The effective of the renewable energy technology on housing Environment

Course: Managing Within a Sustainable Environment

MSc Project Management

Ayman A. I. Melouk

Student No.:000526536-3

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Introduction

One of the definition issues of the 21st century will be the transition to a low-carbon economy. This aims UK to cut emissions by 34% by 2020 and at least 80% by 2050. UK plan to drive change in every area of life: the way we generate energy, the way we heat our homes and workplaces and the way we travel. UK have a choice between replacing people and economic with ever-increasing imports, be subject to price fluctuations and disturbances in the world market and stick with high carbon; or make the necessary transition to low carbon, right for climate change, energy security and jobs. The transition gives community the chance to lead the clean industries of the future. Across business, government can build up the skills to be more resource efficient, every financial officer knowing their savings and liabilities from carbon, every builder having the skills to build in a way which saves energy. UK have to minimize the costs of the low carbon path and spread them fairly.

Understanding climate response to a specified forcing is one of the major challenges facing the climate research community. Because of climate has already changed in the UK, government has a five point plan to tackle climate change[1]:

1. Protecting people from immediate risk
2. Preparing for the future.
3. Limiting the severity of future climate change through a new international climate agreement.
4. Building a low carbon UK.
5. Supporting individuals, communities and businesses to play their part.

Before starting to know what did government policy to change the community behavior and to encourage people to live with sustainable development and to reduce carbon emissions, we have to understand climate changes, why it changes and its impact on our life and finally how to improve sustainability life.

Global Climate Change

The average surface air temperature of the Earth is about 30° C and it is warmed by absorbing thermal Infrared radiation. The IR active gases responsible for the "greenhouse effect," referred to as "greenhouse gases." The concentration of greenhouse gases rapidly increased since the industrial period. The seven greenhouse gases are: **Carbon dioxide (CO2) - Methane (CH4)- Nitrous oxide (N2O) - Industrial Gases - Hydro-fluorocarbons (HFCs) - Per-fluorocarbons (PFCs) - Sulfur hexafluoride (SF6),** they allow sunlight to enter the atmosphere freely, but when sunlight strikes the Earth's surface, some of it is re-radiated back towards space as infrared radiation (heat). Greenhouse gases absorb this infrared radiation and trap its heat in the atmosphere.

For global climate change, Extensive efforts have been made to examine the trends in global and regional mean temperatures over time, which caused the recent global warming in the context of

[1] http://www.agu.org/eos_elec/99148e.html

the last 5 centuries[2]. It is important to consider other data that integrate the state of the climate system over space and time.

Carbon atoms are essential building blocks of life. For organisms they serve three main purposes:

- Structural components of organic molecules;
- Chemical bonds carbon forms to store energy;
- Atmospheric form of CO2 traps reflected long-wave heat radiation near the Earth's surface, causing a 'greenhouse effect' which has kept temperature within a range that sustains life for Earth's surface.

Building Metabolism: Understanding Effects on the Whole System

Dynamic interdependent systems for our life contain are: **the built environment, biogeochemical cycles and ecosystems**. Each is changes in response to the influence of the others, and how our built environment influences both ecosystems and biogeochemical cycles. All of them are elements of a greater system called **biosphere**, and these three interdependency realms (and others) are dictated conditions for life on Earth by cumulating their effective. We can think that buildings, suburbs, towns and cities are like a living body; they must be fed to processes what they receives to keep them alive with making waste products to be released into the environment[3]. To indicate the health of the total system, we have to know the relationships between built environments and nature. On this increasingly crowded planet, whole construction system provides stocks of an increasingly scarce resource – space.

People, motivating communities to participate in housing provision, therefore, a critical component of sustainable development strategies. Their Dialogue have developed a community building programme which creating better housing and community facilities for existing house into a model sustainable building called the Eco-Centre, and providing a community centre to get good learning ecologically sustainable urban living, and is being refurbished into an eco-home for an existing house which reconfigures interior space to provide better natural light, enhancing passive solar performance, and creating obvious links between house, garden, and Melbourne's first grey and black water on-site treatment and reuse system. Periodic maintenance and refurbishment also add embodied energy to a building.

Many professional organizations have responsibility for protecting the environment and they have recently published environmental principles. Ecological sustainability recognized as an ethical consideration with increasing environmental regulation and demand for high performance buildings.

It's very important to be concerned for declining health of ecosystems and functioned ecosystems are features of urban as well as natural environments. Both natural and urban ecosystems need preservation.

[2] http://www.agu.org/eos_elec/99148e.html

[3] Peter Graham, **Building Ecology First Principles for a Sustainable Built Environment**, 2003, Blackwell publishing Co.

Impaction of building environment

Because of construction, surrounding built environments are usually considered as immediate impacts. At the same time due to the material supply chain, natural environments remote from the construction project are impacted upon, construction projects may impact on natural environments which are far removed from the site and may be accumulative and long-term. Ramachandran[4] identified four categories impacting on environment associated with building[5]. They are:

- Resource depletion
- Physical disruption
- Pollution
- Social and cultural effects

Resource type: renewable, non-renewable or reusable?

The definition of renewable resources is used and reused resources without depleting their primary source, for example, solar energy is renewable because we cannot deplete the sun of its atomic energy; on the other hand, using renewable resources does not lead to ecologically sustainable results. Consumption levels which produce effects are excessive because they are not within the carrying capacity of an ecosystem, but reducing the effect of resource consumption on both supplying and receiving environments if resources are reused and recycled.

Non-renewable resources are those that are derived from depleting reserves of a primary resource, in the other side, minerals and fossil fuels such as coal, oil and natural gas considered as finite non-renewable resources, they contain energy in deposits that have taken millions of years to form. Some metals and aggregates like zinc, mercury and lead are becoming scarce and their reserves of are expected to last merely 20 years. The potential scarcity of zinc is of particular concern because it is currently used extensively in corrosion protection for steel. For non-renewable resources to be in level of consumption to be sustained are depend on:

- Reducing consumption;
- Conserving scarce resources;
- Ability of resources to be reused and recycled.

Transforming houses and communities in UK

The UK Government counts the greenhouse gas emissions in Houses and communities for about 13%, but by 2050, this emissions from homes need to be almost zero. The Transition Plan includes immediate help for households to make energy savings, also to meet the commitment to insulate six million homes by:

[4] Ramachandran, A. (1990) **The impact of construction technology on the environment.** Keynote address XVIII IAHS World Congress, October, Rio de Janeiro.

[5] Peter Graham, (2003) **Building Ecology First Principles for a Sustainable Built Environment**. Blackwell publishing Co.

- Creating and increasing the obligation on energy suppliers to reduce emissions[6] and save energy by supporting households, and an obligation on energy suppliers will be maintained further into the future, up to the end of 2012
- Support households to take action by:
    - Installing smart meters in every home by the end of 2020
    - Encouraging the provision of smart displays now and launching a new personal carbon challenge.
    - Developing more proactive services from the Energy Saving.
- Help people meet the costs of transformation.
- Coordinate the support available by delivering treatments to homes in low-income areas.
- Raise standards in every home.
- Help communities to act together.

The impact of these measures will be to add By 2020 an additional 6% to today's household bills with considering of all previously announced climate policies, and it will increase this figure to 8%. This Transition Plan will help the most vulnerable with their energy bills by; creating mandated social price support at the earliest opportunity, Increasing the level of Warm Front grants and Working to ensure that fuel poor households can benefit from new schemes, such as the Renewable Heat Incentive.

Renewable Energy Technologies (Renewables)

Renewable energy technologies generate electricity or heat from renewable energy resources such as solar radiation, and the potential energy from rivers and streams, wind power, or biomass. These technologies and resources are referred to as "renewables", which defined as energy sources with long-term supply characteristics with little chance of resource exhaustion for several hundred years, and in some times, it minimize environmental impacts, or improve environmental quality. The technologies of generating electricity include:

- Solar photovoltaic (PV) modules and arrays.
- Wind turbines and generators.
- Run-of-river micro-hydroelectric turbines and generators with no storage reservoir.
- Reservoir or storage based hydroelectricity facilities.
- Water velocity turbines – for capturing energy from moving water, including vertical-axis tidal generators and run-of-river Darrius turbines for micro-hydro.
- Biomass electricity generation or cogeneration systems – using waste products from the forestry industry or new biomass resources which are grown and harvested in a sustainable manner.
- Landfill and sewage gas electricity generation and cogeneration technologies.
- Electricity generation from combusting municipal solid wastes.
- Geothermal electricity generation and cogeneration technologies.
- Hydrogen fuel cells – if the hydrogen is derived from renewable resources.
- Tidal and wave power technologies.

[6] The Carbon Emissions Reduction Target

Photovoltaic as a part of solar collector in renewable energy technology:

Photovoltaic (PV) systems[7] convert sunlight directly to electricity, and they work any time the sun is shining, especially when the sunlight is more intense and strikes the PV modules directly, they produced more electricity (as when rays of sunlight are perpendicular to the PV modules). Unlike solar thermal systems for heating water, PV does not use the sun's heat to make electricity. Instead, electrons freed by the interaction of sunlight with semiconductor materials in PV cells are captured in an electric current. PV produces electricity without noise or air pollution from a clean, renewable resource. The basic building block of PV technology is the solar "cell." Multiple PV cells are connected to form a PV "module". Modules range in power output from about 10 watts to 300 watts. A PV system connected or the utility grid which contents of:

- One or more PV modules, they are connected to an inverter.
- The inverter converts the system's direct-current (DC) electricity to alternating current (AC).
- Batteries (optional) to provide energy storage or backup power in case of a power interruption or outage on the grid.

AC electricity is compatible with the utility grid. It powers our lights, appliances, computers, and televisions.

Conclusion:

- Worldwide temperature measurements, carefully screened for instrumental and measurement artifacts, such as effects of urbanization, have been used to estimate that global mean annual surface temperatures have increased between 0.3 and 0.6° C during the last 150 years [Hansen and Lebedeff, 1987; Jones et al., 1997; Nicholls et al., 1996].
- The transition to a low-carbon economy will be one of the defining issues of the 21st century.
- There are three interdependent systems: the built environment, biogeochemical cycles and ecosystems, each is a dynamic system and therefore changes in response to the influence of the others.
- Built environments, like our bodies, have a metabolism, and like our body's metabolism, the metabolism of a built environment can be mapped and measured. One method for mapping the ecological interdependency of buildings and built environments is using the extended metabolism approach.
- An important factor affecting the sustainability of resource consumption is whether renewable or non-renewable resources are being consumed and how they are being consumed. Most of the materials renewable.
- Renewable energy technologies are used to generate electricity or heat from renewable energy resources such as solar radiation, and the potential energy from rivers and streams, wind power, or biomass. These technologies and resources are referred to as "renewables".
- The UK has made good progress so far. Emissions have already fallen 21% below 1990 levels, nearly double what was promised at Kyoto. Low Carbon Transition Plan sets out the UK's first ever comprehensive low carbon transition plan to 2020. This plan will deliver emission cuts of 18% on 2008 levels by 2020.

[7] http://www.builditsolar.com/Projects/PV/pv.htm

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