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Ex Post

Ex-post Evaluation of the FGEF Energy Efficiency Project in the Construction Sector in Afghanistan

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Foreword

The purpose of the ex-post evaluation is to form a justified opinion on the relevance, efficiency, effectiveness, impacts and sustainability of the project, taking into consideration the context, policies and procedures of the French Global Environment Facility (FGEF). The evaluation team examined the achievements of the project according to the planned objectives and to the FGEF's development goals. In addition,

they carried out an examination of the process of preparation and implementation of the project in its various phases of identification, appraisal, implementation and monitoring.

The observations, appreciations and recommendations expressed herein are the sole responsibility of their evaluator.

Executive Summary

The project evaluated involves improving energy efficiency in Afghan schools and health centres. At the request of the French Ministry for Foreign and European Affairs (MAEE), the French Global Environment Facility (FGEF) granted the project a €1.35 million subsidy on 27th October 2004.

The implementing agency is the French Public Agency for the Environment and Energy Management (ADEME) supported by GERES, a specialist NGO that initiated the project. A supervisory committee co-chaired by the National Environment Protection Agency (NEPA), which assumes the role of the Afghan Ministry of the Environment, and the French Embassy in Kabul groups together the Afghan ministries involved (Energy and Water; Public Health; Education and, more recently, Urban Development), interested donors, partner NGOs and the FGEF. This committee, convened once a year, has been increasingly successful, which evidences that the project is well integrated into its environment.

The promoters of this energy efficiency project were able to mobilize their efforts very quickly in Afghanistan, after the fall of the Taliban, with a first project in 2002 followed by the FGEF project late 2004. The current project is being completed in a context where the security situation is deteriorating more and more.

The project falls within the framework of the AFGEI, a joint Afghan, French and German energy initiative. Collaborative efforts were undertaken with German technical cooperation (training, demo centre, joint newsletter). This partnership, which is somewhat rare in a country where donor coordination is difficult, was appreciated.

The project is meaningful in a context where wood resources are becoming scarce (less than 4.5% of national territory), being mainly used as fuel for cooking and timber for the construction sector.

Since March 2005, 274 buildings representing 168,225m² have been improved, which exceeds the initial objective of 100 buildings and 38,000m². The extra costs linked to insulation remained within the 12% limit agreed on. Only €36,000 of the €200,000 budget set for the part-funding of these extra costs was used. In a context where outside funding is plentiful, the real added value of the programme lies in the technical advice provided and not in the financing of the construction works.

The project was appraised and implemented rapidly given the limited capacities of the Afghan administration and the large number of actors involved. The various funding arrangements set up proved adequate to complete the project. The greater part of the project's cost corresponds to the services provided by GERES.

The technical improvements carried out are for the most part simple ones: wall and roof insulation, double-walling in some cases, and double-glazing. Nearly 50 on-site practical training courses involving 750 trainees were held. A total of 250 architects, engineers and students attended 20-odd lectures given by the project team. The subject, however, has not been fully covered and the question is now raised of ensuring a more sustainable relay incorporating insulation improvement techniques into a training centre for building industry professionals.

A first step has been successfully taken with the adoption of standard designs for schools and health centres. This is a very important step given the building programmes that are still to be implemented: at least 1,000 schools a year and 150 health centres over the next three years. Several problems still have to be solved: The standard designs are valid for the entire territory but the insulation systems need to be designed to suit different climatic regions. The proposed improvements are not necessarily optimal and the whole needs to be reviewed at some point, at the same time integrating the latest available data on seismic risks and rectifying the many defects of the first buildings that were erected in a context of urgency. The question remains as to whether all the donors will comply with the designs prepared by the Afghan ministries remains open, with two thirds of the aid transiting outside state channels.

The project worked with the Afghan company, Yarash-Huma, which began manufacturing polystyrene locally in 2005. It supplies 30% to 40% of a local market representing 5,000m³/year and growing by 1,000–1,200m³/year. The company is also present on the PVC window market, most of which is held by four main companies. The project has directly helped to introduce a German external insulation technique (STO) into Afghanistan.

The question of the energy efficiency of heating equipment is as important as that of the thermal insulation of buildings. The traditional Afghan *bukhari* (wood stove), which is the most widely used apparatus, is highly inefficient as it results in an energy loss of 75%. An alternative model of gas-fired stove was selected and tested, and appears to be well-adapted to the health centres. Extending its use to households, however, seems to pose problems of cost and initial training.

With respect to the project's environmental and social impact, a theoretical approach shows that for a comfort level at an indoor temperature of 18°C, energy needs in partially-insulated buildings could be reduced by 50% – 70% if insulation were reinforced. Theoretically, improved buildings

would enable a reduction of 18,000 tonnes CO₂/year, the initial objective being 3,933 tonnes CO₂/year.

This scenario is far removed from reality. Apart from improved army buildings, the comfort levels in Afghan public buildings are particularly low in winter with indoor temperatures ranging from 5°C to 15°C. Schools are not heated and remain closed during the three coldest months of the year. The real impact of partial insulation is not therefore a reduction in fuel consumption but improved comfort levels in the classrooms, with temperatures 2°C to 5°C higher in winter, and a cooler environment in summer. In the health centres and improved buildings, the budget earmarked for heating is not sufficient to ensure an indoor temperature of 18°C. For a constant heating budget, the improved level of comfort would be between 5°C to 10°C in winter.

This approach nonetheless remains fragile. Given the very high turnover of Afghan partners and donors, the knowledge acquired runs the risk of being rapidly lost. There is no engineering design office with the appropriate skills in energy-efficiency present in Afghanistan, and the technical directorates of the ministries, notably the Ministry of Public Health, do not have sufficient staff to address alone the issue of improving the thermal efficiency of buildings. As the donors are massively present in the renewable energies sector, it would be a pity if the accumulated know-how were to be lost. Reallocating the residual funds from the FGEF should make it possible to prolong the current actions. During this extension period, emphasis should be laid more on strengthening the capacities of the administration to control its own projects and communication materials, particularly in the Ministry of Public Health, rather than on constructing new buildings.

The project aims to improve the energy efficiency of public buildings by firstly working on new or rehabilitated buildings, then by validating building standards and diffusing knowledge to professionals. Several Afghan contacts have underlined the interest of this approach. According to them, if the project had started by addressing building standards, this

would have been doomed to failure, as the Afghans would have seen only the constraints involved without perceiving any concrete advantages.

In fragile situations, as in the case of Afghanistan, this observation means preferably recommending: simple projects that do not involve multiple objectives or seek to solve all of the dysfunctional aspects of the sector or structure in which they intervene; projects that limit the number of institutional components—choosing only those that guarantee sustainable results—and avoid linkage to a set of requirements and conditionalities, especially if these involve several local authorities; and finally, projects that have a satisfactory level of technical and financial resilience once external finance comes to an end, or should the context deteriorate.

At the outset, the project focused on the education and health sectors, a choice that was and still is relevant. However, opportunities arose for interventions on extensive areas in a new sector: army dormitories. As the aim of the project was to improve the energy efficiency of public buildings, the project was successfully adapted.

Thus, in fragile States, it is important to: define a line of action centred on an overall objective, with alternative scenarios to hand depending on how the situation develops, particularly in terms of security; select dependable partners and ensure much closer outside monitoring than for standard operations; have an *ad hoc* committee able to make quick decisions on any realignments that may be necessary due to a changing context, while still keeping in line with the project's overall goal.

To conclude, in addition to the lessons learned and recommendations expressed, the evaluator wishes to emphasise that this project ran smoothly, with a great deal of work being carried out by the project team and professionals involved in a context that was increasingly difficult from the security point of view.

Today, the real challenge is to strengthen the appropriation of the approach engaged with the ministries, and to train professionals. The project's sustainability depends on the ability of the government to address the roots of the insurgency and bring to the population the dividends of peace.

Introduction

This ex-post evaluation concerns the project aimed at diffusing good energy efficiency practices in the construction of public buildings in the education and health sectors in Afghanistan. The project was supported by the French Global Environment Facility (FGEF), in response to a request by the French Ministry of Foreign and European Affairs (MAEE), through a €1.35 million subsidy, granted on 27th October 2004.

This is the last in a series of evaluations, commissioned from the FGEF by the *Agence Française de Développement* (AFD), on energy efficiency in the construction sector in the Lebanon,¹ Tunisia² and China,³ and which led to the production of a first synthesis document⁴ in September 2008.

This project cannot be considered outside of the highly specific socio-political context in which it has been implemented.

Afghanistan is a country in crisis but it is also on a development path, in a very complex situation that varies from region to region, as well as having considerable differences within each region. Security conditions have greatly deteriorated since 2006.

The evaluation mission visited Afghanistan from 5th to 14th February 2009. Field visits were limited to project operations in Kabul and the capital's immediate surroundings due to the prevailing security and climate conditions.

The evaluator would like to extend his warm thanks to all the people he met, partners and beneficiaries alike, for their support within the framework of this mission, and particularly the project team, their Afghan partners and the French Embassy for their full collaboration and availability in a difficult context.

1 Ries, A. (2007), *Efficacité énergétique dans la construction au Liban*, Ex Post, Série Evaluation et capitalisation n° 3, Agence Française de Développement, Paris.

2 Guillaumie, K. and Ries, A. (2008), *Efficacité énergétique dans la construction en Tunisie*, Ex Post, Série Evaluation et capitalisation, n° 8, Agence Française de Développement, Paris.

3 Ries, A. and Szynekier, D. (2008), *Efficacité énergétique dans la construction en Chine*, Ex Post, Série Evaluation et capitalisation, n° 17, Agence Française de Développement, Paris.

4 Ries, A. and Szynekier, D. (2008), *Améliorer la qualité énergétique des bâtiments : les leçons de quatre programmes FFEM en Chine, au Liban et en Tunisie*, Ex Post, Série Evaluation et capitalisation, n° 19, Agence Française de Développement, Paris.

1. Presentation of the project and relevance to the intervention context

1.1 Objectives and succinct description of the project

The project aims to improve energy efficiency and limit energy consumption in public buildings in the sectors of health and education that fall under large-scale construction programmes financed by international assistance.

It follows on from a first programme carried out by the *Groupe énergies renouvelables, environnement et solidarités* (GERES) with finance from the French MAEE, which showed that energy consumption for heating in cold regions could be reduced by up to 70% by implementing bioclimatic techniques and improving thermal insulation in buildings such as health centres and schools.

The project includes the following components.

1. Constructing 100 public buildings in Afghanistan's cold rural zones, in partnership with the Ministry of Public Health (MoPH) and the Ministry of Education (MoE), mostly new buildings, as well as some renovations in the health sector. Based on these interventions, the project aims to define building standards that will serve as construction guidelines in cold regions for the Ministries of Public Health and Education.
2. Developing the local production of building materials (insulating materials, double-glazed windows) and efficient heating equipment.
3. Developing operational skills (architects, engineers, technical heads in public administrations).
4. Integrating energy issues into sector policies (health and education) and developing the bases of an energy management policy.
5. Coordinating, steering and evaluation.

The logical framework of the project is reported in Annex 1.

FGEF support involves a €1.35 million subsidy for a construction programme totalling €11.76 million (of which about €1.22 million is for energy efficiency). The funding decision was taken by the FGEF Steering Committee on 27th October 2004.

Project implementation was planned as follows:

- NEPA (National Environmental Protection Agency) is the main partner together with the Ministries of Public Health, Education, and Energy and Water;
- the implementing agency is the *Agence de l'environnement et de la maîtrise de l'énergie* (ADEME) in France, with support from GERES, the NGO that initiated the project;
- a Supervisory Committee comprises the Afghan ministries concerned (Environment, Energy and Water; Public Health, and Education), the donors involved, the French MAEE and the French Embassy through the SCAC (*Service de la coopération et de l'action culturelle*), as well as the FGEF. It reviews the activity reports and proposals presented by ADEME and GERES.

The project is included in the Afghan, French and German Energy Initiative (AFGEI), signed in Kabul on 14th May 2004 and incorporated into the international action programme published following the June 2004 Bonn conference. The FGEF project represents the main French contribution to the AFGEI. Cooperation opportunities were identified with the German Technical Cooperation (GTZ) for project implementation.

1.2 Relevance and coherence of the project with respect to the contextual elements

To evaluate the relevance⁵ and external coherence⁶ of the project, it is necessary to place the project in its broad local context (political, social, energy...), and also assess it in the light of both the international aid given to Afghanistan following the downfall of the Taliban regime in 2001 and the different modes of donor intervention in the country.

1.2.1. Political reconstruction well-anchored after the 2001 fall of the Taliban but a new upsurge of insecurity since 2006

Today, the dynamics in Afghanistan are inseparable from international intervention that began in late 2001.

After 20 years of crisis—the last episode of which was the arrival of the Taliban regime in 1997 and then its demise in 2001—the country is now in a disastrous situation both socially (education, health...) and institutionally (State, government, judicial and financial systems) and its infrastructures, built during the Soviet occupation, have for the most part been destroyed.

The political reconstruction process was determined by the Bonn-Petersburg agreement of 5th December 2001, which defined a number of objectives in order to re-establish permanent state institutions and to set up provisional arrangements during an interim period.

- The appointment of an interim government as of 22nd December 2001 and the creation of the International Security Assistance Force (ISAF) to assist in the maintenance of security in Kabul and its surrounding areas. The mandate of the ISAF, today headed by NATO (North Atlantic Treaty Organisation), was subsequently extended to the whole of the territory except for the provinces under the control of the “Operation Enduring Freedom” force,⁷ and finally in 2006 to the entire country.
- The convening of an assembly (*Loya Jirga*), which crafted the Afghan Constitution adopted at the beginning of 2004.

- The setting up of a transitional authority to be in power until the election of a representative government. Presidential elections were organised and held in conditions deemed successful by the international community. These resulted in the election of President⁸ Karzai in October 2004. The Afghan Parliament was set up in September 2005 and a new government formed, bringing the transition period to an end. The year 2009 is due to witness three major political events: the presidential election and regional elections in August, followed by the appointment of a new government and a renewal of parliament.

The promoters of the energy efficiency project successfully seized the window of opportunity that arose during the changing political situation. A first pilot operation was implemented between September 2002 and the end of 2003. Based on the results, a more ambitious project was studied and submitted to the FGEF, which approved it in October 2004.

Following this generally favourable period, tensions have again heightened since 2006, aggravated by spreading insecurity, corruption,⁹ a surge in heroin production and trafficking,¹⁰ continued glaring inequalities within the population,

5 The extent to which the objectives of a development intervention are consistent with beneficiaries' requirements, country needs, global priorities and partners' and donors' policies.

6 This should be looked at through the “3Cs”: coherence with national policies; complementarities with the other interventions within the context; coordination with the other actors in the context of the intervention.

7 Force headed by the United States to fight against international terrorism.

8 The President is both Head of State and of Government.

9 In 2005, the organisation Transparency International ranked Afghanistan in 117th position (out of 158) in its Corruption Perceptions Index, with a score of 2.5/10. Since then, the situation has sharply declined: in 2008, Afghanistan was ranked 176th out of 180 countries with a score of 1.5/10, behind Chad and Guinea, and in front of only Haiti, Iraq, Myanmar and Somalia.

10 Afghanistan now produces 92% of the world's supply. Opiate production may contribute to over a fifth of the country's real GDP and generate a currency flow of around US\$4 billion, which is more than foreign aid (US\$3 billion).

which to varying degrees fosters the resurgence of the armed, mainly Taliban-led opposition.

At the end of 2008, seven years after the fall of the Taliban, the situation is still far from stable¹¹ as security¹² is becoming increasingly less ensured across the whole country, particularly in the South and South-west provinces and some eastern regions. In reality, a whole swathe of Afghanistan escapes State authority and remains inaccessible to humanitarian organisations. These zones are under the control of the Taliban or warlords who refuse wholly or partly to recognise the central government's authority, or in some cases, of criminal gangs who are promoting opium poppy cultivation. These different groups have no interest in seeing the State's power consolidated.

It is in this context of deteriorating security and a certain growing disillusion within the population and the international community that the project was implemented. Whereas it was possible to roll out the first pilot operations across several regions, the latest programmes have been concentrated around Kabul.

1.2.2. National Development Strategy: humanitarian urgency for a medium- and long-term development programme

The international community established a framework for the reconstruction of Afghanistan at the Tokyo Conference held in January 2002. The main priorities decided on at this conference included security; state-building and financing state administration; education especially for girls; the health-care system; infrastructure (roads, electricity, telecommunications); rebuilding the economic system; notably by introducing a new national currency;¹³ agriculture, food security and rural development.

In line with the Tokyo Conference, the 2002 National Development Framework (NDF) designed a strategy designed to avoid a large-scale humanitarian crisis by meet-

ing the population's urgent needs, and defined the State's reconstruction effort.

In 2004, judging that the risk of a humanitarian crisis had been averted, the government began to focus on "Securing Afghanistan's Future" with regard to mid- and long-term priorities, through economic development driven by the private sector and fast enough to impact the population. This vision of development is what determines the role of the State: building and maintaining a secure environment that is functional and stable enough to foster private initiative and investment.

The obligations of the Afghan government, its detailed strategy and the programmes set up are defined in the Interim

11 The latest report from the International Crisis Group, in December 2008, describes the situation in the following terms: "Afghanistan is not lost but the signs are not good. Its growing insurgency reflects a collective failure to tackle the root causes of violence. Six years after the Taliban's ouster, the international community lacks a common diagnosis of what is needed to stabilise the country as well as a common set of objectives. [...] the price [of this situation] could be inordinately high, including: (i) a return to civil war, with factions divided along regional and ethnic lines; (ii) a narco-state with institutions controlled by multiple organised criminal gangs; (iii) a Pashtun-dominated south largely abandoned to lawlessness; and (iv) increased intervention by regional powers seeking to protect their interests."

12 The number of suicide attacks is increasing (6 in 2004, 21 in 2005, 141 in 2006 and 137 causing 1,730 victims in 2007), as well as remotely exploded bombings. Kidnappings of Westerners and Afghans for a ransom or an exchange of Taliban prisoners are more frequent, including inside the capital. The fact that a French businessman was taken hostage in June 2008, two workers of *Action contre la faim* (ACF) in July 2008, a worker of *Solidarité laïque* in November 2008, and that three members of humanitarian organisations were killed in August 2008 shows that foreign companies and NGOs have now become targets. The Taliban threatened UNCHR, UNOPS, WFP, IOM and Oxfam, in early February 2009. Three coordinated suicide attacks took place in Kabul during the evaluation mission, leaving 26 dead.

13 This operation was successfully carried out in October 2002. The new Afghani (AFN) replaced three previous circulating currencies, with an exchange rate initially fixed at AFN50 for US\$1. The AFN has remained generally stable against the US\$ because of international transfers and illegal income from opium sales. At the end of January 2009, the exchange rate was AFN47 for US\$1.

Afghanistan National Development Strategy (IANDS), which was approved at the London Conference in January 2006. The three major pillars of the IANDS are: security; governance and rule of law; and economic and social development. These three key components cover eight sectors of intervention, two of which involve security and governance and six translate into aspects of development: infrastructure and natural resources, education, health, agriculture and rural development, social protection, private sector growth. Five cross-cutting strategic priorities complete the overall strategy: gender, counter-narcotics, regional cooperation, environment and anti-corruption.

More recently, the Afghan government has presented the international community with the Afghanistan National Development Strategy (ANDS). This was adopted at the International Conference on Afghanistan held in Paris on 12th June 2008. The ANDS takes up the pillars, principles and milestones of the London Pact. It defines eight pillars for the country's economic and social development. Agriculture is at the top of the agenda ahead of security, education, governance and health. The last three pillars are the private sector, roads and infrastructure.

Energy efficiency in the construction sector, which is the goal of the FGEF-funded project, is embedded in the IANDS cross-cutting strategic priority for the environment. The sectors chosen for its application (health and education) form two of the eight pillars in the National Development Strategy that were high on the agenda the time of project appraisal and still are today.

1.2.3. International support: importance of financial commitments and difficulty of coordinating multiple actors

Donor intervention in Afghanistan has unfolded in two phases. In the wake of the war against the Taliban (2001-2004), international aid was focused primarily on humanitarian aid and security, but has since become more diversified.

Due to its LDC (Least Developed Countries) status and the ongoing war, Afghanistan¹⁴ receives support from many donors¹⁵ whose actions espouse the dual logic of economic and social development and support mechanism for the “war against terror” declared by the United States following the 9/11 attacks.

Few donors are absent from Afghanistan, which confirms the political importance that the international community attaches to eradicating the threat of Islamist terrorism and, as a corollary, to constructing a lasting peace in the country.

The international community pledged very substantial amounts of aid at four successive conferences:

Tokyo	(January 2002)	for	US\$5.2 billion
Berlin	(March 2004)	for	US\$8.2 billion
London	(January 2006)	for	US\$10.5 billion
Paris	(June 2008)	for	US\$20 billion

These commitments are mainly in the form of bilateral aid implemented via two different routes. The first uses government channels as earmarked budget aid. In this case the donors provide assistance as State budget support. This aid feeds the Afghanistan Reconstruction Trust Fund (ARTF),¹⁶ which finances both the operating expenditures of the Afghan administration and the national programmes.¹⁷ This fund is supervised by the World Bank in collaboration with 24 other donors. Aside from the World Bank, the main contributors are the British DFID and the Canadians.

14 This information is taken from an internal note of the *Agence Française de Développement* (AFD) dated October 2007. AFD has been authorised to intervene in Afghanistan since 2004.

15 In 2006, 31 official development assistance (ODA) donors were listed as active in Afghanistan; 89% of ODA was provided by 21 of them.

16 The first fund set up by the international community for a country in a fragile situation.

17 The community-based national solidarity programme, improved road access for rural areas, micro-finance, capacity building and infrastructure.

The second route bypasses state channels and their regulatory procedures: the donors implement their projects themselves or contract out to UN agencies (UNOPS), the IOM (International Organization for Migration) or NGOs. This channel is very frequently used¹⁸ by USAID (United States Agency for International Development) and the UN (UNHCR, UNICEF, FAO, etc.).

As a result:

- there is a poor level of coordination of international aid,¹⁹
- implementation is a delicate matter given the lack of capacity of contracting authorities,²⁰
- programming aid is difficult in terms of time and geography.²¹

The disbursement of aid reached an accumulated total of US\$14.3 billion,²² from March 2002 to March 2007,²³ according to the Afghan Ministry of Finance (MoF). The United States accounts for nearly half this amount, followed by the European Commission, Japan and the United Kingdom (with a little over 10% each), the World Bank (9%) and Germany (8%). Net ODA disbursements from France represent US\$80 million over this same period (0.55% of the total).

At the sectoral level, between 2004 and 2006, security absorbed one-third of international aid; infrastructure and natural resources 28%; governance, the rule of law and human rights 12%; education and vocational training 4.1%; and health 3.8%.

The project is positioned in a highly specialised niche that should enhance the quality of the reconstruction programme in two key sectors and ultimately improve the population's living conditions. This positioning is adapted to the financial resources available for the FGEF project.

Efforts were made by the project to develop joint actions with the key contributors to the education and health sectors.

1.2.4. Climate and energy context: harsh winters at high altitudes and imported energy

Afghanistan has three main climate zones (cf. Appendix 2):

- a mountain climate, cold in winter and temperate in summer (-5°C ; 20°C), where about 5 million inhabitants live (zone 1),
- a continental climate with sharp summer/winter variation, where most of the population lives (16 million inhabitants), and prone to strong climate constraints: the temperature averages 2°C from November through March with temperatures of up to 35°C in summer, for regions at an altitude of between 1,500m and 2,500m (zone 2).
- a mild climate in winter and very hot in summer in the south of the country and in the peripheral plains (Jalalabad...) with temperatures ranging from 5°C to 35°C (zone 3).

Figure 1. Climate map of Afghanistan



18 Between 2001 and 2004, more than 2,535 projects were initiated on this basis. On average, technical assistance accounted for 50% of their cost.

19 It is estimated that two-thirds of international aid is not routed through State channels. The government has little or no information on external aid.

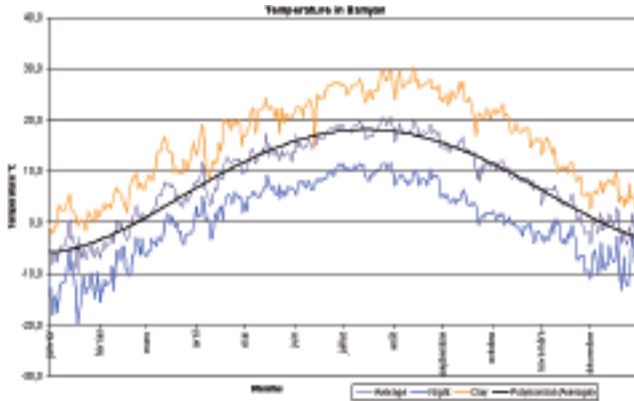
20 According to the OECD, almost half of the projects could not be undertaken because of these difficulties.

21 Afghan authorities have information on barely 52% of the donors' ODA (whatever the delivery channels used).

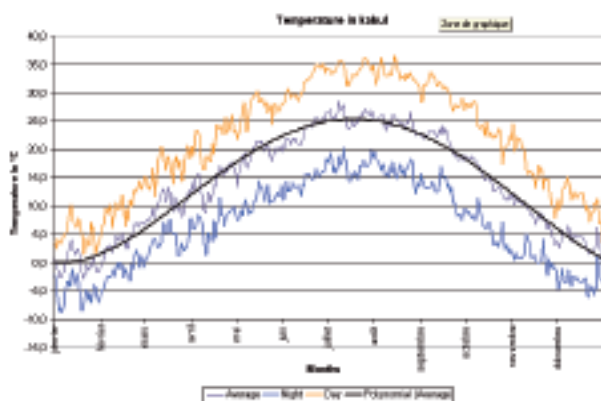
22 Over this period, the United States has engaged about US\$130 billion on military spending in Afghanistan.

23 The Afghan fiscal year begins on 21 March. The year running between 21 March 2008 and 20 March 2009 is the year 1387.

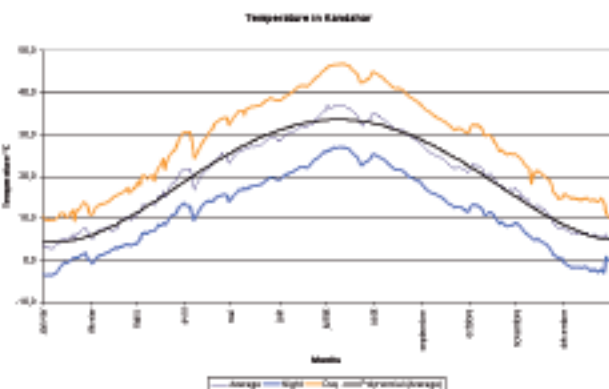
Graph 1. Zone 1 Temperature Range



Graph 2. Zone 2 Temperature Range



Graph 3. Zone 3 Temperature Range



Source: Kabul weather station data; GERES.

Wood is one of the main sources of energy for the country. However, Afghanistan's forest cover has shrunk considerably. In the nineteenth century, the centre, north and east of the country were forested, whereas today the forest covers less than 4.5% of the territory (30,000km², mostly in the east).

Given this situation, imported oil is increasingly used in towns for heating non-residential buildings, particularly in the health sector (at least one quarter of health establishments use petroleum products).

Coal is also used in Afghanistan. Reaching over 1 million tonnes a year in the late 70s, coal production dropped to 50,000 tonnes a year in the early 2000s. Production has been stepped up again since 2005 (308,000 tonnes exported in 2007/2008).

According to a recent study,²⁴ two-thirds of natural gas reserves and three-quarters of petroleum reserves have already been extracted.²⁵

Energy represents a substantial share of urban household expenditure. The share of energy in family budgets is around 10% to 25% (€120 to €350 per year) for households in the middle-income band.

In the Health Centres in cold zones, the cost of energy can reach up to 25% of the operating budget excluding salaries.²⁶ It is, moreover, the only expenditure item on which possible cost-savings can be made.

In schools, the rhythm of attendance is strongly affected by the climatic conditions. In winter, schools are closed from the end of December until the end of March.

24 S. Blank (August 2006), "Afghanistan Energy Future", EurasiaNet.org. Afghanistan's natural resources also include gold, precious stones and copper. A first agreement has been concluded with a Chinese company to exploit the Aynak copper field. Media reports estimate that this could generate revenues of up to US\$400 million for the Afghan State, which is on a par with total government revenue for 2007.

25 The potential exploitable reserves include up to 62m3 billion of natural gas and 14.5 million tonnes of petroleum reserves.

26 ADEME-GERES study, December 2003.

As the Afghan government's own resources are very constrained, the efforts for cost savings on operating expenses for buildings or—at least in an initial phase—a higher comfort level for an equivalent outlay make sense in the perspective of the country's sustainable development.

1.2.5. Two big issues for the population: access to basic social services and job creation

With a *per capita* revenue of US\$300 in 2005 (excluding income from opium), Afghanistan ranks amongst the poorest countries in the world and in 174th place in the Human Development Index (HDI).²⁷

Surveys carried out in 2004²⁸ show that the average life expectancy of the 31 million Afghans is only 43 years. More than half of the population lives under the poverty threshold.

Afghanistan has one of the lowest literacy rates in the world. More than 11 million children under the age of fifteen can neither read nor write. In rural areas, where three-quarters of Afghans live, 90% of women and 60% of men are illiterate. Under the Taliban regime, girls were not allowed to go to school. The implications of this situation are present in all areas of life. As a result, most judges and government officials have a level of education that does not go beyond secondary school.

The construction of schools and the recruitment and training of primary and secondary school teachers has been a real government priority, and resulted in about 6 million pupils being enrolled in March 2008,²⁹ compared with 900,000 in 2001. The number of secondary school teachers has risen from 21,000 in 2001 to 143,000 in March 2007. Today there are 8,400 schools across the country, 5,000 of which have been built since 2001. In total, 21 million school-books have been distributed.³⁰

The health situation remains precarious although there have been improvements (80% of the population apparently

now have access to basic health care). Potable water and electricity are accessible to 31% and 6% of the population respectively.

Population growth³¹ is high and the working population is increasing by 3% a year. There are almost as many economically-active individuals as under-fifteen-year-olds. An annual 9% growth is necessary to reach the objectives of the National Development Strategy and the Millennium Development Goals for 2020. Added to this is the return of some 3.8 million refugees, nearly half of whom are under 18 years old and, for the most part, have no qualifications.

Competition between donors impacts the level of salaries for managerial staff, which are two to three times higher than in Pakistan or Iran. Competition for harvesting the opium poppy crop (April to June) leads to a rise in the wages of casual agricultural labourers. Wages increased from US\$7.7 in 2006 to US\$10 in 2007, and even up to US\$15 in Helmand Province, according to the United Nations Office on Drugs and Crime (UNODC).

Apart from agriculture, construction is the only sector able to generate sufficient employment. The need for infrastructure in the city of Kabul is huge (60% of roads are damaged, 5% of households have electricity, 5% are connected to a sewer system) and municipal revenues are very low

27 The 2007 Human Development Report published by the United Nations Development Programme (UNDP) estimates a HDI of 0.345 for 2005. The 2004 Report showed an equivalent HDI (0.346) for the year 2002. Afghanistan's HDI is not only very low overall, but also compared with other countries in the sub-region: Pakistan (0.539), Tajikistan (0.652), Uzbekistan (0.696), Turkmenistan (0.724), Iran (0.746) and China (0.768).

28 World Bank (2005), *Afghanistan Poverty, Vulnerability and Social Protection: an Initial Assessment*.

29 This involves a real fight. In 2006, the Taliban killed 85 teachers and school-children, and burnt 187 schools. A total of 350 other schools have had to close in the south of the country after receiving threats. In 2007, 600 schools were closed because of insecurity which meant 300,000 school-children had to stay home.

30 Ministry of Education National Education Strategy, 1385-1389. *Towards Equal Access to Quality Education for All*.

31 Cf. *Afghanistan: situation économique et perspectives*, internal note of the AFD, J.R. Chaponnière (update: December 2008).

(US\$5/inhabitant). The Government is planning to build a new city to decongest Kabul. The construction of Deh Sabz city, with a capacity for 3 million inhabitants, would create 100,000 jobs a year, at the same time generating revenues for the State.

The project's objective of developing the use of locally produced materials is in line with the overriding need to create employment in Afghanistan.

1.3 Internal coherence of the project

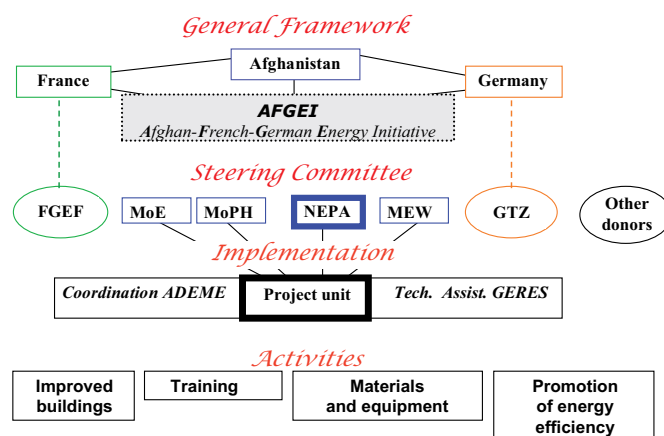
The question of the project's internal coherence³² refers to the adequate consideration of overall organisation and choice of actors with respect to the project's objectives.

1.3.1. Project design: concern about articulation with the Afghan ministries and the country's international partners

Graph 4 illustrates the overall organisation of the project.

- 1) The concern for closer collaboration with German cooperation present in Afghanistan in complementary areas of activity (mainly hydroelectricity and rural electrification) led to a cooperation agreement signed by the French and German Embassies with the Afghan Ministry of Energy and Water in May 2004. This agreement was crafted into a joint Afghan, French and German energy "initiative" (AFGEI), published within the framework of the international conference on energy efficiency and renewable energies held in Bonn in June 2004. The main lines of the FGEF project, which constitutes the French contribution to this agreement and the triangular initiative, were presented at this conference.
- 2) The setting up of a Steering Committee, which is co-chaired by a French Embassy representative and NEPA and includes representatives of the Afghan ministries involved in the project (Education, Energy and Water, and Public Health), GTZ, FGEF, ADEME and GERES. Scheduled to convene twice a year, the Committee has

Graph 4. Project Organisation



Source: the project's business plan

in fact met once a year, which has sufficed to ensure the smooth running of the project. After a first meeting on 22nd February 2006 with a limited number of participants, the Committee's attendance increased as the programme advanced. Representatives from the aid community (UNEP, IOM, UNOPS) and NGO partners (Caritas, Miséréor and TMF) were invited to the second meeting, held on 4th April 2007. The final Committee,³³ held on 16th April 2008 as a follow-on from a workshop in December 2007 on energy efficiency in Afghanistan,³⁴

³² Adequate consideration of means versus activities.

³³ A Steering Committee meeting was also held in Paris on 30th July 2008 at the MAEE on the occasion of a visit, organised by the project, of an Afghan delegation to France and Germany.

³⁴ Towards an Energy Efficiency Policy in Afghanistan.

brought together some thirty attendees, with the arrival of new Afghan ministries (Ministry of Reconstruction and Rural Development - MRRD, Ministry of Urban Development - MoUD) and international organisations (Asian Development Bank, World Bank, Japanese International Cooperation Agency-JICA, USAID).

This growing success shows that the project was successfully integrated into its environment, with the European Union and the British DFID being the only major cooperation agencies absent.

3) The project was placed under the supervision of NEPA. Focal Points were appointed in the Ministries of Education, Public Health, Energy and Water and, more recently, in the Ministry of Urban Development. Six meetings were held with all of the Focal Points. In the meantime, GERES met individually with all of the Focal Points. All of these contacts ensured that the project became firmly anchored within the Afghan administration.

1.3.2. Choice of actors: a specialist NGO that initiated the project and intervened within the framework of a convention with ADEME

GERES,³⁵ which developed its know-how mainly in the Indian Himalayas, started on a pilot project in September 2002³⁶ aimed at introducing energy efficiency and passive solar architecture into buildings, with financing from the French MAEE, in line with the French policy for the reconstruction of Afghanistan, and from ADEME.

A report on 8 buildings that had been constructed made it possible to raise the awareness of the Afghan authorities and to prepare a programme focused on public buildings. This report was presented by the MAEE with a view to obtaining finance for the programme from the FGEF.

Financing implementation was the purpose of an agreement signed by the AFD and ADEME in February 2006, for a

three-year period. This agreement relates to a framework agreement contracted between NEPA and the MAEE.

ADEME's role was primarily to draft and sign the agreements with the Afghan authorities to enable project start-up. It then signed and monitored, on an administrative and accounting level, the contracts required for implementing the project. ADEME's role in monitoring and generally coordinating the project was more limited. At the outset, it was planned that Paris-based project monitoring and support be entrusted to an ADEME official. However, as this was not possible, the role was given to GERES.

GERES was project operator within the framework of an agreement signed with ADEME. The project was managed by GERES' Kabul office, with support from the organisation's headquarters in Aubagne, France.

This arrangement, which functioned satisfactorily overall, raises three comments:

1) The number of NGOs in Afghanistan increased from around one hundred in 2001 to about 2,500 (1,000 foreign and 1,500 Afghan) in 2005. This number was reduced when a law regulating their activities was passed in 2005. It resulted in the exclusion of certain Afghan organisations that belonged more to the private sector, particularly in the area of public works, and the number of NGOs dropped to 1,600. The Afghan Government requires NGOs to align their interventions with the ANDS and regularly provide information on their activities. GERES is officially registered as an NGO in

35 GERES is a non-profit organisation created in 1976 just after the first oil crisis. Today, it has some hundred associates working on sustainable development programmes in 8 African and Asian countries. The organisation's budget (€2.5 million in 2007) is provided by French public support (MAEE, AFD, FGEF, ADEME, local government authorities), and international donors (foundations, firms, individuals).

36 A first identification mission was carried out a few months before the Taliban came to power. The idea of the project was thus put on standby and then reactivated to support the country's reconstruction process.

Afghanistan and reports as required to the Minister of Finance, which is responsible for overseeing the NGOs.

2) The NGOs present in Afghanistan have very different profiles both in terms of size (ranging from large international NGOs to the small NGOs specialised in Afghan issues) and objectives (humanitarian, developmental). GERES occupies a particular place in this landscape as it supports long-term actions rather than emergency relief efforts. Whereas some NGOs operate with little contact with the public sector, GERES prefers to work in

partnership and with the support of the authorities and, thus, appears to encounter fewer difficulties with the authorities than other NGOs.³⁷

3) This type of agreement mechanism had already been put to the test by the FGEF and ADEME for two other programmes in Lebanon and China. The project was able to benefit from the experience gained. ADEME's missions in Afghanistan have not been as frequent as planned due to the unavailability of its officers and security regulations.

³⁷ Regarding the difficulties encountered, see: "A study of NGO relations with Government and Communities in Afghanistan", November 2006. This study was carried out by ACBAR (Agency Coordinating Body for Afghanistan Relief), which groups together some hundred NGOs including Oxfam and Care.

2 Project implementation and effectiveness

This section will highlight the extent to which the objectives defined in the presentation note of 27th October 2004 at the FGEF Steering Committee have been achieved.

These objectives were subsequently developed in the business plan, the final draft of which is dated 3rd March 2006.

First of all the lessons learned prior to the project will be presented, followed by the implementation of the four parts of the project: extending energy-efficiency practices by improving buildings; training and local capacity-building; support for firms in the construction materials and energy equipment sector; and the promotion of energy efficiency.

2.1. Lessons learned prior to the project in Afghanistan

The bioclimatic buildings constructed by GERES with co-financing from the Ministry of Foreign Affairs³⁸ have provided a first fruitful experience in three key sectors: health (one hospital, four clinics), education (two schools and eighteen classrooms) and residential housing (a teachers' residence and two houses).

These buildings were constructed at altitudes ranging from 1,800m to 2,900m in the centre and north of the country.

The following techniques were implemented:

- thermal insulation (polystyrene in walls and roofs or straw in the walls),
- double-glazing,
- bioclimatic design (orientation, compactness of the building).

GERES provided specifically-adapted technical support to the partners responsible for construction (7 NGOs and GTZ): improving architectural concepts of bioclimatic features; drawing up detailed plans for energy efficiency aspects; ordering and supply monitoring for building materials; con-

trolling the production quality of local components (double-glazed windows...); on-site training for worksite supervisors; and additional monitoring of worksites.

For the most part, traditional Afghan construction techniques were used: walls made out of fired brick, stone, breezeblocks; one- and two-storey buildings.

Given the total absence of any reference designs for energy efficiency management in Afghanistan, the basic solutions implemented by GERES for this first experience have provided a sufficiently sound reference for a more ambitious project to be set up with FGEF financing.

³⁸ The programme also received support from the French *Conseil général des Bouches du Rhône* and *Caisse des dépôts et consignations* sponsorship fund.

2.2. Improvement of buildings

A summary table of operations leading to technical recommendations from GERES is reported in Appendix 3.

2.2.1. Quantitative objectives exceeded and a change in the initially targeted sectors

Since March 2005, 274 buildings representing 168,225m² have been improved, which is considerably higher than the initial objective of 100 buildings and 38,000m².

The sectors of intervention are, however, quite different from those originally planned:

- 1) The building market for the national army is large. GERES became involved following a request from an Afghan enterprise for help in drafting a suitable proposal for rehabilitation work on existing buildings. The successful completion of works gave real credibility to the FGEF project due to the surface area involved.

Table 1. Cost and surface area of the improved buildings

No.	Type of project	Number of projects	Total project cost (US\$)	Building areas (m ²)	Remarks
1	Schools	13	1,472,771	7,231	12 schools completed, last one 90% complete
2	Health centres	13	2,011,303	3,219	3 centres completed, 10 now under construction
3	Dormitories for the Afghan National Army (ANA)	236	about 18,000,000	151,254	All buildings completed
4	Demo buildings	3		348	
5	Military Academy	6	about 5,000,000	2,923	
6	Kabul Museum	1		1,683	
7	Training centres and Kabul University	2	1,400,000	3,25	
Total		274	26,411,303	168,225	

Source: GERES data.

Photo 1. Herat – ANA dormitories



Photo 2. Herat – before insulation, firewood



Photo 3. Caritas – Health Centre, Daykundi Province



Photo 4. The Amina Fadawi Kabul girls' school



2) GERES worked with more than 20 different partners (ministries, donors, NGOs, companies) on the pilot projects.

3) The range of projects is very broad, which reinforces the targeted goal of widespread extension of insulation techniques.

2.2.2. Extra costs financed largely by the project owners

The FGEF project had budgeted for an extra cost for insulation not exceeding 12%. This limit was respected.

Photo 5. TMF school at Istalif near Kabul



Table 2. Extra costs and financing

No.	Type of project	Total cost of project (US\$)	Insulation (US\$)	Extra cost %	FGEF subsidy (US\$)	Partners' financing	Time spent GERES (days)
1	Schools	1,472,771	93,173	6,3	40,077	54,602	613
2	Health centres	2,011,303	133,034	6,6	8,208	124,835	209
3	ANA dormitories	about 18,000,000	180	10	No subsidy	180	60
4	Demo buildings		133		35	98	225
5	Military Academy	about 5,000,000	about 88	1,8		88	50
6	Kabul Museum		10			10	60
7	Training centres and Kabul University	1,400,000	Included in the total cost			Total cost funded	16
Total		26,411,303	640,713		83,285	557,437	1,233

Source: GERES data.

Very few programmes received partial funding of extra costs from the FGEF.

Two reasons can explain this.

1) Funding the extra costs is only a secondary issue for large-scale national programmes financed by interna-

tional donors. The contracting process seemed so complex that they were dissuaded from calling on the FGEF, which is not the case for NGOs with more limited budgets.

2) The real value added of the programme lies in the provision of technical advice.

2.3. Definition of level of insulation by type of building

Because of the results of pilot operations, GERES defined the levels of insulation according to the type of building.

Table 3. Characteristics of treated buildings

Type of building	Heating	Comfort level	Number of insulated buildings	Construction cost US\$/m ²
School	No	Depends on outdoor climate conditions	15	150-250
National Army	Yes	18° C	237	350-500
Health centre	Partly heated	5 to 15° C	2	250-550

Source: GERES data.

Table 4. Type of insulation and costs

Type of insulation	Characteristics	Cost of insulation (US\$/m ²)
No insulation	<ul style="list-style-type: none"> • Flat concrete roof • Brick walls • Single glazing 	-
Partial insulation	<ul style="list-style-type: none"> • Roof insulation: 10cm polystyrene or glass wool • Brick walls • Double glazing 	6.8
Complete insulation at limited cost	<ul style="list-style-type: none"> • Roof insulation: 10cm polystyrene or glass wool • Wall insulation: 5 to 10cm polystyrene • Double glazing 	20.5
Complete insulation	<ul style="list-style-type: none"> • Roof insulation: 10cm polystyrene or glass wool • Wall insulation: 5 to 10cm polystyrene (STO Technique) • Double glazing 	46.4

Source: GERES data.

2.4. Training and local capacity building

Nearly 50 on-site practical training courses involving 750 participants were given.

250 architects, engineers and students took part in some twenty conferences given by the project team.

Photo 6. Roof insulation

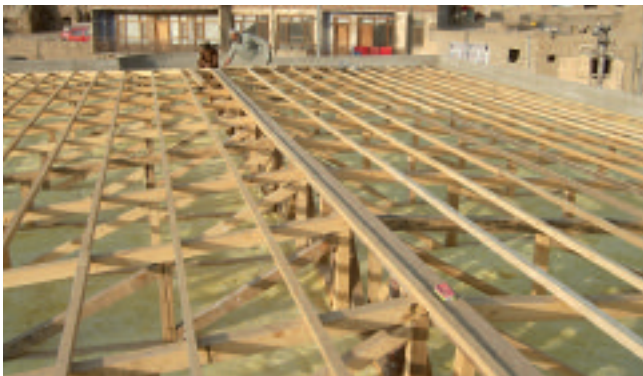


Photo 7. Double wall with polystyrene insulation



The list of these events and the training materials created is given in Appendix 4.

Photo 8. Training material

Roof Insulation (Polystyrene or Mud Straw)
عایق کاری نام (پولیسترین یا گاه گل)

Concrete Roof with Polystyrene

- 1. Insulation
- 2. 100mm concrete
- 3. 20mm screed
- 4. 20mm waterproofing
- 5. 20mm plaster
- 6. 20mm plaster

Polystyrene roof

1 skilled worker	23 Skw*
1 unskilled worker	17 Skw*

* For 1 skilled worker and 2 unskilled workers
* برای یک کارگر ماهر و دو کارگر ناماهر

Thermal Efficiency: ★★★ مؤثریت حرارتی: ۳ ستاره

Advantages مزایا:

- Efficient insulation
- Waterproof
- Easy to apply by spraying and via battage

Disadvantages معایب:

- Blows and wind may be blown into the building
- Training required
- Expensive products

Mud/Clay and Straw Roof

- 1. 100mm concrete
- 2. 20mm screed
- 3. 20mm waterproofing
- 4. 20mm plaster
- 5. 20mm plaster
- 6. 20mm plaster

Mud/Clay roof

2.5 Skw*	12.5 Skw*
1.5 Skw*	17.5 Skw*

* For 1 skilled worker and 2 unskilled workers
* برای یک کارگر ماهر و دو کارگر ناماهر

Thermal Efficiency: ★★★ مؤثریت حرارتی: ۳ ستاره

Advantages مزایا:

- Natural and local materials
- 100% local
- Easy to implement and maintain

Disadvantages معایب:

- Drying required
- Long hard work
- Long drying periods

Appropriate: 1500 Project Model Assessment (PMA) (P. 4/107)
Funded: Renewable Energy Environment and Technology Group (RETEG)
www.geei.org / @geeiandgreen.org

2.5. Promoting energy efficiency in the buildings

Energy efficiency has been promoted by presentations of the project in Kabul, France, Germany, Bangladesh, India and Nepal. Communication materials have been developed for these presentations.

Two demonstration buildings for energy efficiency techniques relating to renewable energies have been built in the framework of AFGEI with GTZ.

Unfortunately, following a bomb attack, a permanent exhibition erected on the site of the demonstration house in Kabul had to be demolished shortly before the date planned for its inauguration.

3. Efficiency

The question of efficiency refers overall to the way in which the project was implemented in order to achieve results. The analysis of efficiency concerns the time taken for implementation, the use of the financial resources available, more

qualitative aspects such as the coordination between the different partners and the project's synergy with its environment.

3.1. Conditions of implementation

3.1.1. Satisfactory appraisal and implementation times

The key dates for the project are reported in Table 4.

This table evidences the rapidity with which the project was appraised and implemented, particularly if account is taken of:

- the overall situation of the Afghan administration, which had the difficult job of reconstructing the country with very limited capacities,
- the fact that ADEME does not have a regular presence in Afghanistan,
- the multiple actors involved and thus the large number of agreements to be negotiated.

This rapid implementation is largely due to the experience gained on the previous project and GERES' capacity to maintain a local team without external funding³⁹ for over a year, between the end of the previous project and the signing of the FGEF financing agreement.

3.1.2. Difficult context: very high turnover of contacts and growing security problems

While there has been a succession of only four project leaders in GERES since 2002,⁴⁰ the turnover was particularly high among the project's key partners: ministries, donors, NGOs...

Among the contacts met by the evaluation mission, it was rare to find any that had been in service for more than two

Table 4. Project Schedule

26 March 2004	Project identification sheet
27 October 2004	Financing decision by the Steering Committee
19 June 2005	Signature of the Framework agreement by the French Embassy in Kabul and NEPA
22 June 2005	Signature of the Framework agreement by the French Embassy in Kabul and the Ministry of Education
15 November 2005	Signature of the Framework agreement by the French Embassy in Kabul and the Ministry of Public Health
15 February 2006	Signature of the financing agreement between AFD, on behalf of FGEF and ADEME
20 December 2006	Signature of the first agreement between ADEME and a NGO
3 July 2007	Signature of the first agreement for implementation of a framework agreement by ADEME and the Ministry of Public Health.
January 2009	Agreement to sign a rider to the financing agreement to extend the deadline for payment of funds to 30th June 2009

Source: FGEF data.

³⁹ Apart from a €20,000 subsidy from ADEME.

⁴⁰ This turnover is exceptionally high for GERES, which is used to intervening on long-term issues with stable local teams.

years. Most had been in their job for less than one year, which meant having to re-explain the project and re-deploy efforts.

On the other hand, the GERES Afghan team, after an initially high turn over, proved to be stable and of a high quality, which had a positive impact and justifies their now being entrusted with a greater degree of responsibility.

Security problems affect the possibilities of monitoring operations and mainly result in increasing limitations on the movements of expatriate officials (GERES and, to a lesser extent, ADEME). The cost of security measures also impacts of the intervention budget of the Kabul-based GERES team (security guards, chauffeur available 24h/24).

3.2. Project cost: savings on planned budget to finance extra costs

The funding granted has been sufficient to carry out the project successfully.

The budget for partial funding of extra costs for thermal improvements to the buildings, set at €200,000, was only used to the extent of €36,000.

Actions of support and training for enterprises were carried out locally with a modest but highly useful budget.

Most of the project's cost, amounting to €1,350,000, corresponds to services provided by GERES.

3.3. Mobilisation of actors

The project is organised in partnership with other donors and their programmes, particularly with GTZ, which is involved in the Afghan French German Energy Initiative. There is also cooperation with USAID, the World Bank, the ADB, the European Commission and various bilateral cooperation initiatives. The programme intervenes on real estate projects already planned by other donors. This is one of the programme's strong points, which makes it less isolated on the international scene than other FGEF energy efficiency programmes may have been.

The project is positively perceived by the Afghan partners within the ministries of Education and Public Health, as well as NEPA, as they appreciate that the project allows them to reinforce their capacities.

3.3.1. AFGEI: Afghan-Franco-German cooperation

This cooperation has been mentioned several times in the present report.

After difficult beginnings, involving misunderstandings between the various parties,⁴¹ collaboration improved and was appreciated in the end.

Starting as the result of political will with no real legal substance, the FGEF project embodied, on the French side, a political link desired by the German and French parties.

In June 2007, a common logo was adopted and training actions were carried out under this banner. GTZ and GERES

⁴¹ See the progress report No. 4, written by GERES.

worked together on various press articles and a joint quarterly newsletter, giving updates on the initiative, was published from October 2007 onwards.

Cooperation also involved the designs for a reference health centre, implemented by Caritas Germany.

A Renewable Energy Information Centre has been established in Taloquan.

A demonstration centre was built in Kabul on the site of the Department of Renewable Energy (DoRE) and inaugurated on 19th September 2006 by the Minister of Energy and Water and the French and German ambassadors. Its use, however, was discontinued in 2007 after three bombings in the vicinity.

Photo 9 : Training session on insulation techniques



3.3.2. Link with numerous partners: the need for “tailor-made”

As mentioned previously, multilateral and bilateral donors are present in Afghanistan. Coordination is difficult, as each donor tends to implement its own projects according to specific modalities. GERES thus had to make multiple contacts and tailor proposals to those who showed an interest in the project.

The cost of these proposals, which were tailored to meet the requirements of each of the donors, negatively impacted the overall efficiency of the FGEF project.

Photo 10 : External insulation (demo wall)



4. Sustainability

4.1. Technical sustainability: a recurring need for vocational training

In the main, the technical improvements carried out on the buildings are easy to implement: wall and roof insulation, double-walling in certain cases, and double-glazing.

These improvements mean that basic training will be required for the personnel of the construction companies that will have to carry them out, their contractors and the inspection bodies.

A great deal of attention has been given to the question of specific training within the framework of projects and the construction sites supported by the project.

The subject of training has not, however, been fully covered and the question is now raised of creating a more sustainable relay to incorporate insulation improvement techniques into a training centre for building professionals.

Lastly, construction materials are not always of good quality: windows that warp because they are made from insufficiently dried wood, and door handles and windows not sturdy enough for schools.

4.2. Building designs and standards: a pragmatic approach to be pursued

The project has a pragmatic approach: first, carry out concrete improvements in schools and health centres, and then move on to standard designs before envisaging a more in-depth modification of the regulations.⁴²

With support from the World Bank, which is the main donor in the sector, the Ministry of Education has drawn up some standard building designs for schools. These cover several sizes and foresee using different materials. The Ministry asked GERES to carry out insulation improvements on 10 classrooms, which then enabled recommendations to be made. These thermal recommendations have not been systematically integrated into the standard school designs.

At the level of the Ministry of Public Health, the two main donors are USAID and the European Union. The ministry does not have the resources to prepare the designs and depends on the donors to undertake this work. The concept of thermal

insulation was new when the FGEF project began. Today, standard designs exist for Basic Health Centres (BHCs) and Comprehensive Health Centres (CHCs) but not for hospitals. The available designs have been drawn up to incorporate details on thermal insulation. It was difficult to convince the Ministry of Finance to integrate the extra costs into the budgets earmarked for the CHCs, but this is now the case.

A first step has been successfully completed. This is very important given the building programmes that are to be carried out in the coming years. The objective of the Ministry of Education is to build at least 1,000 schools a year, over the next three years, while the Ministry of Public Health is planning to build 120 BHCs, 30 CHCs and 32 hospitals, without counting other buildings.

⁴² Afghanistan does not have a Building Code and applies measures proposed by the donors.

However, several problems are outstanding:

- 1) The standard designs are valid for the entire territory even though there is a need for different systems depending on the climate zones.
- 2) The proposed improvements have been drawn up under the implicit constraint of not causing any modification to the structure of a building. If this had not been the case, the modified designs would have had to be approved again by the Ministry of Urban Development, which would have entailed timeframes scarcely compatible with the duration of the FGEF project. The recommendations are therefore not necessarily optimal and all of them will need to be reviewed.
- 3) The standard building designs must be improved in order to integrate the latest data available on the seismic risk⁴³ and rectify the many defects in the first buildings, which were erected in an urgent context.
- 4) One question remains open: knowing whether all the donors will adhere to the designs drawn up by the Afghan ministries.
- 5) Producing standard designs with quantitative parameters only makes sense if their implementation is supervised at work-site level. Training supervisors is not an adequate solution, given that the country has a very high rate of corruption.

4.3 International commitments: large amounts for renewable energies and lesser sums for energy efficiency

Besides the German commitments to small hydraulic systems and rural electrification based on renewable energies, several large-scale programmes have emerged.

Following the US presidential elections, USAID may engage a Clean Energy Program representing US\$100 million over five years. In close collaboration with the Germans, this programme aims to electrify 1,200 remote villages, using mini and micro hydro systems.

The Asian Development Bank is also very present in the energy sector, with a US\$570 million project of which US\$10 million is for technical support. It also has a certain leadership position among the donors and supports a forum for donors and the Government (the Interministerial Commission for Energy - ICE).

The World Bank is increasingly present in the area of energy efficiency in large buildings and the electricity sector. Two issue notes have been produced and a study on alternatives to energy consumption is due to start.

Units specialised in energy efficiency are planned within the MEW and the NEPA.

⁴³ The Americans are working on this question. The seismic risk in Afghanistan was mapped in 2007 by the USGS (United States Geological Survey) at the request of USAID. This map is available on the Internet at: <http://www.usgs.gov/of/2007/1137>.

4.4. Beyond technical and economic aspects: more general political challenges

Today Afghanistan stands at a crossroads.

On the one hand, the Paris Conference of June 2008 saw the confirmation of a massive financial commitment from the donor community, even though the amount appears modest compared to the cost of military interventions. The will to improve donor coordination is once again affirmed and seems better managed on the ground, in the view of the evaluation mission. In the sector of public building construction, the donors are showing a real concern to do better by learning lessons from the shortcomings of the first projects and by better integrating the seismic aspect, which is a major issue. The capacities of local firms are improving.

On the other hand, the high turnover of personnel makes it difficult to firmly build a long-term strategy. Insecurity is pushing up costs and blocking projects, and there is a risk of returning to a period of increased instability.

More broadly, the sustainability of the project will depend on the capacity of the Afghan State to address the roots of the insurgency, to develop a model of State adapted to the country's history, to fight corruption and change the living conditions of the population (job creation, education, health).

Photo 11 : First workshop on Energy Efficiency Strategy in Afghanistan (Dec 2007)



5. Impacts

5.1. Local production of high-performing energy materials and equipment

5.1.1. Growth of the insulation market: local production of polystyrene and the STO technique

In Afghanistan, when the project began, none of the basic components for energy management in construction were produced locally. Insulation materials were imported from Pakistan (expanded polystyrene) at relatively high prices: 5cm-thick foam sheets priced at US\$1.5/m² on departure from Lahore cost US\$3.6/m² on arrival in Kabul.

The project had thus planned to support the creation of at least one local production unit for insulation products.

Technology and know-how transfer was to be carried out in cooperation with GTZ, which supported the Afghan Investment Support Agency (AISA) in its efforts to foster national and foreign investment.

This aspect of the project was designed to make it easier for companies to access indispensable components, and to help to substantially reduce the additional investment costs required, thus rendering energy efficiency more profitable and more attractive.

The project established a partnership with the Afghan firm, Yarash-Huma,⁴⁴ which began manufacturing polystyrene locally in 2005, first on a second-hand machine purchased in China and subsequently on a new Iranian machine. The raw material is imported from South Korea. Yarush-Huma is still the only polystyrene manufacturer in Afghanistan, and holds between 30% and 40% of the local market, estimated at 5,000 m³/year, and growing since 2005 by 1,000 to 1,200 m³/year. The setting up of this firm's production has helped to heighten competitiveness on the Afghan polystyrene market.

The company is also present on the PVC window market, most of which is held by four main companies.

The FGEF project has directly helped introduce the German external insulation technique (STO) into Afghanistan by proposing this solution for the ANA buildings.

5.1.2. Energy equipment: ambitions not fully achieved

The question of the energy efficiency of equipment is as important as that of the thermal insulation of buildings.

Almost all the heating in non-residential buildings and urban housing is provided by locally-produced stoves that burn wood, charcoal, kerosene or cow dung. The most widely-used stove is the traditional Afghan *bukhari* woodstove which being made of cast iron has very low inertia. Its efficiency is very poor as 75% of energy produced is lost.

The project had planned to identify possible improvements, conduct benchmark tests with a Kabul university and promote the commercialisation of a range of improved stoves, either manufactured locally or imported from neighbouring countries.

A first mission in April 2007,⁴⁵ carried out within the framework of the project, was able to identify the heating equipment used in Afghanistan and draw up an action plan.

⁴⁴ This firm was created in 2002 as a joint venture with a Turkish company.

⁴⁵ J.F. Rozis (March 2007) Definition of strategy for improving heating equipments offer in public buildings in Afghanistan.

Twelve types of stoves were studied and categorised, the Delonghi gas stove offering the best perspectives. It was then decided to test it in a laboratory and subsequently with some ten users.

The report produced after this trial phase in March 2008⁴⁶ revealed that gas is less expensive than wood, for a reasonable level of consumption, and that gas stoves are cleaner

than the wood-fired *bukharis*. The gas stove would seem to be primarily suited to health centres. Outside of the non-residential sector covered by the project, distributing gas stoves to households would pose the problem of prior training, as gas stoves need to be serviced regularly. Moreover, the poor quality of available gas causes untimely stoppages. Lastly, its cost means that it is relatively unaffordable for households.

5.2. Environmental, economic and social impacts

A first impact study, full of common sense, was carried out on the project, and due to be completed by temperature measures on several buildings. As the results of this measuring initiative were not available at the time of the present evaluation, the results of the impact study are presented.⁴⁷

building for the same indoor temperature of 18°C throughout all rooms during the daytime.

This gives the following results, with the alternative being fuel wood heating:

5.2.1. Theoretical results: a 50-to-70% reduction in energy requirements

The theoretical approach involves measuring the differences between an improved building and a non-improved

In the coldest climate zone (1): See Table 5

Table 5. Theoretical impact of insulation in climate zone 1

18° C	Heating requirements Kwh/m ² /year	Reduction in CO ₂ emissions	Payback time (years)
New partly insulated building	95	77%	Less than a year
New building with reinforced insulation	60	49%	2 to 3 years

Source: GERES data.

In intermediate climate zone (2): See Table 6

Table 6. Theoretical impact of insulation in climate zone 2

18° C	Heating requirements Kwh/m ² /year	Reduction in CO ₂ emissions	Payback time (years)
New partly insulated building	65	70%	Less than a year
New building with reinforced insulation	40	48%	3 to 4 years

Source: GERES data.

⁴⁶ Simon Biney (March 2008), *Improvement of heating equipment supply in Public Buildings in Afghanistan*.

⁴⁷ Mathieu Faureau (2008), *FFEM Project-Indicators Report*.

To conclude, with a comfort level corresponding to an indoor temperature of 18°C:

- 1) Partly insulated buildings can reduce CO₂ emissions by 50%.
- 2) Buildings with reinforced insulation can reduce CO₂ emissions by 70%.
- 3) Theoretically, savings on improved buildings within the FGEF project amount to 18,000 tonnes of CO₂/year. The FGEF's objective was 3,933 tonnes of CO₂/year.
- 4) In all of the cases, the payback time is less than 4 years.

5.2.2. Results observed in the field: short-run comfort gains

The real situation is very far-removed from the reference scenario used in the above-described theoretical calculation. In fact:

- 1) Schools are closed during the coldest period of the year (January to March) and are not heated for the rest of the year. As shown by a pilot project carried out in 10 schools at the request of the MoE, the use of reinforced insulation is not justified.

- 2) Buildings are never heated throughout; only certain rooms are heated.
- 3) In health centres, the heating budget is never sufficient to obtain an indoor temperature of 18°C, including the improved buildings. Thus, it is necessary to examine, for a constant budget, what comfort improvement is possible.
- 4) As five summer months can be very hot in the climate zones 2 and 3, the need for summer comfort should not be forgotten and thus integrated into the recommendations (orientation of the building with respect to the sun, natural ventilation, and bioclimatic architecture on a broader level).
- 5) The comfort levels of Afghan public buildings are particularly low in winter with indoor temperatures of between 5 and 15°C. The ANA buildings are an exception with a temperature of 18°C in improved buildings.

In these conditions, the actual impacts of the project are as follows in Table 7:

Table 7: Realistic impacts of the FGEF project

Type of building	Heating	Recommended insulation	Cost of insulation US\$/m ²	Payback time	CO ₂ savings	Comfort gain
Schools	No	Partial	6.8	None	None	2 to 5° C more in winter and cooler in summer
Health centres	Partial	Reinforced	20.5	None	None	5 to 10° C more in winter and cooler in summer
ANA	Yes	Reinforced	20.5	3 years	70%	Constant 18°C

Source: GERES data.

6. Lessons learned and recommendations

This part of the evaluation aims to highlight not only the lessons learned and recommendations specific to this pro-

ject, but also those that are more generally applicable to projects implemented in fragile situations.

6.1. Project-specific lessons learned and recommendations

For any project of limited duration, it is vital that the developed know-how be capitalised and distributed to the appropriate levels.

This work is being undertaken by GERES. Yet, this initiative needs to go beyond what is currently planned: thinking needs to be undertaken on the different target publics (donors, project owners, entrepreneurs) and communication tools tailored to each public need to be developed.

It would be helpful for a communication expert to examine this side of the work.

6.1.1. Need to continue the dynamic of energy efficiency in the construction sector

The project has raised awareness among the Afghan ministries and donors of the issue of energy efficiency in public buildings, and shown the feasibility of the improvements and the need to integrate these into the standard designs for schools and health centres.

This approach nonetheless remains fragile. Given the very high rate of turnover of Afghan partners and donors, the knowledge acquired runs the risk of being rapidly lost. There is no engineering design office with the appropriate skills in energy efficiency present in Afghanistan, and the technical directorates of the ministries, notably the Ministry of Public Health, do not have sufficient staff to address the issue of improving the thermal efficiency of buildings alone.

As the multilateral donors (the Asian Development Bank and the World Bank) and bilateral donors (USAID and Germany) are massively present in the renewable energies sectors, it would be a pity if the accumulated know-how were to disappear.

Reallocating the residual funds from the FGEF should make it possible to prolong the current actions.

During this extension period, priority should be laid more on strengthening the capacities of the administration to control its own projects and communication materials, particularly within the Ministry of Public Health, rather than on constructing more improved buildings.

6.1.2. Encourage energy efficiency in domains other than the construction sector

The FGEF is so far the only programme to have achieved concrete results in the area of improving thermal insulation in public buildings. Apart from the World Bank, the other donors are positioned in the renewable energies sector.

Managing demand and renewable energies go hand in hand. Energy efficiency needs to be encouraged in areas other than construction. The creation of a unit specialised in energy efficiency within one or more Afghan ministries, and supported by donors, should make it possible to progress on this point.

6.2. Lessons learned and recommendations of general interest for fragile situations

6.2.1. Simple projects with no preconditions

The project proposed for FGEF financing has a clear aim: to improve the energy efficiency of public buildings by firstly working on new or rehabilitated buildings, then by validating building standards and distributing knowledge among the professionals involved.

Several Afghan contacts within the ministries have emphasised the interest of this approach. According to them, starting by addressing building standards would have been doomed to failure, as the Afghans would have seen only the constraints involved without perceiving any concrete advantages.

This observation gives rise to the following recommendations:

- 1) give priority in fragile situations to simple projects that do not involve multiple objectives or seek to solve all of the dysfunctional aspects of the sector or structure in which they intervene;
- 2) limit the number of institutional components, choosing only those that guarantee sustainable outcomes;
- 3) avoid linking projects to a set of burdensome requirements and preconditions, especially if these involve several local authorities;

- 4) have a satisfactory level of technical and financial resilience once external finance comes to an end, or in the event the situation deteriorates.

6.2.2. Programme-projects offering flexibility in order to take the changing context into account

The project initially focused on the education and health sectors, a choice that was and is still relevant. However, opportunities arose for interventions on extensive areas in a new sector: army dormitories. As the aim of the project was to improve the energy efficiency of public buildings, the project was successfully adapted. Regular meetings of an on-the-spot Steering Committee, which disposed of a leeway for action, proved to be a real asset for the smooth running of the project.

In fragile situations it is thus important to:

- 1) define a line of action centred on an overall objective, with alternative scenarios to hand depending on how the situation develops, particularly in terms of security;
- 2) select dependable partners and ensure much closer outside monitoring than for standard operations;
- 3) have an *ad hoc* committee able to make quick decisions on any realignments that may be necessary due to a changing context, while still keeping in line with the project's overall goal.

7. Conclusion

In compliance with its terms of reference, the main purpose of this evaluation was to bring to light lessons learned and operational recommendations for future projects, along the same lines as the evaluated project or, more generally, in the specific context of the fragile States. Beyond the lessons learned and recommendations expressed, the evaluator wishes to emphasise that this project was run smoothly, with a great deal of work being carried out by the project team and

professionals involved, in a context that was increasingly difficult from the security point of view.

Today, the real challenge is to strengthen the appropriation of the approach engaged with the ministries, and to train professionals. The project's sustainability depends on the ability of the government to address the roots of the insurgency and bring to the population the dividends of peace.

APPENDICES

Appendix 1. Logical framework of the project

Appendix 2. Climate map of Afghanistan

Appendix 3. Operations that led to GERES technical recommendations

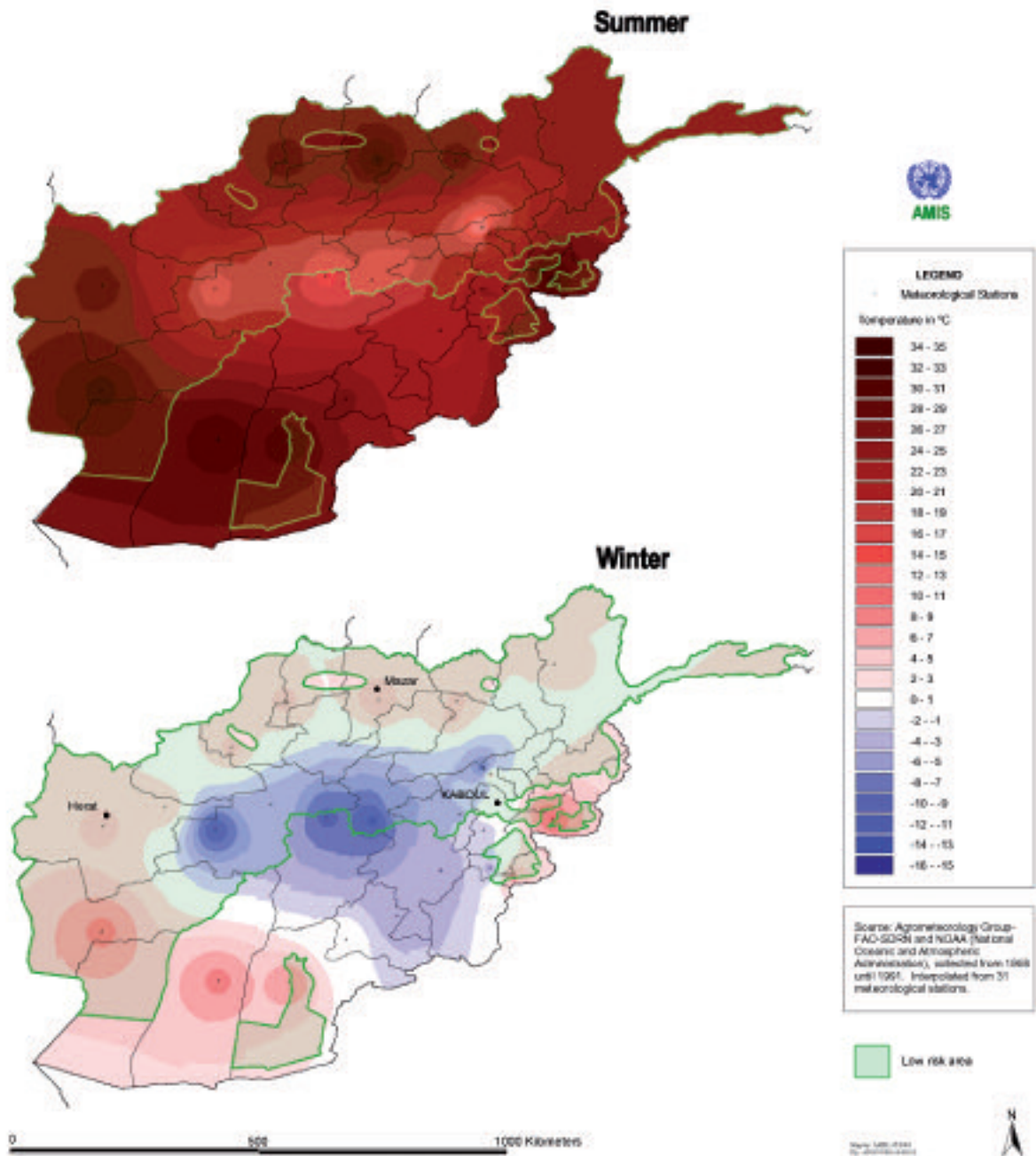
Appendix 4. Practical training and lectures

Appendix 5. People interviewed

Appendix 1. Logical framework of the project

	Intervention logic	Objectively measurable indicators	Sources and means of verification	Assumptions
General objective	Improve the energy efficiency of public buildings in Afghanistan	Comparison of energy consumption in conventional vs. energy-efficient buildings	Measure of energy consumption and expenses	
Specific objectives	<ol style="list-style-type: none"> 1) Diminish the levels of energy consumption and energy expenses in schools and health centres 2) Develop a high level of awareness and participation by Afghan authorities and donors 3) Create the conditions that favour a sustainable approach to energy efficiency 4) Develop local production of energy efficient materials and equipment 	<ol style="list-style-type: none"> 1) 100 reference buildings constructed (38,000 m²) 2) Active participation of the authorities and donors in the project; cofinancing of the project 3) Measures of energy prices, training of staff in the public administration, companies and specialised schools 4) Production units exist and are active 	<ol style="list-style-type: none"> 1) Monitoring of expenditures and consumption over a one-year period for an existing sample 2) Activity report; report from the supervisory committee 3) Ministries of Energy and Finance; government accounting; evaluation of training 4) Surveys and activity report 	<ul style="list-style-type: none"> Stability of the political, social and military situation Continued commitments from the international donors Continuing capacity of the ministries to work together Security maintained for foreigners
Expected results	<ol style="list-style-type: none"> 1) 100 buildings constructed (38,000 m²). Efficient components and equipment produced in Afghanistan 2) Afghan authorities and donors committed 3) Construction standards validated; existence of an energy policy; 200 staff from public and private sectors trained; raised awareness of all ministries concerned 4) Local companies manufacture insulation materials and energy-efficient stoves 	<ol style="list-style-type: none"> 1) Quantity of buildings produced Quality of construction 2) Number of committed partners. Amount of cofinancing committed 3) Standards used; number of training actions done; awareness-raising brochures 4) Production of companies; turnover, job creation 	<ol style="list-style-type: none"> 1) Project activity report External evaluation 2) Consumption surveys in the buildings 3) Technical dossiers validated by the ministries; activity reports; external evaluation 4) Surveys and activity reports 	<ul style="list-style-type: none"> Financing of part of the extra costs by the donors and project owners
Activities to be developed	<ol style="list-style-type: none"> 1) Construction of 100 energy-saving buildings 2) Organise awareness-raising workshops for decision-makers and site visits 3.1) Prepare standards 3.2) Train architects, engineers 3.3) Prepare the elements of an energy policy 4.1) Develop efficient heating equipment 4.2) Transfer know-how relating to this equipment 4.3) Select components (insulation, double-glazing) to be produced in Afghanistan 	<ol style="list-style-type: none"> 1) Produce specifications and designs Introduce the specifications into the ministries' RFP Relationship with donors involved in reconstruction, particularly GTZ Possible construction with GTZ EON Monitoring of construction 2) Mobilise the AFGEI framework (doc. centre, joint seminar with GTZ) 3.1) Working group with the ministries 3.2) Prepare training module and sites for practical work 3.3) Joint GTZ/project approach 4.1) Joint GTZ/project resources; Support from local industrialists 4.2) GTZ human resources and project funders to support investments, training actions organised 4.3) Joint GTZ/project resources 	<ol style="list-style-type: none"> 1) Report of partners' activities. <i>In situ</i> supervision; report on consumption/comfort in the building sample; reduction of operating costs (health) and increased period of activities (schools) 2) Seminar report Attendance of the documentation centre; teaching materials, number of people trained 3.1) Report of work completed Documents approved by the ministries 3.2) Training courses completed; number of people trained 3.3) Tariff-monitoring tools, flows. Publication of texts 4.1) Results of studies and tests 4.2) Companies involved, equipment sales volume 4.3) Results of studies 	<ul style="list-style-type: none"> Agreement of local public and private partners

Appendix 2. Climate map of Afghanistan



Appendix 3. Operations that led to GERES technical recommendations

1	Project contracted by ADEME and subsidised by FGEF	
2	Projects contracted by ADEME and not subsidised by FGEF	
3	Projects not contracted and not subsidised (technical advice or/and design and training of contractors) by GERES	
4	Special demonstration and training projects	

No	Responsible institution	Type of building	Location	Type of work	Partners	Extra costs not linked to thermal insulation	Total cost of the operation	Over cost of EE	Funding of the over cost by FGEF	Funding of the over cost by Partner	Building area	GERES Time invested in the project (days)
1	Ministry of Energy and Water-GTZ	Renewable Energy and Energy Efficiency Information Center	Kabul, Dept of Renewable Energy of MoEW	Small bioclimatic building. Work completed September 2006	GTZ and Ministry of Energy and Water		12,000 USD	Thermal insulation cost is included in total cost of project	12,000 USD		44 m ²	72
2	Ministry of Energy and Water-GTZ	Head-quarters of Ministry of Energy and Water Office of the Deputy Minister (Mr Barakzai)	Kabul, Darulaman	Sun protection, over glazing Work completed July 2006	GTZ and Ministry of Energy and Water		Renovation	800 USD	No Subsidy	GTZ: 800 USD	20m ²	20
3	Ministry of Energy and Water-GTZ	Renewable Energy and Energy Efficiency Information Center	Taloqan, Takhar Province	Small building using solar architecture & thermal insulation. Work completed July 2008	GTZ and Ministry of Energy and Water		75,000 USD	9,000 USD	No	GTZ: 9,000 USD	91 m ²	45
4	Ministry of Education	10 classrooms School	Bala Aghil near Charikar, Parwan province	Thermal insulation of foundation, wall, windows and roof Work completed November 2007	Misereor & Deutsch Afghan Initiative (DAI)		195,750 USD	15,366 Euros	3,075 Euros	DAI: 12,291 Euros	751 m ²	75

Nb	Responsible institution	Type of building	Location	Type of work	Partners	Extra costs not linked to thermal insulation	Total cost of the operation	Over cost of EE	Funding of the over cost by FGEF	Funding of the over cost by Partner	Building area	GERES Time invested in the project (days)
5	Ministry of Education	Malalai High School	Kabul, opposite Ministry of Interior	Roof and windows insulation (renovation) Work completed September 2007	Foundation of France and French Embassy (CEFA-Afghanistan)	13,000 Euros 20,000 USD					300 m ²	
6	Ministry of High Education	Jalaludin Teacher Training Center	Kabul, in the front of the University	Walls, roof and windows insulation Work completed August 2006	French Embassy (Priority Solidarity Fund-Education)	1,000,000 USD	Include in total cost			Paid by French Embassy Kabul	2,350 m ²	12
7	Ministry of High Education	Writing and Literature Faculty at the French Department	Kabul University	Thermal insulation of roof, wall and windows Work completed May 2007	French Embassy (Priority Solidarity Fund-Education)	400,000 USD	Include in total cost			Paid by French Embassy Kabul	900 m ²	4
8	Ministry of Information and Culture	Kabul Museum	Kabul, Darulaman	Thermal insulation of roof and selected windows Work completed December 2006	Dutch Foundation for the Reconstruction of Afghanistan	Renovation	10,000 USD	No subsidy		DFA: 10,000	1,683 m ²	60

No	Responsible institution	Type of building	Location	Type of work	Partners	Extra costs not linked to thermal insulation	Total cost of the operation	Over cost of EE	Funding of the over cost by FGEF	Funding of the over cost by Partner	Building area	GERES Time invested in the project (days)
9a	Ministry of Education	8 Schools of 8 classrooms partly insulated (windows and roof)	Kabul	Thermal insulation (8 schools partially insulated) Work completed November 2008	Ministry of Education	983,284 USD	32,234 USD	FGEF: 15,131 USD MoE: 16,299 USD	4,800 m ²	280		
9b	Ministry of Education	2 Schools of 8 classrooms completely insulated	Kabul	Thermal insulation, 2 schools totally insulated Work completed November 2008	Ministry of Education	216,716 USD	41,669 USD	FGEF: 20,949 USD AEP: 11,000 USD MoE: 9,419 USD	1,200 m ²	120		
10	Ministry of Education	School, 5 classrooms	Qwame Gaeb Ali, Waras district	Thermal insulation on roof and windows Work completed January 2008	Afrane, Misereor	31,021 USD	3,904 USD	Over cost not subsidised by FGEF	Afrane: 3,904 USD	30		
11	Ministry of Defense	161 dormitories for the Afghan National Army	Herat, Gardiz, Mazar e Sharif provinces	Heating and cooling upgrades and external insulation Work completed September 2008	Network of Construction and Development Companies (NCDC)	18,000,000 USD	1,800,000 USD	No Subsidy	US army 1,800,000 USD	60		

No	Responsible institution	Type of building	Location	Type of work	Partners	Extra costs not linked to thermal insulation	Total cost of the operation	Over cost of EE	Funding of the over cost by FGEF	Funding of the over cost by Partner	Building area	GERES Time invested in the project (days)
12	Ministry of Defense	69 administration buildings for the Afghan National Army	Herat, Gardiz, Mazar e Sharif provinces	Heating and cooling upgrades and external insulation Work completed September 2008	Network of Construction and Development Companies (NCDC)	Included in No.II	Repairs	Included in No.II	No Subsidy	Included in No.II	62,147.9 m ²	Included in No.II (same compound)
13	Ministry of Defense	6 training and dining buildings for the Afghan National Army	Herat, Gardiz, Mazar e Sharif provinces	Heating and cooling upgrades and external insulation Work completed September 2008	Network of Construction and Development Companies (NCDC)	Included in No.II	Repairs	Included in No.II	No Subsidy	Included in No.II	8,384.1 m ²	Included in No.II (same compound)
14	Ministry of Public Health	Medical Institute	Arzan Qemat, Kabul Province	Thermal insulation on walls, roof and windows Work completed January 2008	IbnSina, Cordaid and Novib	Total cost: 291,900 USD	14,960 USD	12,466 Euros	2,493 Euros	EC: 3,740 Euros IbnSina: 6,233 Euros	834 m ²	90
15	Ministry of Public Health	Comprehensive Health Center (CHC)	Qalaei Sang-Takht Sang-Takht district, Daikundi province	Thermal insulation on walls, roof and windows Work completed September 2007	Funded by Caritas and implemented by KROA	246,000 USD 164,000 Euros	15,000 USD 11,538 Euros	2,400 Euros	2,400 Euros	Caritas: 9,138 Euros	466 m ²	35

No	Responsible institution	Type of building	Location	Type of work	Partners	Extra costs not linked to thermal insulation	Total cost of the operation	Over cost of EE	Funding of the over cost by FGEF	Funding of the over cost by Partner	Building area	GERES Time invested in the project (days)
16	Ministry of Public Health	Basic Health Center (BHC)	Bandar, Sang-Takht district, Daikundi province	Thermal insulation on walls, roof and windows Work completed August 2008	Funded by Caritas Implemented by KROA	153,103 USD	11,089 USD	1,508,20 USD	Caritas: 8,871 USD	280 m ²	30	
17	Ministry of Public Health	Basic Health Center (BHC)	Kijran town, Kijran District, Daikundi Province	Thermal insulation on walls, roof and windows Work started August 2008	Funded and implemented by Caritas	160,000 USD	Not separate budget include in total budget	No FGEF subsidy		280 m ²	5	
18	Ministry of Public Health	Basic Health Center (BHC)	Spahi Khil clinic, Gardiz Town, Paktia Province	Thermal insulation on walls, roof and windows Work started July 2008	Funded by Government and implemented by Elias Ariobi Construction Company	100,000 USD	10,000 USD	No FGEF subsidy	MoPH: 10,000 USD	280 m ²	10 On-going	
19	Ministry of Public Health	Basic Health Center (BHC)	Gulghundi, Paktia Province	Thermal insulation on walls, roof and windows Work started July 2008	Funded by Government and implemented by Elias Ariobi Construction Company	100,000 USD	10,000 USD	No FGEF subsidy	MoPH: 10,000 USD	280 m ²	10 On-going	

No	Responsible institution	Type of building	Location	Type of work	Partners	Extra costs not linked to thermal insulation	Total cost of the operation	Over cost of EE	Funding of the over cost by FGEF	Funding of the over cost by Partner	Building area	GERES Time invested in the project (days)
20	Ministry of Public Health	Basic Health Center (BHC)	Ahmad Khil clinic, Paktia province	Thermal insulation on walls, roof and windows Work started, August 2008	Funded by Government and implemented by Elias Ariobi Construction Company	100,000 USD	10,000 USD	No FGEF subsidy	MoPH: 10,000 USD	280 m ²	4 On-going	
21	Ministry of Public Health	Basic Health Center (BHC)	Mohamad Khil clinic, Paktika province	Thermal insulation on walls, roof and windows Work started, July 2008	Funded by Government and implemented by Himat Mangal Construction Company	100,000 USD	10,000 USD	No FGEF subsidy	MoPH: 10,000 USD	280 m ²	10 On-going	
22	Ministry of Public Health	Eyes Clinic	Darulaman, Kabul	Thermal insulation on walls, roof and windows	Funded by Vision International	500,000 USD	Included in the total cost	No FGEF subsidy		1,840 m ²	20 On-going	
23	Ministry of Defence	6 buildings in the National Military Academy	Next to Airport, Kabul	Thermal Insulation on walls and roof. Work 90% completed	Funded by US government	5,000,000 USD (Approximately)	88,880 USD (Approximately)	No FGEF subsidy	All has been paid by US Corps of Engineers	2,923 m ²	50 On-going	
24	Ministry of Public Health	CHC	Maiden wardak province Besud District	Thermal insulation on walls, roof and windows According to new standard	Funded by the Turkish government Implemented by Turkish PRT Constructed by Fushun Construction Company	160,000 USD	16,000 USD	No FGEF subsidy	MoPH: 16,000 USD	466 m ²	0 On-going	

No	Responsible institution	Type of building	Location	Type of work	Partners	Extra costs not linked to thermal insulation	Total cost of the operation	Over cost of EE	Funding of the over cost by FGEF	Funding of the over cost by Partner	Building area	GERES Time invested in the project (days)
25	Ministry of Public Health	BHC	Maiden wardak province	Thermal insulation on walls, roof and windows According to new standard	Funded by the Turkish government Implemented by Turkish PRT Constructed by Fushun Construction Company	100,000 USD	10,000 USD	No FGEF subsidy	MoPH 10,000 USD	280 m ²	0	On-going
26	Ministry of Public Health	CHC	Maiden wardak province Chak District (Chawni)	Thermal insulation on walls, roof and windows According to new standard	Funded by the Turkish government Implemented by Turkish PRT Constructed by Aziz Noori Construction Company	160,000 USD	16,000 USD	No FGEF Subsidy	MoPH: 16,000 USD	466 m ²	0	On-going
27	Ministry of Public Health	BHC	Maiden wardak province Jaghatau District (Mangji)	Thermal insulation on walls, roof and windows According to new standard	Funded by the Turkish government Implemented by Turkish PRT Constructed by Aziz Noori Construction Company	100,000 USD	10,000 USD	No FGEF subsidy	MoPH 10,000 USD	280 m ²	0	On-going
28	Ministry of Education	4 classrooms Prototype school	Khuwaja Hasan village, Istalif district, Kabul province	Natural local material for thermal insulation Completed December 2008	Turquoise Mountain and Ministry of Education	46,000 USD	Thermal insulation cost is included in total cost of the project	FGEF : 50% 23,000 USD TMF: 50% 23,000 USD	213 m ²	108 90%: Completed		

Source: GERES data.

Appendix 4. Practical training and lectures

The list of training sessions and conferences given by the project team is as follows⁴⁸:

1. Training sessions

1.1. Prototype school with Turquoise Mountain Foundation (170 participants)

Training on use of local materials provided to Khuwaja Hassan villagers; location: Khuwaja Hassan school, Istalef district:

- 12-13 November 2008: 2 days training **Natural Clay paints**. 6 participants
- 20-24 October 2008: 4 days training **Timber Windows with Secondary Glazing**. 2 participants
- 2-6 September 2008: 4 days training **Earth/Straw Plaster**. 4 participants
- 14-24 November 2008: 10 days training **Masonry High Temperature Storage Heating**. 2 participants
- 10-13 October 2008: 3 days training **Extension Earth, Lime, Straw Plaster**. 4 participants
- 10-16 September 2008: 6 days training **Timber Windows with Secondary Glazing**. 6 participants
- 17-22 September 2008: 6 days training **Finishing of 5 layers low maintenance lime stabilized earth roof**, 6 participants
- 7-12 September 2008: 5 days training **Mixing of earth/straw plaster**. 6 participants
- 26 July 2008: One day training **Lime plaster technique & roof insulation with local material**. 2 participants
- 2-13 July 2008: 10 days training **Insulated wall using straw and mud blocks**. 14 participants
- 21 June - 1 July 2008: 10 days training **Insulated wall using straw and mud blocks**. 15 participants
- 9-19 June 2008: 10 days training **Insulated wall using straw and mud blocks**. 18 participants
- 28 May - 8 June: 10 days training **Insulated wall using straw and mud blocks**. 16 participants
- 17-27 May 2008: 10 days training **Foundation insulation using mud and straw blocks**. 13 participants
- 5-15 May 2008: 10 days training **Foundation insulation using mud and straw blocks**. 14 participants
- 24 April - 4 May 2008: 10 days training **Foundation insulation using mud and straw**. 14 participants
- 13-23 April 2008: 10 days training **Foundation insulation using mud and straw blocks**. 14 participants
- 1-12 April 2008: 10 days training **Lime & sand mortar for foundation and brick masonry**. 13 participants

Training organized by TMF, MoE, GERES provided to Eng Khalil, building designer from MoE, location: Design Office of the Department of Construction, MoE, Kabul

- 5 April 2008 – 5 June 2008: 40 days training **Bioclimatic school design**.

⁴⁸ GERES Activity Report no. 6, 15 January 2009.

1.2. Training sessions and lectures since January 2007 (747 participants)

The list below concerns training provided from beginning 2007 and participation at workshops and international conferences.

1 September – 5 November 2008

Two months **earth techniques** training for UN Habitat and UNHCR provided by TMF and GERES, to builders of a refugee camp. Location at Jalalabad province, Surkh Road district, Shaikh Mesre refugee camp (20 participants).

- 25 October - 5 November 2008: 10 days training **Outside roof plaster from sand, mud and lime**
- 20-30 October 2008: 10 days training **Insulation of mud and straw block on roof**
- 15-25 October 2008: 10 days training **Ceiling plaster from mud, sand and lime**, and mixing of mortar from mud, sand and lime
- 5-20 October 2008: 15 days training **Ramp earth wall**
- 5-20 October 2008: 15 days training **Frame work for ramp earth wall**
- 25 September - 10 October 2008: 15 days training **Mud and straw blocks for roof**
- 22-30 September 2008: 8 days training **Setting out and foundation stone masonry**
- 1 September - 15 October 2008: 15 days theoretical training about **Local materials insulation**
- 23 November - 15 December 2008: 19 days **Roof insulation for hospital using glass wool** organized by Vision International, GERES, MoPH, provided by Vision International to five skilled workers. Location: Eyes Clinic, Darulaman Kabul. 5 participants

17 November 2008

One day training **Roof insulation for hospital using glass wool organized** by Vision International, GERES, MoPH provided by Vision International to MoPH engineers and Afghan contractors. Location: Eyes Clinic, Darulaman Kabul. 20 participants

3 September - 30 October 2008

22 days theoretical and practical training **Double wall techniques and roof insulation** organized by MoPH and GERES provided to MoPH staff. Location: GERES and MoPH. 3 participants

29 June – 6 July 2008

Mission in Paris and Cologne provided to MoPH, MoE, MoEW, NEPA. 13 participants:

- 3 July 2008: One day visit **Electrical Power Engineering and Renewable Energies** organized by Cologne University, DED/GTZ, NEPA and GERES. Location: Cologne University of Applied Sciences, Laboratory of the Institute of Electrical Power Engineering, Germany.
- 2 July 2008: One day site visit **Bioclimatic buildings: positive energy school and social housing** organized by the Municipalities of Saint-Denis and Limeil-Brevannes, ADEME, NEPA and GERES, Location: Limeil-Brevannes and Saint-Denis near Paris.

- 1 July 2008: One day participation in the **International Energy Workshop – ‘Demand and methodology’ session**. Location: International Energy Agency, Paris.

1 July 2008

Presentation: **Energy Efficiency Practices in Afghanistan for Economic and Environmental Gains**. Provided by GERES, MoE, MoPH, NEPA, MoEW. Location: International Energy Agency provided at International Energy Workshop – session ‘Demand and methodology’ Paris. 65 participants from worldwide Universities and International Organizations

23 June 2008

One day information workshop: **New design for thermal insulated BHC and CHC** organized by GERES, MoPH provided to Vision International, Kapula, Ibsina, Caritas, MoPH, MoUD, BDN, NESPAK. Location: GERES Kabul. 27 participants

14 May 2008

One day workshop: **Façade Insulation system (STO therm classic)** organized by NEPA, Ansari Engineering Products and services and GERES provided to: Afghanistan Engineer’s Association (AEA). Location: Kabul, AEA main office. 38 participants

28 February 2008

Output workshop: **Eco-architecture for the NEPA HQ** organized by NEPA, AFIR design office, GERES provided to NEPA staff. Location: NEPA library room. 16 participants

20 January 2008

Input workshop: **Eco-architecture for the NEPA HQ** organized by NEPA, AFIR design office, GERES, provided to NEPA staff GTZ, GERES, United States Geological Survey. Location: NEPA library room. 16 participants

13 December 2007

One day workshop: **Energy efficiency policy** organized by NEPA, MoEW, French Embassy, GERES, provided to 8 Afghan Ministries, NEPA, World Bank, Asian development Bank, UNEP, UNDP, GTZ, USAID, French Embassy. Location: Intercontinental Hotel. Kabul, 49 participants

29 November 2007

One day training: **Roof insulation** organized by NEPA, GERES, provided to Network of Construction and Development Company (NCDC). Location: military bases of Herat. 15 participants

12 November 2007

One day training: **Roof insulation** involving GERES, provided to Network of Construction and Development Company (NCDC). Location: military bases of Mazar e Sharif. 20 participants

25 October 2007

One day **Techniques of local materials** organized by MoE, GERES and TMF, provided to Ministries, development agencies and contractors. Location: Renewable Energy and Energy Efficiency Information Center, Kabul. 38 participants

24 October 2007

One day **External insulation technique covered with cement plaster** organized by NEPA, GERES and Yarash Huma Construction Company, provided to NCDC and ministries, international organizations, development agencies, contractors. Location: Energy Information Center in Kabul. 47 participants

5-7 October 2007

Three days **STO technique**, organized by NEPA, GERES and Ansary Engineering Products and Services, provided to Mustafa Sahak Construction Company. Location: Afghan Military Academy, Kabul. 10 participants

2-4 October 2007

Three days **STO technique** organized by MoE, GERES and Ansary Engineering Products and Services (AEP), provided to Mustafa Sahak Construction Company and Afghan Maskan Construction Company Location: Rukhshana High School, Darulaman, Kabul. 9 participants

23 August 2007

One day **Internal insulation covered with cement plaster** organized by MoPH, GERES and MoPH provided to NGOs, Afghan ministries and contractors. Location: Department of Renewable Energy, Kabul. 29 participants

22 August 2007

One day **Double walls techniques** organized by MoPH and GERES, provided to NGOs Afghan ministries and contractors. Location: Department of Renewable Energy, Kabul. 29 participants

11 August 2007

Technical instruction **Sheep wool insulation** organized by MoE, GERES provided to the field supervisor of afrane School in Waras district, Bamyan Province. 25 participants

23 May 2007

One day **STO Therm** organized by MoE, AEP and GERES provided to Mustafa Sahak Construction Company. Location: MSCC office in Kabul. 11 participants

1-2 May 2007

Two days **STO Therm** organized by MoE, AEP, GERES, provided to Contract Construction Company, Zarnegar Company, NCDC Construction Network. Location: contrac Office, Jalalabad Road. 55 participants

24-26 April 2007

Three days training, **STO Therm** organized by MoE, AEP, GERES. Location: Department of Renewable Energy, Kabul. 25 participants

Mars 2007

Insulation with **Glass wool and gypsum board** organized by NEPA, GERES, Farzad Sediqi Construction Company, provided to MoE, MoEW, Ibn Sina, AKDN and contractors. Location: Department of Renewable Energy in Kabul. 22 participants

1.3. Lectures in 2005-2006 (250 participants)

- 1) KU (Kabul University); 37 architecture students on 24 June 06
- 2) KPU (Kabul Polytechnic University); 78 architecture students on 5 August 06
- 3) MoUD (Ministry of Urban Development); 13 architects and engineers on 17 July 06
- 4) NSP (National Solidarity Program); 42 architects and engineers on 2 July 06
- 5) IOM (International Organization for Migration); 2 architects and engineers on 27 March 06
- 6) MoPH weekly meeting; 15 representatives of donors including NSP, USAID, IOM and HOPE on 19 April 06
- 7) ASP (Afghan Stabilization Program); 2 engineers on 18 July 06
- 8) FKH Geo Experts; 2 engineers on 30 April 06
- 9) MoPH from April to November 2005; weekly contacts with the MoPH architect and construction deputy minister
- 10) MoE; 25 engineers with site visits on 26 July 2005
- 11) ASP (Afghan Stabilization Program), national program, part of Ministry of Interior, 25 representatives of the Provinces on 28 August 2006.
- 12) IBN SINA, Afghan NGO, 3 representatives on 31 October 2006
- 13) CARITAS, 2 representatives on 28 October 2006
- 14) Misereor, Country Director on 31 October 2006
- 15) AKVTC (Afghan Korea Vocational Training Center), Chief Advisor and Construction Advisor on 15 Jan 2007.
- 16) Ministry of Higher Education, Director of Planning and Policy on 14 December 2006.
- 17) KROA (Khorshid Rehabilitation Organization for Afghanistan), Afghan contractor, training of site supervisor on 31 October 2006
- 18) People in Need, training of Program Officer, Logistics Manager and Head of Engineering on 27 October 2006.
- 19) Three weeks internship provided to young Afghan women on April 2007.
- 20) Technical sheets details and guideline for GTZ construction team for the construction of the energy center by GTZ in Taloqan on June 2007
 - In all, about **1,167 people** attended lectures or training sessions.

Tools for training have been produced.

- Tools for new standards
- Technical specifications and standard designs including thermal insulation for BHC and CHC
- Quality guidelines for Ministry of Public Health, and for BHC and CHC standard designs
- Two demonstration corners for Ministry of Public Health, and for BHC and CHC standard designs
- New architectural design for bioclimatic school
- PowerPoint presentations
- New set of designs for energy-efficient BHC and CHC
- 20 slides for internal insulation and double wall insulation training
- 40 slides about solar architecture projects in Afghanistan
- STO Therm classic, façade insulation system (STO document)
- 40 slides. Bioclimatic architecture and thermal insulation techniques (one version in English and one in Dari)
- 64 slides. Energy issues in Afghanistan and in the world (one version in English and one in Dari)
- 20 slides. Presentation of FGEF program for media and donors (English)
- 110 slides. Course for students of the University (Dari)
- Technical specifications about bioclimatic architecture and thermal insulation. 10 pages (one version in Dari and one version in English)
- STO Therm classic, 28 pages, about façade insulation system.
- Concept papers, invitations and certificates for trainings
- Details of double-glazed windows and thermal insulation for site supervisors (details according to each specific project)
- Energy efficiency techniques for the construction of the GTZ Energy Center in Taloqan
- Posters
- 13 posters for CESEF (Cost Effective Social and Environmentally Friendly) building materials workshop in Nepal
- 31 posters about energy efficiency, thermal insulation and renewable energy.
- Technical sheets for thermal insulation using local materials (cotton, sheep wool, reeds)
- 4 pages technical sheet about the Demo House and solar architecture (250 in Dari and 250 in English)
- 10 Wall models for exhibit in the Demo House and the Energy Information Centers

Appendix 5. People interviewed

Dr Ackram, Head of Planning Department, Focal Point FGEF, MoPH
 Najibullah Akrami, Managing Director, N-CDC
 Claudia Alexandrescu, Programme Officer, Construction of Health and Education Facilities Programme, IOM
 Eng. Mir Seqiq Ashan, Executive Director, Interministerial Commission for Energy, MoEW
 Eng. Dad Mohammad Baheer, President of the Steering Committee, Energy Efficiency in Public Buildings, NEPA
 Tobias Becker, ESRA Programme Director, GTZ
 Jerry Bisson, Director, Office of Infrastructure, Engineering and Energy in Afghanistan, USAID
 Philippe Bosse, chargé de mission, FGEF
 René Cornand, chargé de mission projets internationaux, Direction de l'Action internationale, ADEME
 Bogdan Danila, Programme Officer, Construction of Health and Education Facilities Programme, IOM
 Edgard Dezuari, consultant GERES
 Denis Fromaget, chef du service de coopération et d'action culturelle, Ambassade de France en Afghanistan
 Michael Gruber, Directeur Afghanistan, KFW
 Alain Guinebault, Délégué général, GERES
 Michel Hamelin, Directeur adjoint de l'Action internationale, ADEME
 Tooryali Himat, GERES Afghanistan
 Charles Hulot, ancien agent GERES Afghanistan
 Eng. Humaira, Head of Engineering Department, MoUD
 Graham Hunter, Architect, TMF
 Paul Kohorst, EC Technical Advisor, MoPH
 Abdul Wali Ibrahim, Operations Analyst – Sustainable Development Network, The World Bank Group
 Dr. Anwarulhaq Jabarkail, President and CEO IbnSina
 Eng. Khalid Architect, MoE
 Daniel Kamelgarn, AFD
 Jarullah Mansoori, Focal Point FFEM, NEPA
 Matin Magul, Deputy Director, MoE
 Nekmal Abdullah Mazari, Quality Control Eng., Yarash-Huma Group
 Nasim Mohammadi, Administrative Assistant, Yarash-Huma Group
 Paiman A. Nasiri, agent de liaison Afghanistan, AFD
 Jean François Ospital, directeur Afghanistan, GERES
 Hosay Rahimi, GERES Afghanistan
 Sayed Mohammad Rahimi, Head of Division for Policy, Research and Information, NEPA
 Eng. Ramin Riaz, GERES Afghanistan
 Mohammad Arif Rasuli, Senior Environmental Specialist, The World Bank Group
 Mohammad Saeed, EC National Consultant, MoPH
 Jamshid Saeedi, Manager, Uniplast Yarash-Huma Group
 Eng. Ahmad Wali Shairzay, Deputy Minister of Energy, MoEW
 Eng. Mohammad Salim Shoaib, Project Supervisor, MoPH
 Martin Schuldes, First Secretary, German Embassy in Afghanistan
 Eng Tamin, Head of Engineering Department, MoE
 Yves Terracol, directeur d'agence Afghanistan et Pakistan, AFD
 Nathalie Varhely, chargé de mission Afghanistan, AFD
 Dr. Ingolf Verano, Afghanistan Director, GTZ
 Sabien Verderber, représentante Afghanistan, Caritas
 Anosha Wahidi, Advisor, BMW
 Ahmad Zahir, Programme Advisor, Caritas

List of Abbreviations and Acronyms

ADEME	French Public Agency for the Environment and Energy Management (<i>Agence de l'environnement et de la maîtrise de l'énergie</i>)
AFD	French Development Agency (<i>Agence Française de Développement</i>)
AFGEI	Afghan, French and German Energy Initiative
ANA	Afghan National Army
AISA	Afghan Investment Support Agency
AFN	Afghani – national currency of Afghanistan
ANDS	Afghan National Development Strategy
ARTF	Afghanistan Reconstruction Trust Fund
ADB	Asian Development Bank
BHC	Basic Health Centre
CHC	Comprehensive Health Centre
EU	European Union
FAO	Food and Agriculture Organization
FGEF	French Global Environment Facility (<i>Fonds Français pour l'Environnement Mondial: FFEM</i>)
GERES	Renewable Energy and Solidarity Group (<i>Groupe énergies renouvelables, environnement et Solidarité</i>)
GTZ	German Technical Cooperation (<i>Deutsche Gesellschaft für Technische Zusammenarbeit</i>)
HDI	Human Development Index
IANDS	Interim Afghanistan National Development Strategy
ICE	Interministerial Commission on Energy
IOM	International Organization for Migration
ISAF	International Security Assistance Force
JICA	Japanese International Cooperation Agency
KFW	German Development Bank
LDCs	Least Developed Countries
MAEE	French Ministry of Foreign and European Affairs (<i>Ministère des Affaires étrangères et européennes</i>)
MoE	Ministry of Education
MoEW	Ministry of Energy and Water
MoF	Ministry of Finance
MoPH	Ministry of Public Health
MRRD	Ministry of Rural Rehabilitation and Development
MUD	Ministry of Urban Development
NATO	North Atlantic Treaty Organisation
NDF	National Development Framework
NEPA	National Environmental Protection Agency
NGO	Non-Governmental Organisation
ODA	Official Development Assistance

PRT	Provincial Reconstruction Team
SCAC	French Cooperation and Cultural Action Office (<i>Service de Coopération et d'Action Culturelle</i>)
TMF	Turquoise Mountain Foundation
UNAMA	United Nations Assistance Mission to Afghanistan
UNDAF	United Nations Development Assistance Framework
UNODC	United Nations Office on Drugs and Crime
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
UNOPS	United Nations Office for Projects Services
USAID	United States Agency for International Development
USGS	United States Geological Survey
WFP	World Food Programme

