

Photovoltaics (PV)

Traditional methods of electricity generation have created problems for our planet. Over-emission of carbon dioxide, methane, carbon monoxide, and other harmful gases has worsened the greenhouse effect. As a result, average temperature around the world keeps increasing steadily and rapidly in recent years. To treat this serious problem, alternative methods of electricity generation, featuring reduced or zero emission of greenhouse gases, must be innovated and improved. This learning module will focus on photovoltaics (PV), or solar cells, which is a new renewable energy resource under intensive development.

The mechanism of PV is to generate electricity by converting solar energy from the Sun (Whittington). Locations that receive more sunlight would have more opportunities to produce electricity. This technology is environmentally friendly because the conversion of sunlight to electricity does not involve any chemical reactions that release greenhouse gases. Its efficiency in energy conversion is about 24% (Whittington). The cost is moderate, pricing from \$0.30 to \$0.40/kWh, and slightly more expensive than wind energy, which is about \$0.06 to \$0.20/kWh. Technological advancement on silicon technology in recent years result in reduced cost and improved efficiency in PV technology (Dincer). The payback time of PV is about 3-4 years (Turner). It is expected to shorten the payback time to 1-2 years in the near future. The other advantage of PV is that it is easy to install. Even home owners in urban areas can install PV on their rooftops and generate electricity for their own use.

According to Dincer, there are several elements for renewable energy to effectively promote public interest:

1. Public awareness
2. Information
3. Environmental education and training
4. Innovative energy strategies
5. Promoting renewable energy resources
6. Financing
7. Monitoring and evaluation tools

Devotion by the public is essential to the improvement of our environment. Electricity users should take an active role to promote renewable energy resources. In order to save a livable environment for future generations, "greener" actions must be taken immediately!

Sources:

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