

Turning Green (Energy) Into Gold

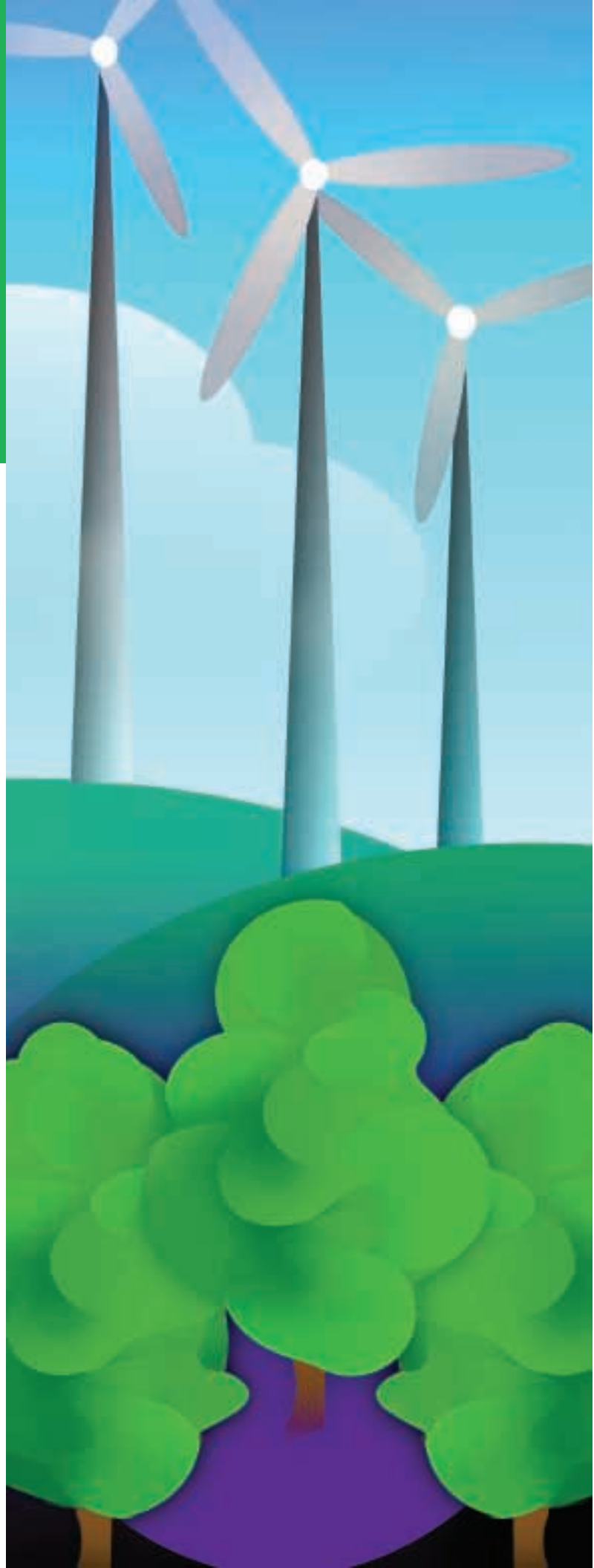
by **HANS HERRMANN, President -
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Do you know who the largest consumer of green energy in the U.S is right now? It's the United States Air Force. Did you know that a solar panel in Chicago will produce nearly the same amount of energy as one in Miami, and that Chicago's usable sunlight is nearly equal to that of Los Angeles and Atlanta? Be prepared: green energy is full of surprises!

Green is the new buzzword. Everyone agrees that green energy is a good idea. No matter what your personal beliefs or your political leaning, it's hard to argue against an energy source that doesn't pollute, constantly renews itself and decreases our dependence on foreign suppliers. But, as in starting a diet, an exercise program, reading more, or spending less money, all of which are great ideas, the overwhelming questions of how and where to start keep us from moving forward.

The main obstacle is an obvious one: start up costs. Green Energy, whether it's solar, wind, combined heat and power or micro-turbines, requires a substantial initial investment. In Europe, where green energy is much more prevalent than in the United States, government incentives and higher energy rates have played a significant role. Current government incentives here in America aren't very helpful to condominium associations and other not-for-profit groups, as they are built around tax credits and accelerated depreciation. If green energy is going to happen now, we need to find other benefits and a creative solution.

Answers can come from American ingenuity, i.e. working together with strategies that can help all involved. Energy conservation will need to be part of any energy plan, as with conservation there are the associated cost savings. A condominium association that is unified behind a commitment to green energy can package power generation (solar panels, combined heat and power, etc.) with a comprehensive plan to increase efficiency and reduce use



throughout the property. This “bundled” green energy solution enhances the economics of the project. One more step is needed to make the economics work for condominium associations in Illinois — structure the solution as a Power Purchase Agreement (PPA).

Most solar and wind green energy projects in the U.S. have been structured as a PPA's. A PPA brings together vendors, investors and buildings seeking green energy installations in a partnership where each party contributes and each party benefits. Investors contribute upfront costs and in return, enjoy the benefits of government incentives, as well as a steady return from the generated energy the condominium association purchases. The vendors provide the latest and greatest equipment and get access to customers who otherwise could not afford their technology. Condominium associations provide the site for the installations and in turn, enjoy the benefits of their personal green energy, and have predictable energy expenses with no out of pocket, upfront costs.

Plans such as these require a new forward thinking attitude towards energy. In the past, energy has been a somewhat predictable, regulated expense. Today, energy consumers can have a more active role in their energy plan and can take steps to understand and be aware of their energy options. This is a great time to seek out and consult with the experts.

Here's an overview of some of the green technologies available today:

Solar Photo Voltaic (Electric) –

There are multiple new applications coming on the market. Integrated building systems (shingles, wall panels, and windows that actually contain the solar cells in the product), thin film (cheaper, but also a lower efficiency), concentrating photovoltaic which shows promise, and the standard crystalline silica. You can have a fixed mount or a tracking installation. Tracking follows the sun and can generate 25% to 30% more electricity, but comes with a larger investment and higher maintenance costs.

While there is great potential in the new technology, with the expectation of a system lasting 30 years or more, the finance options are mainly focused on the established systems with a track record. The upfront cost of a solar installation can pose a problem at today's rates. A 100kW system requires approximately 30,000 square feet of roof space and \$750,000 in capital. A system of that size will generate approximately 200,000 kWh per year of electricity. There are not many roofs or spaces in Chicago that can accommodate such a large installation. But there are



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many roofs on many different buildings in Chicagoland, when aggregated, that will offer opportunities for multiple solutions.

Wind Turbines –

Wind is a rapidly growing renewable energy source that can produce competitive power in many markets with utility scaled wind farms. There are two main types of turbines; horizontal axis wind turbine (HAWT) — think propeller — and vertical axis wind turbine (VAWT) — think egg beater. Wind power has a cubic relationship to wind speed: a site where average wind speed is 20 miles an hour will actually generate more than twice as much power as a site where wind speed is only 15 miles per hour on average. So, elevating your tower (free of obstruction) can make a huge difference. In fact, the three main problems for wind development are:

1. Tower height is too low.
2. Tower height is too low.
3. Tower height is too low.

Ideally, the tower should be at least 50 feet higher than any object within 3,000 feet to reduce the eddy current and loss of wind power. A number of companies are trying to sell very small scale units that mount on a roof with the concept “it is always windy up there.” However, non-uniform wind direction and constant wind power makes the wind lose the ability to generate electricity economically for the investment required. Cost per kW also increases for small sites to the point that solar electric makes more sense. Most small roof mount systems are priced \$6,000 to \$8,000 per kW. By comparison, large scale turbines are approximately \$1,500 per kW, but where do you fit a 300 foot tower?

Combined Heat and Power (CPH) –

Typically, this system is an internal combustion engine or turbine (using natural gas as its fuel) that generates electricity on-site while capturing the waste heat for the facility to use for heating or hot water. These systems have an overall efficiency of 80% to 90% compared to a utility operating at 35%, which then dumps all of the waste heat into the atmosphere. This improved efficiency is definitely green. There are systems sized from residen-



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tial, small scale turbines that can be moved to a basement or roof top in the elevator, to massive systems for hospitals. The key element is to size the system to the thermal need and not the electric need. In Europe, 30% of the electricity being generated is through CHP systems. The cost is lower and it benefits the environment.

Energy Efficiency –

The greenest energy is the energy not being used. Energy savings opportunities range from lighting technologies, daylight harvesting, waste heat recovery, water efficiency improvements (3% of electricity used nationwide is for pumping water or waste water treatment) and HVAC controls and efficiency upgrades. Any green energy program should include an audit which can identify and combine energy efficiency improvements to reduce consumption.

Fall is the season of changing colors. There will be numerous green energy solutions coming to the Chicagoland area specifically targeting multi-family residential properties. You'll have your chance to turn green (energy) to gold.



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