



TheElite Training Group track club

## Expanding the area of what is possible

In Track & Field Distance Running & Competent Self-Care in medicine and psychology

# basics of solar & wind electricity

**A major part of TheETG mission** is to expand the area of what is possible in competent self-care in medicine and psychology. TheETG's primary method of achieving that is to proliferate applied science based information by way of – free– packets containing plain language info for “the average joe” seeking to move themselves or others forward in these areas. The mail problem TheETG packets attempt to address.....

“...takes an average of 17 years to translate 14% of original research into benefit.....average of 9 years for interventions recommended as evidence-based practices to be fully adopted.”

M.Tinkle, et al  
Dissemination and Implementation  
Nursing Research and Practice...Volume 2013

**Competent Self-Care: Medicine**.....The best medicine comes with no risk-versus-benefit equations to contemplate, no daily violations of “first, do no harm”, no whac-a-mole medicine being practiced to medicate each health issue as it pops up. To be a good doctor one must -first- be a good physiologist. And in order to have a fully functioning health care system available to all human beings in America its core must be comprised of competent self-care and good physiologists.

**Competent Self-Care: Psychology**.....So-called “mental health professionals” should practice more mental health and less pharmacology. The goal of applied psychology is to empower people to achieve self-mastery. This should be the goal of competent self-care and all psychologists. Parenting....dysfunction moves from the parents, into the home, into the kids, into the streets, into the norm. Personal growth toward being a fully functional human being can move from the parents, into the home, into the kids, into the streets, into the norm.

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# 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