

Watt's Happening? #177

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AN OCEAN OF ENERGY

Nature is returning. As humanity has scaled back its frenzied activity while in the grip of a global pandemic, the porpoises are returning to Venice, the stars are visible again over Hong Kong and Los Angeles.

This tells us at least two important things: the natural world is still there to help us if we give it a chance; and there is something seriously wrong with an economic system so intimately tied to environmental destruction.

Is there a better way to do things? Of course there are! Can we have a thriving economy, rich and rewarding lives and a clean environment too? You bet. Mostly it boils down to energy.

ENERGY EVERYWHERE

For thousands of years before the Industrial Revolution, humans had a wide range of energies at our disposal. We could burn wood to heat our homes and smelt iron, we harnessed wind power to sail the oceans, we had watermills

and windmills to grind grain, and we had the muscle power of our own bodies and those of domesticated animals to build great structures like the pyramids.

But until the Industrial Revolution, we had not the slightest idea of how to convert one energy source into another. We could not burn wood to grind grain, for instance.

Steam power changed all that overnight. After thousands of years of never even thinking much about it, somehow we discovered that by burning a fuel like wood or coal to boil water, we could capture the steam created and force a piston to move back and forth. For the first time, we had learned how to convert one form of energy (heat) into another (motion).

Now, several hundred years later, we know how to convert just about any source of energy into any other, and the number and variety of energy sources at our disposal just keeps growing.



Can we create a 21st century world where nature and humanity live together and both prosper? Now we know that yes, we can.

Bear Mtn. Wind Park, Don Pettit photo

FOREVER ENERGY IS HERE

Solar energy has been powering life on planet earth for a few billion years now, and will continue to do so for several more billion years.

Only a tiny portion of the sun's energy falls upon our little planet, but that amounts to some 4 billion exajoules of energy each year (a joule is a metric unit of energy, about the amount you expend to lift an apple one meter straight up; an exajoule is a billion, billion joules).

All the world's plants capture about 3,000 of those solar exajoules through photosynthesis. All human industry and activity consumes about 500 exajoules per year, mostly through the burning of fossil fuels. This is about what the Earth receives from the sun every 90 minutes.

And that's just from raw sunlight. Wind energy is solar energy converted to wind power, caused by the atmosphere moving from one place to another due to uneven solar heating.

Gravitational energy is available in the power of the tides caused by the moon's pull on the earth or by the power of falling water in the Earth's gravitational field.

Geothermal energy is available from the heat generated by the molten core of the Earth itself.

All of these energies: solar, wind, gravitational and geothermal, are essentially eternal energies, constantly renewed by the forces of nature. They are free for the harvesting. They are non-polluting, the same energies that have been powering life here for billions of years.



All the energy needed by our modern world each year falls as sunlight on the Earth every 90 minutes.

The key is that we now know how to convert any of these natural energies into other energies: motive power, heat/cold, and now, most importantly, electricity.

Electricity is probably the most versatile and useful form of energy. Once your natural energy source is converted to electricity, it can then be used for essentially anything we can imagine, from computers to automobiles. It travels through a simple wire at almost the speed of light (186,000 miles per second) arriving

right where it is needed exactly when it is needed, no pipelines or air pollution required.

There is no reason whatsoever of staying with any particular source of energy if it is proving to be a problem. We can switch to something better.

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