CLINTON FOUNDATION | CLINTON CLIMATE INITIATIVE

INTERNATIONAL SCHOOL OF MACAO

TAIPA, MACAO

BUILDING RETROFIT CASE STUDY

PROJECT OVERVIEW

The International School of Macao (TIS) worked with the Clinton Climate Initiative (CCI) to develop and implement a best practice energy savings performance contracting project with Honeywell. With Phase 1 completed, the project is currently lowering energy costs by over 25 percent, significantly more than the guaranteed savings. During Phase 2 renewable energy technologies and other measures will be installed to improve environmental sustainability.

INITIAL ENGAGEMENT

TIS asked CCI to facilitate an energy efficiency project, as part of the overall "greening" strategy for the school.

ESCO SELECTION

Three energy service companies (ESCOs) responded to the request for proposal issued by TIS in February 2009, following guidance from CCI on ESCO selection criteria. TIS made the decision to execute the project with Honeywell because it presented the most comprehensive proposal and its team exhibited interest in incorporating an educational program for students. Honeywell proposed an energy fair following full implementation of the project to teach students about the merits of energy efficiency; it also agreed to help TIS integrate the project into the curriculum.

A MULTI-PHASE PROJECT

Honeywell proposed a number of energy efficiency and clean energy measures to improve the school buildings and campus. TIS decided to split the project into two phases. Phase 1 includes standard building retrofit measures that enhance energy efficiency and have cost savings that are guaranteed by Honeywell. Phase 2 includes the installation of a green roof, solar panels, a wind turbine, and LED outdoor lighting, making TIS the first school in Macao to have such renewable energy features. TIS has negotiated with CEM, the local electricity company, to feed any excess electricity generated onsite back into the grid.

PROJECT AT A GLANCE (PHASE 1)

ESCO:	Honeywell
Project Size:	126,300 sq ft
Project Cost:	MOP $1,348,076 (US$ 170,000)
Annual Savings	
• Electricity:	183,000kWh/yr
• Energy savings:	22%
• Water:	10,000m^3
• Cost savings:	MOP $236,857/yr (US$ 30,000)
CO_2 Reductions:	85 tons/year

FINANCING

The International School has self-financed the Phase 1 work and is fundraising for Phase 2.

PROJECT CHALLENGES

During Phase 1 the project proceeded very smoothly and according to the established timeline. Construction took place over the summer holidays when students and faculty were away and was completed before the new term began.

PROJECT TIMELINE

Achieving all of TIS's goals for a "green" campus with a limited budget was a challenge. To address this, TIS split the project into two phases. TIS self-financed the immediate installation of measures with guaranteed energy cost savings as Phase 1; and it is currently fundraising for the additional measures as Phase 2.

CCI ROLE

CCI provided support to TIS throughout the project development process, including:

- Introducing the concept of energy services performance contracting as a mechanism for implementing large-scale energy efficiency retrofits without large capital expenses
- Helping design a procurement process and schedule that met internal procurement regulations and incorporated CCI's best practices in performance contracting
- Identifying and selecting ESCOs that could support the project and deliver according to best practices
- Providing ongoing technical assistance and guidance for the project
- Providing access to CCI's purchasing alliance supplier partners to include discounted pricing on energy efficient technologies

KEY CONTACTS

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ENERGY CONSERVATION MEASURES AND CONTRIBUTION TO TOTAL SAVINGS

GYMNASIUM

Automatic occupancy and temperature controls on the lighting and air conditioning system to replace manual operation. Air curtains to prevent external hot air from entering.

- Automated chiller plant controls
- Ahu/pau temperature controls
- Air curtains
- Clean filter and chiller condenser
  - Cost = MOP $345,789
  - Annual savings = MOP $136,925
  - Payback = 2.2 years

CLASSROOM

Modern automated controls in indoor environment and occupancy sensors to control the lighting and air conditioning systems in the classrooms. Lighting retrofit to reduce total number of lamps while maintaining level of lighting.

- Cooling controls on pau
- Occupancy controls
- De-lamping with nano reflector
- Local timer controls
  - Cost = MOP $984,906
  - Annual savings = MOP $99,932
  - Payback = 8.4 years

LAVATORY

Limit the water flow to cut off unnecessary water flow from the sinks.

- Water flow control
  - Cost = MOP $17,381
  - Annual savings = MOP $51,840
  - Payback Period = 0.3 years