

Proton Accelerator Conventional Facilities Design Status for the Savings of Energy

Jang-Hyung Cho *, Jun Yeon Kim, Gye-Po Jeon, Kyeong-Jun Mun
Proton Engineering Frontier Project, Korea Atomic Energy Research Institute,
Daedeok-Daero 1045, Dukjin-Dong Yuseong-Ku, Daejeon, 305-353, Korea
*Corresponding author: jhcho1@kaeri.re.kr

1. Introduction

Proton Engineering Frontier Project has been developing a 100 MeV proton linear accelerator.

This paper describes the energy saving efforts for the proton accelerator conventional facilities of PEFP. To achieve energy saving of PEFP, various efforts have been made in each field of construction.

This paper describes design status for the energy savings of PEFP.

2. Energy Savings in Heating and Cooling System of PEFP

For the heating and cooling system of PEFP, we adopt heating and cooling of high efficiency. For pipe and duct, heat insulated materials are used. Efficiency of HVAC fan should be more than 50%. High efficiency motor should be more than 50% of all motor facilities.

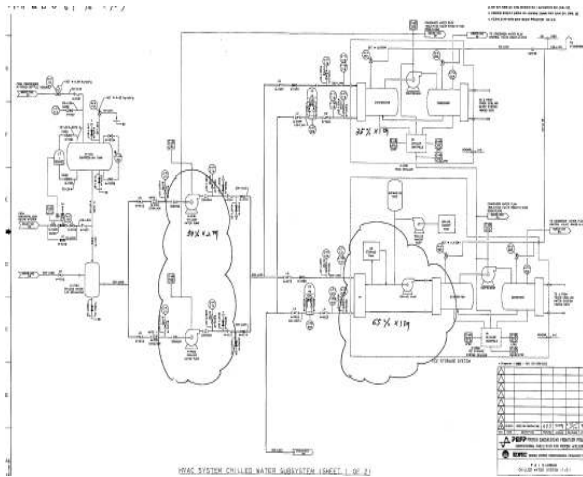


Fig. 1. High efficiency motor example : motors in HVAC system.

3. Energy Savings in Electrical System of PEFP

For the electrical system of PEFP, we installed wattmeter for each receiving transformer. We also adopt green consent to eliminate standby electricity loss, which is described in Fig. 2. For each motor load and bus, capacitor is installed to improve power factor, which is described in Fig. 3.

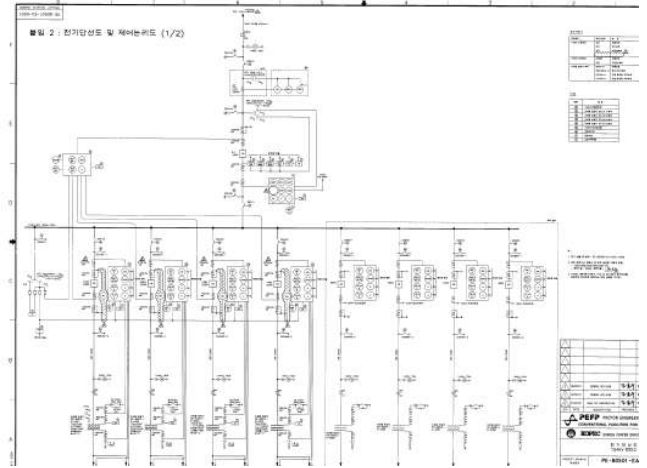


Fig. 2. Wattmeter Installation for each receiving transformer

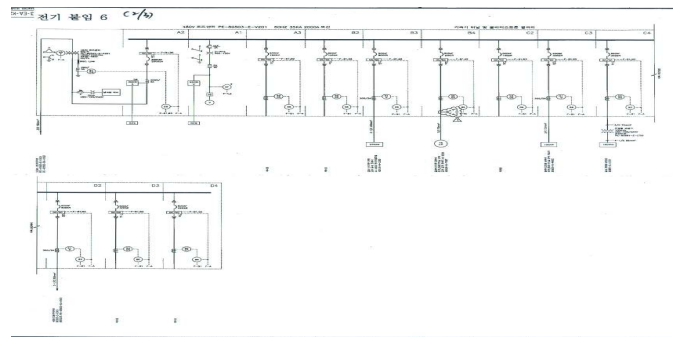


Fig. 3. Capacitor Installation for each motor

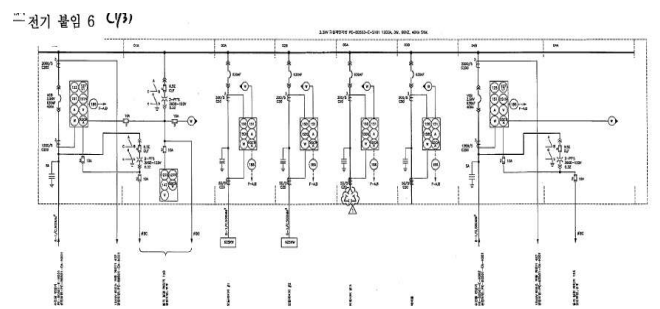


Fig. 4. Capacitor Installation for each bus

4. Renewable Energy for PEFP : Solar Power Generating System

To utilize renewable energy, we designed solar power generating system. Equipments of solar power system is described in Table 1.

Table 1. Equipments of Solar Power System

	Spec.	Unit	Q'TY
Module	200W		1,040
Inverter	110KW	EA	2

As described in Table 1, total generating electric power of solar system is 200W with 2 110kW inverters. Fig. 5 describes solar power system configuration of PEFP.

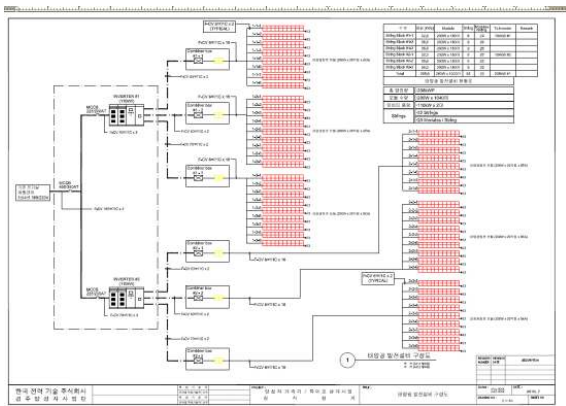


Fig. 5. Solar Power System Configuration of PEFP

5. Conclusions

In this paper, we describe the energy saving efforts of PEFP. To save energy, high efficiency heating & cooling systems are adopted. We also adopted green consent and capacitor installation for electrical system. We also designed renewable energy as solar power generating system.

ACKNOWLEDGEMENT

This work was supported by the Ministry of Education, Science and Technology(MOST) of the Republic of Korea through the Proton Engineering Frontier Project.

REFERENCES

[1] "Radiation Protection for Particle Accelerator Facilities," NCRP Report No. 144, published by National Council on Radiation Protection and Measurements, 2003.