prices. After years of subsidies, energy prices in Mexico, particularly for the fuels used for water heating (namely LPG and natural gas), have been either market prices or very close to those prices. In the case of LPG, prices are still defined by the government and have some level of subsidies, but not at the levels of the past. Natural gas prices are regulated at the wholesale level, but these prices are reflecting full cost. In 2005, however, unusually high prices drove the government to issue temporary subsidies.
- Tax deduction. Since 2004, investments in renewable energy systems (such as SWH) can be deducted fully for tax purposes by enterprises (not individuals) in one year.
- Institutions. CONUEE is a well established government agency with a mandate to promote the sustainable use of energy. It has, designed and is currently implementing programs to promote SWH in the residential sector. This includes the joint CONUEE-GTZ effort PROCALSOL.
- The mandatory standard in Mexico City. Late in 2005 the Government of Mexico City issued a proposal for a mandatory standard for all of new public-use buildings with significant water usage (such as sport clubs and hotels) to heat a significant fraction of its water with solar energy. The law was promulgated in April 2006.
- CONUEE's Pilot project. CONUEE is analyzing a new program that would focus on financial mechanisms for green mortgages. The program recently received the joint approval of INFONAVIT and CONUEE.
- CONAVI's Pilot Project. CONAVI is implementing a pilot project to install SWH in new housing in five locations with collaboration from an equal number of housing developers.

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- ANES voluntary standard for flat-plate solar collectors. ANES, together with CANACINTRA, CONUEE and other institutions, established a standards committee that has already issued a voluntary flat-plate collector standard. The committee is now looking for resources to issue three more voluntary standards for SWH systems and installations.
- Testing laboratory. The University of Guanajuato, with the support of CONACYT, is completing a testing laboratory for flat-plate solar collectors that will be used to test and certify compliance with ANES' voluntary standard.
- FIDE's program for CFE's employees. FIDE is operating a program that finances residential SWH systems for CFE employees.
- ICA (Procobre) is sponsoring a market survey for solar water heating in Mexico. As part of the market survey, an advisory council has been established that includes the most important stakeholders in the market.

### **Core Commitments and Linkages**

114. UNDP's areas of interest in Mexico include environmental protection, poverty reduction, promotion of technical cooperation among developing countries, disaster prevention and recovery and democratic governance. Promoting the use of renewable energy in the form of SWH falls under two of the categories (environmental protection and technical cooperation among developing countries) as the project will help to reduce emissions from fossil fuel combustion and draw from experiences from other developing countries.

115. Mexico has developed energy standards for new non-residential buildings. However, the standards were primarily targeting lighting and building shells, thus leaving out the HVAC building appliances, including solar water heating.

116. The process of setting minimum quality standards and labeling of SWH systems has been initiated by Mexico's ANES. As a first step in that direction, a formal standards committee (which includes the involvement of CONUEE and the Energy Ministry) was put in place two years ago and has already produced and formalized a voluntary product standard for flat-plate collectors. Other standards are being considered and a testing facility to certify products under the voluntary standard (which includes labeling) is close to starting operations.

**Table 5: Summary of Reviewed Market Information**

Information Reviewed	Pages of the "prodoc" presenting the information
Existing policy framework	10-11
Determinants of energy prices (Natural gas and LPG)	5-6, Figure 1
Current size of the SWH market	12-13, Table 1
Market potential across different sectors	39, Table 6
Local SWH system costs and technology availability	12-15
Economic comparison with competing energy sources	5-6, Figure 1
End-user profiles	15-17, Tables 2 & 3
Maturity and level of financial sector engagement	17-22, Table 4 & Figure 2
Available public incentives and other promotional measures	22-23
Existence of local NGOs, trade associations or government entities, which can act as local advocates for the project	7-9

### *Sustainability (including financial sustainability)*

117. On the policy side, the Government of Mexico has committed itself to a sustained national effort to stimulate investment in energy efficiency and promotion of renewable energy as evidenced by market prices for the fuels used for water heating, the existence of public agencies dedicated to these activities such as CONUEE and FIDE, and its interest in designing and implementing a number of pilot projects for SWH in the residential sector. One of CONUEE's main accomplishments has been to implement a set of more than 15 energy-efficiency mandatory standards, some of which have been formally harmonized with those of the US and Canada.

118. It is obvious that in order to facilitate sustainable market transformation, there is a need for both demand - and supply - side measures, which together can increase the market demand for solar water heating, while simultaneously ensuring the supply of reliable, customer friendly technology, thereby building the long term confidence and customer satisfaction. As highlighted by experiences from countries with more mature markets, as well as Mexico itself, word-of-mouth impressions are particularly important in guiding the decisions of second-generation purchasers, since there is still relatively little actual experience with the technology, and little support data upon which purchasers can make their investment decisions. To some extent, this problem can be addressed through manufacturers' warranties. In the long run, however, sustainability will depend on a broad base of cost-effective, trouble-free customer experience with the technology. Such solid experience can be supported, by, among others, internationally recognized and understood production standards, as well as certification and labeling schemes. Furthermore, training of designers, sales persons, plumbers and heating and hot water systems installers, which often are the first points of contact with the customers considering the installation of a new hot water system, is expected to be among the core national level activities supported by the project.

119. The residential sector has been identified as a target well suited to a SWH promotion program in Mexico at this time. The sector currently represents approximately 10% of aggregate SWH sales in the country, which demonstrates the need for attention to be placed on increasing activity in this particular market segment. The purpose of this program should be to cater to that customer base that will benefit most from the savings in energy costs generated by SWH technology, i.e. the residential sector, and to target the market segment that will allow the program to achieve significant transformation. An overarching goal should be the facilitation of a shift in the structure of the current SWH market in Mexico in favor of the residential sector, at which point the focus can be broadened (or will do so naturally) to the commercial and residential sectors, which would include swimming pool applications.

120. While the initial focus of the program's initiatives will be on the residential sector in Mexico, initiatives addressing the commercial and industrial sectors are not beyond the scope of the program. The design of the program will remain flexible so as to incorporate initiatives directed at these additional sectors, as well as those directed at promoting SWH use beyond simple water heating (such as temperature regulation, refrigeration, drying, industrial processes, etc.).

121. For the sustainability of the project, it is critical that the consumer prices of competing energy sources for sanitary hot water preparation, such as LPG and natural gas, reflect full market prices or, in the case existing public subsidies, the Government is prepared to provide support for new and renewable energy sources, as it has for fossil fuel based energy sources (including electricity). In January of 2006, the retail price of LPG was US\$ 1.7 per million MBTU, while retail natural gas prices were US\$ 1.3 per million MBTU and US\$ 0.76 per million MBTU for wholesale. While LPG makes up 90% of fossil fuel demand in both the residential and commercial sectors, demand for the fuel is much lower in the industrial sector, representing only 5.6% of total demand (the main fossil fuel used in Mexico's industrial sector is natural gas, which makes up 52% of demand).<sup>5</sup>

122. The financing arrangements with targeted consumers, vendors and the targeted financing entities obviously constitute a crucial component for project's successful completion and operation. The ability to convince local financial institutions to raise funds for financing SWH systems will largely determine the success of the project as a whole. In order to mitigate this risk, specific emphasis will be given to active participation and involvement of all the major financial stakeholders from the very beginning. This will also require active cooperation with the Government in order to ensure that an adequate legal, regulatory and institutional framework will be in place to support investments in energy efficiency. This will include select financial incentives and, as applicable, social support schemes to support the most vulnerable population groups.

123. Finally, in a project of this complexity, an experienced entity capable of quality local project management is essential for its success. Aside from experience in and good knowledge of the technical questions with which the project is dealing, project management must have experience in dealing with associated institutional aspects, project financing, and working with local and international financial organizations. In addition, good marketing skills and an ability for adaptive management addressing innovatively the emerging, unforeseen issues and changing circumstances is crucial for the successful completion of the project.

### Replicability

124. Energy consumption in buildings accounts for some 23% of the total final energy consumption of Mexico, which together with the estimated cost-effective energy saving potential of this sector (from 10 to 15% of the energy used, and up to 20 % if supply side measures are included) poses large and feasible opportunities for GHG reduction.

125. The long term market development potential of SWH systems in Mexico with a steady annual growth of SWH sales and installations of 20% per year has been estimated as over 20,000,000 m<sup>2</sup> with active, public market development support, and represents an estimated saturation point of 150 m<sup>2</sup> per 1000 inhabitants.

Table 6: Estimated SWH Potential in Selected Market Segments

Market Segment	Market shares (ANES, 2005)	Targeted market shares by 2012	Targeted Total Capacity by 2012 (m <sup>2</sup> )

<sup>5</sup> Secretaría de Energía: *Prospectiva del mercado de gas natural; Prospectiva del mercado de gas licuado de petróleo*. Mexico, 2005.

Swimming pools	78%	68%	1,430,417
Industrial-Commercial	14%	18%	560,258
Residential	8%	14%	509,325
Total	100%	100%	2,500,000

Source: Econergy

126. The replication strategy of the project will be based on the following features of the project design:

- technical assistance activities that are intended to strengthen existing supportive legal and regulatory framework, and enhance institutional structures and national capacities to further develop and manage sustainable promotion of the solar water heating market levels;
- global networking, management and dissemination of international experiences, success stories and best practices by building on the separate global “umbrella” project supporting the national level activities elaborated in this document;
- adoption of internationally recognized product standards, testing and quality control schemes;
- through the involvement of local banks in the use of appropriate risk sharing instruments, supporting and demonstrating commercial viability of new financing and service models for solar water heating, thereby encouraging the increased involvement of private sector for replicating the models introduced;
- close monitoring and evaluation of the project implementation and results, thereby providing lessons learned for future action; and
- ongoing public awareness raising efforts and effective dissemination of the project results.

127. It is evident that the effective replication of project activities will require a combination of policy related changes as well as effective dissemination of the project results and lessons learned. The project will facilitate continuing contacts and co-operation between the different stakeholder groups by organizing seminars, workshops and other public events where local success stories will be shared and bring the project proponents, the policy makers and the potential investors / other donors together.

### Part III - Project Management Arrangements

128. This national subcomponent (later referred to as “the Project”) of the joint UNDP/UNEP Global Solar Water Heating Market Transformation and Strengthening Initiative will be executed by SENER through CONUEE under the UNDP national execution modality (NEX). The executing agency (CONUEE) will appoint a National Project Director who will assume responsibility over the project, including accountability for the use of the funds and meeting the overall objectives of the project. The day-to-day management of any financial support schemes using the project resources is envisaged to be entrusted with an experienced financial entity in Mexico such as NAFIN under the supervision of UNDP, the Project Director and the UNEP Global Project Management Unit.

*[Handwritten signatures and initials in blue ink]*

129. All activities relating to project execution in chapters III, IV, V y VI will be carried out in accordance with the guidelines and regulations of the United Nations Development Programme contained in the UNDP Mexico National Execution Manual, version 4, March 2004 and its later updated versions. <sup>6</sup>

### Functions of the participants

**Ministry of Foreign Affairs (SRE):** The Government of the United Mexican States has designated the Technical and Scientific Cooperation Directorate of the SRE as the official counterpart to UNDP. Its principal responsibilities are:

- As the entity responsible for technical cooperation in México, to act as the Mexican government's official counterpart to UNDP; specifically, and in accordance with the National Development Plan, to formalize approval of the project cooperation documents presented to UNDP by federal, state and private entities;
- If necessary, to make a written request to UNDP for reports on the project;
- To approve the annual audit plan for the project and, in accordance with UNDP norms and procedures, to convene an information and consultation meeting prior to the audit.
- If considered expedient, to attend at least one Executive Committee meeting of the project per year; and
- As required, to participate in tripartite meetings or in any follow-up or reorientation sessions.

**Comisión Nacional para el Uso Eficiente de la Energía** is the Executing Agency responsible for supporting the Project Coordinator and the Executive Committee in managing the project's resources to achieve the planned results. Its principal responsibilities are to:

- Participate, together with UNDP, in selecting the Project Coordinator;
- Designate a representative to act as a permanent liaison between UNDP, the Ministry of Foreign Affairs and the Project Coordinator, both in the Executive Committee and the Technical Committee, to ensure that the necessary inputs are available to execute the project;
- Provide the technical and administrative support to implement the project;
- Monitor the project's work plan and progress;
- Provide the name and describe the functions of the person or persons authorized to deal with UNDP concerning the project's administrative and financial matters in a letter to UNDP; and
- Provide the name and describe the functions of the person or persons authorized to sign the project's budget and/or substantive revisions made to it in a letter to UNDP.

**United Nations Development Programme (UNDP):** UNDP is the world development network established by the United Nations with a mandate to promote development in countries and to

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<sup>6</sup> UNDP is the only authorized to approve amendments to these rules as appropriate. The UNDP Country office in Mexico is responsible for communicating timely manner to all users of the new manual provisions and revisions to the rules and procedures that are generated as a result of best practices formalized by the Headquarters in New York. UNDP-Mexico reserves the right to make improvements to the Handbook of national execution to facilitate the presentation and user's query. This procedure respects the integrity of the current UNDP corporate standards.

connect them to the knowledge, experience and resources needed to help people achieve a better life. Its principal responsibilities are to:

- Designate a programme officer responsible for providing substantive and operational advice and to follow up and support the project's development activities;
- Administer the financial resources agreed in the revised work plan and approved by the project's Executive Committee, and inform the Executing Agency and the Executive Committee of its origin and destination;
- As agreed with the Executive Committee, advise the project on management decision making;
- Be part of the project's Executive Committee;
- Supervise and follow up every project activity requiring UNDP administrative support;
- Use national and international contact networks to assist the project's activities and establish synergies between projects in common areas and/or in other areas that would be of assistance when discussing and analyzing the project;
- As deemed necessary, use the project's resources to prepare external evaluations and audits and to monitor them; and
- Provide technical advice to the project on including activities on transversal equality of gender and strengthening civil society participation. These specialized services will be provided on the condition that the costs will be totally recovered.

The UNDP country office (UNDP-MX) in Mexico will monitor the progress towards the intended results through regular contact with the Project Management Unit and national counterparts, and through monitoring visits meant to address implementation matters and foster problem solving. In this respect, the project will be implemented according to standard UNDP National Execution Guidelines.

Arrangements between UNDP and the Executing Agency on providing support services are described in the section on "Budget and Work Plan".

**National Project Steering Committee:** The Steering Committee is the project's supervisory and decision making body that meets at least twice a year, a will be formed, with the participation of a representative from CONUEE, SENER, the UNDP Programme Officer or representative and the project coordinator. The responsibilities of the Project Steering Committee are envisaged to be:

- Monitor compliance with the project's objectives;
- Prepare, focus on, or redesign the project's strategy;
- Approve work plan and budget revisions;
- Monitor both the budget and the prompt delivery of financial, human and technical inputs to comply with the work plan;
- Ensure satisfactory compliance with UNDP norms and procedures;
- Convene ordinary meetings to consider the Technical Committee's proposals and recommendations, as well as the progress made by the project;
- Convene, if necessary, extraordinary meetings;
- Prepare, at least once a year, a substantial revision of the project document;
- Providing the necessary political support for the project's implementation;
- Ensuring communication of the project and its objectives to stakeholders and the public;

- Commenting on project work plans and progress reports;
- Mobilizing cost-sharing and follow-up financing as well as providing input on allocation of project resources where adjustment in budget allocations may be deemed appropriate;
- Approving main project outputs;
- Assuring coordination between this project and other ongoing government activities and programs, notably PROCALSOL;
- Assuring all stakeholders are appropriately involved in the project preparation and management phases; and
- Facilitating linkages with high-level decision making.

**Project Advisory Committee:** On as needed basis, the National Project Steering Committee can be extended to a larger Project Advisory Committee that will include additional stakeholders, such as INFONAVIT, CONAVI, Procobre, ANES, IMEVI, representatives of private SWH manufacturers, importers and/or installers, as well as other entities that the Project Steering Committee may choose to include in consultations. The Technical Committee is a technical advisory and consulting body whose main function is to ensure full and successful compliance with the project's objectives. Its principal functions are to:

- Ensure the project provides good results;
- Guarantee that the parties involved will help to achieve the project's objectives and will adopt them;
- Support the project in the management of the knowledge within the framework of the activities stipulated in the work plan;
- Revise the work plan and progress reports to provide technical inputs and sound practices (national and international) that will help to meet the project's objectives.
- Revise the project's results and supplement them with each member's technical expertise;
- Identify consultants and experts on the theme, both national and international, for the implementation of the project;
- Analyze or, if necessary, solve problems concerning the project's progress to follow up on the work plan and comply with the performance indicators; and
- Promote synergies between potential stakeholders, and mobilize resources to broaden the project's impact.

**Project Management Unit:** will give be in charge of the management of the project, a separate office will be established and located in Mexico City, led by a full time national project coordinator and supported by the required professional staff. The project coordinator is the responsible for the project management and to achieve the project goals on time by providing administrative and technical inputs for project activities.

In close collaboration with the Environment and Energy Programme Officer, the project's Coordinator will be responsible for preparing reports for the Executive Committee and for donors. The main tasks are:

- Follow up on progress made on the tasks outlined in the work plan, as well as on a future mobilization of resources for the project's sustainability;
- Prepare, and monitor compliance with work plans (annual and quarterly);

- Prepare budgets (annual and quarterly);
- Negotiate with UNDP the inputs needed to develop the project;
- Revise the project's technical and administrative documents;
- Prepare technical, financial and progress reports (quarterly, annual and final).
- Inform the Executive Committee and the Technical Committee of the project's progress, problems and possible solutions adopted and/or recommendations on how to achieve its objectives;
- Prepare and present a project situation report at any meeting or meetings about the project;
- Supervise and ensure compliance with the work of the personnel contracted by UNDP according to the contractual criteria contained in the Execution Manual;
- Take minutes of Executive Committee and Technical Committee meetings and be a member of the latter; and
- Provide the technical capacity needed to develop the project.

This project unit would also be supported by a part time Technical Advisor, who should be an international SWH expert (or a company) that is able to support monitoring procedures and provide advice for the implementation of the project in order to ensure that the best practices and lessons learned in other countries are adequately taken into account. Through networking, the Project Management Unit is also expected to enter into partnerships with different foreign institutions (including certification bodies, testing centers, etc.) so as to draw from a wide range of experiences and ensure that the activities supported by the project are in line with international best practices.

130. The project will also benefit from the technical backstopping provided by the knowledge management component of the global SWH umbrella project and will also be subject to the agreed upon monitoring and evaluation activities, as well as the associated country program reporting obligations under the global project.

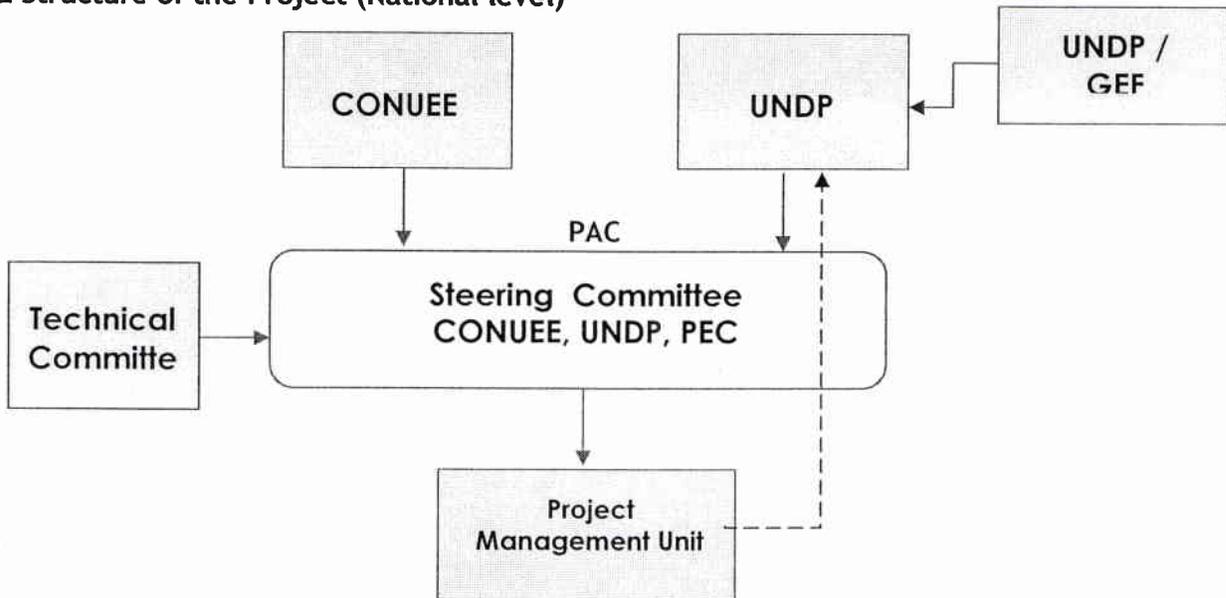
131. Through cooperation with other ongoing efforts to promote SWHs in Mexico, the project will build on activities already initiated by parallel programs, which include:

- CONUEE and INFONAVIT recently approved pilot program focusing on green mortgages;
- CONUEE cooperation with GTZ: The Project will develop synergies with the GTZ-supported PROCALSOL program managed by CONUEE. Cooperation between these two programs will serve to strengthen each one, and avoid the duplication of efforts. GTZ has already provided US\$ 30,000 that directly supported the project during its development stage (from June 2005, when the concept was requested by GEFSec) and it has expressed interest in providing additional technical assistance to the project for a total amount of about USD 100 000;
- CONAVI pilot project to install SWH in new housing: The Project will build on the activities initiated by CONAVI with respect to the results and conclusions drawn from their pilot project. More specifically, the Project will work in cooperation with CONAVI to support work on the development of a mandatory model building code to be adopted by states or municipalities in Mexico. In addition, support will be provided to the DF for the adequate monitoring and evaluation of its municipal code, specifically by applying the Project's Monitoring and Evaluation Plan to SWH systems installed to comply with the DF's municipal code. The DF's efforts to promote the code to other

municipalities in Mexico should also be supported by the Project. To facilitate coordination between the UNDP/GEF program and the two programs implemented by CONAVI and the DF, representatives of both entities should be invited to Project Advisory Committee coordination meetings as and when relevant.

132. This national component of the global UNDP/UNEP/GEF SWH Market Transformation and Strengthening Initiative will also be implemented in close co-operation with the global Knowledge Management and Technical Assistance network by drawing from its international expert support, networking, knowledge sharing and other related activities.

### 3.2 Structure of the Project (National level)



#### *Stakeholder Involvement*

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133. The key stakeholders in Mexico to be involved in the project include:

- SENER: SENER will be main supporter of the policy in the context of Mexico's Federal Government behind the promotion of SWH and will facilitate the participation of other government entities, such as those involved with environmental, housing, financing and tax policy issues.
- CONUEE: CONUEE's role will be to facilitate the project design, implementation, and promotion.
- ANES: ANES represents the solar community in Mexico and will integrate the points of view of the academic community and of the solar industry into the project.
- CONAVI: CONAVI will promote and facilitate SWH installation in new housing with collaboration from an equal number of housing developers (such as Alta Homes).
- INFONAVIT: INFONAVIT is the closest to rolling the cost of SWHs into mortgages for new housing, as demonstrated by the approval of a proposed green mortgage program by its Board on November 15, 2006..
- FONACOT: FONACOT expressed greater awareness of SWH technology and interest in developing a financial mechanism to promote sales than did private commercial banks. The opportunities to co-operate with FONACOT will be further explored during the implementation of the project.
- CANACINTRA: CANACINTRA is the chamber in which the majority of SWH product manufacturers, developers and importers have created a specific chapter. Its role would be gather points of view and establish consensus about the main strategies and elements of the project from an industry perspective.
- Individual SWH manufacturers, developers and importers: These enterprises will be the driving force behind the project.
- GTZ: GTZ has assisted on the formulation and on the design of the PROCASOL as well as on different related studies about the potential of SWH in Mexico. Its support in the promotion of the heaters and on the development of the Mexican market make it an important partner for the project
- FRICO is close to rolling the promotion of the SWHs in the agrindustrial sector

#### **Administrative arrangements**

To administer the resources, UNDP will make its installed capacity available to the project, guaranteeing that their use is both transparent and prompt. The budget and work plan are given in Annexes B and C of this document. If modifications are made to this section, they must be considered and approved by the Steering Committee, and UNDP written approval must be requested.

It should be mentioned that any services provided to the project by UNDP will be in accordance with its internal guidelines and regulations.

The project will be financed by the GEF with a total amount of US\$8,250,000 at the global level. The Mexico country project has a total budget of US\$1,750,000.

As an Implementing Agency, UNDP earns a fee from the GEF upon approval of the project. The fee is used to cover the costs incurred by UNDP, both at Headquarters and in Country Office, in

supporting project development and implementation (3%). The total fee that UNDP will receive is of US\$ 52,500. The cost recovery for the administration of the project will be handled under the modality of the Implementation Support Services (ISS) based on UNDP's Universal Price List.

If payment is made in a currency other than United States dollars, its value will be determined by applying the United Nations operational exchange rate in force on the date of payment. If, before UNDP has used the total amount deposited, there is a change in the United Nations operational exchange rate, it will be adjusted in line with the value of the balance of unused funds. If this leads to a loss in the value of that balance, UNDP shall inform the donor with a view to determining whether the donor must provide additional funds. If these additional funds are not available, UNDP may reduce, suspend or cancel its assistance to the programme/project.

On the other hand, activities will also have to be adjusted to the cash funds available; also in this case, if there is a deficit because of the exchange rate, UNDP has the obligation to inform the Executing Agency to determine whether it is necessary to transfer additional funds or simply to make budget changes.

If the event the project is suspended, reduced or cancelled, UNDP will return the unused funds at the United Nations operational exchange rate in force on the date they are returned; if there is an exchange rate loss, the deficit will be charged to the project.

In case of a surplus, the Steering Committee will decide how it is to be spent and what results are expected and will make the necessary work plan adjustments.

Because the Steering Committee will supervise and monitor the project based on a satisfactory and detailed work plan design, no unforeseen circumstances are expected that would imply administrative risks in its execution.

It is envisaged that, as the project proceeds, counterparts will be added as partners to implement it or as donors, and they may be either state governments or federal executive entities.

It is important to mention that any services provided by UNDP to the project will be performed under its internal policies and rules, as stated on the NEX handbook.

#### **Commitments by UNDP and the Mexican government to provide support services**

The support services required of UNDP will be provided in accordance with the conditions mentioned below.

The UNDP office in the country can provide the necessary support services and assistance requested, whether to prepare reports or make direct payments. In providing these services, UNDP Mexico will check whether the capacity of the designated institution has been increased to enable it to directly carry out these activities.

The UNDP country office, when asked to do so by the designated institution, may request support services for the programme or project, including:

- National and international technical support provided by the United Nations System.
- Project design and strategic planning.
- Project administration by making technical and financial follow-up available, with a results-based approach.
- Develop international, national and local international knowledge networks based on United Nations System experience.
- Select project personnel, assist in awarding contracts and suggest candidates (individuals or companies) for the project's substantive and administrative work.
- Acquire goods and services, in accordance with its procedures and policies.
- The acquisition of goods and services as well as contracting personnel for the project are both the responsibility of the Executing Agency, and will be charged to the project's budget. It is important to mention that the candidates for the posts of Coordinator and Administrative Assistant should be selected jointly by the Executing Agency and UNDP Mexico.

Should any demands or controversies arise concerning the provision of services by the UNDP office in the country, they will be dealt with according to this document's basic assistance model.

If there are changes in the need for support services while the project is in force, the project document will have to be revised as mutually agreed by the UNDP Resident Representative and the counterpart institution.

#### **Audit Clause**

134. The Government will provide the Resident Representative with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of UNDP (including GEF) funds according to the established procedures set out in the Programming and Finance manuals. The Audit will be conducted by the legally recognized auditor of the Government, or by a commercial auditor engaged by the Government.

135. An audit of the project is an integral part of the financial and administrative management within the accountability framework of UNDP. The project will be audited in order to obtain an assurance that resources are managed according to financial regulations, the terms and conditions of the project document, work plan and budget.

136. The project budget must contemplate the necessary resources to carry out the audit. The firm selected by UNDP Mexico, through a bidding process and subjected to a rigorous evaluation within the principles of transparency, neutrality and cost benefit, will take over this exercise in accountability.

#### **Special considerations**

137. The publications, research and products that are generated as part of what is proposed is owned jointly by the National Commission for Energy Efficiency and UNDP Mexico. Also, all material which occurs as a result of this project must bear in a visible and similar size of UNDP's logo and CONUEE and quote the full title of the project ( " Global Solar Water Heating

Market Transformation and Strengthening Initiative: Mexico Country Programme"); giving them credit for the perpetrators and support agencies, consistent with the Steering Committee.

In addition, all publications produced as a result of this document should include a compulsory basis of the following inscription:

*"The opinions, analysis and policy recommendations do not necessarily reflect the viewpoint of the United Nations Development Programme, nor of its executive board or its member states."*

138. This project document will be translated to Spanish according to the UNDP procedures. The project budget will consider this activity to be held in the first month of the project implementation.

## Security

139. It is UNDP's priority to ensure basic minimum conditions of security within the project operation, and the project offices must comply with security requirements and operational standards established by the United Nations Department of Safety and Security (UNDSS).

140. To achieve the above mentioned requirement, there will be regular meetings, workshops and training for project team and contracted personnel under the project in order to familiarize them with the regulations, procedures and training necessary to ensure compliance with such standards.

141. In consultation with the UNDSS, held on November 20th, 2008, UNDP provides the following support:

- a) Services to strengthen project team's security through training courses via electronic means such as: 1) On-line basic security course, and b) advanced security in the field course.
- b) In addition, to complement this training, UNDP provides project staff an induction session on security measures, current Operational Procedures (POV's), and brochure containing recommendations concerning specific issues. It is the responsibility of the Coordinating Unit that the personnel working on the project receive information that UNDSS develops.
- c) UNDSS will review the facilities of the counterpart where project staff is based and issue recommendations to ensure compliance with MOSS
- d) UNDSS in Mexico will provide recommendations and, if necessary, assessments of venues in which events will be carried out under the project.

142. The staff recruited under the project will be working in the offices of the counterpart (CONUEE). Access control and security of these facilities are responsibility of the counterpart. UNDP will request UNDSS to security-clear the CONUEE's project facilities before project staff start working there.

143. The recommendations of the UNDSS review will be shared with the counterpart to guarantee the security of personnel. Project Offices are expected to be MOSS compliance.

144. The resources necessary to implement these measures will be reviewed in the steering committee and will seek co financing from the counterpart for such purposes. The project

envisages an initial budget of \$6,000 USD which could increase or decrease based on the assessment of UNDSS and the counterpart co-financing.

145. If the project requires renting office spaces outside CONUEE facilities, the project offices shall be checked and cleared by DSS according with the security principles and requirements established by UNDP (Moss Compliance). MOSS will be included in the terms of reference for office rental and spaces for workshops and hotels.

146. All project workshops and activities promoted by the project will be held with external static security, ensuring safety of staff and participants.

147. Finally, UNDP regularly circulates a memo to those geographic areas that are considered at greatest risk for project staff. Project staff that is intended to travel to, or be stationed in the areas that are in a high security phase (indicated by UNDSS), must complete the Advanced Course on Security the Field course and must obtain the security clearance by DSS.

### **Learning and Knowledge Sharing and Communication Strategy**

148. The learning and knowledge sharing is a key component of this Project and is directly related with Outcome 2 “Enhanced awareness and capacity of the targeted end-users and housing developers” and Outcome 5 “Provide support to institutionalized the experiences, results and lessons learned by documenting and disseminated them”. The total amount assigned for these outcomes is \$225,000 USD.

149. Results from the project will be disseminated within and beyond the project intervention zone through a number of existing information sharing networks and forums facilitated, in particular, by the knowledge management component of the global SWH umbrella project (Outcome 5). In addition:

- The project will participate, as relevant and appropriate, in UNDP/GEF sponsored networks, organized for senior personnel working on projects that share common characteristics;
- The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks which may benefit the project’s implementation through lessons learnt.
- The project will be disseminated, as relevant and appropriate, in CONUEE sponsored networks.

150. Being a knowledge network, UNDP promotes the sharing of experiences and lessons learned from the projects, so that they can be shared within countries and the rest of the international community to help its people to forge a better life.

Therefore, UNDP in coordination with the implementing agency will promote the systematization of experience and dissemination of products arising from the framework of this project as a cross in the results. These activities are covered in the annual work plan of the project and will be allocated resources of its budget for this purpose.

151. The Steering Committee will define the communication strategy and review it regularly to promote the visibility of lessons learned and best practices in the implementation of project activities. The committee will also determine the adjustments to the project budget to accomplish this goal.

152. The communication strategy will include key stakeholders and determine distinct channels of communication for each one. Among the target audiences identified, we can find: the construction and housing developers; chambers and associations of engineers and architects; faculties of engineering and architecture from different universities; federal and state ministries of construction and environment; companies from different sectors that employ hot water in their productive processes and services.

The channels of communication identified will vary according to the profile. These channels include advertising in specialized magazines and Internet sites; breakfasts and meetings with associations and chambers to promote the advantages of the technology; promotional literature; journalistic spaces in television and radio programs for both, the general and the specialized press, to talk about this technology: interviews, reports, etc.

153. As part of the communication strategy, a project launching event with key actors will publicize its scope and its linkages to other programs. Likewise, mid-term the project, there will be a series of outreach activities on the progress made at the time. The project will actively seek media coverage for the launching event. A symbolic building will be chosen for this launch.

As part of the strategy, the involvement of other actors in the dissemination activities which could increase the financing for the project. Which is generated by the co-financiers will be reported to the GEF through the quarterly and annual reports.

UNDP and CONUEE will also be coordinated in promoting these results drawing spaces dissemination of the United Nations (World Environment Day) and other spaces of common interest that will be accorded in the Steering Committee in order to ensure the visibility of the project and its objectives.

Finally, UNDP will continue a policy of access to information related to the project, respecting information that CONUEE considered confidential.

154. The project will identify, analyze and share lessons learned that may benefit the design and implementation of similar future projects. Identifying and analyzing lessons learned is an ongoing process and the need to communicate such lessons not less frequently than 12 months is one of the project's central contributions. The GPMU shall provide a format and assist the project team in categorizing, documenting and reporting the lessons learned. To this end a percentage of project resources will need to be allocated for these activities.

### **Monitoring and Evaluation (M & E) Plan**

155. Project monitoring and evaluation will be conducted in accordance with established UNDP and GEF procedures and will be provided by the project team and the UNDP Country Office (UNDP-MX) with support from UNDP/GEF. The Logical Framework Matrix in Annex I

provides performance and impact indicators for project implementation along with their corresponding means of verification. These will form the basis on which the project's Monitoring and Evaluation system will be built.

156. The following sections outline the principle components of the Monitoring and Evaluation Plan and indicative cost estimates related to M&E activities. The project's Monitoring and Evaluation Plan will be presented and finalized at the Project's Inception Report following the fine-tuning of indicators, means of verification, and the full definition of project staff M&E responsibilities.

### ***Monitoring and Reporting***

#### ***Project Inception Phase***

157. A Project Inception Workshop will be organized with the full project team, relevant government counterparts, co-financing partners, the UNDP-MX and representation from the Global SWH Project Management Unit (GPMU) and, as applicable, the UNDP-GEF Regional Coordinating Unit (RCU) or UNDP-GEF headquarters (HQs).

158. The main objective of the project inception phase will be to assist the project team to understand and take ownership of the project's goals and objectives, as well as finalize preparation of the project's first annual work plan on the basis of the project's log frame matrix, with support from UNDP-MX and, as appropriate, external experts. This will include reviewing and fine-tuning the log frame (indicators, means of verification, assumptions), imparting additional detail as needed, and on the basis of this exercise finalize the Annual Work Plan (AWP) with precise and measurable performance indicators, and in a manner consistent with the expected outcomes for the project. These will be used to assess whether implementation is proceeding at the intended pace and in the right direction. Targets and indicators for subsequent years would be defined annually as part of the internal evaluation and planning processes undertaken by the project team.

159. Additionally, the purpose and objective of the Inception Workshop (IW) is to: (i) introduce project staff with the UNDP-GEF expanded team which will support the project during its implementation, namely the UNDP-MX and the responsible GPMU and, as applicable, UNDP/GEF staff; (ii) detail the roles, support services and complementary responsibilities of UNDP-MX, GPMU, and RCU staff vis a vis the project team; (iii) provide a detailed overview of UNDP-GEF reporting and M&E requirements, with particular emphasis on the joint Annual Project Reports and Project Implementation Reviews (APR/PIRs), Tripartite Review Meetings, as well as mid-term and final evaluations. Equally, the IW will provide an opportunity to inform the project team on UNDP project related budgetary planning, budget reviews and mandatory budget re-phasing.

160. The IW will also provide an opportunity for all parties to understand their roles, functions and responsibilities within the project's decision-making structure, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference of the project staff (and decision-making structure) will be reviewed and, as needed, revised in order to clarify each party's responsibilities during the project's implementation phase.

### *Monitoring and Evaluation Responsibilities and Events*

161. A detailed schedule of project reviews meetings will be developed by the project management, in consultation with project implementation partners and stakeholder representatives and incorporated in the Project Inception Report. Such a schedule will include: (i) tentative time frames for Tripartite Reviews, Steering Committee Meetings, (or relevant advisory and/or coordination mechanisms) and (ii) project related Monitoring and Evaluation activities.

162. Weekly monitoring of implementation progress will be the responsibility of the Project Coordinator, Director or Chief Technical Advisor (CTA) (depending on the established project structure) based on the project's Annual Workplan and its indicators. The Project Team will inform the UNDP-MX of any delays or difficulties faced during implementation so that the appropriate support or corrective measures can be adopted in a timely and remedial fashion. Matters relating to the financial design or incentive will be referred to UNEP.

163. The project manager and the responsible GPMU staff and, as applicable, UNDP/GEF RCU or HQ staff will jointly fine-tune the progress and performance/impact indicators of the project in consultation with the project team at the Inception Workshop with support from UNDP-CO. Specific targets for the first year implementation progress indicators together with their means of verification will be developed at this Workshop. These will be used to assess whether implementation is proceeding at the intended pace and in the right direction and will form a part of the Annual Workplan. The local implementing agencies will also take part in the IW, in which a common vision of overall project goals will be established. Targets and indicators for subsequent years will be defined annually as part of the internal evaluation and planning processes undertaken by the local project management team and its international support staff (including GPMU).

164. Measurements of impact indicators related to global benefits will occur according to the schedules defined in the Inception Workshops and outlined in the annual APR/PRI template. The measurement of these will be undertaken, as applicable and as needed, through subcontracts or retainers with relevant institutions or through specific studies that are to form a part of the project activities (e.g. measurements of carbon benefits or through surveys for capacity building efforts).

165. Periodic monitoring of implementation progress will be undertaken by the UNDP-MX through quarterly meetings with the project proponent, or more frequently as deemed necessary. This will allow parties to take stock and to troubleshoot any problems pertaining to the project in a timely fashion to ensure smooth implementation of project activities.

166. The representatives of the UNDP-MX and the GPMU will conduct yearly visits to assess firsthand project progress, or more often based on an agreed schedule to be detailed in the project's Inception Report/Annual Workplan. Any other member of the Project Steering Committee can also accompany, as decided by the Project Steering Committee (PSC). A Field Visit Report will be prepared jointly by the CO and the GPMU and circulated no less than one

month after the visit to the project team, all PSC members and the responsible UNDP-GEF Task Manager.

167. Annual Monitoring will occur through the **Tripartite Review (TPR)**. This is the highest policy-level meeting of the parties directly involved in the implementation of a project. The project will be subject to Tripartite Review (TPR) at least once every year. The first such meeting will be held within the first twelve months of the start of full implementation. The project proponent will prepare an Annual Project Report (APR/PIR) and submit it to UNDP-MX, UNEP Global Knowledge Management unit and the UNDP-GEF regional office at least two weeks prior to the TPR for review and comments.

168. The APR/PIR will be used as one of the basic documents for discussions in the TPR meeting. The project proponent will present the APR/PIR to the TPR, highlighting policy issues and recommendations for the decision of the TPR participants. The project proponent also informs the participants of any agreement reached by stakeholders during the APR/PIR preparation on how to resolve operational issues. Separate reviews of each project component may also be conducted if necessary.

169. The annual APR/PIRs of the national country programs will form the basis for the consolidated APR/PIR of the global project to be prepared by the GPMU and submitted to the GEF to report on the progress of the global SWH project as a whole.

#### *Terminal Tripartite Review (TTR)*

170. The terminal tripartite review is held in the last month of project operations. The project proponent is responsible for preparing the Terminal Report and submitting it to UNDP-MX and the Regional Coordinating Unit. It shall be prepared in draft at least two months in advance of the TTR in order to allow review, and will serve as the basis for discussions in the TTR. The terminal tripartite review considers the implementation of the project as a whole, paying particular attention to whether the project has achieved its stated objectives and contributed to the broader environmental objective. It decides whether any actions are still necessary, particularly in relation to sustainability of project results, and acts as a vehicle through which lessons learnt can be captured to feed into other projects under implementation of formulation.

171. The TPR has the authority to suspend disbursement, if project performance benchmarks are not met. Benchmarks are partly provided in Annex I and will be further developed at the Inception Workshop, based on delivery rates, and qualitative assessments of achievements of outputs.

#### *Project Monitoring Reporting*

172. The project manager will be responsible for the preparation and submissions of the following reports that form part of the monitoring process. Items (a) through (f) are mandatory and strictly related to monitoring, while (g) through (h) have a broader function, the frequency and nature of which will be project specific and is to be defined during the project's implementation.

*(a) Inception Report (IR)*

173. A Project Inception Report will be prepared immediately following the Inception Workshop. It will include a detailed First Year/Annual Work Plan divided in quarterly time frames detailing the activities and progress indicators that will guide implementation during the first year of the project. This Work Plan should include the dates of specific field visits, support missions from the UNDP-MX, the GPMU or the Regional Coordinating Unit (RCU) or consultants, as well as time-frames for meetings of the project's decision-making structures. The Report will also include the detailed project budget for the first full year of implementation, prepared on the basis of the Annual Work Plan, and including any monitoring and evaluation requirements to effectively measure project performance during the targeted 12 months time-frame.

174. The IR will also include a more detailed narrative on the institutional roles, responsibilities, coordinating actions and feedback mechanisms of the project partners. In addition, a section will be included on project establishment and start-up activities and an update of any changed external conditions that may affect project implementation.

175. When finalized, the report will be circulated to project counterparts, who will be given a period of one calendar month to respond with comments or queries. Prior to this circulation, the UNDP-MX, the GPMU and, as applicable, the responsible UNDP-GEF's task manager will review the document.

*(b) and (c) Annual Project Report and Project Implementation Review (APR/IR)*

176. The APR is a UNDP requirement and part of UNDP-MX's central oversight, monitoring and project management. It is a self-assessment report by project management to the UNDP-MX and provides input to the country office reporting process and the ROAR, as well as forming a key input to the Tripartite Project Review. An APR will be prepared on an annual basis prior to the Tripartite Review, to reflect progress achieved in meeting the project's Annual Work Plan and assess performance of the project in contributing to intended outcomes through outputs and partnership work.

177. The format of the APR is flexible but should include the following:

- An analysis of project performance over the reporting period, including outputs produced and, where possible, information on the status of the outcome;
- The constraints experienced in the progress towards results and the reasons for these;
- The three (at most) major constraints to achievement of results;
- AWP, CAE and other expenditure reports (ERP generated);
- Lessons learned;
- Clear recommendations for future orientation in addressing key problems in lack of progress.

178. The PIR is an annual monitoring process mandated by the GEF. It has become an essential management and monitoring tool for project managers and offers the main vehicle for extracting lessons from ongoing projects. Once the project has been under implementation for one year, a Project Implementation Review must be completed by the CO together with the Project manager. The PIR is usually prepared after the end of each UNDP/GEF financial year

(June 30) and ideally prior to the TPR. The PIR should then be discussed in the TPR so that the result has been agreed upon by the project, the executing agency, UNDP-MX, the GPMU and, as applicable, the responsible UNDP/GEF task manager.

*(d) Quarterly Progress Reports*

179. Short reports outlining main updates in project progress will be provided quarterly to the local UNDP-MX, the GPMU, the UNDP-GEF RCU and the responsible UNDP/GEF task manager.

*(e) Periodic Thematic Reports*

180. As and when called for by UNDP or the GPMU, the project team will prepare Specific Thematic Reports, focusing on specific issues or areas of activity. The request for a Thematic Report will be provided to the project team in written form by UNDP and will clearly state the issue or activities that need to be reported on. These reports can be used as a form of lessons learnt exercise, specific oversight in key areas, or as troubleshooting exercises to evaluate and overcome obstacles and difficulties encountered. UNDP is requested to minimize its requests for Thematic Reports, and when such are necessary will allow reasonable timeframes for their preparation by the project team.

*(f) Project Terminal Report*

181. During the last three months of the project, the project team will prepare the Project Terminal Report. This comprehensive report will summarize all activities, achievements, and outputs of the project, lessons learnt, objectives met, or not achieved, structures and systems implemented, etc. and will be the definitive statement of the Project's activities during its lifetime. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project activities.

*(g) Technical Reports (project-specific - optional)*

182. Technical Reports are detailed documents covering specific areas of analysis or scientific specializations within the overall project. As part of the Inception Report, the project team will prepare a draft Report List, detailing the technical reports that are expected to be prepared on key areas of activity during the course of the Project and their tentative due dates. Where necessary, this Report List will be revised and updated, and included in subsequent APRs. Technical Reports may also be prepared by external consultants and should be comprehensive, specialized analyses of clearly defined areas of research within the framework of the project and its sites. These technical reports will represent, as appropriate, the project substantive contribution to specific areas, and will be used in efforts to disseminate relevant information and best practices at local, national and international levels.

*(h) Project Publications (project-specific- optional)*

183. Project publications will form a key method of crystallizing and disseminating the results and achievements of the project. These publications may be scientific or informational texts on the activities and achievements of the project, in the form of journal articles, multimedia publications, etc. These publications can be based on Technical Reports, depending

on the relevance, scientific worth, etc., of these reports, or may be summaries of compilations of a series of Technical Reports and other research. The project team will determine if any of the Technical Reports merit formal publication, and will also (in consultation with UNDP, GPMU, the government and other relevant stakeholder groups) plan and produce these Publications in a consistent and recognizable format. These articles will be published in specialized international and national media, seeking adequate forums to achieve the best dissemination of the results free of charge. Special resources were set aside by GTZ in order to finance some of the publications.

**Independent Evaluation**

184. The project will be subject to at least two independent external evaluations as follows:

**Midterm Evaluation**

185. An independent Mid-Term Evaluation will be undertaken at the end of the second year of implementation. The Mid-Term Evaluation will determine progress being made towards the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learnt about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organizations, terms of reference and timing of the Mid-Term Evaluation will be decided after consultation between the parties to the project documents. The Terms of Reference for this Mid-Term Evaluation will be prepared by the UNDP-MX based on guidance from the GPMU and as applicable, the responsible UNDP/GEF task manager.

**Final Evaluation**

186. An independent Final Evaluation will take place three months prior to the terminal tripartite review meeting, and will focus on the same issues as the Mid-Term Evaluation. The Final Evaluation will also look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental goals. The Final Evaluation should also provide recommendations for follow-up activities. The Terms of Reference for this evaluation will be prepared by the UNDP-MX based on guidance from the GPMU and, as applicable, the responsible UNDP/GEF task manager.

**Table 7: Indicative Monitoring and Evaluation Workplan and Corresponding Budget**

Type of M&E activity	Responsible Parties	Budget US\$ Excluding project team staff time	Time frame
Inception Workshop	Project Manager , UNDP CO, GPMU, UNDP GEF (as applicable)	\$3,500 USD	Within first two months of project start up
Inception Report	Project Team, UNDP CO	None	Immediately following IW
Measurement of Means of Verification for Project Purpose Indicators	Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members	To be finalized in Inception Phase and Workshop.	Start, mid and end of project
Measurements of Means of Verification for Project Progress and Performance	Oversight by CO, GPMU and Project Manager  Measurements by COs and local IAs	To be determined as part of the Annual Work Plan's	Annually prior to APR/PIR and to the definition of annual work plans

(on an annual basis )		preparation.	
APR and PIR	Project Team, UNDP-MX, GPMU and , as applicable, UNDP/GEF	None	Annually
TPR and TPR report	Project Team, Government Counterparts, UNDP CO, GPMU and, as applicable UNDP-GEF	None	Every year, upon receipt of APR
Steering Committee Meetings	Project Manager, UNDP CO	None	Following Project IW and subsequently at least once a year
Periodic status reports	Project team	None	To be determined by Project team and UNDP CO
Technical reports	Project team Hired consultants as needed	\$10,000	To be determined by Project Team and UNDP-MX
Mid-term External Evaluation	Project team, UNDP- CO, GPMU, UNDP-GEF (as applicable), External Consultants (i.e. evaluation team)	\$25,000	At the mid-point of project implementation.
Final External Evaluation	See above	\$30,000	At the end of project implementation
Terminal Report	Project team, UNDP-MX External Consultant	None	At least one month before the end of the project
Lessons learned	Project team GPMU (suggested formats for documenting best practices, etc)	\$15,000 (average \$3,000 per year)	Yearly
Audit	UNDP-MX, Project team	\$10,000 (average \$2,000 per year)	Yearly
Visits to project sites (UNDP staff travel costs to be charged to IA fees)	UNDP Country Office, GPMU, UNDP-GEF (as applicable), Government representatives	\$15,000 (average one visit per year)	Yearly
TOTAL INDICATIVE COST <i>Excluding project team staff time and UNDP staff and travel expenses</i>		US\$ 105,000	

## Legal Context

The reference instrument for the agreement between the Special Fund and the Government of Mexico (signed on 23 February 1961), together with its two resolutions on assembly, is part of this document.

For the purposes of the agreement, the Government's executing organism is the same as that of the host country that appears in the agreement. The document governing its norms is the National Projects Execution Manual (Manual Nex).

By virtue of the Convention on Privileges and Immunities of the United Nations, signed by the Government of the United Mexican States, nothing in this document or in its signed contractual documents shall be interpreted as an express or tacit renunciation of immunity of jurisdiction, privilege, exception or other immunity enjoyed by UNDP.

SECTION II: STRATEGIC RESULTS FRAMEWORK

Part I: Logical Framework Analysis

Project Strategy	Indicator	Baseline	Target	Sources of Verification	Assumptions
<p><b>Objective:</b> To accelerate and sustain the solar water heating market in Mexico as a part of the Global SWH Market Transformation and Strengthening Initiative.</p>	<p>The total, estimated amount of installed SWH systems.</p> <p>Growth of the annual sale of SWH systems.</p>	<p>Current baseline expansion of installed capacity shows 14% annual growth, relative to approximately 743,000 m<sup>2</sup> of installed capacity in 2005. At this rate, total installed capacity will reach 1,500,000 m<sup>2</sup> by 2013.</p>	<p>Accelerate and ensure sustainable growth rate of 25-30% (in total installed capacity) for the SWH market in Mexico to reach a target of 2,500,000 m<sup>2</sup> by the end of the project in 2013. The growth rate in the residential sector will be proportionately faster</p> <p>Residential systems made to account for 14% of the total installed capacity by 2013.</p>	<p>Official import and company statistics and vendor/manufact. interviews</p> <p>Ex-post project evaluations</p> <p>Market surveys</p>	<p>Economic and financial feasibility of the SWH investments to be promoted</p> <p>Continuing commitment of the key partners, such as relevant public entities, financiers and other key interest groups (such as INFONA-VIT, FONACOT) to work towards meeting the project objectives.</p>
<p><b>Outcome 1</b> Promote the development of a legal and regulatory framework to promote sustainable SWH market.</p>	<p>The adoption and effective enforcement of new legal and regulatory provisions promoting sustainable SWH market.</p>	<p>No specific building regulations (aside from DF municipal code), fiscal or public financial incentives in place to promote sustainable SWH market.</p> <p>Voluntary standards or quality control mechanisms in place.</p>	<p>Assignment of and strengthened capacity of the assigned public entity (<i>CONUEE</i>) to take the lead on supporting the sustainable development of the SWH market in Mexico.</p> <p>New regulations for standards and adequate quality control mechanisms adopted and effectively enforced.</p> <p>New building regulations, fiscal or public financial incentives to promote sustainable SWH market adopted and effectively enforced.</p>	<p>Official government publications.</p> <p>Project monitoring and evaluation reports.</p>	<p>See above</p>
<p><b>Output 1.1</b> Analysis, and recommendations,</p>	<p>The status of the proposal for new</p>	<p>Required financial and fiscal incentives to stimulate the</p>	<p>With key stakeholders, discuss and agree upon an adequate proposal</p>	<p>Project reports</p>	<p>Support of key government</p>

Project Strategy	Indicator	Baseline	Target	Sources of Verification	Assumptions
associated advocacy work for the introduction of adequate public financial and fiscal incentives to promote the SWH market will be finalized.	financial or fiscal incentives to stimulate the SWH market.	SWH market not effectively promoted.	for the required financial and fiscal incentives and their effective operationalization submitted for final government approval.	Official government publications	stakeholders.
<b>Output 1.2</b> Analysis, recommendation and the associated advocacy work for setting up the required regulatory framework for SWH quality control to be finalized.	The status of the proposal for setting up the required regulatory framework for a SWH quality control system.	No legal or regulatory framework for a SWH quality control scheme	With key stakeholders, discuss and agree upon a proposal for a quality control scheme.	See above	See above
<b>Output 1.4</b> Adoption of new regulations to consider or oblige the integration of SWH systems into the design and construction of new buildings.	New regulations to integrate SWH into the design and construction of new buildings.	A regulation to integrate SWH into the design and construction of a subset of new commercial buildings in Mexico City has been implemented.	New regulations in place to consider or oblige the integration of SWH systems into the design and construction of new buildings in additional cities.	Project reports	See above
<b>Outcome 2</b> Enhanced awareness and capacity of targeted end-users and housing developers to facilitate integration of SWH into new homes and into other promising new market segments.	Annual sales of SWH system.	Annual sales average of 100,000 m2 a year in 2005 and 200,000 m2 reached by 2013 following the expected baseline development.	Annual sales reaching at least 500,000 m2 by end of project.	Project reports and market surveys.	
<b>Output 2.1</b> Materials for public awareness raising and marketing campaigns developed or adapted into Mexican conditions.	The availability of suitable public awareness raising and marketing material.	Shortage of effective and high quality public awareness raising and marketing material.	Development and dissemination of effective and high quality public awareness raising and marketing material available adapted to Mexican conditions available. (The details to be specified later)	Project reports Market surveys	
<b>Output 2.2</b> Public awareness raising and marketing campaigns implemented in co-operation with relevant public entities and private SWH suppliers and manufacturers.	The visibility of the public awareness raising and marketing campaign.	Procobre planning to launch publicity & comm. campaign in Cuernavaca	Utilize content & media used by Procobre & University in context of broader national campaign.  Additional, targeted public awareness raising and marketing campaigns implemented in co-	Project reports Market surveys	

Project Strategy	Indicator	Baseline	Target	Sources of Verification	Assumptions
			<p>operation with relevant public entities and private SWH suppliers and manufacturers and reaching the targeted customers.</p> <p>Exploration of potential interest of commercial and non-commercial media (Televisa, Azteca, IPN Channel 11, etc.)</p>		
<b>Outcome 3</b> Increased demand for SWH systems based on availability of attractive end-user financing mechanisms.	The level of marketing, product and installation services available in the market.	Generally, the cost of SWH systems is too high for majority of residential sector, and the financial sector (banks, mortgage institutions) lacks adequate support mechanisms.	Generation of demand for SWH through applicable consumer financing and, as applicable, financial support schemes with objective of adding an increment of approximately 900,000 m <sup>2</sup> of additional SWH capacity by 2013, and meeting set target of 2.5 million m <sup>2</sup> of total installed SWH capacity by that year. This equates to an objective of leveraging at least US\$ 100 million (10% of total investment needs) to attain the set target.	Project reports and supply side surveys.	
<b>Output 3.1</b> Enhanced awareness of key financial sector stakeholders and local suppliers on the specific characteristics and financing opportunities in SWH market.	Level of interest created.	Lack of information on SWH market characteristics and possible financing models.	All the key financial stakeholders and local suppliers identified in the Mexican market (INFONAVIT, FONACOT, NAFINSA, commercial banks such as Scotiabank, etc.)	Project reports	
<b>Output 3.2</b> Design the financial structure and implementation arrangements for specific purpose financing vehicles that will address consumer needs in the SWH market.	New financing instruments	<p>No financing models yet implemented.</p> <p>INFONAVIT green mortgage program approved, not yet operational.</p>	<p>New financing instruments (such as the INFONAVIT green mortgage program) tailored and marketed to specifically include the purchase of SWH as part of the overall energy efficiency package.</p> <p>As applicable, FONACOT (with or without IMEVI) to increase level of support to lower-income subscribers in the purchase of SWHs.</p>	Project reports	
<b>Outcome 4</b> A certification &	The share of	Lack of adequate incentives	Adoption of a voluntary quality	Project reports	

Project Strategy	Indicator	Baseline	Target	Sources of Verification	Assumptions
quality control scheme applicable for all SWH manufactured and/or installed in Mexico & enhanced capacity of supply chain to offer products and services promoting a sustainable SWH market.	supply side entities adopting the proposed quality control schemes.  The level of customer satisfaction with the installed systems.	for, and some lack of capacity of the supply side to offer equipment and services at required level to sustain market growth.	control and certification scheme for SWH equipment and installation services adhered to by the majority (over 80%) of SWH equipment and service providers in Mexico.	and supply side surveys.	
<b>Output 4.1</b> Set of SWH standards and associated certification system developed (or adapted) for Mexican conditions.	Availability of quality control system for SWH equipment suitable for Mexico.	Voluntary standard driven by supply side.	A quality control system consisting of required standards and associated certification scheme suitable for Mexico will first be adopted on a voluntary basis, and may later evolve to carry a mandatory status.	Project reports	Support of the SWH supply chain recognizing the value added.
<b>Output 4.2</b> Availability of effective and affordable testing services to check compliance with standards.	The number of locally tested systems according to adopted standards.	Test standard for efficiency already approved, but the costs of testing and certification are still perceived as too high by many stakeholders.	As applicable, ensuring access to a certification subsidy for all SWH manufacturers and distributors in Mexico.  All main brands of SWH systems sold in Mexico are tested and certified for their performance.	Project reports	See above
<b>Output 4.3</b> A training and recognition system in place for SWH system installers.	The availability of the system.  The number of SWH systems installed	N/A	A training and recognition system in place for SWH system installers.  Over 70% of the installers required to meet the SWH market development targets trained and recognized by the end of the project	Project reports	See above
<b>Outcome 5</b> The provided support institutionalized and the results, experiences and lessons learned documented and disseminated (including monitoring, learning, evaluation and other feedback	Continuing support for SWH market development continuing beyond the end of the program.	No sustainability of the required market support.  No results and experiences documented and disseminated.	Local institutions continuing to promote the SWH market beyond the duration of the project.	Final evaluation.  Project reports	

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Project Strategy	Indicator	Baseline	Target	Sources of Verification	Assumptions
for adaptive management).					
<b>Output 5.1</b> The reporting framework and arrangement for the SWH market monitoring established and continuing after the end of the project.	Agreed reporting format and institutional arrangements for SWH market monitoring established.	No systematic reporting format and institutional arrangements for SWH market monitoring.	Agreed reporting format and institutional arrangements for SWH market monitoring established and continuing after the end of the project.	Project reports and final evaluation	
<b>Output 5.2</b> Project midterm and final evaluation.	Status of the evaluations	No evaluations	Project midterm and final evaluations conducted on schedule	Project reports	
<b>Output 5.3</b> The project final results and lessons learned documented and disseminated.	Available report	No results and lessons learned compiled, analyzed and disseminated.	Report finalized and disseminated.	Project reports and final evaluation.	

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### SECTION III: TOTAL BUDGET AND WORKPLAN

187. The total cost of the proposed project have been estimated at USD 18,570,000. Of this total, the GEF is requested to finance US\$ 1,750,000 from the country program budget of the Global SWH Market Transformation and Strengthening Initiative approved for GEF Work Program Entry by GEF Council August 2006 under GEF 3. The GEF funds will cover the incremental costs consisting of technical assistance and a small financial incentive to leverage financing for SWH investments in selected new market segments in México, as discussed in further detail under Outcome 3.

188. The co-financing sources of the listed project activities include:

- a. The Government of Mexico with a commitment to support SWH market development through CONUEE with an in-kind contribution of US\$ 1 million over the four-year duration of the project, which can cover the costs of CONUEE's staff to participate in the implementation of project activities, involvement of external consultants when and as needed, travel related costs and other logistics support.
- b. The International Copper Association (Procobre) through its Mexican office with USD 700,000 over the duration of the project.
- c. The National Association of Solar Energy (ANES) with an estimated in-kind contribution of USD 20,000 to co-operate in the implementation of the different project activities and the overall promotion of the SWH technology.
- d. GTZ by supporting a studies such as "International Experiences with the Promotion of SWH at the Household-Level" and "Alternative Financing Mechanisms for the Promotion of SWH Use in Mexico's Domestic Sector", which has been used in the project preparation (with a value of USD 30,000) as well as additional support for funding GTZ experts to support the PROCALSOL program at the estimated value of USD 100,000 during the project implementation.
- e. The USD 750,000 GEF allocation for the financial compoment is expected to leverage directly at least USD 15,000,000 for the purchase of SWH systems through financial mechanisms such as the INFONAVIT green.mortgage program and/or, as applicable, others.
- f. Other public-sector financial institutions specializing in consumer finance, such as FONACOT, may provide additional financing for the purchase of SWHs, e.g. through the IMEVI Sustainable Home program, which is under development. The amount will be driven by consumer demand.
- g. Although not yet particularly active, the commercial banks can provide an additional source of financing for the purchase of SWH equipment.

The envisaged, indicative project financing structure and sources of co-financing are presented in further detail in the table below.

**Table 8: Tentative Project Budget**

OUTCOMES	TOTAL US\$	GEF US\$	GOVERNMENT US\$	OTHERS US\$
<b>Outcome 1:</b> An enabling legal and regulatory framework to promote a sustainable SWH market.	255,000	75,000	100,000 (CONUEE, in-kind)	80,000 <sup>7</sup> (Procobre)
<b>Outcome 2:</b> Enhanced awareness and capacity of the targeted end-users and housing developers to facilitate the integration of SWH into new housing developments.	525,000	175,000	190,000 (CONUEE, in-kind)	160,000 (Procobre)
<b>Outcome 3:</b> Increased demand for SWH systems based on the availability of attractive end-user financing mechanisms.	450,000 (TA) 15,750,000 (Financing support)	100,000 (TA) + 750,000 (Financing)	250,000 (CONUEE in-kind)	100,000 (GTZ)  15,000,000 (INFONAVIT & al. - to be leveraged)
<b>Outcome 4:</b> An effective and affordable certification and quality control scheme applicable for all SWH manufactured and/or installed in Mexico, and enhanced capacity of the supply chain to offer products and services promoting a sustainable SWH market.	890,000	350,000	150,000 (CONUEE, in-kind)	390,000 (ProCobre)
<b>Outcome 5:</b> The provided support will be institutionalized and the results, experiences and lessons learnt will be documented and disseminated (including monitoring, learning, evaluation and other feedback for adaptive management).	280,000	150,000	110,000 CONUEE, in-kind	20,000 (in-kind) (ANES)
Project management <sup>8</sup>	420,000	150,000	200,000 (in-kind)	70,000 (in-kind)
Subtotal	2,820,000 (TA) 15,750,000 (Financing)	1,750,000	1,000,000 (in-kind)	820,000 (confirmed) 15,000,000 (to be leveraged)
<b>GRAND TOTAL</b>	<b>18,570,000</b>	<b>1,750,000</b>	<b>1,820,000 (confirmed)</b>	<b>15,000,000 (to be leveraged)</b>

**Table 9: Sources of Co-financing**

Sources of Co-Financing				
Name of Co-financier (source)	Classification	Type	Amount (US\$)	Status*
The Government of Mexico (CONUEE)	Government	In-kind	1,000,000	Confirmed
INFONAVIT, FONACOT	Government	Cash	15,000,000	Letter of Intent
ProCobre	Private	TA	700,000	Confirmed
ANES	NGO	In-kind	20,000	Confirmed
GTZ	Government	Cash	100,000	Confirmed

<sup>7</sup> The allocation of the confirmed ProCobre cofinancing (USD 700,000) between the different Outcomes is a tentative one and will be specified during the project implementation.

<sup>8</sup> Covering the tasks related to the administrative management of the project. Technical contributions of the PMT covered under the Outcome budgets.

Sub-Total Co-financing	1,820,000 15,000,000	Confirmed Letter of Intent
Expected Co-Financing in the End	16,820,000 min.	
Private		To be leveraged

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***Cost Effectiveness***

189. With the set project target to facilitate the installation of 900,000 m<sup>2</sup> of incremental SWH capacity over the duration of the project with the associated reduction of GHG emissions by at 3 million tons of CO<sub>2</sub> as a direct result of the project activities in Mexico (calculated over the min. 15 year lifetime of the systems), the CO<sub>2</sub>-reduction costs to the GEF can be estimated at about US \$ 0.58 per ton of CO<sub>2</sub> reduced.

190. Cost efficiency aspects were a determining factor in selecting the overall project intervention strategy, which builds on close coordination of the national component with the overall global project framework, and the most cost effective technical backstopping, networking and coordinating opportunities that such a global initiative can provide

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Table 10 Total Project Workplan and Budget in Atlas

Award ID:	00050856
Award Title:	PIMS 3611 Global - Solar Water Heating Market Transformation and Strengthening Initiative: Mexico Country Program
Business Unit:	MEX10
Project Title:	PIMS 3611 Global - Solar Water Heating Market Transformation and Strengthening Initiative: Mexico Country Program
Implementing Partner (Executing Agency)	National Commission for Energy Efficiency (CONUEE)

GEF Outcome/ Atlas Activity	Responsible Party/ Implementi ng Agent	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	Total (USD)	See Budget Note:		
<b>Outcome 1</b> <i>An enabling legal and regulatory framework to promote a sustainable SWH market</i>	CONUEE	62000	GEF	71200	International Consultants Sht Term		20,000				20,000			
				71300	Local Consultants Sht Term									
				71400	Contractual services - individuals	10,000	10,000	10,000	10,000	5,000	45,000			
				71600	Travel									
				72100	Contractual services - companies									
				74200	Printing and publication costs									
				74500	Miscellaneous	2,000	2,000	2,000	2,000	2,000	10,000	4)		
					sub-total GEF	12,000	32,000	12,000	12,000	7,000	75,000			
TOTAL OUTCOME 1						12,000	32,000	12,000	12,000	7,000	75,000			
<b>Outcome 2</b> <i>Enhanced awareness and capacity of the targeted end-users, housing developers and other key stakeholders to facilitate the integration of SWH into new housing developments and into other promising new market segments</i>	CONUEE	62000	GEF	71200	International Consultants Sht Term		20,000		10,000		30,000			
				71300	Local Consultants Sht Term	5,000	5,000	5,000	5,000		20,000			
				71400	Contractual services - individuals	6,000	6,000	6,000	6,000	6,000	30,000			
				72100	Contractual services - companies	20,000	30,000	10,000	10,000	5,000	75,000	2)		
				74200	Printing and publication costs	2,000	2,000	2,000	2,000	2,000	10,000	3)		
				74500	Miscellaneous	2,000	2,000	2,000	2,000	2,000	10,000	4)		
					sub-total GEF	35,000	65,000	25,000	35,000	15,000	175,000			
				TOTAL OUTCOME 2						35,000	65,000	25,000	35,000	15,000
<b>Outcome 3</b> <i>Increased demand for SWH systems based on availability of attractive end-user financing mechanisms.</i>	CONUEE	62000	GEF	71200	International Consultants									
				71300	Local Consultants Short Term	15,000	20,000	10,000			45,000			
				71400	Contractual services - Individual	10,000	10,000	10,000	10,000	6,000	46,000			
				72100	Contractual Services - Companies							2)		
				72600	Grants		200,000	200,000	200,000	150,000	750,000	8)		
				74200	Printing and publication costs	1,000	1,000	1,000	1,000		4,000	3)		
				74500	Miscellaneous	1,000	1,000	1,000	1,000	1,000	5,000	4)		
					sub-total GEF	27,000	232,000	222,000	212,000	157,000	850,000			
TOTAL OUTCOME 3														

<b>Outcome 4</b> <i>An effective and affordable certification and quality control scheme applicable for all SWH manufactured and/or installed in Mexico, and enhanced capacity of the supply chain to offer products and services promoting a sustainable SWH market.</i>	CONUEE	62000	GEF	71200	International Consultants Sht Term	15,000	20,000	20,000			55,000		
				71300	Local Consultants Sht Term								
				71400	Contractual services - individuals	7,000	7,000	7,000	7,000	7,000	35,000		
				71600	Travel			5,000			5,000	1)	
				72100	Contractual services - companies	15,000	15,000	10,000	5,000		45,000	2)	
				72200	Equipment					190,000		5)	
				74200	Printing and publication costs			2,000	2,000	2,000	2,000	8,000	3)
				74500	Miscellaneous	2,000	3,000	3,000	2,000	2,000	12,000	4)	
					sub-total GEF	39,000	52,000	232,000	16,000	11,000	350,000		
<b>TOTAL OUTCOME 4</b>						<b>39,000</b>	<b>52,000</b>	<b>232,000</b>	<b>16,000</b>	<b>11,000</b>	<b>350,000</b>		
<b>Outcome 5</b> <i>The provided support will be institutionalized and the results, experiences and lessons learnt will be documented and disseminated (including monitoring, learning, evaluation and other feedback for adaptive management).</i>	CONUEE	62000	GEF	71200	International Consultants Sht Term			20,000		30,000	50,000	6)	
				71300	Local Consultants Sht Term			10,000		10,000	20,000		
				71400	Contractual services - individuals	8,000	6,000	6,000	6,000	6,000	32,000		
				71600	Travel				3,000		3,000	6,000	1)
				72100	Contractual services - companies	10,000	2,000	2,000	2,000	7,000	23,000	7)	
				74200	Printing and publication costs				3,000	1,000	5,000	9,000	3)
				74500	Miscellaneous	2,000	2,000	2,000	2,000	2,000	10,000	4)	
					sub-total GEF	20,000	10,000	46,000	11,000	63,000	150,000		
<b>Total Outcome 5</b>						<b>20,000</b>	<b>10,000</b>	<b>46,000</b>	<b>11,000</b>	<b>63,000</b>	<b>150,000</b>		
<b>Project Management</b>	CONUEE	62000	GEF	71400	Contractual services - Individual.	27,000	27,000	27,000	27,000	27,000	135,000		
				71600	Travel	3,000		2,000			5,000	1)	
				74500	Miscellaneous	2,000	2,000	2,000	2,000	2,000	10,000	4)	
					sub-total GEF	32,000	29,000	31,000	29,000	29,000	150,000		
<b>TOTAL PROJECT MANAGEMENT</b>						<b>32,000</b>	<b>29,000</b>	<b>31,000</b>	<b>29,000</b>	<b>29,000</b>	<b>150,000</b>		
<b>Total</b>		<b>62000</b>	<b>GEF</b>			<b>165,000</b>	<b>420,000</b>	<b>568,000</b>	<b>315,000</b>	<b>282,000</b>	<b>1,750,000</b>	<b>0</b>	
<b>Project Total</b>						<b>165,000</b>	<b>420,000</b>	<b>568,000</b>	<b>315,000</b>	<b>282,000</b>	<b>1,750,000</b>	<b>0</b>	

**Budget Notes:**

Number	Note
1	Required travel for co-ordination, consultations and exchange of information
2	Can be used for both international and national contracts on as needed basis
3	Including public awareness raising and marketing support as well as training materials
4	Miscellaneous expenses, including the costs of training workshops and stakeholder consultation meetings
5	Required equipment for training of operators, installers and other supply side professionals

*me*

*f*

6	<i>Including the costs of international experts for independent mid term and final evaluations</i>
7	<i>Including, among others, audit costs</i>
8	<i>Requested GFF participation in the proposed financing mechanisms</i>

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**SECTION IV: ADDITIONAL INFORMATION**  
**Part I: Other Agreements (Endorsement letters)**

gtz

gtz

Dr. Juan C. Mata Sandoval  
 Director General  
 Comisión Nacional para el Aprovecho de Energía  
 Presente

Organización Mexicana Alemana  
 Promov, ER  
 Promoción de  
 Energías Renovables y  
 Eficiencia Energética S de RL de CV  
 Cda. del Valle  
 Deleg. Benito Juárez  
 CP 06700 México, D.F.

Surf Teléfono +52 56 5100 2000 ext. 1030  
 MEX Fax +52 56 5100 1020 ext. 1040  
 E-Mail: info@gtz.com.mx Fecha: 01/04/07

Organización Mexicana Alemana  
 Promov, ER  
 Promoción de  
 Energías Renovables y  
 Eficiencia Energética S de RL de CV  
 Cda. del Valle  
 Deleg. Benito Juárez  
 CP 06700 México, D.F.

Estimado Doctor Mata Sandoval:

La Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH (GTZ por sus siglas en alemán, es una empresa federal alemana que trabaja en el ámbito de la cooperación internacional para el desarrollo sostenible. Su principal cometido es el Ministerio Federal de Cooperación Económica y Desarrollo (BMZ). La GTZ ofrece soluciones con proyección de futuro para el desarrollo político, económico, ecológico y social, y opera en más de 120 países con alrededor de 9.500 empleados. Con base en acuerdos pactados entre los gobiernos de México y Alemania, desde hace más de 25 años la GTZ está apoyando proyectos en México.

El tema prioritario de esta alianza es la protección del medio ambiente. El programa "Gestión Ambiental y Uso Sostenible de Recursos" reúne los temas prioritarios acordados entre los gobiernos de México y Alemania, y consta de un componente dedicado a la "Promoción de Energías Renovables y Eficiencia Energética". El objetivo de este componente es "contribuir a que las instituciones responsables fomenten de manera más eficaz el desarrollo del mercado de energías renovables". Para lograr este objetivo e impulsar el uso de las energías renovables a gran escala se colabora estrechamente con actores tanto del sector público, primeramente a nivel federal, como del sector privado dando asesoría para la adecuación de los marcos legales y regulatorios, así como al desarrollo de mercados y proyectos. El fomento del uso de calentadores solares de agua es un enfoque principal en la línea de acción "Desarrollo de Mercados" del componente.

Me permito hacer constar que la GTZ, en el marco de la cooperación bilateral entre los gobiernos de los Estados Unidos Mexicanos y la República Federal de Alemania ha colaborado con la CONAE en varias actividades dirigidas al fomento del uso de calentadores solares de agua. Además de dos estudios y otras actividades menores, la GTZ a apoyado a la CONAE en el desarrollo conceptual del "Programa Nacional para la Promoción de Calentadores Solares de Agua" y la planeación de su implementación. Es de nuestro conocimiento que la CONAE planea realizar este Programa en colaboración con diversas agencias, instituciones y organismos competentes, entre ellas el Fondo para el Medio Ambiente Global (GEF) a través de la agencia implementadora "Programa de Naciones Unidas para el Desarrollo (PNUD)".

La dependencia a mi cargo ha facilitado los medios a su alcance necesarios para facilitar el desarrollo y la implementación del Programa, y está en la mejor disposición de aportar recursos adicionales en el marco de la cooperación bilateral mencionado en el futuro. Hasta el momento las aportaciones de la GTZ se suman a un monto total aproximado de: USD 100,175.

Agradeciendo las consideraciones que se sirva prestar a la presente, aprovecho para referirle mi más alta consideración.

Atentamente,

  
 Dr. Bernhard Bös  
 Director General  
 de la GTZ México

c.c.p.: Verónica Chao, Oficial de Programas de Energía y Medio Ambiente - PNUD  
 Dr. Jorge Wolpert Kuri, Coordinador de enlace y Programas Regionales - Conae







# Asociación Nacional de Energía Solar A.C.

México, D.F. a 25 de Mayo de 2007

PR/003/07  
006473

**JUAN C. MATASANDOVAL**  
**DIRECTOR GENERAL**  
**COMISIÓN NACIONAL PARA EL AHORRO DE ENERGÍA**  
**PRESENTE**

La Asociación Nacional de Energía Solar (ANES) es una asociación civil constituida en 1980 cuya objetivo fundamental es la promoción de la utilización de la Energía Solar en sus manifestaciones de radiación solar y del aprovechamiento de los fenómenos que produce en forma indirecta, tales como la energía del viento, la biomasa y la hidráulica. La ANES está conformada por investigadores, profesores, estudiantes e industriales y realiza actividades continuas de capacitación, normalización, difusión, y promoción. Ejemplo de ello es la organización de treinta Semanas Nacionales de Energía Solar y un sinnúmero de foros, seminarios, talleres y cursos con el fin de fomentar la utilización de las energías renovables, a través de sus 22 secciones regionales establecidas en todo el país, coadyuvando de esta manera al mejoramiento del medio ambiente.

Por lo cual hacemos patente nuestro interés en participar en las actividades del proyecto "Programa Nacional para la Promoción de Calentadores Solares de Agua" que planea realizar en colaboración con la Comisión Nacional para el Ahorro de Energía (CONAE) y diversas agencias, instituciones y organismos competentes, con apoyo del Fondo para el Medio Ambiente Global (GEF) a través del Programa de Naciones Unidas para el Desarrollo (PNUD) como agencia implementadora, acciones encaminadas para propiciar el uso masivo de estos dispositivos y fortalecer el mercado de calentamiento solar de agua en los sectores residencial, comercial e industrial, así como aliviar la demanda de combustibles fósiles.

En caso de que el proyecto sea aprobado para financiamiento por parte del GEF esta Asociación a mi cargo está en la mejor disposición de aportar los medios en especie a su alcance, necesarios para facilitar la implantación del programa. Tales como el personal capacitado para su gestión (un coordinador y consultores de apoyo), gastos administrativos y operativos; todo esto con un monto total aproximado de \$ 20,000.00 USD.

Agradeciendo las consideraciones que se sirva prestar a la presente, quedo de ustedes

**ATENTAMENTE**

Ing. Rodolfo Martínez Stravel  
Presidente

P.A. Lic. Carolina Olivos Montes de Oca  
Directora Ejecutiva ANES



c.c.p. Verónica Chao Programa de Naciones Unidas para el Desarrollo PNUD  
c.c.p. Dr. Jorge Wolpert, Coordinador de Entace y Programas Regionales CONAE  
c.c.p. Oca, Ernestina Torres, Vicepresidente, ANES

Av. Anáhuac 524 Depto. 506 "B" Prateres Compa  
C.P. 14350, Tlámpa  
55-84-41 02

TEL: 55-84-41 02 FAX: 55-84-41 02

PR02/07

05 de Junio de 2007

Dr. Juan C. Mata Sandoval  
Director General  
Comisión Nacional para el Ahorro de Energía

Estimado Dr. Mata:

Para saludarle y en atención a solicitud expresa de CONAE con respecto a una carta compromiso de la naturaleza, tiempos y condiciones bajo las cuales Procobre México a través la International Copper Association estará colaborando con el Programa Nacional para la Promoción de Calentadores Solares Planos de Agua que dirige la Comisión Nacional de Ahorro de Energía dignamente representada por usted, me permito distraerlo para enviarle información al respecto.

Nuestra colaboración inició en Octubre 2005 para nuestro país y dentro del marco de la iniciativa de UNDP "GLOBAL SOLAR WATER HEATING PDF-B 14".

Para ello, se inició un proceso de consenso con los principales actores de gobierno y del mercado, que ha dado inicio a diferentes actividades y acciones.

La International Copper Association ha comprometido fondos dentro del marco del programa GEF, con una inversión de \$USD 5,000,000. (ver anexo I).

Posteriormente, en 2006 se presentó ante GEF-UNDP un proyecto complementario, que está sujeto a disponibilidad de Fondos de ICA en dos sentidos:

- a) La conclusión de este primer proyecto PDF-B 14 para remover barreras
- b) Que los equipos e instalaciones empleadas sean preponderantemente de Cobre

Dicho proyecto estará sujeto a revisión y fondos posteriores en la medida en que el primer programa se pueda implementar.

Adicionalmente desde ese año, hemos invertido e incluyendo acciones durante 2007 los siguientes fondos en dólares americanos como sigue:

Proyecto Solar - México Inversión en USD	2005	2006	2007	
			Presup.	TOTAL
Preparatorios (ICA)	26,741	42,052	34,102	102,895
Trabajos directos (ICA)	11,460	29,222	36,943	77,625
subtotal ICA	38,201	71,274	71,045	180,520

Procobre Centro Mexicano de Promoción del Cobre AC  
Soc. Nueva Sur de la Cruz No 14, Oficina 305, Tlalampampa Estado de México 54000  
Tlalampampa - Tel: (52) 55 1641-63-30 y -52 (55) 1641-63-62  
[www.procobre.org](http://www.procobre.org)

En resumen, nuestro compromiso continua tanto para la aportación con los fondos GEF así como de manera local. El taller realizado dentro del PROCALSOL permitirá incluir actividades específicas dentro de los fondos locales a partir de 2008.

Atentamente,



Ing. Efran Franco  
Director Ejecutivo  
Procobre México, Oficina en México de International Copper Association Ltd

CEP Victoria Chao, Oficial de Propósitos de Energía y Medio Ambiente - PAUC  
Jorge Walfredo Kuri, Coordinador de enlace y Programas Regionales - CONAE





## Part II: Terms of Reference for Key Project Staff and Main Subcontracts<sup>9</sup>

### Project Steering Committee (PSC)

#### Duties and responsibilities

The Project Steering Committee (PSC) is the main body to supervise the project implementation in accordance with UNDP rules and regulations and referring to the specific objectives and outcomes of the project with their agreed performance indicators;

The main functions of the PSC are:

- General monitoring of the project progress in meeting of its objectives and outcomes and ensuring that they continue to be in line with the national development objectives;
- Facilitating the co-operation between the different Government entities, whose inputs are required for successful implementation of the project, ensuring access to the required information and resolving eventual conflict situations raising during the project implementation when trying to meet its outcomes and stated targets;
- Supporting the elaboration, processing and adoption of the required institutional, legal and regulatory changes to support the project objectives and overcoming of the related barriers;
- Facilitating and supporting other measures to minimize the identified risks to project success, remove bottlenecks and resolve eventual conflicts;
- Approval of the annual work plans and progress reports, the first plan being prepared at the outset of project implementation;
- Approval of the project management arrangements; and
- Approval of any amendments to be made in the project strategy that may arise due to changing circumstances, after the careful analysis and discussion of the ways to solve problems.

#### **PSC Structure and Reimbursement of Costs**

The PSC will be chaired by the Project Director or another person assigned by the National Executing Agency for this purpose. The PSC will include a representative from each of the key Ministries and Agencies involved in the project, a representative of UNDP and, as applicable, representatives of project's other cofinancing partners. Other members can be invited by the decision of the PSC, however, by taking care that the PSC still remains operational by its size. The project manager will participate as a non-voting member in the PSC meetings. When and as needed, the meetings of the PSC can be extended to Technical Advisory Group meetings.

The costs of the PSC's work shall be considered as the Government's or other project partners' voluntary in-kind contribution to the project and shall not be paid separately by the project. Members of the PSC are also not eligible to receive any monetary compensation from their work as experts or advisers to the project.

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<sup>9</sup> Standard basic ToRs

## **Meetings**

It is suggested that the PSC will meet at least twice a year, including the annual TPR meeting. A tentative schedule of the PSC meetings will be agreed as a part of the annual work plans, and all representatives of the PSC should be notified again in writing 14 days prior to the agreed date of the meeting. The meeting will be organized provided that the executing agency, UNDP and at least 2/3 of the other members of the PSC can confirm their attendance. The project manager shall distribute all materials associated with the meeting agenda at least 5 working days in prior to the meeting .

## **National Project Director**

As a representative the Government and project's executing agency, the National Project Director is having the main responsibility to ensure that the project is executed in accordance with the project document and the UNDP guidelines for nationally executed projects.

His/her main duties and responsibilities include:

- Supervising the work of the Project Manager through meetings at regular intervals to receive project progress reports and provide guidance on policy issues;
- Certifying the annual and, as applicable, quarterly work plans, financial reports and requests for advance of funds, ensuring their accuracy and consistency with the project document and its agreed amendments;
- Authorizing the project contracts, following the approval of UNDP;
- Unless otherwise agreed, chairing the Project Steering Committee and representing the project in other required meetings;
- Taking the lead in developing linkages with the relevant authorities at national, provincial and governmental level and supporting the project in resolving any institutional or policy related conflicts that may emerge during its implementation;

## **Project Manager**

Duties and responsibilities:

Operational project management in accordance with the project document and the UNDP guidelines and procedures for nationally executed projects, including:

- General coordination, management and supervision of project implementation;
- Managing the procurement and the project budget under the supervision of the Executing Agency and with support from UNDP to assure timely involvement of local and international experts, organisation of training and public outreach, purchase of required equipment etc. in accordance with UNDP rules and procedures;
- Submission of annual Project Implementation Reviews and other required progress reports (such QPRs) to the PSC, Executing Agency and the UNDP in accordance with the section "Monitoring and Evaluation" of the project document;
- Ensuring effective dissemination of and access to information on project activities and results, (including an regularly updated project website);
- Supervising and coordinating the contracts of the experts working for the project;
- Communicating with international investors and financial organizations to define fields of cooperation and attracting additional financing in order to fulfill the project objectives; and

- Ensuring successful completion of the project in accordance with the stated outcomes and performance indicators summarized in the project's logframe matrix and within the planned schedule and budget otherwise.

#### Expected Qualifications:

- Advance university degree and at least 5 years of professional experience in the specific areas the project is dealing with, including good knowledge of the international experiences, state of the art approaches and best practices (by applying different policy measures, new financing mechanisms etc.)
- Experience in managing projects of similar complexity and nature, including demonstrated capacity to actively explore new, innovative implementation and financing mechanisms to support the SWH market and leveraging of financing for that;
- Demonstrated experience and success on the engagement of and working with the private sector and NGOs, creating partnerships and leveraging financing for activities of common interest;
- Good analytical and problem solving skills and the related ability to adaptive management with prompt action on the conclusion and recommendations coming out from the project's regular monitoring and self-assessment activities as well as from periodical external evaluations;
- Ability and demonstrated success to work in a team, to effectively organize it works and to motivate its members and other project counterparts to effectively work towards the project's objective and expected outcomes;.
- Good communication skills and competence in handling project's external relations at all levels;
- Good working knowledge of English in addition to the national languages of the host country; and
- Familiarity and prior experience with the specific UNDP and GEF requirements are considered as assets

#### Project Assistant

##### Duties and responsibilities:

Supporting the project manager in the implementation of the project, including:

- Responsibility for logistics and administrative support of the project implementation, including administrative management of the project budget, required procurement support etc.
- Maintaining the business and financial documentation up to date, in accordance with UNDP and other project reporting requirements;
- Organizing meetings, business correspondence and other communication with the project partners;
- Supporting the project outreach and PR activities in general, including keeping of the project web-site up to date;

- Managing the projects files and supporting the project manager in preparing the required financial and other reports required for monitoring and supervision of the project progress;
- Supporting the project manager in managing the contracts, in organizing correspondence and in ensuring effective implementation of the project otherwise

Expected Qualifications:

- Fluent in English and the national languages of the host country
- Demonstrated experience and success of work in a similar position
- Good administration and interpersonal skills
- Ability to work effectively under pressure
- Good computer skills

**International Project Adviser(s) (part time)**

Duties and Responsibilities:

Support UNDP and the project management to monitor the progress of the project and its different subcomponents, and, as needed, build the capacity of the local experts working for the project to successfully implement the project activities ensuring that they comply with the agreed benchmarks and success indicators of the project as well as international best practices and lessons learnt.

The specific responsibilities include, among others to:

- support the local project team in organizing the implementation of the different sub-components of the project at the inception phase and after that, including support to the project manager in the preparation of the project inception report and the annual work plans, drafting of Terms of Reference for the national and, as needed, additional international experts and subcontractors, required tender documents etc;
- support the project manager in supervising the work of the contracted individual experts and companies, including review of the feasibility studies and the technical design, financing and implementation arrangements of the planned pilot projects;
- support the project manager in arranging co-operation with the current project partners and, as applicable, in establishing new, additional national and/or international partnerships to support the project goals and objectives;
- support the local project team in monitoring and evaluating the performance and outcome of the SWH installations supported by the project;
- monitor the progress of the project and participate in developing periodic progress reviews and, as applicable, the annual Project Implementation Reviews;
- train personally or, as needed, organize other training for the local stakeholders to successfully implement the project and to meet its capacity building objectives; and
- provide advice on the required institutional, legal and regulatory changes to support the reaching of the stated outcomes of the project and provide other required advice on the successful implementation of the specific project subcomponents and activities by drawing from the international lessons learnt and best practices.

Expected Qualifications:

- A university degree in the area the project is dealing with;
- Demonstrated experience and success in supporting similar projects (or its subcomponents) in other GEF programme countries;
- Good knowledge of the international experiences, state of the art approaches and best practices in the specific areas the project and its subcomponents are dealing with;
- Good analytical skills and effective communication and training skills and competence in handling external relations at all levels;
- Ability to work in a team and to motivate other team members and counterparts;
- Good knowledge of the working languages of the local team in addition to English, including the ability to review, draft and edit required project documentation
- Familiarity with the specific UNDP and GEF requirements is considered as an asset.



**SIGNATURE PAGE**

Country: Mexico

UNDAF Outcome(s)/Indicator(s):

Institutional and individual capacities strengthened to stop and/or reverse environmental degradation, support natural resources conservation, encourage participatory management, natural resources governance and promote human development through policies and programmes for sustainable development.

Expected Outcome(s)/Indicator (s):

*(CP outcomes linked to the SRF/MYFF goal and service line)*

Strengthened national and local capacities for mitigation and adaptation to climate change

Expected Output(s)/Indicator(s):

*(CP outcomes linked t the SRF/MYFF goal and service line)*

Mitigation of climate change strategies: Institutional and professional capacities strengthened to adopt renewable energy technologies.

Implementing partner:

Comisión Nacional para el Uso Eficiente de Energía (CONUEE)

Other Partners:

Agencia de Cooperación Técnica México-Alemania (GTZ)

International Cooper Asociation (PROCOBRE)

Instituto Nacional de Fomento a la Vivienda de los Trabajadores (INFONAVIT)

Asociación Nacional de Energía Solar (ANES)

<p>Programme Period: <u>2008-2012</u></p> <p>Programme Component: Energy &amp; Environment</p> <p>Project Title: Global Solar Water Heating Market Transformation and Strengthening Initiative: Mexico Country Programme</p> <p>Project ID: PIMS 3611</p> <p>Project Duration: 4.5 years</p> <p>Management Arrangement: NEX</p>
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<p>Total budget: USD 3,570,000</p> <p>Total budget (UNDP managed): USD 1,750,000</p> <p>Allocated resources:</p> <ul style="list-style-type: none"> <li>• GEF: USD 1,750,000</li> <li>• Government: USD 1,000,000 (+ USD 15,000,00 to be leveraged)</li> <li>• Other (in-kind and parallel): USD 820,000</li> </ul>
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Aproved by:	Sign:	Date:	Name and Title:
Comisión Nacional para el Uso Eficiente de Energía (CONUEE)		26/06/09	Emiliano Pedraza Hinojosa Executive Director
Ministry of Foreign Affairs Unit for Scientific and Technical Cooperation		09/07/09	Maximo Romero Unit Director
United Nations Development Programme (UNDP)		15/07/09	Magdy Martinez-Soliman Resident Representative