Independent Sustainable City

Karim Chehab  Eisa Alzarooni  Ameen Ezzeddine  Ahmed Jabr

**Situation**

Nowadays, cities are mostly relying on non-renewable sources of energy such as fossil fuels.

- The International Energy Agency estimates that in 2011, 81.2% of the world’s primary sources of energy came from fossil fuels. [1]
- In the United Arab Emirates (UAE) where the climate is very hot, a huge amount of energy is consumed by cooling and air conditioning purposes.

**Problem**

- Depending on non-renewable energy sources to generate electricity.
- Controlling heat flow.
- Management of energy consumption is not efficient. 70% of electricity consumed for cooling and air conditioning purposes. [2]
- Handling and treatment of wastewater is inadequate.

**Solution**

- **Wastewater:**
  Two different pipes are used for sewage depending on type of wastewater. Leads to minimization of cost and reduction of wastewater treatment process.
- **Infrastructure:**
  Use building materials which reduces thermal flow from outside to inside (PCM bricks, Insulated glass).
- **Architectural design:**
  The city will be elevated from its surrounding area and the buildings will have a swaying shape design.

**Evaluation**

- **Wastewater piping:**
  An expensive process that requires double the number of pipes, which makes facilities look repugnant. However, this makes secondary treatment unnecessary which leads to saving time and reducing costs.
- **Materials:**
  Expensive materials that are not manufactured in all factories. Nonetheless, these materials as well as the architectural design aid in reducing power usage and cost in the long run.
- **Smart Grid:**
  Privacy and security of information is a hue concern. On the other hand, implementing powerful security measures will prevent any breaches.

**References**


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**Figure 1:** An image of swaying walls [4]

**Figure 2:** Smart grid connecting facilities and solar panels [5]