Why Should Christians Care About Energy?

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Energy in Our Daily Lives

Energy is everywhere!
Energy: How Much?

Humanity uses ~15 TW in 2012

Average per capita US consumption is ~10 kW
200 Years that Changed the World

- wealth and health animation from Gapminder.org
Wealth and Life Expectancy
Wealth and Child Mortality
How Did We Become Wealthy and Healthy?

- Industrialization: science and technology
- Public health and medicine
  - sanitation
  - infant mortality
- Food security
Energy and Wealth
How Useful is Energy? Farming.

200 years ago, basically everyone in the world relied on human or animal labor for farming.
How Useful is Energy?  Farming.

Mechanization and industrial production of fertilizer have greatly increased agricultural productivity and crop yields.
How Useful is Energy? Light and Heat.

1/3 of the world uses traditional biomass (wood, dung) for cooking. Associated health problems, pollution, and depletion of forests.
How Useful is Energy? Light and Heat.

Lighting at night can help with education.
How Useful is Energy? Industry.
How Useful is Energy? Transportation.

Not so long ago, people were lucky to have one horse to ride or help carry stuff.
How Useful is Energy?  Transportation.

Now in rich countries we have the equivalent of hundreds of horses!
Energy in Our Daily Lives (US)

- Transportation: 29%
- Industry: 30%
- Commercial: 19%
- Residential: 22%
Energy Slaves!

147 energy slaves working 24/7
Energy and Wealth

• Good news! We are rich on a world-historic scale!

• this wealth is facilitated by our use of energy

• the Bible is full of references to wealth, including warning against the love of riches, the value of good stewardship, and the need to be concerned for the poor
“Command those who are rich in this present world not to be arrogant nor to put their hope in wealth, which is so uncertain, but to put their hope in God, who richly provides us with everything for our enjoyment. Command them to do good, to be rich in good deeds, and to be generous and willing to share. In this way they will lay up treasure for themselves as a firm foundation for the coming age, so that they may take hold of the life that is truly life.”

1 Timothy 6: 17-19
Wise Choices for Energy?

- Wise stewardship of our resources
  - including for potential negative effects of energy use (pollution, climate change)
  - ensuring that future generations will receive an “inheritance” (livable environment, available energy resources)
- Peace and justice (oil wars, dictators)
- Concern for the poor
Energy in Developing Countries

• 1.6 billion people have no access to electricity

• Other than Libya, Egypt and South Africa, less than 20% of people in African nations have access to electricity

• Poor infrastructure means that “distributed” electricity generation is often needed
  – diesel generators OR
  – renewable energy e.g. solar, wind
Solar Powered Lighting

Solar lanterns (solar cells + battery + LED lamp) are brighter than traditional kerosene lamps. Plus they don’t require costly fuel.
Solar Powered Water Pumps

Solar cells + pump + water storage tank.

Provides clean water, for up to thousands of people, depending on well size.

Can be used for agricultural irrigation.
Solar Cooking

Cardboard + metal foil + pot.

Good for slow-cooking of food, particularly stews.

No smoke and pollution hazardous to health.
Solar Cooking

Drastically reduces need for firewood.

Mitigates de-forestation.

Frees women and girls from time-consuming tasks of gathering firewood and tending fires. Benefits education of girls and economic opportunities for women.
Bio-Gas for Cooking

Bio-gas can be made from animal dung, sewage and organic waste.

Bacteria digest the biomass in oxygen-free environment, producing gas.

Gas is mainly mixture of methane and $\text{CO}_2$, and can be burned similar to natural gas.
“Micro-Grids” for Access to Electricity

Small-scale solar (photovoltaics), wind, and hydro-power to generate electricity for a local area not connected to a national/regional power grid.
Big Picture: Growing Energy Demand in the World

• Population growth from current 7 billion to 9 billion by 2050

• Increased energy use per capita, and wealth, in developing countries

• IEA projects a 55% increase in total energy use from today, from 15 to 28 TW!

• How will we supply this energy?
Summary

The earth is the LORD’s, and everything in it, the world, and all who live in it.

Psalm 24: 1