SUSTAINABLE ENERGY TECHNOLOGIES USED FOR SUSTAINABLE URBAN CITIES DEVELOPMENT TO REDUCE THE IMPACT OF CLIMATE CHANGE AND GREEN HOUSE GASSES EMISSIONS DUE TO URBANIZATION IN SRI LANKA

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INTRODUCTION

- **Past Sri Lanka -** urban growth has continued and the period of 1953 -1971 was particularly outstanding.

- **Present** - although, in 2018, 18,48% total population lived in urban city areas. (H. Plecher, Feb 5, 2020). Rate of urbanization is 0.85% annual rate of change.

- **Problems of urbanization** – poverty, Environmental hazards, food/water/fuel scarcity, Urban pollution, climatic change etc.

- **Climate change** is one of the main reason for global warming.

- Many studies focused only how Green House Gas Emission contribute to climate change and how control it?

- *In this study, intended to include* both reduce the environmental impact of urbanization and mitigate climate change and **GHG emission** by using **sustainable energy** sources as **sustainable urban city** planning methods.

- *Research focuses* on the importance of **controlling the greenhouse gases emission** in the cities and **environmental technology** use to creating a healthy environment free of corrupted energy using.

OBJECTIVE

- Generally understand how urbanization affect to climate change and greenhouse gas emission.
- Identify main sources of greenhouse gas emission at the urban cities in the Sri Lanka.
- Improve ideas about that what to do or solutions for control green house gasses in urban cities Sri Lanka.
- Relationship between greenhouse gas emission and Sustainable urban cities development.
- **The specific objectives** identifying the sustainable energy technologies and how those are use to create sustainable urban development for control GHG.

METHODOLOGY

- Text Analysis method
  Identification>mining>Categorization>clustering>Summarization>visualization
- Secondary data

  Government publications, Earlier research, personal ideas, published by authors, Library books, Internet, Other investigations
- Phenomenology

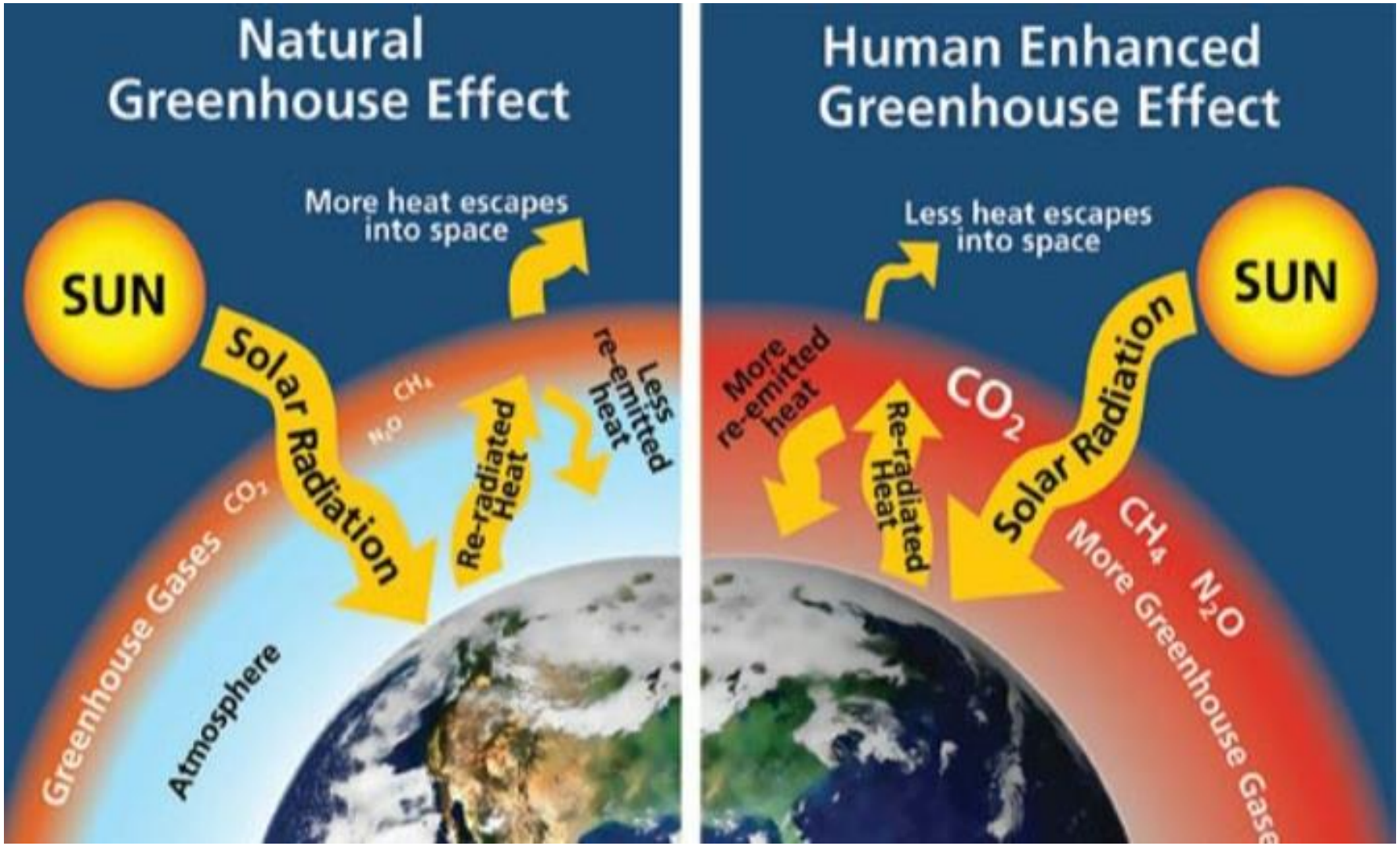
  Study of individually
- Small sampling theoretical method

WHAT IS URBANIZATION

An increasing concentration of the population in cities and a transformation of land use and society to a metropolitan pattern of organization.

GREENHOUSE GAS EMISSION

What is Energy and the GHG effect ?



Greenhouse Gases	Sources of GHG emission
• Carbon Dioxide (CO_2)	• Fossil fuel burning, land clearing, Industrial process
• Methane (CH_4)	• Landfills, gas drilling, sewage disposal
• Chlorofluorocarbons (CFC)	• Industrial activities, chemical compounds, refrigeration compressors
• Nitrous Oxide (N_2O)	• Fossil fuel burning, lightning, biomass burning
• Sulfur hexafluoride	• Fossil fuel burning, Industry, biomass burning

CONTROLLIG GREEN-HOUSE GAS EMISSION

Sustainable urban cities development

- Sustainable building
- Green infrastructure
- Sustainable Industries
- Pollution Management
- Renewable energy
- Green public transportation
- Water recycling and clean water
- Clean, Green and Environmental Technology

SUSTAINABLE ENERGY TECHNOLOGY

Sustainable Energy is power which is able to be replenished within a human lifetime and so cause no long-term damage to the environment. (Lemaire, 2004)

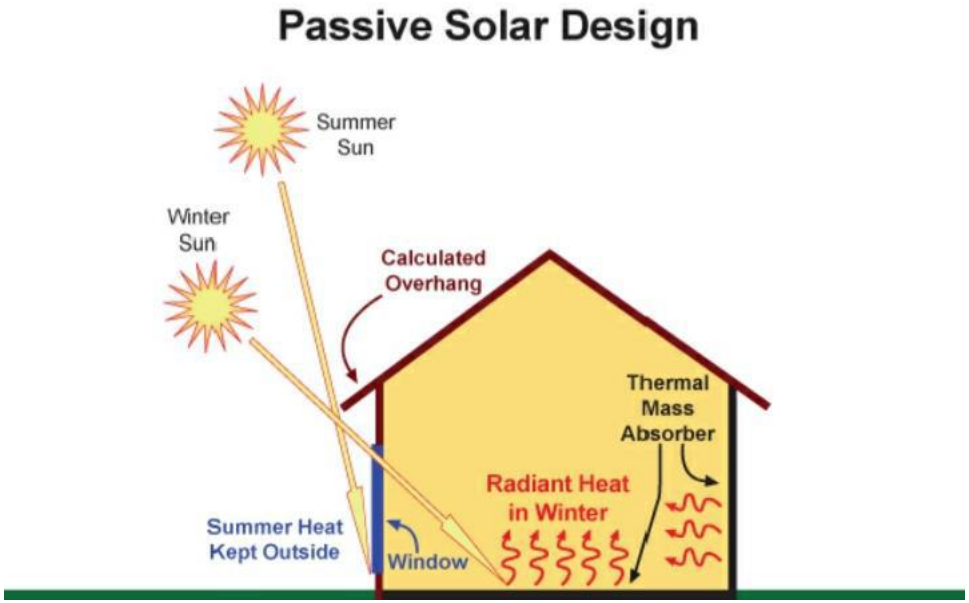
- Sustainable energy includes all renewable energy sources such as, *Hydroelectricity, biomass, geothermal, wind, tidal, wave, and solar energy, fuel cells*

Sustainable Energy Technology includes renewable energy sources and technologies designed to improve energy efficiency, it need to be integrated into existing power networks and market structures.

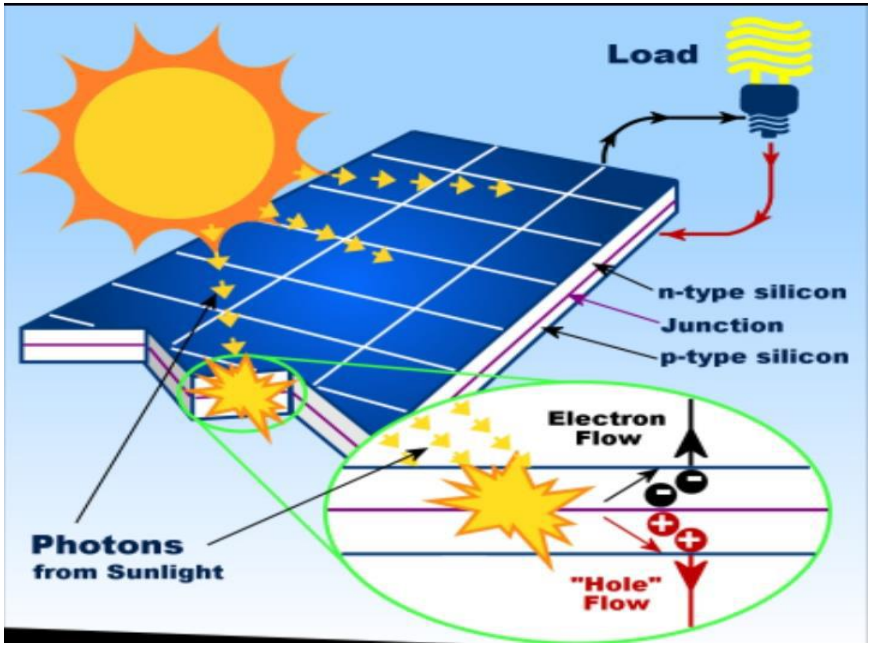
- Sustainable energy technology sources includes, Solar panel, Hybrid technology, solar cookers, nuclear power plant, wind towers, tidal station ect.

SOLAR ENERGY

Passive Solar Heat

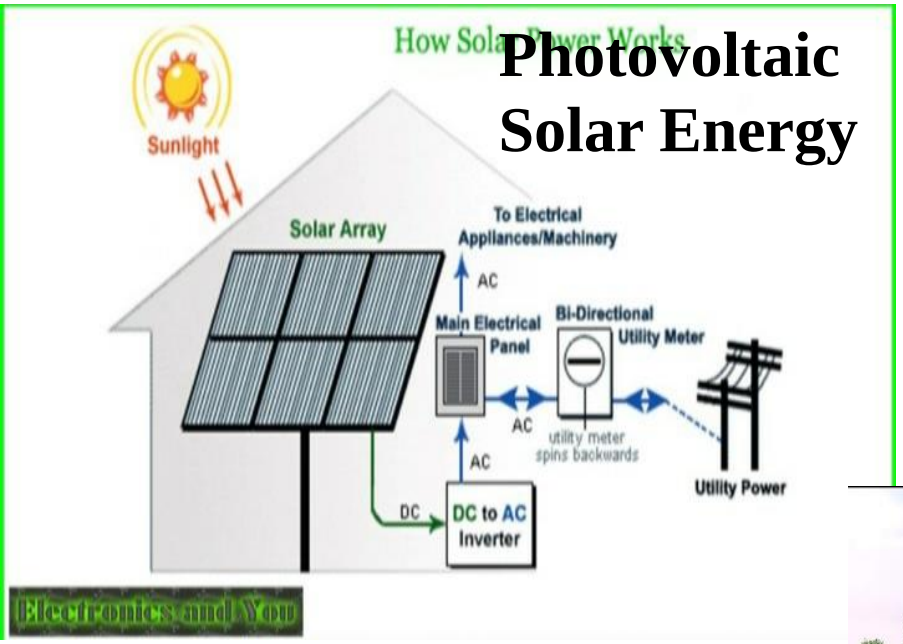


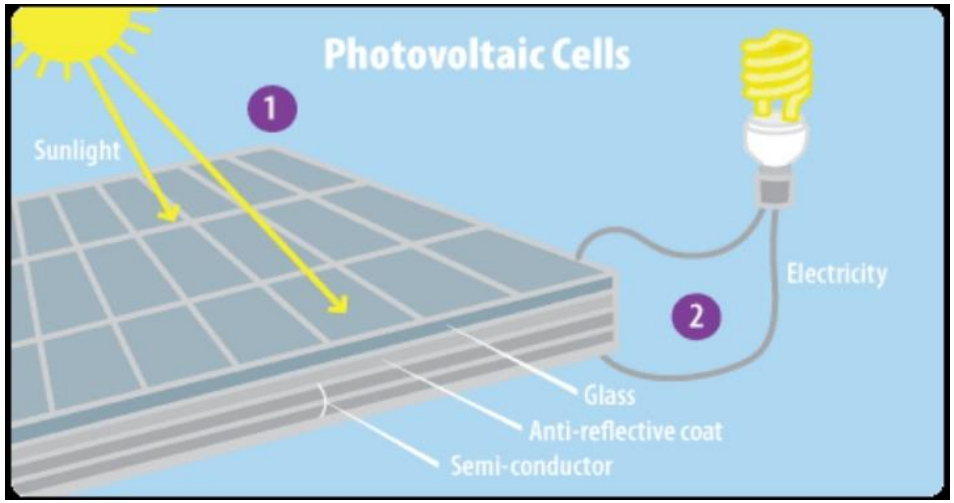
Active Solar Heat



Parabolic Mirror with Solar cooker

Photovoltaic Solar Energy



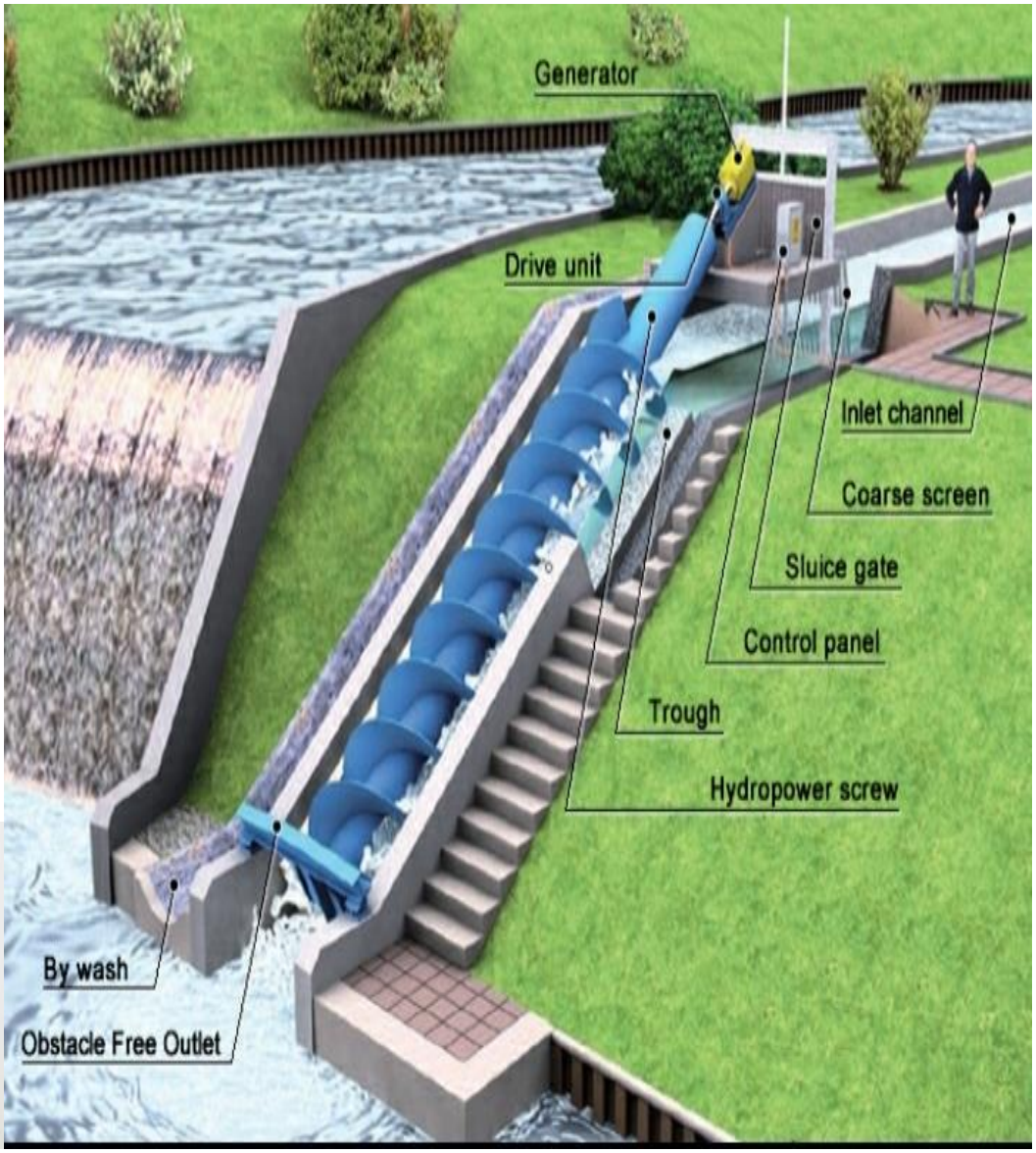


At urban house or institute

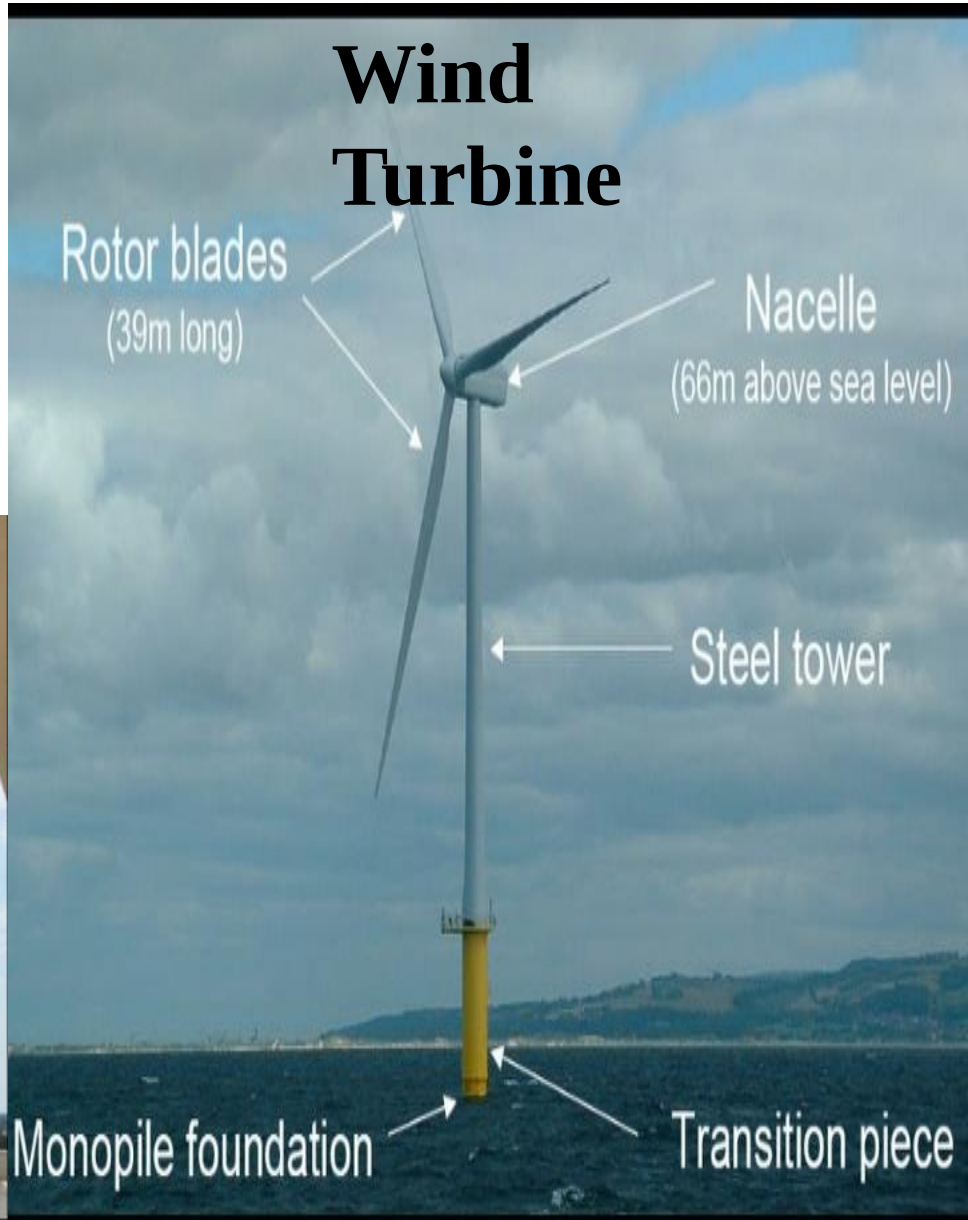
HYDROPOWER ENERGY

Low head hydropower

Micro generator hydropower

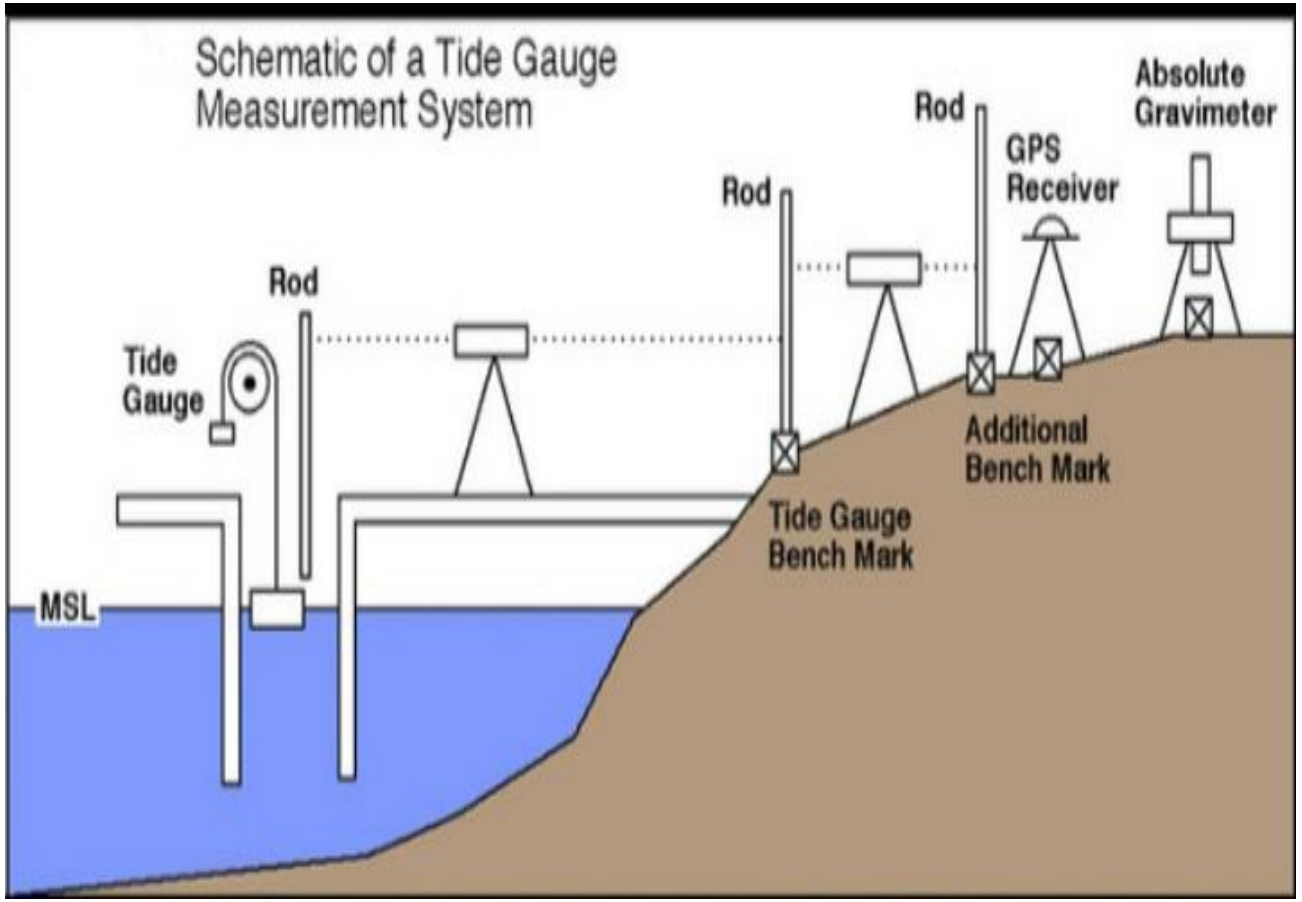


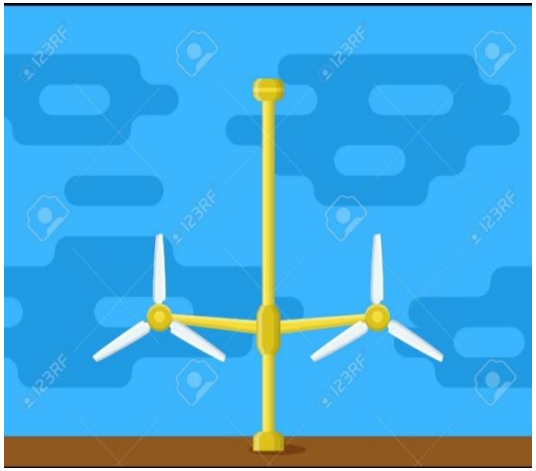
Wind Energy Technology



Tidal and Wave Energy

Tidal station





Tidal Tower

Compact fluorescent bulbs

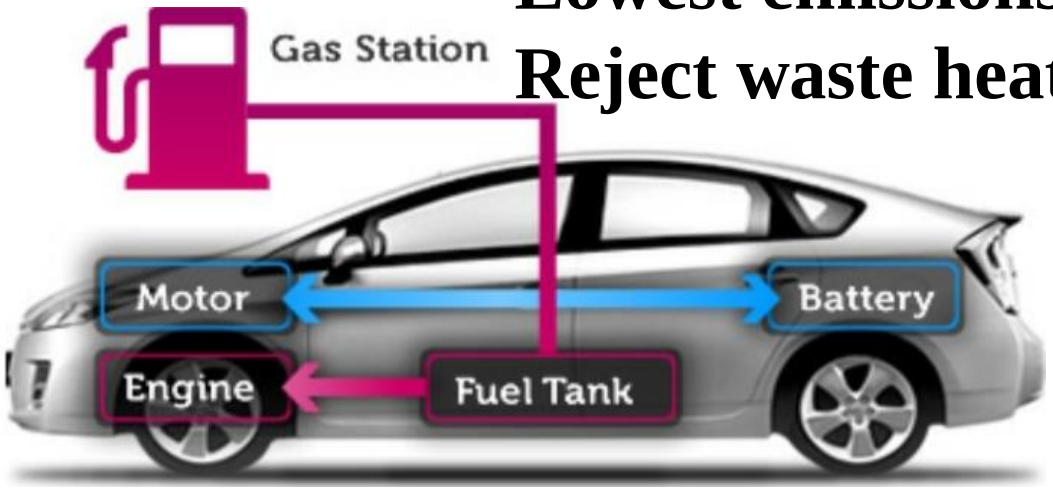
- Reducing carbon emissions
- More efficient
- Less expensive in the long run

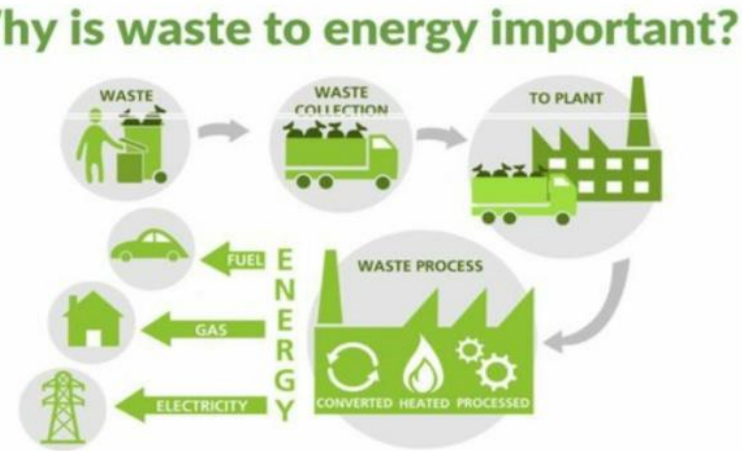
Light – emitting Diodes

- Save energy
- Lower electricity bills
- Less carbon footprint
- Over the potential barrier at the depletion ozone.

Hybrid Gasoline electric technology

Lowest emissions and
Reject waste heat





Waste Management energy production

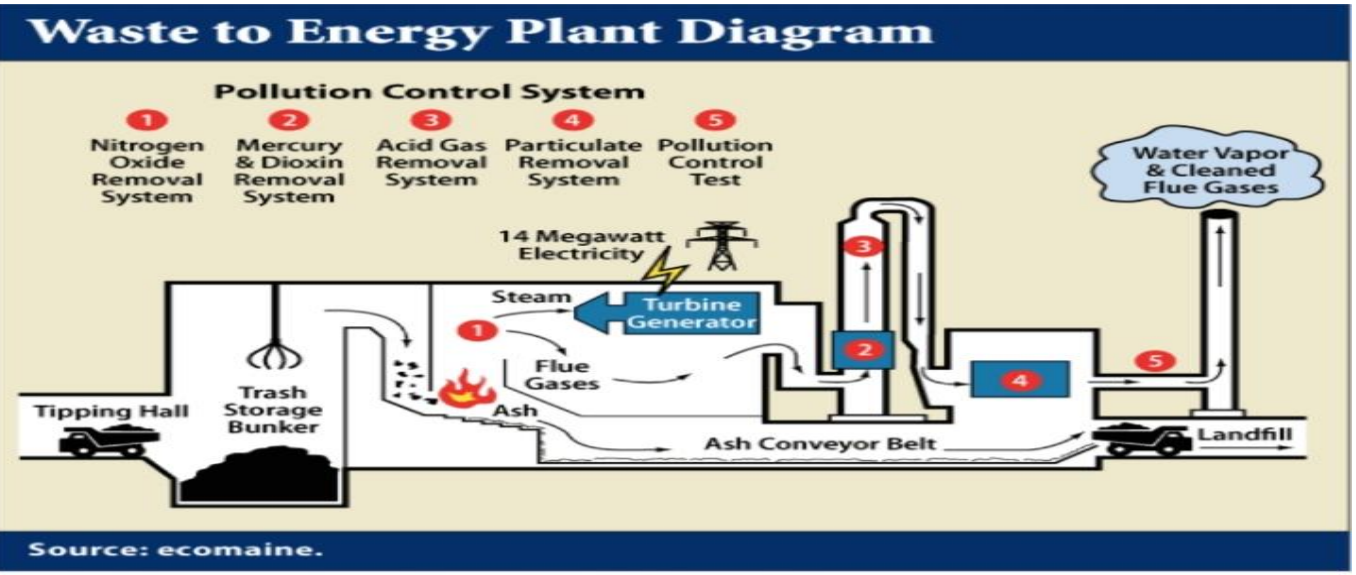
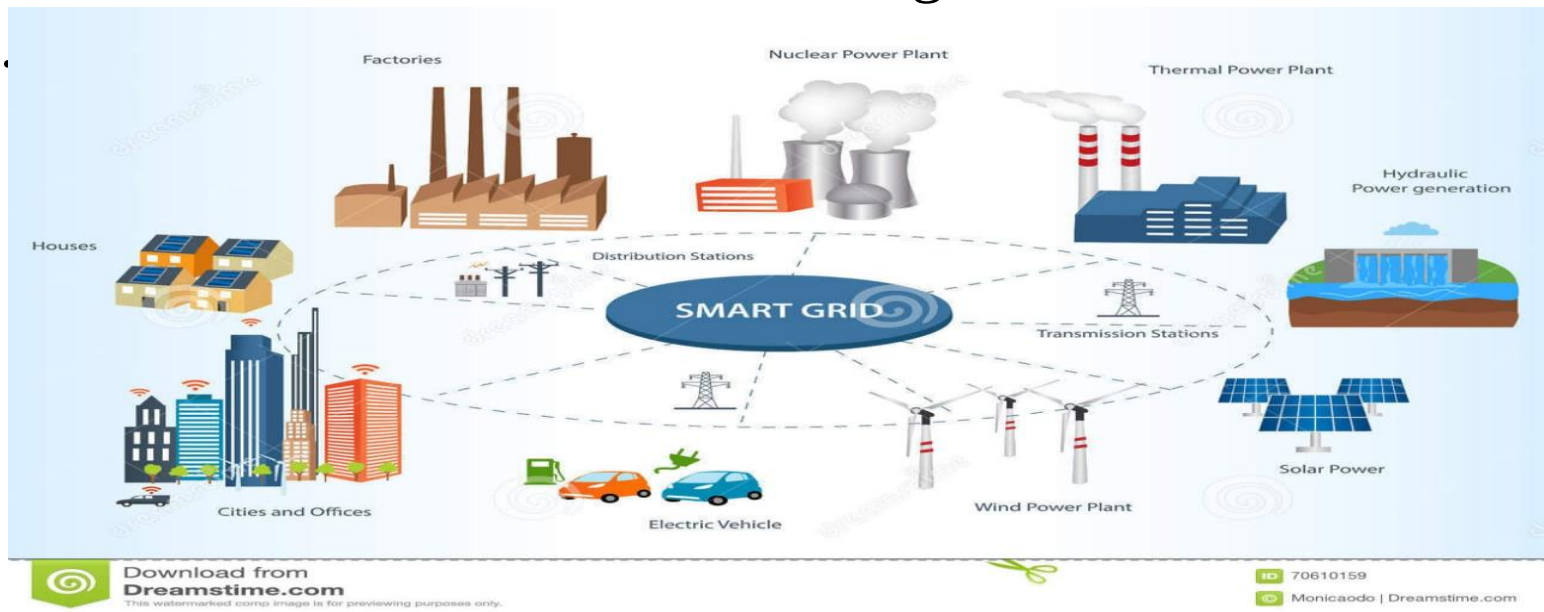


Figure 1 typical WTE diagram

Incineration Plant (EfW process / Municipal Combustion)

CONCLUTION

- The polluted urban cities are mostly support to climatic change
- Untimely energy usage the vastly pushed to climate change
- At present, commencement opportunity to sustainable energy technologies use for urban cities in Sri Lanka.
- Can build up sustainable urban cities in the future.
- Control green house gas emission sources use Such technologies become resultant urbanization.
- Content to collaborative of Governmental, nongovernmental institutions.



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THANK YOU !