

WATER MANAGEMENT AND RECYCLING SYSTEM

Yonsei University Health System (YUHS)

GGHH Agenda Goal

- Water

Hospital Goal

- Encourage and Facilitate Water Conservation
- Significantly Reduce Hospital's Water Consumption

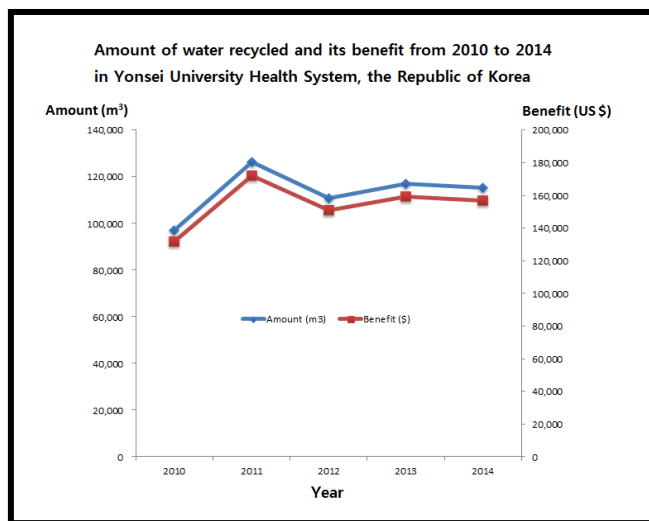
Progress Achieved

- Environmental Benefit: An automatic control system daily measures the volume of water recycled at exactly the same time. The system measured that on the average the hospital recycles at least 316m³ per day. Yearly, the hospital is able to save 115,405 m³ of water which is used for toilet flushing and other water needs.
- Financial benefits: Approximately \$160,000 per year saved during the last five years comparing it to projected cost since the establishment of the program and hospital

The Issue

Around year 2000, concerns about global water crisis and awareness of the need of water-saving were growing in the Republic of Korea. The increased awareness also affected management strategies in the special context of hospital environment.

During the construction of the new hospital in YUHS, there was an agreement that water for flushing toilet and watering garden was costly– and water–consuming, and the need of water recycling system came to the fore.



It was then decided to install a water recycling system which costs approximately KRW 695,000,000.

The water recycling system is an intermittent type. This means the amount of recycled water depends on the domestic sewage and underground water.

GS10 (Green Severance 10)
 우리의 습관을 바꾸는 것! 녹색 생활의 기본입니다!

- 1. 깨끗한 세면대 사용**
 •洗面대 물이 5초는 연간 2천리 CO2가 배출됩니다. 30초를 절약하면 CO2가 1천리 줄어듭니다.
- 2. 컴퓨터 사용 절약**
 • 컴퓨터 한 대는 1000시간 동안 약 150,000리 CO2가 배출됩니다. • 절전 모드, 30초-5분까지 절전기 사용합니다.
- 3. 프린터 사용 절약**
 • 대기전력은 최고 10%에서 에너지가 저장됩니다. • 에너지 절약 설정을 15분을 기본 (연간 780리 CO2가 줄어듭니다).
- 4. 음식물 줄이기**
 • 1명의 음식을 소비하는 약 150,000리 CO2가 배출됩니다. • 재활용(분리) 음식물 쓰레기는 연간 약 1,000리 CO2로 연간 약 2천리 줄어듭니다.
- 5. 에너지 절약하기**
 • 에어컨은 1시간을 작동하면 100리 CO2를 배출할 수 있습니다.
- 6. 수돗물 절약**
 • 샤워를 사용하면 1분 동안 약 4,000리 CO2를 배출합니다.
- 7. Paperless 업무**
 • 종이나 글자판은 인쇄, 복사, 스캔하는 것보다 10배 이상 환경에 해롭습니다. • 사용하지 않는 프린터는 약 4,000리 CO2가 발생됩니다.
- 8. 동행기 사용(승객)을 위한 차량의 에너지 절약**
 • 1대의 차량은 100리 CO2를 11~12리 이하로 줄일 수 있습니다.
- 9. 엘리베이터 사용 절약**
 • 엘리베이터 1칸을 1시간 동안 사용하면 약 12,000리 CO2가 발생됩니다.
- 10. 엘리베이터 사용 절약**
 • 승객이 1칸을 1시간 동안 사용하면 약 100리 CO2가 발생됩니다. (1칸은 100리) • 4층을 10층까지 사용하면 10배 이상 에너지를 절약할 수 있습니다.

Sustainability Strategy Implemented

- Green Severance Task Force
 - ✓ The Task Force is composed of heads and/or deputy heads in charge of purchasing, facility, building, customer management, and the Institute of Environmental Research.
 - ✓ All members are responsible for reporting their activities, developing strategies for greening healthcare, and sharing the information with faculty in their departments.
 - ✓ To boost bottom-up process, Green Severance Task Force held an idea contest and all faculty members were encouraged to make any suggestions regarding greening healthcare.
- Water saving promotion as part of “Green Severance 10” activities
 - ✓ The slogan of “Green Severance 10” imbues all staff and faculty with social and environmental responsibility.
 - ✓ Details of the activities are posted on message boards in hospital.

Implementation process

The new hospital’s construction planning started in 1994. Passing through 10-year designing and about 5-year construction period, the new hospital was completed with 1,004 beds in 2005. The implementation of water recycling system was part of the new hospital’s construction plan because the system needed special piping from the beginning of construction. In response to increased awareness of water-saving and its benefit, the CEO and the office of planning decided to implement the system in the new hospital.

In particular, Kim, Do Hyun (Environment Section Chief, Office of Facilities Maintenance) and Shin, Young Kug (Manager, Office of Facilities Maintenance) facilitated the program.

The recycled water is stored at Heavy Water Pit and then is supplied to hospital’s toilet by Heavy Water Pipe. The use of recycled water is for patient and consulting rooms.

In addition to the installation of recycling system to conserve water employees are oriented. Korean Environmental Industry and Technology Institute (KEITI), a quasi – governmental organization affiliated with the Ministry of Environment provides orientation on wastewater disposal. These orientations are conducted through E-discussions.



Tracking Progress

The control center for water management is located at the first basement level in the new hospital, monitoring the amount and pH of water. The amount of water recycled is measured on a daily basis, and the Facility team reports the current status of water recycling at the Green Severance Task Force meeting.

Challenges and Lessons Learned

Yonsei University Health System is not only concerned on the cost reduction outcome of installing the Water Recycling System. Moreover, the hospital values the significant contribution of water recycling in preventing water pollution and saving water resource. However, Yonsei University experienced concerns in implementing this program.

Although water recycling is always beneficial and profitable for hospital and environment water quality has become an issue. Thus, YUHS applied its own water quality standards which are stricter than those of corresponding Act (Promotion of and Support for Water Reuse Act). Also, water quality is measured by the Institute of Environmental Research in YUHS twice a year. They measure the pH level, residual chlorine, chromatility, and turbidity. Activated carbon used in filtration is replaced three times a year. In addition, preventive maintenance and cleaning of the inner Heavy Water Pit are conducted.

Next Steps

Yonsei University Health System Aims to strengthen Water Quality Management through the following activities:

1. Replacement of heavy water filters quarterly and strengthening water management through water analysis such as pH, BOD, COD.
2. Optimal the mounting cost of drugs on an input - output reduction and efficiency gains through Jar-test
 * jar-test : is the test to measure the most optimum drug content to be add in the heavy water production processes.
3. Once or twice a year of the heavy water pit inside cleaning will be carried out, including sediment removal.
4. Periodically check the toilet water quality
5. Analysis of heavy water production and groundwater inflow periodically
6. Case Study on the heavy water related literature and activation will be carried out.
7. Groundwater will be used to complement recycled water
8. Utilization of recycled water for as cooling water, car wash and fire control.
9. Maximize the capacity of the system which is at 900m³. Currently, the hospital recycles 160m³ of water.

Demographic information

Yonsei University Health System is led by its CEO and President, who also serves as the Vice-President for Health Sciences of Yonsei University. He oversees 2 graduate schools (Public Health and Nursing), 3 colleges (Medicine, Dentistry, Nursing) and 5 hospitals (Severance Hospital, Gangnam Severance Hospital, Yongin Severance Hospital, Severance Mental Health Hospital, and the Dental Hospital).

There are approximately 7,000 employees throughout the Health System, which include some 2,000 physicians and 5,000 support personnel. In addition, a total of 24,000 students have graduated from the colleges and graduate schools. The hospitals have around 3,700 beds and see around 3 million outpatients and 1 million in-patients annually. The total lot size is 95,000 Pyung (77 acres) with a building size of 18,000 Pyung ($59,508\text{m}^2 = 640,538\text{ft}^2$), and a total floor area of 140,000 Pyung ($462,840\text{m}^2 = 4.98\text{ million ft}^2$).

Quotes:

Keywords / topics: Water conservation, Water Recycling, Yonsei University Health System