



RÉPUBLIQUE
FRANÇAISE

*Liberté
Égalité
Fraternité*



Energy efficiency of buildings

KEY PROJECTS SUPPORTED BY PEEB

#WorldInCommon

An aerial photograph of a city skyline, likely Singapore, featuring a dense cluster of modern skyscrapers and older buildings. In the foreground, a vast, lush green park with many trees is visible. The sky is blue with scattered white clouds.

WHAT IS PEEB?

The total floor area of the global building stock is expected to double by 2060.

The building and construction sectors are therefore essential in the fight against climate change and achieving development goals. Today, building construction and operation account for 40% of total energy-related carbon dioxide emissions and 36% of global final energy consumption.

The **Partnership for Energy Efficiency in Buildings (PEEB)** was created by the French and German governments and is implemented by AFD, GIZ, and ADEME. Thanks to funding from the Green Climate Fund and the European Commission, it has expanded into a multi-programme partnership.

PEEB collaborates with governments and professionals to develop strategies tailored to local climate and energy needs through programmes such as PEEB Cool, PEEB Med, PEEB ASEAN, and PEEB Overseas.

It provides expertise in the construction and renovation of various buildings (social housing, schools, hospitals, administrative buildings, etc.) and finances a wide range of services within short timeframes. By supporting feasibility studies and projects, and contributing to public policies, PEEB facilitates the creation of regulatory frameworks and the dissemination of best practices.

PEEB also strengthens skills in both the public and private sectors by helping its partners enhance their energy efficiency policies and frameworks. Finally, it mobilises innovative financing **to promote the construction and renovation of energy-efficient buildings**, ensuring thermal comfort and environmental sustainability.

AFD has extensive experience in providing technical support and financing for energy efficiency projects. This brochure aims to present concrete examples of technical assistance and supported building projects, along with their benefits.

PROJECTS SUPPORTED BY PEEB



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TUNISIA: HIGH-QUALITY ENVIRONMENTAL HOSPITALS

This project, implemented with the Tunisian Government, aims to renovate existing regional healthcare infrastructure and construct new facilities. It is funded by AFD and the European Union.

SUSTAINABLE CONSTRUCTION MEASURES

- **Optimising building orientation and shape** to minimise thermal losses based on solar exposure and climatic conditions.
- **Thermal insulation of walls and roofs** to reduce heat exchange with the exterior.
- **Installation of sunshades on façades** to limit overheating of glazed areas while maximising natural light.
- **Grouping air-conditioned or ventilated spaces** to prevent internal thermal losses and improve the efficiency of heating, ventilation, and air conditioning (HVAC) systems.
- **Use of solar energy** for electricity production and hot water supply, incorporating photovoltaic panels and solar thermal systems.

PEEB SUPPORT

PEEB's support includes project management assistance for HQE certification of the two hospitals in Gafsa and Sidi Bouzid. Furthermore, through an AFD/GIZ collaboration, PEEB has trained municipal employees to enforce building codes, as well as policymakers, architects, and engineers on sustainable building financing. A guide was also published within this framework for healthcare facilities.

MEASURABLE BENEFITS

- The two hospitals will have 20% lower energy consumption compared to regulatory requirements.
- Together, the two hospitals will save 171,700 tonnes of CO₂ equivalent over 25 years compared to their baseline scenario.
- The hospitals are prepared for a scenario of a 3°C temperature increase by 2050.

PERU: ECO-RESPONSIBLE HOUSING

This programme aims to integrate environmental criteria into the construction of social housing, in collaboration with the MiVivienda Fund, a public development bank of the Peruvian state dedicated to social housing. This project is funded by AFD.

SUSTAINABLE CONSTRUCTION MEASURES

- **Use of low-energy lighting** equipment and systems for both housing units and common areas.
- **Installation of energy-efficient household appliances**, such as low-energy refrigerators.
- **Implementation of low-energy systems**, including high-efficiency elevators.
- **Development of a communal laundry** to optimise resource use and reduce individual energy consumption.
- **Installation of photovoltaic and thermal solar panels** for lighting common areas and providing hot water via solar water heaters.

PEEB SUPPORT

Technical assistance helped integrate energy efficiency measures in Phase 1 of the project. PEEB also supported the development of eligibility criteria for the second edition of the programme (Fondomivivienda II).

MEASURABLE BENEFITS

- Estimated energy and water savings of 10 kWh/year/m² and 0.5 m³/year/m², respectively.
- 130 tonnes of CO₂ equivalent avoided per year for a typical housing unit.
- 74,725 sustainable housing units built.



© Fondo MiVivienda

SENEGAL: A RESILIENT HEALTH SECTOR

This project aims to build rural healthcare clinics in line with Senegal's strategy in this sector. It is funded by AFD.

SUSTAINABLE CONSTRUCTION MEASURES

- **Thermal insulation of roofs** to reduce heat loss and improve overall energy efficiency.
- **Installation of shading devices** to protect buildings from direct sunlight and limit overheating.
- **Use of Building Technology Concept (BTC)** for optimised walls and high-performance air conditioning systems with inverter technology.

PEEB SUPPORT

Support consisted of assisting the project during the design phase by proposing improvements and evaluating their impact on thermal comfort and energy through dynamic thermal simulations. Additional support was also provided for procurement processes.

MEASURABLE BENEFITS

- Reduction of thermal discomfort periods, according to ASHRAE criteria, from 85% to 5% during extreme heat days.
- €20,000 saved annually per healthcare centre compared to a similar building constructed without PEEB support.
- Improved living and healthcare conditions for staff and patients.

PALESTINIAN TERRITORIES: A RESILIENT AND SUSTAINABLE HOSPITAL

AFD is supporting Saint Joseph Hospital in renovating and expanding its 70-year-old facility in East Jerusalem.

SUSTAINABLE CONSTRUCTION MEASURES

- **Implementation of passive strategies** to optimise energy efficiency.
- **Improvement of the building envelope's thermal efficiency.**
- **Optimisation of lighting** to reduce energy consumption.
- **Adjustment of heating and cooling systems** for better energy performance.
- **Increase in renewable energy production capacity.**

PEEB SUPPORT

PEEB supports this project with a €1 million grant, delegated by the European Union, to integrate measures aimed at strengthening the hospital's resilience and reducing its energy consumption.

MEASURABLE BENEFITS

- 57% projected energy savings (1619 MWh/year, equivalent to the annual consumption of approximately 405 Palestinian households).
- Reduction of the hospital's annual energy bill by approximately \$290,000 compared to the current situation.
- 837 tonnes of CO₂ equivalent avoided each year.

ECUADOR: SUSTAINABLE SOCIAL HOUSING

This project aims to improve access to affordable, sustainable, and universally accessible housing for Ecuadorian households experiencing poverty or vulnerability. The new houses are also designed and structured in an environmentally friendly manner. It is implemented by MIDUVI, with support from AFD.

SUSTAINABLE CONSTRUCTION MEASURES

- **Addition of shading structures on façades** to reduce direct sun exposure and improve thermal comfort.
- **Installation of false ceilings and application of white paint** on roofs to reflect heat and minimise thermal gains.
- **External wall insulation** to improve thermal efficiency and reduce heat loss.

PEEB SUPPORT

AFD financed part of this programme through a sovereign loan granted to the Ministry of Urban Development and Housing. Beyond this support, PEEB was requested to carry out dynamic thermal simulations for the two types of housing (collective housing and individual housing) funded by AFD under the programme, as well as the development of an energy efficiency guide for future housing occupants.

MEASURABLE BENEFITS

- At least a 20% improvement in thermal comfort for users in the hottest climatic zones over the medium term.
- 220,000 sustainable housing units built.



© Hôpital Saint Joseph

TURKEY: ENHANCING SKILLS IN HOUSING PROJECTS

This project with the public bank Vakifbank, the 4th largest bank in Turkey, aims to both strengthen the bank's practices in sustainable housing and stimulate the adoption of energy efficiency and environmental measures by construction sector stakeholders.



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PEEB SUPPORT

A technical assistance programme deployed by PEEB supported Vakifbank in implementing the credit line financed by AFD for the funding of sustainable housing. This was achieved through capacity building for its teams, including the development of an internal training programme on building energy efficiency. Additionally, tools were created to assist the bank in its adoption of the subject, covering aspects such as urban sprawl risk management, an action plan for defining a business strategy in the category A housing segment, and a monitoring and evaluation system.

MEASURABLE BENEFITS

- 575 employees trained.
- A best practices manual published.
- 2,754 housing projects supported.

FRANCE: AN ECO-RESPONSIBLE HIGH SCHOOL IN RÉUNION ISLAND

The project involves the construction of a high school in the town of Bras-Panon, co-financed with the Réunion Region.

SUSTAINABLE CONSTRUCTION MEASURES

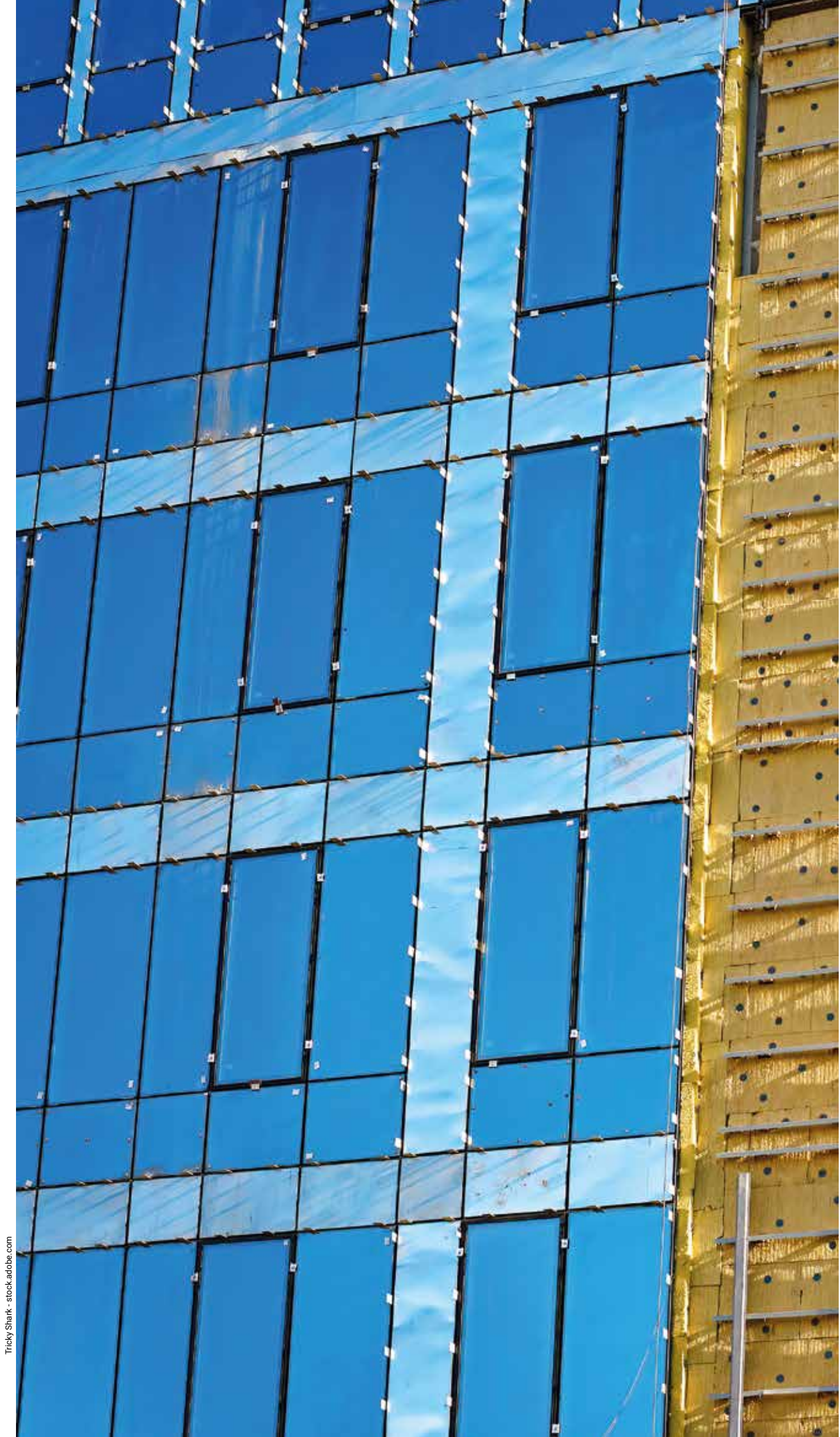
- **Permeable pavement in parking areas to reduce urban heat islands in outdoor spaces.**
- **Replacing sliding windows with louvres of the same dimensions** to promote natural ventilation in non-air-conditioned rooms.
- **Adding ventilated cladding** on the northeast and southwest facades of the buildings to enhance natural ventilation
- **Implementation of controllable lighting** in classrooms to reduce energy consumption.
- **Installing ceiling fans** in rooms with prolonged occupancy to improve thermal comfort.

PEEB SUPPORT

The support focuses on improving energy performance and enhancing the thermal comfort of future users of the institution. The mission involves assisting the project owner in optimising the project in terms of energy efficiency and resilience. More specifically, the aim is to conduct an analysis of the environmental quality of the three buildings (envelope and systems), as well as an assessment of the external developments and the potential for rainwater harvesting.

MEASURABLE BENEFITS

- Up to 83% reduction in average annual discomfort hours
- 600 students will benefit from improved thermal comfort.



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NON-PEEB PROJECTS

AFD, A GLOBAL EXPERIENCE
IN ENERGY EFFICIENCY PROJECTS

TOGO: ROBUST SCHOOLS

This project aims to improve access to education and the quality of teaching in the two most populous regions of Togo, notably through the construction and renovation of classrooms and schools.

SUSTAINABLE CONSTRUCTION MEASURES

- **Use of compressed earth bricks** to provide better thermal insulation while limiting the energy required for their production. A press was purchased and artisans were trained.
- **High ceilings** to reduce heat accumulation and improve thermal comfort.
- **Perforated walls (claustras)** to maximise natural ventilation.

PEEB SUPPORT

PEEB's support helped revise school plans in the design phase to incorporate construction practices adapted to current and future local climatic conditions, particularly for intense heat waves.

PEEB supported the project management team in recruiting and strengthening the capacity of community enterprises responsible for school construction.

MEASURABLE BENEFITS

- 380 classrooms renovated or built.



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For a World in Common

AFD Group finances and drives the transition to a fairer, safer and more resilient world, working with its partners to support communities all over the world. Drawing on the complementary strengths of its entities – Agence Française de Développement for public financing, Proparco for responsible private investment, and Expertise France for technical expertise – the Group is ideally positioned to meet all sustainable development challenges.

Working in over 160 countries, including France's Overseas Territories and Departments, the Group adapts its operations to the realities on the ground, actively supporting local initiatives. With over 4,000 projects, whose objectives are aligned with the Sustainable Development Goals (SDGs), AFD Group works on behalf of the French people, together with all stakeholders committed to economic development and the preservation of common goods: climate, biodiversity, peace, gender equality and global health. Working by your side, toward a world in common.



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