SUSTAINABLE PLANET USA ORGANIZATION

ENERGY INDEPENDENCE THROUGH INNOVATION

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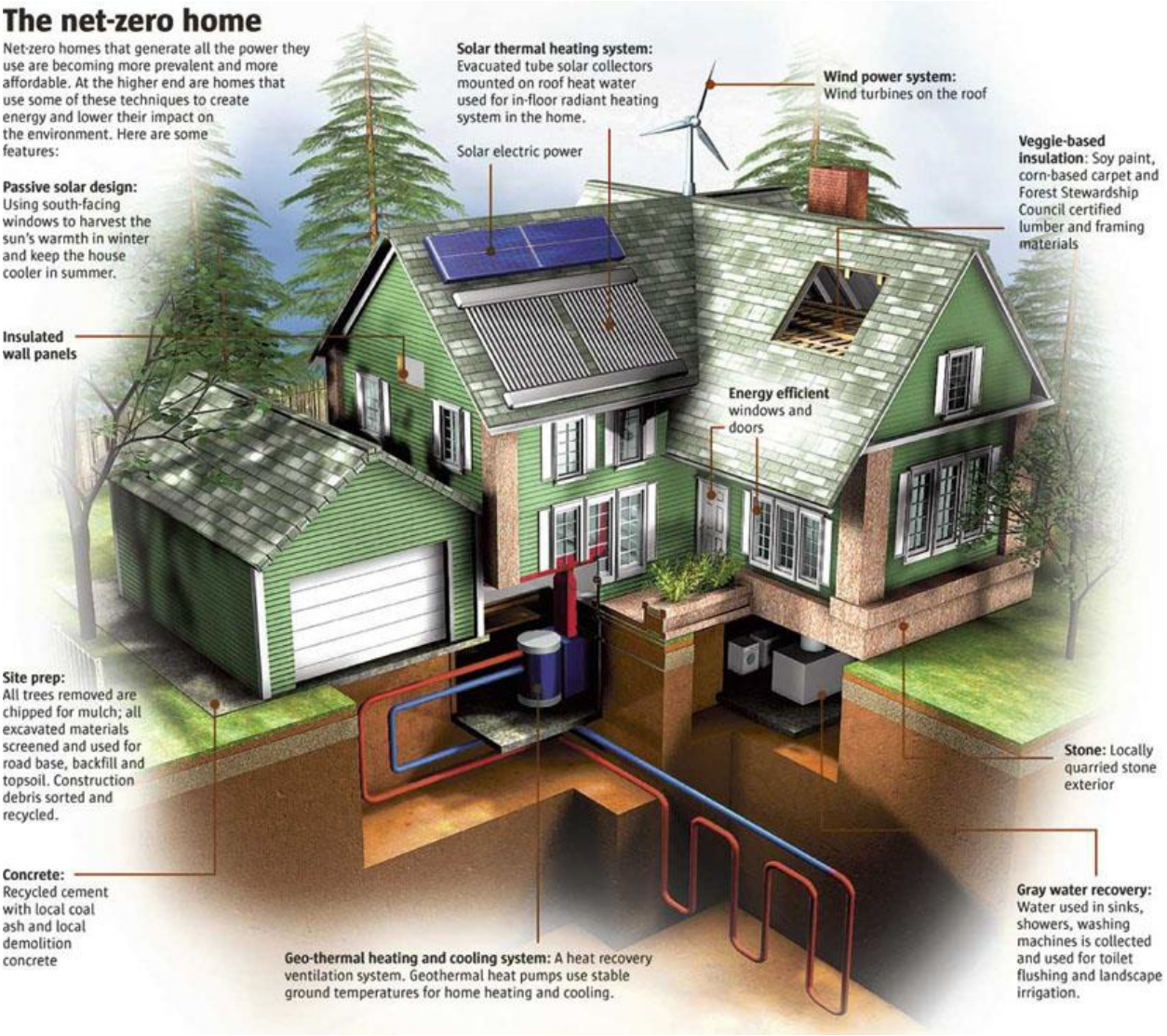
PROPOSAL TO REINVENT AMERICA'S ELECTRIC INFRASTUCTURE



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Secretary of Energy Rick Perry
U.S. Department of Energy
1000 Independence Ave. SW
Washington, DC 20585

Dear Secretary Perry,

America's national security is in danger due to our outdated, decaying, and poorly designed electric power infrastructure. This requires changing how we think about the generation, transmission, and distribution of power throughout the United States. High Voltage Alternating Current HVAC is our main power source but High Voltage Direct Current HVDC has been used effectively since the 1930's with undersea and land power lines. HVDC expanded as equipment evolved and the longest HVDC power line in America is 846 miles. It was completed in 1970 from the Columbia River in Oregon to Los Angeles and it has provided electricity to 2.5 million homes for 49 years. During the last 30 years, distances have expanded to 2000 miles worldwide and today there are HVDC lines being built from 500-2500 miles in many countries including China, Russia, Germany, India, and Brazil. The reasons for the change from AC to DC is that DC is easier to control which reduces blackouts, it costs less to transmit, it's better when crossing oceans and national borders, and it works with renewable energy.

The U.S. spends $1 trillion annually on all forms of energy and $400 billion on electric power alone. Unfortunately, 55% of our electricity is wasted due to the inefficiency of the AC grids and our current inability to store electricity in batteries once it has been created. We have a plan to redesign, rebuild, and strengthen our grids, which will eliminate 90% of our wasted power. The electricity that we save could be used to charge all of America's future electric vehicles. Instead of sending AC electric power directly to consumers from large power plants, we need to start with consumers and work outward. This is how futuristic solar, wind, and DC battery power storage microgrids are created that operate independently from the electric grid. The storage of electric power is the key to reducing America's dependence on fossil fuels, making our country energy independent, and also providing emergency backup systems for all 150 million U.S. homes and buildings. Battery power storage must be fully developed and implemented to protect our grids and to save U.S. consumers $200 billion each year.

Additional problems are that most homes and buildings are very energy inefficient. This makes them waste huge amounts of power and 50% of U.S pollution is caused from the generation, transmission, distribution, and use of electricity in our homes, buildings, manufacturing, and industry. Breakdown for U.S. consumption is 38% homes, apartments, and condos, 37% commercial, and 25% industrial. Today, 29% of U.S. power is generated from coal and it's one of the main factors in causing our high pollution levels. Coal can be eliminated by changing our focus to creating Positive Energy Structures (PES) which produce more power than consumption and creating a HVDC infrastructure to transmit, distribute, and store electricity in battery power storage microgrids. This includes small battery units for homes, apartments, condos, and small buildings, medium-sized units for 100 electric consumers and medium-sized buildings, and large battery units for 1000 electric consumers and large buildings.

HVAC that is generated at large power plants should be sent to 15,000 HVDC battery power storage substations located in and near towns and cities across America and every substation will provide power for 10,000 electric consumers. This will help stop the 55% loss of electricity that occurs when sending AC power directly to end-users. Once the electricity is created, it can be stored long-term in DC batteries and homes and buildings can send their surplus power to the grid to receive a credit. HVAC should be phased out in the U.S. over the next 30 years and the total cost to replace it with HVDC will be $750 billion. The payback period would be less than four years. The U.S. government should fund this cost-effective Apollo scale HVDC project so we don't fall behind other counties that are switching from HVAC to HVDC and renewable energy. This effort will lower the price of electricity by 50%, reduce U.S. pollution by 25% which is a major U.S. goal, and it would create millions of jobs.

Traditionally built homes consume an average of $1500 each year in electricity and extremely energy efficient homes consume 1/3 of this amount or $500 annually. If you install 20 solar panels covering 350 sq. ft. at an energy efficient residence, the panels will generate an average of $50 each = $1000 annually in electricity. This will create a surplus of $500 in electricity to charge electric vehicles or to sell to the grid. This concept is our planet's future because it will change homes, apartments, condos, and various buildings into power generation facilities instead of just consumers of electricity. Homes that generate more power annually than they consume are called Positive Energy Homes (PEH) and homes that create enough electricity to equal their consumption are called Net Zero Homes (NZH).

There are numerous energy saving concepts that are utilized in PEH and NZH that can be applied to existing traditional homes. This includes impact insulated windows and doors that can save 20% of a structure's energy consumption, insulated and sealed attics that can save 20% of the heating and cooling energy used in peaked roof homes, and the sealing of all air leaks that can save 20%. Payback periods will be 5-10 years. A mistake in home construction is that the floors in unfinished and unused vented attics are usually covered with insulation when the best place to install insulation is over the bottom of the roof rafters. Insulating and sealing attics causes attic temperatures to be similar to occupied areas. The alternative is traditional attics with heating and cooling ducts running through the space, where temperatures can reach between 120-140 degrees in summer and 20-40 degrees in winter. Insulating and sealing attics with common (R40) 8" foil-backed ridged foam insulation will cause attics to stay between 60-80 degrees. This creates a zone that reduces heating and cooling costs by 20% and it can provide added square footage in homes that will increase real estate values.

Energy efficiency has continually improved in industries such as automobile manufacturing but the home and building construction industry has been slow to implement energy saving practices that benefit buyers financially and reduce pollution. Builders aren't doing buyers a favor by only including the minimum in energy efficiency because the costs to occupy structures are higher from increased utility costs. The choices are investing $$ in a structure to reduce utility costs and potentially creating a profit or paying an equal amount annually in higher utility bills that provide no $$ return. PES have evolved and there is no reason to not use some of these energy saving concepts in new construction.

Homes and buildings are individually created which makes it difficult for builders to compete with the auto industry and mass-produced vehicles. To lower construction costs and increase efficiency we need to embrace some of the practices and high standards that automakers use to create better and less expensive products that are cheaper to operate. An example is that every structure should have energy efficient impact windows and doors because the utility and insurance cost savings will offset the higher mortgage costs and structures will be quieter, more comfortable, and more secure.

In hot weather, clothes dryers typically pull cool air-conditioned air into the dryers, which is heated and sent outdoors. This wastes energy and creates a vacuum inside the home that pulls hot outside air into it from the many air leaks in the structure. This causes the air-conditioning to work overtime. Dryers should be designed, located, and utilized to maximize efficiency and a missed opportunity in cold weather is that dryers create hot air that is sent outdoors when it could be used to provide heat for a home. This includes heating hot water tanks and providing radiant heating in floors, ceilings, and walls. We will expose design flaws and promote benefits and ask architects/builders to consider them when creating structures to attain greater energy efficiency, reduce costs, and lower pollution.

On May 9, 2018, California passed a new regulation which starts on January 1, 2020, that requires builders constructing new homes, apartments, and condos under four stories to install solar panels. This is a major step forward in the housing industry to reduce America's dependence on fossil fuels and it provides consumers with free electricity from the sun. Unlike the auto industry which has high national standards for vehicles, building codes across the U.S. are low and vary depending on the region. It is important to know that for every $10,000 spent adding solar to new homes, apartments, condos, and commercial and other buildings, the return on investment can be over $30,000 during the 25-year lifetime of the equipment. In the future, the $20,000 in profit will increase because solar panel efficiency has improved by 5% annually, while the costs have declined. Since most structures are designed to last 100 years, adding long-term upgrades such as energy efficient impact windows and doors to raise the efficiency of structures will provide huge $$ benefits during a structure's life.

There are a few national home builders who are starting to test the market for constructing PEH and NZH but this will be slow in development. To help speed up this process, we will create and promote a revolutionary microgrid PEH energy independent grid-tied community in Florida with 100 futuristic homes and a town center built on 40 acres of land. We will demonstrate many new cost-effective renewable energy concepts to set a new high standard in the U.S. construction industry and we will connect all of the structures together so they can share electricity. We will install 4000 solar panels and battery power storage on two acres of land in the community to provide a solar farm which will generate $2000 each year in free power for every residence and their electric vehicles. The homes will be designed to last 100+ years and each home will generate and save $2000 annually in energy.

In our revolutionary homes we will install DC powered renewable energy equipment and technology and innovative construction elements which will create 300% more in $$ savings than the costs to provide these items. This will include LED lights, ultra-efficient air-conditioners, smart thermostats, Energy Star appliances, radiant heating and cooling in floors, ceilings, and walls, passive geothermal, solar panels, small wind power generators, solar thermal hot water panels, battery power storage, air and water purification, cool roof designs, insulated and sealed attics, impact insulated windows and doors, and rainwater storage, etc. These items will provide annual utility and insurance savings which will offset the added costs that will be paid through low interest 30-year mortgage payments.

One million new homes and buildings are built in the U.S. annually. We propose to begin eliminating America's 55% waste of electricity by starting with new structures which is the most cost-effective way to install renewable energy equipment. The 1st step is to add small $2500 four-part systems to the structures that will include four solar panels and one wind power unit to create power, two solar thermal hot water panels to lower energy usage, and one battery power storage unit to store power. By starting with new structures this will reduce costs because the equipment designs will be identical and included in the architectural plans. If larger systems are desired, the systems could be expanded.

Considering the cost to install the one-design renewable energy systems in new structures will be $2500, this will be 25% of the cost to install similar systems in existing structures. The cost to install one million small systems annually in all new U.S. homes and buildings would be $2.5 billion. This is reasonable when you consider that from 2008-18, federal and state renewable energy subsidies for home and building owners have averaged over $2.5 billion annually. Unfortunately, the majority of the on-site energy systems were installed inefficiently. This is because 95% of the equipment was installed in existing structures which involves custom installation of non-standardized designs. This makes the project roughly four times more expensive when compared to installing the one-design systems in new structures. After spending 10 years improving the efficiency of the small systems by 100% and reducing costs by 50%, we can begin cost-effectively installing them in existing structures.

One major factor which supports adding on-site renewable energy is that the electric power that is generated at homes and buildings is free. In contrast, electricity that is provided by for-profit electric utilities is never free. This is why most utilities do not encourage home and building owners to add renewable energy to their structures. They say that they support expanding solar and wind power but only if they can sell the electricity that is produced. This is about making profits for the utilities and their stakeholders and they don't want to give up their total monopoly for producing electricity. The utilities support renewable energy but only if they can build large solar and wind farms and then sell the power. Electric consumers usually pay for these farms from rate increases and utility profits. This practice has been common for decades when building 100% subsidized nuclear power plants.

The $2500 four-part solar, wind, solar thermal hot water, and battery power storage systems will generate and save an average of $375 annually on electricity = 25% of a typical homeowner's $1500 consumption. The systems will last 25 years with an average payback = 6.7 years. Potential benefits include that the battery power storage units could be charged from the grid during off-peak hours (11pm-5am) when rates can cost 50% less. This will help flatten our grids and reduce electricity costs by decreasing daytime peak power use and increasing non-peak power at night. This concept could be expanded by charging medium-sized power units for 100 utility consumers, large units for 1000 consumers, and very large units for 10,000 consumers during non-peak times to prevent blackouts and lower costs. This creates a four-tier battery power storage microgrid that starts with homes and buildings which provides them with power and security by connecting them to 10,000 consumers.

This revolutionary renewable energy and battery power storage concept works on the same basic principle as rechargeable flashlights, cell phones, laptop computers, battery powered tools, and electric vehicles, etc. They pull AC electricity from the grid to charge DC batteries inside a device and store it until needed. Low-voltage DC (12-110V) is utilized to run lights, appliances, and electronics in yachts, motor homes, airplanes, and trains. We should use this same safe, reliable, efficient, and proven system in new and existing homes and buildings. And because of the lower voltage used, we can use the existing wiring systems in older structures. This is not reinventing electricity but instead using well known electricity concepts developed over 100 years ago to create new energy benefits.

An example is that most people know Thomas Edison demonstrated the first DC electric lightbulb at his lab in Menlo Park, New Jersey on Dec. 31, 1879 and he lighted Lower Manhattan on Sept. 4, 1882 with DC electric power for 59 customers. But most people do not know that in May 1880, the first demonstration outside Edison's laboratory was on a new 334 ft. steamship called Columbia using 120 DC lightbulbs. Edison installed the lights while the ship was being constructed and it operated for 27 years from California to Alaska until it sank from a collision with another ship on July 21, 1907.

By 1887, Edison installed DC power in 121 U.S. locations. He promoted DC for safety reasons because it powered lights and electric devices at 12-110V versus AC at 110-240V. It's critical to know that by using DC voltages which are lower, safer, and more stable, it can require less power to operate lights, appliances, and equipment. This reduces the usage and cost of power and lowers pollution, and the stability of DC means surge protectors may not be needed and any electrical device will last longer. The reason DC was replaced by AC, which was invented by Nikola Tesla and implemented by George Westinghouse, is that during those early years, DC could only be sent efficiently one mile. This is not the case in 2019, with modern equipment that can transmit DC 2500 miles more efficiently than AC. It is a tragedy that Edison and Westinghouse were bitter rivals because if they had worked together, they could have created an infinitely safer, cleaner, cheaper and more reliable hybrid AC/DC system.

Thomas Edison received 1093 patents and he filed a patent for a DC electric subway train in 1882. Today, most of the world's subways run on DC electricity because it costs less and it's more reliable than AC. Edison created his first of three electric vehicle prototypes starting in 1895 and there were more electric vehicles in the U.S. in 1910 than gas vehicles. Edison worked with Henry Ford, a former Edison Company employee, from 1896-1918 to develop electric vehicles. But when Ford was about to order 100,000 of Edison's large DC EV batteries to start manufacturing electric vehicles in 1918, the availability of cheap gasoline caused Ford to cancel this visionary project. Imagine how different things would be today if Ford and Edison had begun manufacturing hybrid electric and gas vehicles in 1918. But it's never too late to change the future. By redesigning, rebuilding, and strengthening our grids, improving the energy efficiency of U.S. homes and buildings, and eliminating our 55% in wasted power, we will be able to utilize the power saved to charge all of our future electric vehicles.

In 1913, Henry Ford revolutionized vehicles by mass-producing one-design automobiles. It originally required 12 hours to create one Model T but after Ford added assembly lines, the cars were built in 1.5 hours and costs dropped from $900 in 1910 to $265 in 1925. We will promote this same concept to create inexpensive one-design renewable energy systems for all of America's 150 million homes and buildings. We also will encourage combining HVDC and battery power storage to create a more efficient electric infrastructure while phasing out HVAC over 30 years. The 150 million small $2500 systems for structures will work with 1.5 million medium-sized battery power storage substations (100 consumers), 150,000 large substations (1000 consumers), and 15,000 very large substations (10,000 consumers) to create and save enormous amounts of power. This will strengthen our grids, reduce U.S. dependence on fossil fuels, lower the cost of power by 50%, reduce pollution by 25%, increase our national security, create millions of jobs, and help make America energy independent.

These energy concepts can be applied globally to start our small and rapidly shrinking planet on a new crucial pathway to reducing fossil fuels and replacing them with renewable energy. We are at a turning point because our planet will grow to 10 billion people within the next 50 years. Now is the time to create a better world by changing to a free, clean, safe, and unlimited solar, wind, solar thermal hot water, and DC battery power storage alternative, and this will reduce global warming!

I look forward to hearing from you soon regarding my proposals.

Kind regards,

Patrick Post Executive Director Sustainable Planet USA Organization