



UNICEF Beijing Peer Review – Executive Summary

The key findings and recommendations of the Peer Review conducted by the United Nations Environment Management Group on the corporate environmental management of UNICEF at its Beijing office are presented here. The purpose of this summary is to share the lessons learned in the Peer Review process and to highlight possible areas of focus and collaboration among UN and related agencies in corporate environmental management.

For more detailed information on the report please contact the EMG Secretariat at emg@un.org.

The Peer Review Process

The Peer Review is undertaken by a team comprising of technical experts, representatives of UN entities, international organizations and local government authorities, with support and coordination provided by the EMG Secretariat. The Peer Review Team analyses data and information which has been gathered during site visit of the reviewed facility, and shared by the reviewed agency. Achievements, challenges, good practices and lessons learned in approaches to corporate environmental management are then identified and compiled in the Peer Review Report, along with proposed recommendations. These recommendations focus on how the environmental performance of the reviewed entity could be improved, ensuring greater resource efficiency, and economic and social sustainability.

A peer review of the UNICEF Office in Beijing

The peer-review of UNICEF was conducted with a 5-day site visit from the 23rd-27th October 2017. This visit allowed the peer review team to visit the facilities of UNICEF, UN Compound, UN Women, and WHO in Beijing.

The Executive Summary shares the findings in terms of the status, achievements, challenges, and recommendations. The full version of the report presents the same topics more comprehensively.

In the spirit of the Peer Review, the recommendations are non-binding and subject to validation by the Peer Review Body. The good practices, lessons learnt, and the recommendations are expected to help UNICEF Beijing in its efforts to improve its environmental performance. It is advisable that UNICEF conducts a more detailed analysis of the recommendations to confirm the expected environmental and economic benefits and their technical and organisational feasibility.

Facilities Management

UNICEF in Beijing is located at the heart of Beijing's diplomatic district. It fronts the well-known SanLiTun Road in Chaoyang District, and has a land area of 4,575 m² with a built-up area of 2,034 m². The built-up spaces are distributed over 4-5 single and double stories (former residential) structures. The main building is 52 years old, while the newer ones are at least 19 years old. Half the buildings are orientated north-south and the rest east-west, following the city grid of Chaoyang District.

Beijing has a temperate and continental monsoon climate. It has four distinct seasons and significant differences in temperature between day and night. Summer in Beijing is hot and humid, while winter is cold and dry. Spring and Autumn are short and cool. About 75% of the annual precipitation is

concentrated in Summer from June to August, with frequent showers in July and August. The coldest month is January at an average of -4 °C, and the hottest month is July at an average of 26 °C.

Energy Consumption



Status

UNICEF Beijing's GHG emissions are contributed to by electricity consumption and district heating. As the district heating usage is not metered, it is not possible to estimate the facility's energy use from heating, to be converted into carbon emission. UNICEF Beijing significantly reduced their energy consumption between 2015 and 2017, but there are challenges in place for the facilities, including a high phantom load and a lack of an effective energy consumption and greenhouse gas monitoring system.

Achievements

Consumption Reduction: UNICEF has reduced the energy consumption in both 2016 and 2017 in comparison to 2015. In 2016, the energy consumption was 24% less than in 2015, and if data is extrapolated to the end of 2017, then there is predicted to be a 38% reduction from 2015 values.

Solar Panels and Battery Storage: Photovoltaic panels with crystalline technology and battery storage were installed, which are expected to generate 9.5MWh per year for UNICEF Beijing during the peak tariff period.

Building air-tightness: Fresh air enters the building through infiltration through doors and windows, openings and cracks. The measured CO₂ data from the facility indicates that the building is air-tight, and thus has a lower energy consumption. The standard office spaces have a measured CO₂ level that reflects good air quality while minimizing energy consumption.

Lighting Efficiency: The recommended minimum value of lighting on the desktop of offices is 300 lux by international standards. At UNICEF, Beijing, the lighting level of 300-350 lux is adequate for occupants' visual comfort and energy efficiency. There is also a trend to reduce general lighting level to 150-200 lux while providing task light on each desktop that can increase the lux level to 500 lux or higher as required. All conventional lights have been replaced by more energy efficient LED lights. All internal lights were found to be switched off at night, and compound lighting points are operated with photovoltaic panels and storage batteries.

Challenges

Energy Consumption and GHG Monitoring: There is currently no automatic reporting of the production, storage, and consumption of energy, and the facility manager is unable to plan and control energy use, mainly during the peak electricity tariff periods. The facility manager is unable to reduce the total consumption, particularly during unoccupied office hours, as it is not possible to identify which devices are contributing to increased consumption and which devices can be turned off.

PV and Battery Storage: Three weeks after installation, the solar panels were already coated with a thick layer of dust which reduces photovoltaic output by up to 40%. Due to concerns expressed by the landlord, the panels were installed flat; this reduces the capacity to generate electricity and leaves the

photovoltaic panels vulnerable to water and dust accumulation. Since the solar panels will rarely produce more electricity than is needed for the building, the batteries will mainly be charged from the grid.

Phantom Load: UNICEF Beijing's power demand during unoccupied hours is approximately 30% of the daytime demand, much of which is made up of phantom loads (also known as standby power). At UNICEF Beijing, the phantom load consists of printers, wireless devices, power adapters for notebooks and monitors, and refrigerators, amongst other devices.

Recommendations

Installing Energy Monitoring Systems: It is recommended that a power and energy monitoring system is installed in UNICEF Beijing to keep track of real-time solar electricity production, storage and its usage. Ideally, the monitoring system will produce automatic reporting to show the real-time power usage of the facility and provide regular reports.

PV and Battery Storage: To obtain the maximum benefit from the photovoltaic panels throughout the year, it is recommended to tilt the panels 33.5° South. If it is not possible, the panels should be tilted by at least 10° to prevent water and dust accumulation to increase the photovoltaic output. If there are concerns about the weight of the panels, these can be offset by designing the photovoltaic mounting system to evenly distribute the weight across the roof.

Phantom Load: It is recommended to equip every desktop computer with a device such as a power strip, to automatically shut the computer down when it monitors no activity for 15 minutes. Power strips and extension cables can also be installed to switch off power supply to multiple devices at once, so that when staff leave the office in the evening all devices that do not need to be on standby can be turned off and reduce the energy consumption.

Lighting: When the lamps need replacing, it is more efficient to replace the entire fitting with a purposely built LED fitting than to replace traditional lamps with LED designed to look like a traditional lamp. The brightness level on some walkways could also be reduced. Lamps could also be zoned (circuited), so that lights can be switched on as needed to balance with daylighting through windows, or occupancy sensors installed so that lights are used only when needed.

Air Conditioning Efficiency: Only 23 of the 71 split air conditioning units have been replaced with energy efficient inverters, with many of the remaining air conditioning having the lowest air conditioning efficiency. Further, if the inverter air-conditioning system is undersized and thus consistently working at maximum capacity, its efficiency is significantly reduced. It is recommended that the air-conditioners be sized by making actual measurements of power consumption of the equipment with a clamp meter for existing spaces, which would increase the system efficiency.

Heating: UNICEF Beijing could install its own heat pump and thermal storage system to provide heating to the facility at a fraction of the current heating cost. Simultaneously, this would lower the greenhouse gas emissions compared to the centralised district heating network which is operated using coal as fuel. This system could also be used as a cooling system in the summer months, but this would involve replacing the present air-conditioning system with water-based fan-coil units.

The heating system could also be improved by installing thermostats on the radiators to allow the temperatures to be changed, by installing reversible ceiling fans to improve air flow in rooms, and to ensure that all radiators are not blocked by furniture.

Electrical Devices



Status

UNICEF Beijing successfully utilise a variety of electrical devices to further reduce their energy consumption, including to use a higher proportion of laptops than desktop computers and to install and electric car charger to charge UNICEF Beijing's electric car. However, some changes are recommended including the methods for maintaining the data centre temperature and updating low efficiency refrigerators.

Achievements

Laptops: Within UNICEF Beijing, there are 28 desktop computers and 93 notebook computers. A notebook/laptop computer is approximately 80% more energy efficient than a desktop. Even though the number of desktop computers is three times less than notebook computers, they account for a higher total power consumption. Thus, by using notebook/laptop computers UNICEF has achieved lower power consumption.

Electric Car and Charger: An electric car is used to transport UNICEF's delegates around Beijing with zero emissions from the vehicle. There is also an electric car charging point on site, which is used to charge up the car overnight.

Challenges

Personal Printers: Currently, UNICEF Beijing has a total of 26 printers on their premises, and although most offices in the premises share printers a small number of offices have personal printers on each desk. This makes up 70% of the facility's printers. This high proportion of personal printers increases the energy consumption of the facility, particularly as it is more difficult to shut down multiple printers overnight than to only turn one or two off.

Refrigerators: Two of the refrigerators at the facility were found to be inefficient; such refrigerators consume approximately 200kWh/year more than an energy efficient refrigerator.

Recommendations

Data Centre: The data centre room is recommended to be maintained at a temperature of 25°C, as server failure rates increase above 27°C. The most efficient air-conditioners need to be used for this space so that the temperature can be effectively maintained. Free cooling could be implemented for the data centre, which would significantly reduce energy consumption from mid-September until mid-April when free cooling is a viable option.

Refrigerators: It is recommended to purchase the lowest cost, highest efficiency labelled refrigerators, and all other devices, when the devices are being replaced. This will lower the energy consumption significantly.

Electric Car Charging: The electrical tariff remains high until 11pm, so it is recommended that a timer is installed on the car battery charging system to turn on the charger at the period of the lowest tariff.

Office Environment



Status

Throughout the UNICEF Beijing facilities, there was a high awareness of sustainability and reducing energy consumption among staff. However, there is still a potential for the internal air quality within the UNICEF facilities to be improved, and thus create a better office environment for UNICEF staff.

Achievements

Awareness: There was found to be a high awareness of the need for Greenhouse Gas emissions reduction throughout UNICEF, Beijing. This could also be seen by the extensive use of daylight within the facility, including in the office of the Head of UNICEF, Beijing, as well as the energy efficiency reminders throughout the facility.

Recommendations

Air Temperature and Quality: Insulation on the walls and the roof would not only reduce the thermal transmission, but also improve comfort for the occupants by allowing a temperature set-point closer to the outdoor condition. In the Winter months when heating is on high position, occupants find the air to be very dry. This can be rectified by providing humidifiers in rooms which are especially dry. It is recommended to install all meeting rooms with silent air extraction fans which, controlled manually or using a CO₂ sensor, will increase the infiltration of fresh air into the rooms.

Training: There is already a high awareness of Greenhouse Gas reduction among employees, but this needs to be sustained through a continuous program to improve technical understanding and to maintain the current level of motivation in UNICEF. This can be done through periodic technical training and information sharing on energy efficiency and sustainability awareness, and this training can be relevant to the end-user for reducing energy use in their own homes.