

Sustainable Smart Houses

Khadija AlKhoory (ELE)/ Marwa Kamel (CVE)/ Zaina AlAyedi (CVE)/ Mohammed AlMasabi (MCE)

American University of Sharjah

ENG207 - Dr. Khawlah Ahmed

Situation

- There is a need to turn smart houses to sustainable smart houses to reduce the harm on the environment and make these houses Eco-friendly

Problems

- The wastage of water in smart houses is around 50% to 80% on applications used in the house
- The emission of toxic gases to the environment is caused by the aggregates contained in construction materials used in smart houses
- The usage of fossil fuel as a source of energy in smart houses releases toxic gases to the environment

Solutions

- Reuse the water used in the house for toilet flush, garage cleaning, car wash and irrigation

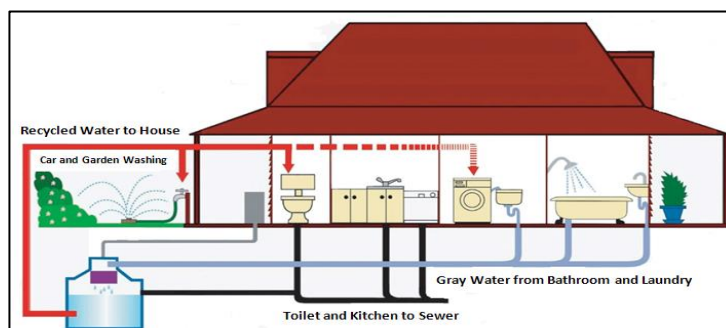


Figure 1: Pipe System to Reuse Water [1]

- Substitute limestone which is a component of blended cement with flyash
- Use concentrating solar panels that increases the flux of sun radiation absorbed in small areas and reflect it back to the tower as heat to be converted then to electrical energy

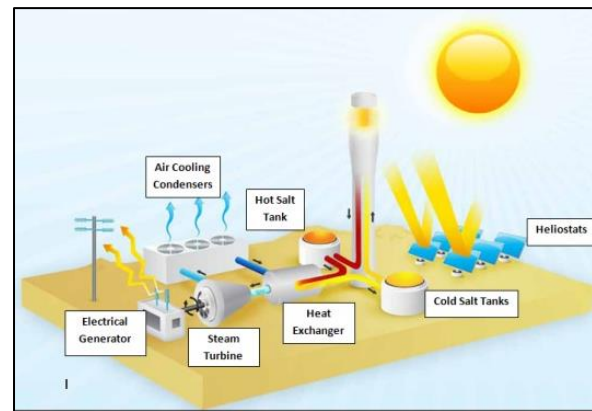


Figure 2: Concentrating Solar Panel [2]

- Apply Tri-generation system that converts the wasted energy from power generation to energy that can be used for cooling and heating purposes

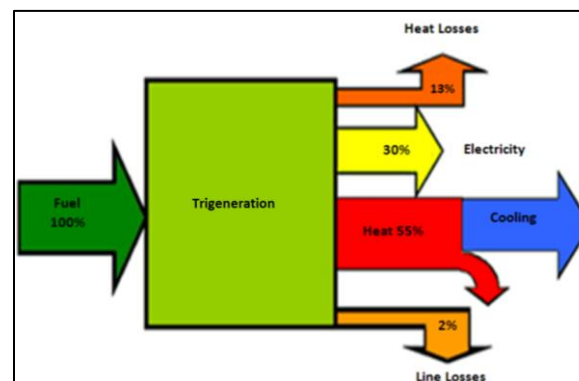


Figure 3: Trigeneration System [3]

Evaluations

- Wasted water to be reused requires addition pipe system
- Tanks and filtration system needs extra space
- Flyash increases the time for the concrete to reach its full strength
- Concentrating solar panels need large space to provide enough electrical energy for smart houses
- Trigeneration system cannot be applied for one unit only and it need enough space to be installed

References

- [1] Pipe system stages. Available global4life.blogspot.ae/2013/03/grey-water-has-been-used-and-it-will.html
- [2] Concentrating solar panel. Available <http://www.skepticalscience.com/pics/SolarThermalPowerTower.png>
- [3] Trigeneration system. Available www.trigeneration.com