

# ETG Training To Live Training For Life Project

mission;

- to encourage and enhance the general public's pursuit of personal growth, self-education, and life long learning
- to change the paradigm of medical health, psychology, and parenting in our society
- to contribute to the removal of large numbers of "customers" from the old medicine and mental healthcare systems

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## Section 27

# Electricity Production

# Solar & Wind

## Amount Of Electricity Needed to Be Produced By Solar -----

- A kilowatt hour is an amount of force (1000 watts) passing through your house/apartment's electric meter over the period of an hour.
  - One kilowatt-hour (kWh) equals the amount of electricity needed to burn a 100 watt light bulb for 10 hours.
  - A 100 watt light bulb turned on for 10 hours.....uses one kilowatt hour of electricity.
  - [10] light bulbs [each 100 watts] turned on for 1 hour.....uses one kilowatt hour of electricity.
  - a Megawatt is 1,000,000 Watts.....a Gigawatt is 1000 Megawatts
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- A typical household in the U.S. uses about 870 kilowatt-hours of electricity.....per month.  
.....this is about 30 kilowatt-hours of electricity per day
  - An average size electric home in Austin, Texas [lots of air conditioning] uses about 1500 kilowatt hours per month  
.....this is about 50 kilowatt-hours of electricity per day
  - Solar panel system that produces 30 kilowatt-hours per day would be sufficient to provide 100% of the electricity for a typical household in the U.S.
  - Solar panel system that produces 50 kilowatt-hours per day would be sufficient to provide 100% of the electricity for An average size electric home in Austin, Texas
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- generally a 1 kilowatt solar panel system produces 1 kilowatt-hours of electricity during each hour that the sun is shining.
  - If the sun is shining 6 hours/day on average, a 1 kilowatt solar panel system will produce 6 kilowatt-hours of electricity.
  - If the sun is shining 6 hours/day on average, a 5 kilowatt solar panel system will produce **30 kilowatt-hours** of electricity.
  - A typical household in the U.S. uses about **30 kilowatt-hours** of electricity per day
  - generally speaking, **for most months of the year**, a 5 kilowatt solar panel system is sufficient to supply ~100% of the electricity needed **for most homes in the United States** [costs \$30,000 - \$40,000 in 2004, however many/most States have rebate programs, as do many city utility companies.....which may cut the cost by 45% - 75%]. Over the course of about 7 - 10 years, the system may pay for itself in the form of not having an electric bill, and/or being paid by your local utility company for excess electricity your house produces.
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- A typical solar panel generates 100 Watts and measures about 2 feet by 4 feet [takes up **8 - 10 square feet**]
  - a 5 kilowatt solar panel system will take up about **500 square feet** of roof space
  - most normal size houses in the U.S. have at least **900 square feet** of roof space
  - you'll need about **100 square feet** of roof space ---**for every kilowatt**--- that you'd like to have for your house.

## General Examples of Quantity of Electricity Use -----

- A 12 cubic feet Refrigerator uses about 67 kilowatt hours.....per month
  - about 2.2 kilowatt hours.....per day [about 100 watts per hour]
- A Color Television (in use 6 hours a day) uses about 50 kilowatt hours.....per month
  - about 1.7 kilowatt hours.....per day
- A personal computer (in use 10 hours a week) uses about 13 kilowatt hours.....per month
  - about 0.5 kilowatt hours.....per day
- energy use is [10 kilowatts per hour] from an air conditioner run for 7 hours to maintain 76 degree temp in the house
- Florida, in June, house uses about 60 kilowatts per day

### Cost Of Electricity Production ---

- By way of oil/gas.....Americans spend 10 cents of every dollar on energy
- Oil/Gas driven utility companies charge 5 to 10 cents per kilowatt hour [ and about 40 cents during summer peak hours]
- wind power costs about 2.7 cents per kilowatt hour
- oil/gas energy in California, Montana costs about \$25 - \$30 per megawatt hour
- wind energy from west Texas windmill farms costs about \$27 per megawatt hour

### Solar Panels ---

- Photons [light particles from the sun] strike a photovoltaic [PV] cell [a solar panel], many photons are absorbed, and cause movement of electrons that are associated with the silicon atoms in the PV cells.
- efficiency of most solar panel systems.....4 - 16% of sunlight is converted to electricity.

### Solar "Shingles" -----

- shingles produce about 3 kilowatts per home = about 75% of electricity needs

### Large Scale Solar/Wind Projects -----

- need about 350 megawatts for every 350,000 homes
- Stirling Dish Technology [Solar power plant]....designed to provide power on an industrial scale
  - focuses sun's rays to heat tubes filled with synthetic oil, the heated oil runs steam turbines
  - thermal plant built in Barstow, California
  - generates 354 megawatts, enough for about 350,000 homes
- Texas uses ~60,000 megawatts during the summer
- Austin, Texas uses 10,000 megawatt hours per year
- A **Landfill electric plant** in Los Angeles produces enough electricity from methane to power 100,000 homes
- West Texas windmill plants produce 760 megawatts when wind blows at 28 mph