Green Parliament of Pakistan

Parliament House,
Islamabad, Pakistan

Visioned and Executed by
Honorable Speaker of the National Assembly **Sardar Ayaz Sadiq**

ABSTRACT

Parliament House of Pakistan got the distinction to be the World's first largest Green legislative by taking comprehensive energy conservation measures as a "first fuel", implementation of energy management system (EnMS) and shifting on renewables energy. It helped to curtail 69.7 % overall usage of electrical as well as gaseous energies in the building and cut the annual energy usage form 35723728.3 kWh to 10832995.7 kWh and saved 59260606.03 kWh equivalent to 220.68 million monetary saving so far besides a saving of capital investment of around 1.02 billion. It also drastically reduced around 30429.64 tons of CO2 emissions so far, which is equivalent to 1.38 million trees planted and 10639.73 tons of coal burn. It is an excellent precedent for other public and private sector buildings and set a trend for them to convert into Green buildings which will help them in combating greenhouse gases by resource reduction and building a sustainable environment.

Go Green

Islamabad, 06st of September, 2018

Grasping the prevailed energy shortfall, high energy cost and to reduce the utility budget of Parliament House, it was the broad vision of the Hon'ble Speaker of the National Assembly, Sardar Ayaz Sadiq to carry out the Energy Audit of the Parliament House, Islamabad. His principal intention was to transform the Parliament House into a sustainable and Green building by reducing all energy losses of the building.

The totalized energy audits leaded to energy conservation and to find energy efficient solutions. During the audit, the load of the building was observed which reached 02 MW and remained constant over a period. The sanctioned load of the building is 2.3 MW. It also revealed that an excessive maintenance budget is being utilized for the operation & maintenance of the Parliament House. All these factors spurred the authority of the house to take some initiatives toward energy conservation as a "first fuel", leaded further to adopt solar energy as a renewable energy source and to set a precedent for rest of the country as a pioneer project in the Parliament building.

It included a comprehensive energy conservation projects included a broad set of energy efficiency technology, upgradation of electrical and Implementation of energy management system (EnMS) in line with ISO-50001 in true later and spirit. Which helped to curtail 69.7 % total energy usage in the Parliament House, while carrying out significant revamping and upgradation with retrofit solution to mechanical systems of 07 Nos. lifts & HVAC system including replacement of 1600 RT system with high

efficient chillers, digital electrical controls, water management to reduce the evaporation and pumping cost by installation of energy saving devices (VVFDs) for variables flows and energy efficient luminaires. Finally, shifting to renewable solar system as a greener energy source.

Replacement of old out dated less efficient chillers of 0.36 COP with new latest energy efficient chillers of 1.33 COP (Fig-1), revamping of allied equipment imparted a significant role in energy conservation to curtail the energy usage, besides saving of huge capital investment.

Fig-1

Rehabilitation of cooling tower has not only allowed to save significant energy but also improved the efficiency and reliability of HVAC system. It also helped to reduce the pumping and evaporation cost besides increasing the operational life of pumps and Chillers. The operational and maintenance cost of the system has also been decreased. In addition to above, this measure has also able to conserve the water.

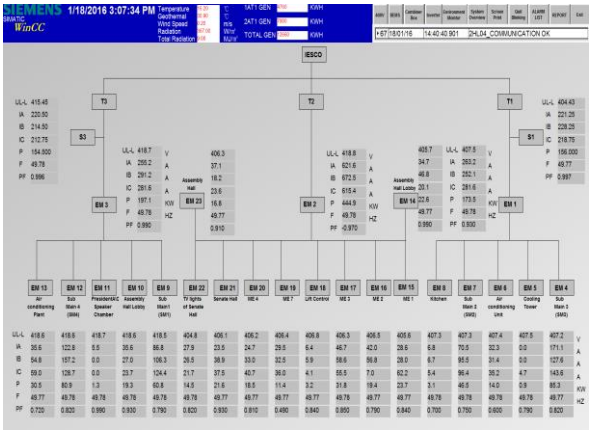
Besides above, the 30 years old analogue lifts mechanism, which is now replaced with modern digital system equipped with latest energy saving devices, and allowed significant energy savings. Installation of new operational control enhanced lift performance, reliability and user satisfaction besides curtailing operational and maintenance cost.

The improved lightning system (Fig-2) has not only played its role in energy conservation by cutting only lights load from 458 kW to 131 kW, but also provided better lighting outcome of 350 LUX instead of 100 LUX at a very minute cost, and imparted to maintain the building temperature having covered area of 600,000 ft2 with Zero emission of infrared and ultra violet.

Fig-2

Power factor panel energization has also not played a significant role in energy conservation measures, but also increased the reliability of electrical system of the building.

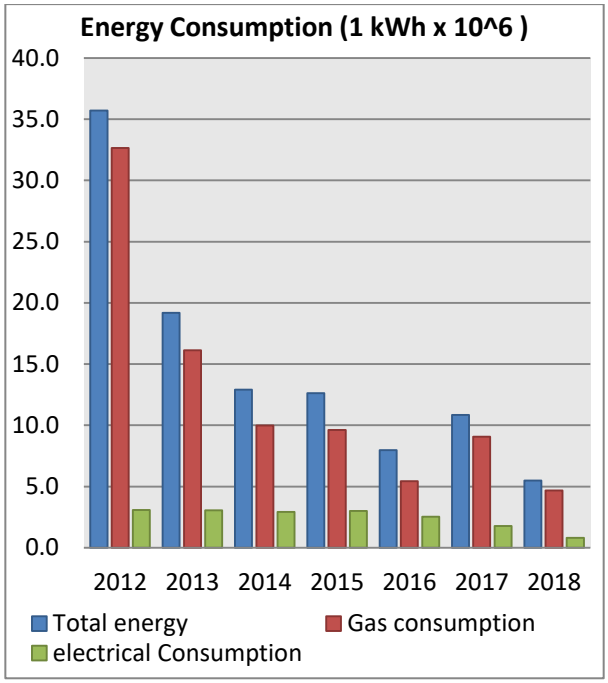
Implementation of building energy management system (EnMS) helped to document the significant usage of energy in line with ISO 50001 standard and managed it by continuous reviewing (Fig 3). It included 23 Nos. digital energy meters communicated with SIEMENS software for real time operational parameter and data achieving. It cut the electrical billing form 3,077,000 kWh (units) to 422,424 kWh, saved 2,654,576 kWh annually and 6,246,285 kWh totally, by giving monetary saving of 39.82 million PKR annually and 93.69 million PKR million so far.



(Fig-3)

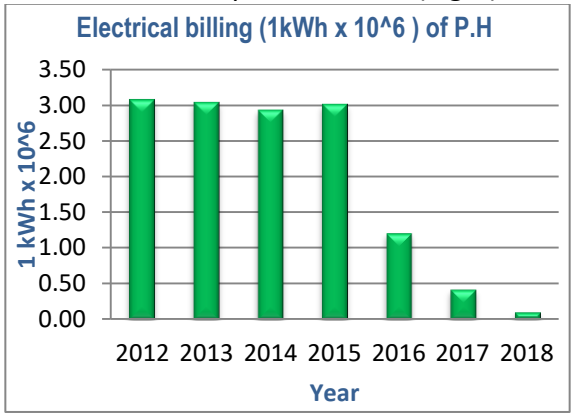
Furthermore, EVC Gas meters have also been installed in the building at individual load for

real time monitoring of equipment's performance and to take corrective measures, accordingly. It reduced annual gaseous consumption from 46,505.3 MMBTU to 12,917.5 MMBTU, saved 33,587.8 MMBTU annually and 180,893 MMBTU totally, by giving monetary saving of 23.58 million PKR annually and 126.99 million PKR so far. It also helped to improve the environment performance to set an excellent precedent being first-of-a-kind approach in the entire country.



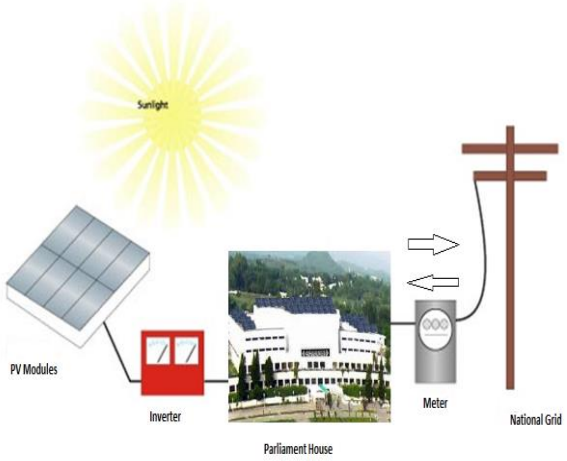
(Fig-4)

Apart from above energy conservation measures enabled to cut the total energy demand up to 69 % (Fig-4), the remaining load requirement is being met by 01 MW Grid Connected distinct Solar Power System while using the available space for improving the environment performance. (Fig-5)



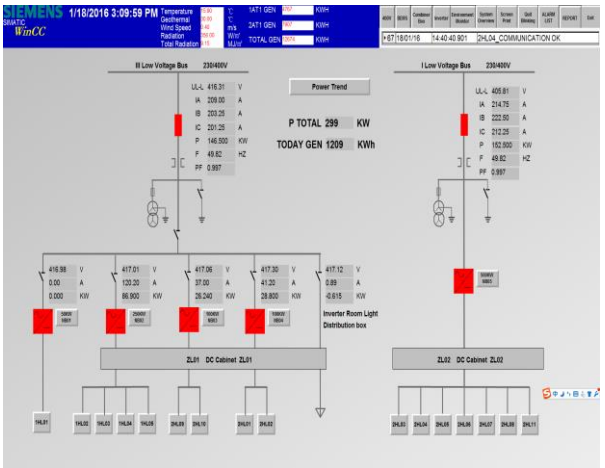
(Fig-5)

Pakistani Parliament has also got the distinction to be the first largest Parliament almost completely powered by solar energy. (Fig-6)



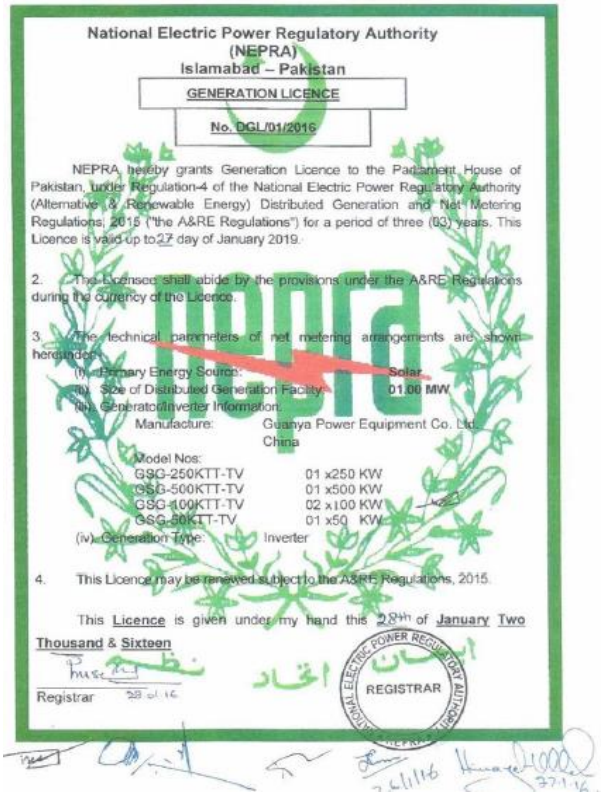
(Fig-6)

This distinct Solar Project is an art of technology, which meets the substantial energy requirements of the Parliament House besides providing an aesthetically designed parking area in harmony with the surrounding buildings. An important feature of the project is its capacity to not only to power itself but also to feed excess electricity into the national electricity grid. (Fig-7)



(Fig-7)

Pakistan's Parliament is the first in the country to have been issued "Net-Metering" 01 license by NEPRA (Fig-8). It is an excellent precedent for rest of the country and opened the way for placing Pakistan in the list of countries having implemented the possibility for feeding cleaner electricity into the grid.



National Electric Power Regulatory Authority
(NEPRA)
Islamabad – Pakistan

GENERATION LICENCE

No. DGL/01/2016

NEPRA hereby grants Generation Licence to the Parliament House of Pakistan, under Regulation-4 of the National Electric Power Regulatory Authority (Alternative & Renewable Energy) Distributed Generation and Net Metering Regulations, 2015 ("the A&RE Regulations") for a period of three (03) years. This Licence is valid up to 27 day of January 2019.

2. The Licensee shall abide by the provisions under the A&RE Regulations during the currency of the Licence.

3. The technical parameters of net metering arrangements are shown hereunder:-

(i) Primary Energy Source: Solar
(ii) Size of Distributed Generation Facility: 01.00 MW
(iii) Generator/Inverter Information:
Manufacture: Guanya Power Equipment Co. Ltd. China
Model Nos:
GSG-250KTT-TV 01 x250 KW
GSG-500KTT-TV 01 x500 KW
GSG-100KTT-TV 02 x100 KW
GSG-50KTT-TV 01 x50 KW
(iv) Generation Type: Inverter

4. This Licence may be renewed subject to the A&RE Regulations, 2015.

This Licence is given under my hand this 28th of January Two Thousand & Sixteen

Registrar

REGISTRAR

(Fig-8)

This system has generated 3,380,214 kWh (unit) of electricity from its installation in February, 2016 till June, 2018, from which surplus 1,023,067 kWh (unit) have been contributed to National Grid. This system also reduced the environmental impacts of combustion used in fossil fuel power generation, such as impacts from greenhouse gases and other air pollution emissions. It is an excellent precedent for rest of the country and also strengthens the Pakistan Building management standards enactment.

Aforesaid initiatives crowned the Parliament House to be the "Green Parliament of Pakistan". The Green Parliament is a kind of unique and demonstrated nature in the country, and there is no such precedent in the whole country before. The payback of the project was only 15 months. These measures cut the annual energy usage form 35723728.3 kWh to 10832995.7 kWh and saved 59260606.03 kWh equivalents to 220.68 million monetary saving so far besides a saving of capital investment of around 1.02 billion. It also drastically reduced around 30429.64 tons of CO_2 emissions so far, which is equivalent to 1.38 million trees planted and 10639.73 tons of coal burn.

It also got distinction that the project has been selected to receive **AEE's Asia Subcontinent Region Energy Project of the Year Award for 2018** from **Association of Energy Engineer (AEE)** at World Energy Engineering Congress, Charlotte Congress Center in Charlotte, North Carolina.

In addition to above, Green Parliament Project has also been selected to receive **Platinum level certification** under SEED certification by the **World Green Building council**. **WWF** has also appreciated Parliament's efforts towards Green Parliament Project and offered their services for certifying the Parliament house to be the first government building as Green Office. As, ISO-50001 has already been implemented in the Parliament House and now we are in a process to get its confirmatory, for which M/S SGS Pakistan (Private) Limited (a world renowned organization for certification) is conducting reviews. It will enable to apply for **Energy Management Leadership Awards"** presented by "**Clean Energy Ministerial (CEM)"**, a high-profile event that gathers clean energy leaders and partners from around the world, including ministers form the world, including energy ministers from the 24 governments' active in CEM.

It does not go end here, the documentation reviews and system optimization will further cut the energy utilization in the Parliament House by taking operational and control measures as per ISO-50001 for continual improvement going forward.

The Green Parliament Project is the key to get rid of energy as well as socio-economic crises in the country. Other public as well as private sector of the country may adopt the same mechanism as a "first fuel" to improve their energy security to overcome the energy crises and to cut greenhouse gas emissions.

SHAHID SHOUKAT,
Project Manager,
National Assembly Secretariat