

Seoul Metropolitan City, Improved the Self Reliance of Power Consumption for Tap Water Production through Distribution of New Renewable Energy

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1. Overview

- 18.7GWh, the one year electric power consumption of 5,000+ households, of power was generated creating KW800million earning in 2016.
- Generating power by installing 20MW fuel cells at Amsa Arisu Water Purification Center by 2019 is planned.
- Additional 10MW solar power generation facilities at 34 locations including Arisu Water Purification Centers are to be installed by 2022.
- Achieving 37% self reliance of tap water facility generating electric power and the tap water production cost saving of KW3.7billion per year are expected.

2. Background

- In the event the capacity of facility of solar power plant is big, mostly the solar power generation projects have been done in the way leasing the facility site land to private investors, and obtain lease based earning rather investing own funds, as the initial investment cost for solar power generation facility construction is so high. It is required to install the solar power generating facility using the government subsidy expense & etc. in order to directly save the electricity charge consumed in producing and supplying the tap water, and in case the securing of fund is difficult, then proceeding the projects with private investments is also necessary.

3. Major Aspects

- The Seoul Metropolitan City Government plans to obtain 37% (182GWh) of total power consumption (486GWh) required in the production of Arisu tap water from the new renewable energy by installing the new renewable power generating facilities such as solar power at the sites of Arisu Water Purification Centers by 2022.
- The Seoul City Office of Waterworks has been installing the new renewable energy facilities at the Arisu Water Purification Centers & etc. since 2009, now holding the total 5,169kW (Solar power generation facility : 12,002kW, Geothermal Cooling & Heating System : 2,867kW, Small Scale Hydro-electric power generation facility : 300kW) of facilities as of September 30th, 2017. With such new renewable power generation facilities, the Seoul City Office of Waterworks was able to obtain the KW800million earning last year by generating 18.7GWh of power equivalent to the power consumption of 50,000 households for 1 year.
- Being able to secure the capability with the substantial effect of supplying the world top class Arisu tap water to citizens at the lower cost through the saving of electricity charge with installation of new renewable energy facilities together with the earning from leased sites, the Seoul City Office of Waterworks plans to accelerate the distribution of new renewable energy as a part of 'Reducing one nuclear power plant' campaign initiated by Seoul Metropolitan City including the expanded installation of solar power & fuel cell power generating facilities.

- First, the Seoul City Office of Waterworks plans to additionally install 10MW of solar power generating facilities at 34 sites of Arisu Water Purification Centers & various offices of waterworks by 2022. With that, the Seoul City Office of Waterworks finished the complete investigation on the idling sites of Arisu Water Purification Centers & various offices of waterworks applicable to install the solar power generation facilities, planning to install solar power generation facilities at 10 locations including the parking lot of Guui Arisu Water Purification Center right away in 2018.
- Also, at the cooperation with Office of Environment, the Seoul City Office of Waterworks plans to install the 20MW fuel cells allowing the generation of electricity and heat all at the same time by 2019, contributing to the energy self reliance goal of Seoul Metropolitan City.



<Solar Power Generation Facility at Gangbuk Arisu Water Purification Center>

- Status of Fuel Cell Power Generation Facility at Amsa Arisu Water Purification Center Project Progress
 - Proposal of fuel cell power generation project : August, 2016
 - Discussion on project site with Office of Waterworks : October, 2016 ~ April, 2017
 - Discussion of fuel cell power generation facility installation plan : September, 2017

- The Seoul City Office of Waterworks will be able to generate 182GW every year since 2022, once the additional installation of new renewable power generation facilities at Arisu Water Purification Center is completed.
 - Yearly Power Generation Capacity : 182GWh
 - Solar Power : $22\text{MW} \times 3.2\text{h} \times 365\text{ days} = 25\text{GWh}$
 - Fuel Cell : $20\text{MW} \times 21.6\text{h} \times 365\text{ days} = 157\text{GWh}$
 - Self Power Reliance Rate : 37%
 - Power Consumption for Tap Water Production & Distribution in 2016 : 486GWh
 - Self Power Reliance Rate : $182\text{GWh} \div 486\text{GWh} \times 100\% = 37\%$
 - Crude Oil Replacement Effect : 38,000 TOE
 - 1TOE (ton of oil equivalent) : Heat contained in 1 ton of crude oil
 - $182\text{GWh} \times 0.211\text{ TOE/kWh} \times 10^{-3} = 38,000\text{ TOE}$
 - Saving of Electric Charge : $25\text{GWh} \times \text{KW}148/\text{kWh} = \text{KW}3.7\text{billion}$
- The Seoul City Office of Waterworks' self power reliance rate of 37% with new renewable power generation has a significant implication in view of achieving the government target 10 years earlier, considering the voluntary greenhouse gas reduction target of Korea by 2030 is to achieve 37% of entire greenhouse gas emission forecast.
- The Seoul City Office of Waterworks, as a energy prosumer, plans to lead the new renewable energy distribution policy campaign of National and Seoul Metropolitan City Governments by implementing the installations of new renewable energy facilities when planning on the improvement or addition of waterworks facilities in the future.

4. Source

- Seoul Metropolitan Government (www.seoul.go.kr)