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Chapter 1 : What Are the Effects of Overusing Energy? | Home Guides | SF Gate

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There is no denying that. However, as our environment changes, so does the need to become increasingly aware of the problems that surround it. With a massive influx of natural disasters, warming and cooling periods, different types of weather patterns and much more, people need to be aware of what types of environmental problems our planet is facing. Global warming has become an undisputed fact about our current livelihoods; our planet is warming up and we are definitely part of the problem. All across the world, people are facing a wealth of new and challenging environmental problems every day. Some of them are small and only affect a few ecosystems, but others are drastically changing the landscape of what we already know. Our planet is poised at the brink of a severe environmental crisis. Current environmental problems make us vulnerable to disasters and tragedies, now and in the future. We are in a state of planetary emergency, with environmental problems piling up high around us. Unless we address the various issues prudently and seriously we are surely doomed for disaster. Current environmental problems require urgent attention. Pollution of air, water and soil require millions of years to recoup. Industry and motor vehicle exhaust are the number one pollutants. Heavy metals, nitrates and plastic are toxins responsible for pollution. While water pollution is caused by oil spill, acid rain, urban runoff; air pollution is caused by various gases and toxins released by industries and factories and combustion of fossil fuels; soil pollution is majorly caused by industrial waste that deprives soil from essential nutrients. Climate changes like global warming is the result of human practices like emission of Greenhouse gases. The population of the planet is reaching unsustainable levels as it faces shortage of resources like water, fuel and food. Population explosion in less developed and developing countries is straining the already scarce resources. Intensive agriculture practiced to produce food damages the environment through use of chemical fertilizer, pesticides and insecticides. Overpopulation is one of the crucial current environmental problem. Natural resource depletion is another crucial current environmental problems. Fossil fuel consumption results in emission of Greenhouse gases, which is responsible for global warming and climate change. Globally, people are taking efforts to shift to renewable sources of energy like solar, wind, biogas and geothermal energy. The cost of installing the infrastructure and maintaining these sources has plummeted in the recent years. The over consumption of resources and creation of plastics are creating a global crisis of waste disposal. Developed countries are notorious for producing an excessive amount of waste or garbage and dumping their waste in the oceans and, less developed countries. Nuclear waste disposal has tremendous health hazards associated with it. Plastic, fast food, packaging and cheap electronic wastes threaten the well being of humans. Waste disposal is one of urgent current environmental problem. Climate change is yet another environmental problem that has surfaced in last couple of decades. It occurs due to rise in global warming which occurs due to increase in temperature of atmosphere by burning of fossil fuels and release of harmful gases by industries. Climate change has various harmful effects but not limited to melting of polar ice, change in seasons, occurrence of new diseases, frequent occurrence of floods and change in overall weather scenario. Human activity is leading to the extinction of species and habitats and and loss of bio-diversity. Eco systems, which took millions of years to perfect, are in danger when any species population is decimating. Balance of natural processes like pollination is crucial to the survival of the eco-system and human activity threatens the same. Another example is the destruction of coral reefs in the various oceans, which support the rich marine life. Our forests are natural sinks of carbon dioxide and produce fresh oxygen as well as helps in regulating temperature and rainfall. Deforestation simply means clearing of green cover and make that land available for residential, industrial or commercial purpose. It is a direct impact of excessive production of CO2. The main impact is on shellfish and plankton in the same

way as human osteoporosis. Once these toxic gases reach the upper atmosphere, they cause a hole in the ozone layer, the biggest of which is above the Antarctic. Ozone layer is valuable because it prevents harmful UV radiation from reaching the earth. This is one of the most important current environmental problem. Acid rain occurs due to the presence of certain pollutants in the atmosphere. Clean drinking water is becoming a rare commodity. Water is becoming an economic and political issue as the human population fights for this resource. One of the options suggested is using the process of desalinization. Industrial development is filling our rivers seas and oceans with toxic pollutants which are a major threat to human health. Urban sprawl refers to migration of population from high density urban areas to low density rural areas which results in spreading of city over more and more rural land. Urban sprawl results in land degradation, increased traffic, environmental issues and health issues. The ever growing demand of land displaces natural environment consisting of flora and fauna instead of being replaced. The current environmental problems pose a lot of risk to health of humans, and animals. Dirty water is the biggest health risk of the world and poses threat to the quality of life and public health. Run-off to rivers carries along toxins, chemicals and disease carrying organisms. Pollutants cause respiratory disease like Asthma and cardiac-vascular problems. High temperatures encourage the spread of infectious diseases like Dengue. Genetic modification of food using biotechnology is called genetic engineering. Genetic modification of food results in increased toxins and diseases as genes from an allergic plant can transfer to target plant. Genetically modified crops can cause serious environmental problems as an engineered gene may prove toxic to wildlife. Another drawback is that increased use of toxins to make insect resistant plant can cause resultant organisms to become resistant to antibiotics. The need for change in our daily lives and the movements of our government is growing. If humans continue moving forward in such a harmful way towards the future, then there will be no future to consider. By raising awareness in your local community and within your families about these issues, you can help contribute to a more environmentally conscious and friendly place for you to live.

Chapter 2 : Causes and Solutions to the Global Energy Crisis - Conserve Energy Future

*Energy for our world: Energy, society, environment: digest of the 11th World Energy Conference, September , , Munich [World Energy Conference] on calendrierdelascience.com *FREE* shipping on qualifying offers.*

Electricity demand is increasing twice as fast as overall energy use and is likely to rise by more than two-thirds to Almost all reports on future energy supply from major organisations suggest an increasing role for nuclear power as an environmentally benign way of producing reliable electricity on a large scale. The challenge of meeting rapidly growing energy demand, whilst reducing harmful emissions of greenhouse gases, is very significant and proving challenging. In global atmospheric concentrations of carbon dioxide rose by 0. Electricity demand growth has outpaced growth in final energy demand for many years. Increased electrification of end-uses â€" such as transport, space cooling, large appliances, ICT, and others â€" are key contributors to rising electricity demand. The number of people without access to electricity has fallen substantially; in , the EIA estimates 1. Aside from the challenges of meeting increasing demand and reducing greenhouse gas emissions, cleaner air is a vital need. Studies have repeatedly shown that nuclear energy is a low-emitting source of electricity production in general. It is also specifically low-carbon; emitting among the lowest amount of carbon dioxide equivalent per unit of energy produced when considering total life-cycle emissions. Primary energy and electricity outlook There are many outlooks for primary energy and electricity published each year, many of which are summarised below. In each recent WEO report, a third scenario is included that starts with a vision of how and over what timeframe the energy sector needs to change â€" primarily to decarbonise â€" and works back to the present. There are many changes ahead in the sources of primary energy used. As the use of electricity grows significantly, the primary energy sources used to generate it are changing. In both scenarios generation from all low-carbon sources of electricity is required to grow substantially. It is especially suitable for meeting large-scale, continuous electricity demand where reliability and predictability are vital â€" hence ideally matched to increasing urbanisation worldwide. It outlined measures to achieve this, including moves to reduce the cost of building new nuclear capacity and creating a level playing field that would allow all low-carbon generation technologies to compete on their merits. Without that contribution, the cost of achieving deep decarbonisation targets increases significantly," the study finds. The MIT study is designed to serve as a balanced, fact-based, and analysis-driven guide for stakeholders involved in nuclear energy, notably governments. With high carbon constraints, the system cost of electricity without nuclear power is twice as high in the USA and four times as high in China according to the MIT study. Also clear across successive reports is the growing role that nuclear power will play in meeting global energy needs, while achieving security of supply and minimising carbon dioxide and air pollutant emissions. The report recommended a series of measures including increasing energy efficiency, reducing the use of inefficient coal-fired power plants, increasing investment in renewables, reducing methane emissions, and phasing out fossil fuels subsidies. Half of the additional emissions reductions in its Scenario come from decarbonisation efforts in power supply, driven by high carbon price incentives. The IEA acknowledges that nuclear power is the second-biggest source of low-carbon electricity worldwide after hydropower and that the use of nuclear energy has avoided the release of 56 billion tonnes of CO2 since , equivalent to almost two years of global emissions at current rates. Most of the new nuclear plants are expected to be built in countries with price-regulated markets or where government-owned entities build, own, and operate the plants, or where governments act to facilitate private investment. The Scenario gives a cost-effective transition to limiting global warming assuming an effective international agreement in , and this brings about a more than doubling of nuclear capacity to GWe in , while energy-related CO2 emissions peak before and then decline. In this scenario, almost all new generating capacity built after needs to be low-carbon. For countries that import energy, it can reduce their dependence on foreign supplies and limit their exposure to fuel price movements in international markets. CO2 emissions from gas grow strongly to Ten countries account for almost

three-quarters of the world total for fossil-fuel subsidies, five of them in Middle East notably Iran and Saudi Arabia or North Africa where much electricity is generated from oil, and where nuclear power plants and renewables would be competitive, but for those subsidies. Its effect would be to "increase import bills, heighten energy security concerns and make it harder and more expensive to combat climate change.

Chapter 3 : Energy All around: Energy in Our Lives

Access to energy is a key pillar for human wellbeing, economic development and poverty alleviation. Ensuring everyone has sufficient access is an ongoing and pressing challenge for global development.

Wastes remain a major consideration whether they are released to the environment or not. Ethical principles seem increasingly likely to influence energy policy in many countries, which augurs well for nuclear energy. The competitive position of nuclear energy "is robust from a sustainable development perspective since most health and environmental costs are already internalised. Today, in the context of the ethical framework of sustainable development, including particularly concerns about global warming, other aspects are also very important. These include environmental effects and the question of wastes, even if they have no environmental effect. Safety is also an issue, as well as the broad and indefinite aspect of maximising the options available to future generations. Geopolitical questions of energy security are central to the assessment of sustainability for individual countries, along with the affordability of the electricity produced. Sustainable development criteria have been pushed into the front line of energy policy. In the light of concerns about climate change due to apparent human enhancement of the greenhouse effect, there is growing concern about how we address energy needs on a sustainable basis. Energy demand A number of factors are widely agreed. Energy demand is likely to increase even faster, and the proportion supplied by electricity will also grow faster still. However, opinions diverge as to whether the electricity demand will continue to be served predominantly by extensive grid systems, or whether there will be a strong trend to distributed generation close to the points of use. That is an important policy question itself, but either way, it will not obviate the need for more large-scale grid-supplied power, especially in urbanised areas, over the next several decades. Much demand is for continuous, reliable supply of electricity on a large scale, and this qualitative consideration will continue to dominate. The key question is how we generate that electricity. There is no prospect that we can do without any of these though oil has a more vital role in other applications. Sources of energy Harnessing renewable energy such as wind and solar is an appropriate first consideration in sustainable development, because apart from constructing the plant, there is no depletion of mineral resources and no direct air or water pollution. In contrast to the situation even a few decades ago, we now have the technology to access wind on a significant scale for electricity, and with some subsidy on a minority of supply being from those sources, they are affordable. Renewable sources other than hydro â€” notably wind and solar â€” are diffuse, intermittent, and unreliable by nature of their occurrence. These aspects offer a technological challenge of some magnitude, given that electricity cannot be stored on any large scale. For instance, solar-sourced electricity requires collecting energy at a peak density of about 1 kilowatt kW per square metre when the sun is shining to satisfy a quite different kind of electricity demand â€” one which mostly requires a relatively continuous supply. Wind is the fastest-growing source of electricity in many countries, and there is a lot of scope for further expansion. Wind is intermittent, and when it does not blow, back-up capacity such as hydro or gas is needed. When it does blow, and displaces power from other sources, it reduces the economic viability of those sources and hence increases prices. The rapid expansion of wind farms and solar power capacity is helped considerably by generous government-mandated grants, subsidies and other arrangements ultimately paid for by consumers. Where the financial inducements to build wind and solar capacity result in a strong response however, the subsidies become unaffordable and are now being cut back in many countries. Also there is often a strong groundswell of opposition on aesthetic grounds from the countryside where wind turbines are located. Renewable sources such as wind and solar are intrinsically unsuited to meeting the demand for continuous, reliable supply on a large scale â€” which comprises most demand in developed countries. A fuller treatment of electricity from renewable sources is in the information page on Renewable Energy and Electricity. Apart from renewables, it is a question of what is most abundant and least polluting. Today, to a degree almost unimaginable even 30 years ago, there is known to be an abundance of many energy resources in the ground. Coal and uranium not to mention thorium are

available and unlikely to be depleted this century. The criteria for any acceptable energy supply will continue to be cost, safety, and security of supply, as well as environmental considerations. Addressing environmental effects usually has cost implications, as the current climate change debate makes clear. Supplying low-cost electricity with acceptable safety and low environmental impact will depend substantially on developing and deploying reasonably sophisticated technology. This includes both large-scale and small-scale nuclear energy plants, which can be harnessed directly to industrial processes such as hydrogen production or desalination, as well as their traditional role in generating electricity. IAEA classification of nuclear energy scenario sustainability Level 1. Safe, secure, economical and publicly acceptable nuclear power with security of supply â€" addresses conditions necessary for newcomers to deploy nuclear energy. Safe disposal of all nuclear wastes in a complete once-through fuel cycle with thermal reactors and with retrievable spent nuclear fuel disposal. Initiate recycling of used nuclear fuel to reduce wastes. A branch of Level 3 is a once-through breed and burn option, providing significant improvement in resource utilization up to 10 times. Guarantee nuclear fuel resources for at least the next years via complete recycle of used fuel. Closed fuel cycle with breeding of fissile material from U or Th to improve natural resource utilisation by a factor of 10 to Reduce radiotoxicity of all wastes below natural uranium level. Closed fuel cycle recycling all actinides and only disposing fission products to minimise long-term radiotoxicity of nuclear waste. As an option, transmutation of long-lived fission produces could be considered to further reduce waste radiotoxicity. Is nuclear energy renewable? Conventional nuclear power reactors do use a mineral fuel and demonstrably deplete the available resources of that fuel. In such a reactor, the input fuel is uranium U , which is part of a much larger mass of uranium â€" mostly U But about one-third of the energy yield comes from something which is not initially loaded in: So the U used actually renews itself to some extent by producing Pu from the otherwise waste material U This process can be optimised in fast neutron reactors, which are likely to be extensively deployed in the next generation of nuclear power reactors. While it can produce more fuel than it uses, there does need to be a steady input of reprocessing activity to separate the fissile plutonium from the uranium and other materials discharged from the reactors. This is fairly capital-intensive but well-proven and straightforward. The used fuel from the whole process is recycled and the usable part of it increases incrementally. As well as utilizing about 60 times the amount of energy from uranium, fast neutron reactors will unlock the potential of using even more abundant thorium as a fuel see information page on Thorium. Using a fast neutron reactor, thorium produces U, which is fissile. This process is not yet commercialised, but it works and if there were ever a pressing need for it, development would be accelerated. India is the only country concentrating on this now, since in a world context uranium is so abundant and relatively cheap. In addition, some 1. The consequence of this is that the available resource of fuel for fast neutron reactors is so plentiful that under no practical terms would the fuel source be significantly depleted. Energy resources There is abundant coal in many parts of the world, but with the constraints imposed by concern about global warming, it is likely that this will increasingly be seen as chemical feedstock and its large-scale use for electricity production will be scaled down. The main technology involves the capture and subsequent storage of the carbon dioxide from the flue gas. Elements of the technology are proven but the challenge is to actually commercialize it and bring the cost down sufficiently to compete with nuclear power. Natural gas is also reasonably abundant, especially with the advent of technologies for tapping that in coal seams and shales, but is so valuable for direct use after being reticulated to the point where heat is required, and as a chemical feedstock, that its large-scale use for power generation makes little sense and is arguably unsustainable. However, while abundant supply keeps prices down in the short to medium-term, it is the most economical means of generating electricity in some places, notably North America. Fuel for nuclear power is abundant, and uranium is even available from sea water at costs which would have little impact on electricity prices. Furthermore, if well-proven but currently uneconomic fast neutron reactor technology is used, or thorium becomes a nuclear fuel, the supply is almost limitless. See information page on Supply of Uranium. The hydrogen economy Someday, hydrogen is expected to come into great demand as a transport fuel which does not contribute to global warming. It may be

used in fuel cells to produce electricity or directly in internal combustion motors â€" as experimentally now. Fuel cells are at an early stage of technological development and still require substantial, research and development input, although they are likely to be an important technology in the future. Hydrogen may be provided by steam reforming of natural gas in which case the emission of by-product CO2 has to be taken into account , by electrolysis of water, or in future by thermochemical processes using nuclear heat. This gives rise to quantities of carbon dioxide emissions - each tonne produced gives rise to 11 tonnes of CO2. Large-scale use of electrolysis would mean a considerable increase in electricity demand. However, this need not be continuous baseload supply, as hydrogen can be accumulated and stored, and solar or wind generation may well serve this purpose better than supplying consumer electricity demand. However, pending the development of affordable mass-produced fuel cells, a significant increase in base-load electricity demand may result from the adoption of plug-in electric hybrid vehicles and full electric vehicles see information page on Electricity and Cars. Wastes Wastes â€" both those produced and those avoided â€" are a major concern in any consideration of sustainable development. Burning fossil fuels produces primarily carbon dioxide as waste, which is inevitably dumped into the atmosphere. With black coal, approximately one tonne of carbon dioxide results from every thousand kilowatt hours generated. Natural gas contributes about half as much CO2 as coal from actual combustion, and also some including methane leakage from its extraction and distribution. Oil and gas burned in transporting fossil fuels adds to the global total. As yet, there is no satisfactory way to avoid or dispose of the greenhouse gases which result from fossil fuel combustion. Nuclear wastes Nuclear energy produces both operational and decommissioning wastes, which are contained and managed. Although experience with both storage and transport over half a century clearly shows that there is no technical problem in managing any civil nuclear wastes without environmental impact, the question has become political, focussing on final disposal. In fact, nuclear power is the only energy-producing industry which takes full responsibility for all its wastes, and costs this into the product â€" a key factor in sustainability. Ethical, environmental and health issues related to nuclear wastes are topical, and their prominence has tended to obscure the fact that such wastes are a declining hazard, while other industrial wastes retain their toxicity indefinitely. Regardless of whether particular wastes remain a problem for centuries or millennia or forever, there is a clear need to address the question of their safe disposal. If they cannot readily be destroyed or denatured, this generally means that they need to be removed and isolated from the biosphere. This may be permanent, or retrievable. An alternative view asserts that indefinite surface storage of high-level wastes under supervision is preferable. This may be because such materials have some potential for recycling as a fuel source, or negatively because progress towards successful geological disposal would simply encourage continued use and expansion of nuclear energy. However, there is wide consensus that dealing effectively with wastes to achieve high levels of safety and security is desirable in a year perspective, ensuring that each generation deals with its own wastes. This is a consequence of the many years of work by numerous professionals in institutions around the world There is a wide consensus on the safety and benefits of geologic disposal. He starts on a very broad canvas, quoting four fundamental principles proposed by the US National Academy of Public Administration 4: Every generation has obligations as trustee to protect the interests of future generations. No generation should deprive future generations of the opportunity for a quality of life comparable to its own. Chain of Obligation Principle:

Chapter 4 : Environmental Impacts of Renewable Energy Technologies | Union of Concerned Scientists

The energy crisis is the concern that the world's demands on the limited natural resources that are used to power industrial society are diminishing as the demand rises. These natural resources are in limited supply. While they do occur naturally, it can take hundreds of thousands of years to.

Energy efficiency saves you money. But buying energy-efficient appliances, making energy-efficient home improvements, and taking energy-efficient actions every day can save hundreds of dollars. Energy efficiency improves the economy. While energy efficiency helps you save at home and at the pump, it helps businesses and city, state and federal governments save on a much bigger scale. In addition to saving money, energy efficiency projects like building improvements and infrastructure repairs create jobs. In alone, energy efficiency accounted for more than , jobs nationwide. Industry leaders make energy-efficient innovations, and energy-efficient policies lead to breakthroughs among manufacturers. From LED streetlights to flame-shaped, dimmable candelabra CFLs, energy-efficient lights are just as pleasing to the eye as the old bulbs but use far less energy. Energy efficiency is good for the environment. When we use less energy, we save precious natural resources and cut down on pollution. So, energy efficiency helps us keep more resources on the earth longer. From power plants to cars, consuming energy can produce emissions that harm our environment. But investments in energy efficiency across the biggest sectors of our economy could abate up to 1. Energy efficiency improves national security. Energy efficiency safeguards our nation by decreasing the overall demand for energy, and therefore the need to import and transport fossil fuels. With energy efficiency, we save energy resources for future generations to use. Saving money for defense: As the armed forces improve the energy efficiency of their equipment, buildings and general practices, they save money that can be invested directly in defense programs. Keeping our troops safe: The armed forces need fuel to supply their troops, but battleground supply missions can be dangerous. In alone, there were 1, attacks on fuel convoys. Energy efficiency enhances quality of life. You might not see it, but you can feel it: Energy efficiency improves quality of life. Notice how your insulated home keeps AC inside during the summer, and heat in during the winter? Or how you rarely need to change your energy-efficient light bulbs? Businesses can improve productivity, as well as the bottom line, by taking advantage of energy efficiency in office buildings and production processes. Residents of cities that employ smart growth technologies and transportation systems have an easier time of getting around â€” and getting consistent access to electricity. Want More Reasons to be Energy Efficient?

Chapter 5 : Wind Energy Effects on Society

Renewable energy technologies are clean sources of energy that have a much lower environmental impact than conventional energy technologies. Energy for our children's children's children Renewable energy will not run out. Ever.

What are the benefits of renewable energiesâ€”and how do they improve our health, environment, and economy? These gases act like a blanket, trapping heat. In the United States, about 29 percent of global warming emissions come from our electricity sector. Carbon dioxide CO2 is the most prevalent greenhouse gas, but other air pollutantsâ€”such as methaneâ€”also cause global warming. Different energy sources produce different amounts of these pollutants. To make comparisons easier, we use a carbon dioxide equivalent, or CO2eâ€—the amount of carbon dioxide required to produce an equivalent amount of warming. In contrast, most renewable energy sources produce little to no global warming emissions. The comparison becomes clear when you look at the numbers. Burning natural gas for electricity releases between 0. Different sources of energy produce different amounts of heat-trapping gases. As shown in this chart, renewable energies tend to have much lower emissions than other sources, such as natural gas or coal. Increasing the supply of renewable energy would allow us to replace carbon-intensive energy sources and significantly reduce US global warming emissions. For example, a UCS analysis found that a 25 percent by national renewable electricity standard would lower power plant CO2 emissions million metric tons annually by â€”the equivalent of the annual output from 70 typical MW new coal plants [4]. Improved public health The air and water pollution emitted by coal and natural gas plants is linked with breathing problems, neurological damage, heart attacks, cancer, premature death, and a host of other serious problems. The pollution affects everyone: Wind, solar, and hydroelectric systems generate electricity with no associated air pollution emissions. In addition, wind and solar energy require essentially no water to operate and thus do not pollute water resources or strain supplies by competing with agriculture, drinking water, or other important water needs. Biomass and geothermal power plants, like coal- and natural gas-fired power plants, may require water for cooling. Hydroelectric power plants can disrupt river ecosystems both upstream and downstream from the dam. A relatively small fraction of US electricity currently comes from these sources, but that could change: In fact, a major government-sponsored study found that clean energy could contribute somewhere between three and 80 times its levels, depending on assumptions [8]. And the previously mentioned NREL study found that renewable energy could comfortably provide up to 80 percent of US electricity by Jobs and other economic benefits Two energy workers installing solar panels. Solar panels need humans to install them; wind farms need technicians for maintenance. This means that, on average, more jobs are created for each unit of electricity generated from renewable sources than from fossil fuels. Renewable energy already supports thousands of jobs in the United States. In , the wind energy industry directly employed over , full-time-equivalent employees in a variety of capacities, including manufacturing, project development, construction and turbine installation, operations and maintenance, transportation and logistics, and financial, legal, and consulting services [10]. Other renewable energy technologies employ even more workers. The hydroelectric power industry employed approximately 66, people in [13]; the geothermal industry employed 5, people [14]. Increased support for renewable energy could create even more jobs. The Union of Concerned Scientists study of a percent-by renewable energy standard found that such a policy would create more than three times as many jobs more than , as producing an equivalent amount of electricity from fossil fuels [15]. In contrast, the entire coal industry employed , people in [26]. For example, industries in the renewable energy supply chain will benefit, and unrelated local businesses will benefit from increased household and business incomes [16]. Local governments also benefit from clean energy, most often in the form of property and income taxes and other payments from renewable energy project owners. Farmers and rural landowners can generate new sources of supplemental income by producing feedstocks for biomass power facilities. Stable energy prices Renewable energy is providing affordable electricity across the country right now, and

can help stabilize energy prices in the future. As a result, renewable energy prices can be very stable over time. Moreover, the costs of renewable energy technologies have declined steadily, and are projected to drop even more. The cost of generating electricity from wind dropped 66 percent between and [21]. Costs will likely decline even further as markets mature and companies increasingly take advantage of economies of scale. In contrast, fossil fuel prices can vary dramatically and are prone to substantial price swings. For example, there was a rapid increase in US coal prices due to rising global demand before , then a rapid fall after when global demands declined [23]. Likewise, natural gas prices have fluctuated greatly since [25]. Coal news and markets report. Using more renewable energy can lower the prices of and demand for natural gas and coal by increasing competition and diversifying our energy supplies. And an increased reliance on renewable energy can help protect consumers when fossil fuel prices spike. Reliability and resilience Wind and solar are less prone to large-scale failure because they are distributed and modular. Distributed systems are spread out over a large geographical area, so a severe weather event in one location will not cut off power to an entire region. Modular systems are composed of numerous individual wind turbines or solar arrays. Even if some of the equipment in the system is damaged, the rest can typically continue to operate. For example, Hurricane Sandy damaged fossil fuel-dominated electric generation and distribution systems in New York and New Jersey and left millions of people without power. In contrast, renewable energy projects in the Northeast weathered Hurricane Sandy with minimal damage or disruption [25]. Water scarcity is another risk for non-renewable power plants. Coal, nuclear, and many natural gas plants depend on having sufficient water for cooling, which means that severe droughts and heat waves can put electricity generation at risk. Wind and solar photovoltaic systems do not require water to generate electricity and can operate reliably in conditions that may otherwise require closing a fossil fuel-powered plant. The risk of disruptive events will also increase in the future as droughts, heat waves, more intense storms, and increasingly severe wildfires become more frequent due to global warmingâ€”increasing the need for resilient, clean technologies.

Chapter 6 : 15 Current Environmental Problems That Our World is Facing - Conserve Energy Future

Founded Conserve Energy Future with the sole motto of providing helpful information related to our rapidly depleting environment. Unless you strongly believe in Elon Musk's idea of making Mars as another habitable planet, do remember that there really is no 'Planet B' in this whole universe.

Incredible discoveries about the nature of electricity were becoming common place. Nikola Tesla was demonstrating " wireless lighting " and other wonders associated with high frequency currents. There was an excitement about the future like never before. Within 20 years, there would be automobiles, airplanes, movies, recorded music, telephones, radio, and practical cameras. The Victorian Age was giving way to something totally new. For the first time in history, common people were encouraged to envision a utopian future filled with abundant modern transportation and communication, as well as jobs, housing and food for everyone. Disease would be conquered, and so would poverty. Life was getting better, and this time, everyone was going to get a piece of the pie. In the midst of this technological explosion, where did the energy breakthroughs go? Was all of this excitement about free energy, which happened just before the beginning of the last century, just wishful thinking that "real science" eventually disproved? Current State of Technology Actually, the answer to that question is no. In fact, the opposite is true. Spectacular energy technologies were developed right along with the other breakthroughs. Since that time, multiple methods for producing vast amounts of energy at extremely low cost have been developed. None of these technologies have made it to the consumer market as an article of commerce, however. Exactly why this is true will be discussed shortly. But first, I would like to describe to you a short list of free energy technologies that I am currently aware of, and that are proven beyond all reasonable doubt. The common feature connecting all of these discoveries, is that they use a small amount of one form of energy to control or release a large amount of a different kind of energy. Many of them tap the underlying aether field in some way; a source of energy conveniently ignored by modern science. This natural energy form can be gathered directly from the environment mistakenly called "static" electricity or extracted from ordinary electricity by the method called fractionation. The Methernitha Community in Switzerland currently has 5 or 6 working models of fuelless, self-running devices that tap this energy. Robert Adams NZ has developed astounding designs of electric motors, generators and heaters that run on permanent magnets. Tom Bearden USA has two working models of a permanent magnet powered electrical transformer. It uses a 6-watt electrical input to control the path of a magnetic field coming out of a permanent magnet. By channeling the magnetic field, first to one output coil and then a second output coil, and by doing this repeatedly and rapidly in a "ping-pong" fashion, the device can produce a watt electrical output with no moving parts. Troy Reed USA has working models of a special magnetized fan that heats up as it spins. It takes exactly the same amount of energy to spin the fan whether it is generating heat or not. Beyond these developments, multiple inventors have identified working mechanisms that produce motor torque from permanent magnets alone. There are two classes of machines that transform a small amount of mechanical energy into a large amount of heat. In these machines, one cylinder is rotated within another cylinder with about an eighth of an inch of clearance between them. The space between the cylinders is filled with a liquid such as water or oil, and it is this "working fluid" that heats up as the inner cylinder spins. Another method uses magnets mounted on a wheel to produce large eddy currents in a plate of aluminum, causing the aluminum to heat up rapidly. All of these systems can produce ten times more heat than standard methods using the same energy input. Water can be broken into hydrogen and oxygen using electricity. Standard chemistry books claim that this process requires more energy than can be recovered when the gases are recombined. This is true only under the worst case scenario. Also, using different electrolytes additives that make the water conduct electricity better changes the efficiency of the process dramatically. It is also known that certain geometric structures and surface textures work better than others do. The implication is that unlimited amounts of hydrogen fuel can be made to drive engines like in your car for the cost of water. Even

more amazing is the fact that a special metal alloy was patented by Freedman USA in that spontaneously breaks water into hydrogen and oxygen with no outside electrical input and without causing any chemical changes in the metal itself. This means that this special metal alloy can make hydrogen from water for free, forever. All major industrial engines use the release of heat to cause expansion and pressure to produce work, like in your car engine. Nature uses the opposite process of cooling to cause suction and vacuum to produce work, like in a tornado. These are fuelless engines that produce mechanical work from energy accessed from a vacuum. There are also much simpler designs that use vortex motions to tap a combination of gravity and centrifugal force to produce a continuous motion in fluids. In March , two chemists from the University of Utah USA announced that they had produced atomic fusion reactions in a simple tabletop device. The claims were "debunked" within six months and the public lost interest. Nevertheless, cold fusion is very real. Not only has excess heat production been repeatedly documented , but also low energy atomic element transmutation has been catalogued, involving dozens of different reactions! This technology definitely can produce low cost energy and scores of other important industrial processes. The refrigerator in your kitchen is the only free energy machine you currently own. It uses one amount of energy electricity to move three amounts of energy heat. This gives it a co-efficient of performance COP of about 3. Your refrigerator uses one amount of electricity to pump three amounts of heat from the inside of the refrigerator to the outside of the refrigerator. This is its typical use, but it is the worst possible way to use the technology. A heat pump pumps heat from the source of heat to the "sink" or place that absorbs the heat. The source of heat should obviously be hot and the sink for heat should obviously be cold for this process to work the best. The source of heat is inside the box, which is cold, and the sink for heat is the room temperature air of your kitchen, which is warmer than the source. This is why the COP remains low for your kitchen refrigerator. But this is not true for all heat pumps. This process is equivalent to a steam engine that extracts mechanical energy between the boiler and the condenser, except that it uses a fluid that boils at a much lower temperature than water. This is not the system promoted by Dennis Lee. The amount of energy it took to run the compressor input was less than 20 hp, so this system produced more than 17 times more energy than it took to keep it going! It could power a small neighborhood from the roof of a hot tub gazebo, using exactly the same technology that keeps the food cold in your kitchen. Currently, there is an industrial scale heat pump system just north of Kona, Hawaii that generates electricity from temperature differences in ocean water. There are dozens of other systems that I have not mentioned, many of them are as viable and well tested as the ones I have just recounted. But this short list is sufficient to make my point: It offers the world pollution-free, energy abundance for everyone, everywhere. It is now possible to stop the production of greenhouse gases and shut down all of the nuclear power plants. We can now desalinate unlimited amounts of seawater at an affordable price, and bring adequate fresh water to even the most remote habitats. Transportation costs and the production costs for just about everything can drop dramatically. Food can even be grown in heated greenhouses in the winter, anywhere. All of these wonderful benefits that can make life on this planet so much easier and better for everyone have been postponed for decades. Whose purposes are served by this postponement? Four Invisible Forces There are four gigantic forces that have worked together to create this situation. To say that there is and has been a conspiracy to suppress this technology only leads to a superficial understanding of the world, and it places the blame for this completely outside of ourselves. Our willingness to remain ignorant and actionless in the face of this situation has always been interpreted by two of these forces as implied consent. So, besides a non-demanding public, what are the other forces that are impeding the availability of free energy technology? In the United States, and in most other countries around the world, there is a money monopoly in place. There is nothing I can do to be paid in Gold Certificates, or some other form of money. This money monopoly is solely in the hands of a small number of private stock banks, and these banks are owned by the wealthiest families in the world. An independent source of wealth free energy device in the hands of each and every person in the world, ruins the plans of the wealthiest families for world domination, permanently. Why this is true is easy to see. But if an independent source of capital energy were

present in the economy, and any business or person could raise more capital without borrowing it from a bank, this centralized throttling action on interest rates would simply not have the same effect. Free energy technology changes the value of money. The wealthiest families and the issuers of credit do not want any competition. They want to maintain their current monopoly control of the money supply. For them, free energy technology is not just something to suppress, it must be permanently forbidden! So, the wealthiest families and their central banking institutions are the first force operating to postpone the public availability of free energy technology. Their motivations are the imagined divine right to rule, greed, and their insatiable need to control almost everything except themselves. The weapons they have used to enforce this postponement include intimidation, "expert" debunkers, buying and shelving of technology, murder and attempted murder of the inventors, character assassination, arson, and a wide variety of financial incentives and disincentives to manipulate possible supporters. They have also promoted the general acceptance of a scientific theory that states that free energy is impossible laws of thermodynamics. The second force operating to postpone the public availability of free energy technology is national governments. The problem here is not so much related to competition in the printing of currency, but in the maintenance of national security. The fact is, the world out there is a jungle, and humans can be counted upon to be very cruel, dishonest, and sneaky. For this, police powers are delegated by the executive branch of government to enforce "the rule of law. There are always a few individuals, however, that believe that their own benefit is best served by behavior that does not voluntarily conform to the generally agreed upon social order. These people choose to operate outside of the rule of law and are considered outlaws, criminals, subversives, traitors, revolutionaries, or terrorists. Most national governments have discovered, by trial and error, that the only foreign policy that really works, over time, is a policy called "tit for tat.

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The Organisation for Economic Co-operation and Development OECD warns that, given the current trends, energy-related emissions will increase by 70 percent by This can accelerate the negative consequences of climate change, including higher temperatures and a rise in the frequency of extreme weather events See References 1. Increased Carbon Footprint The primary environmental effect of energy overuse is an increase in your carbon footprint, but there are simple changes you can make at home to avoid this. Leaving your laptop plugged in all the time will use nearly kilowatt hours kWh of electricity each year, and a desktop computer left to idle will use more than kW of electricity annually. Even leaving your fully charged cellphone attached to its charger can waste almost 20 kWh a year, explains the Lawrence Berkeley National Laboratory. References 2 and 3 Increased Risk of Climate Change Coal and natural gas supplied more than two-thirds of the energy in the U. Each energy form contributes to total greenhouse gas emissions. According to the U. This figure is a 10 percent increase from In addition, methane emissions from natural gas increased during the same period by 17 percent. Part of this increase is due to the careless use of electricity. Reduction in Supply In areas with heavy population densities, the price you pay for home electricity is determined by supply and demand. Some power plants charge consumers more during peak hours. Your overuse will contribute to a scarcity in this energy supply and thus an increase in overall electricity costs. Over the long term, the rise in demand may place additional burdens on threatened environmental areas -- such as coastal areas or wildlife refuges -- to ensure adequate resources. Drilling for natural gas or mining for coal to meet excessive energy demands will negatively impact the environment See References 6. Higher Energy Costs A natural consequence of overusing energy is increased costs for you. This can come in the form of fuel and energy bills; you will be paying more without an appreciable return on your investment. You may also risk lowering the expected lifespan of appliances and other electronics. When you have to replace spent devices, you further impact the environment by generating waste and purchasing replacement equipment. Your wise use of electricity, therefore, can translate into long-term savings in energy bills and also reduce the need for other purchases See References 7.

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Ideally, the free energy technologies underpin a just society where everyone has enough food, clothing, shelter, self-worth, and the leisure time to contemplate the higher spiritual meanings of life. Do we not owe it to each other to face down our fears and take action to create this future for our children's children?

Nuclear energy is not necessarily a clean energy source. The effects nuclear energy have on the environment pose serious concerns that need to be considered, especially before the decision to build additional nuclear power plants is made. However, nuclear wastes are difficult to manage and accidents -- and the threat of terrorism -- are serious concerns. Carbon Dioxide Nuclear power has been called a clean source of energy because the power plants do not release carbon dioxide. While this is true, it is deceiving. Nuclear power plants may not emit carbon dioxide during operation, but high amounts of carbon dioxide are emitted in activities related to building and running the plants. Nuclear power plants use uranium as fuel. The process of mining uranium releases high amounts of carbon dioxide into the environment. Carbon dioxide is also released into the environment when new nuclear power plants are built. Finally, the transport of radioactive waste also causes carbon dioxide emissions. Low Level Radiation Nuclear power plants constantly emit low levels of radiation into the environment. There is a differing of opinion among scientists over the effects caused by constant low levels of radiation. Various scientific studies have shown an increased rate of cancer among people who live near nuclear power plants. Long-term exposure to low level radiation has been shown to damage DNA. The degree of damage low levels of radiation cause to wildlife, plants and the ozone layer is not fully understood. More research is being done to determine the magnitude of effects caused by low levels of radiation in the environment. Waste from nuclear power plants can remain active for hundreds of thousands of years. Currently, much of the radioactive waste from nuclear power plants has been stored at the power plant. Due to space constraints, eventually the radioactive waste will need to be relocated. Plans have been proposed to bury the radioactive waste contained in casks in the Yucca Mountains in Nevada. There are several issues with burying the radioactive waste. Waste would be transported in large trucks. In the event of an accident, the radioactive waste could possibly leak. Another issue is uncertainty about whether the casks will leak after the waste is buried. The current amount of radioactive waste requiring long-term storage would fill the Yucca Mountains and new sites would need to be found to bury future radioactive waste. There is no current solution to deal with the issue of radioactive waste. Some scientists feel that the idea of building more nuclear power plants and worrying about dealing with the waste later has the potential of a dangerous outcome. Cooling Water System Cooling systems are used to keep nuclear power plants from overheating. There are two main environmental problems associated with nuclear power plant cooling systems. First, the cooling system pulls water from an ocean or river source. Fish are inadvertently captured in the cooling system intake and killed. Second, after the water is used to cool the power plant, it is returned to the ocean or river. The water that is returned is approximately 25 degrees warmer than the water was originally. The warmer water kills some species of fish and plant life. Nuclear Power Plant Accidents and Terrorism According to the Union of Concerned Scientists, regulated safety procedures are not being followed to ensure that nuclear power plants are safe. Even if all safety precautions are followed, it is no guarantee that a nuclear power plant accident will not occur. If a nuclear power plant accident occurs, the environment and surrounding people could be exposed to high levels of radiation. The accident at the nuclear power plant in Fukushima, Japan is one of the worst nuclear disasters in history; the reactors were destroyed by a tsunami following a major earthquake. Terrorism threats are another concern that needs to be addressed. A satisfactory plan to protect nuclear power plants from terrorism is not in place. Conclusion There is no disagreement that clean sources of energy are vital to the environment. The disagreement lies in what form that clean energy should be in. Supporters of nuclear energy argue that it is an efficient source of energy that is easy to implement. People against nuclear energy propose using combined methods of solar, wind and geothermal energy. Solar, wind and geothermal energy still have

environmental issues, but ones that are not as great as nuclear plants or coal-burning power plants. References Union of Concerned Scientists: Nuclear Power About the Author This article was written by the Sciencing team, copy edited and fact checked through a multi-point auditing system, in efforts to ensure our readers only receive the best information. To submit your questions or ideas, or to simply learn more about Sciencing, contact us here.

Chapter 9 : Sustainable Energy : Renewable Energy : World Nuclear Association - World Nuclear Associat

This interactive tool is a partnership between the World Energy Council and our Project Supporter ARUP. What does it do? The maps convey a narrative of the key energy issues, regional and local variances and also how these have changed over time.

No one today asks why is solar energy important because the need for alternative sources of energy is clear. Solar energy is radiant light and heat from the sun that supports life on this planet. The amount of energy released by the sun is immense and we are using only a fraction of this energy. Why is solar energy more important today than ever before? At some point, the population of the planet will use up all the coal and oil that lay beneath the surface of the earth. More importantly, using the coal and oil and the by-products of those natural materials creates by-products that pollute our environment. From oil spills in the ocean to the scarred earth of strip mining, for generations we have damaged our global environment in our constant quest for more electrical power. Before asking why is solar energy important to us consider how much you rely on the light and heat of the sun in your own life every day. You can stand out of doors and feel the energy of the sun heating your skin. Photovoltaic panels and thermal collectors use active solar techniques. Passive solar relies on designing buildings to use the rays of the sun when they reach the earth. This may involve how a building is oriented on the land and which direction windows are facing. Urban planning and home design today often rely on solar energy. Homes are placed on lots with south facing windows while northern exposures are less open. One traditional use of solar energy is the simple glass greenhouse. The main purpose of a greenhouse, however, is to allow the energy of the sun to reach growing plants as they need that solar energy to flourish. Practical Applications Solar technologies are often referred to as thermal technology. These are used increasingly in homes and businesses today to heat spaces, provide ventilation and to create hot water. The water flowing from underground pipes or aquifers is too cold for the human body to be immersed in for long. We fill the pool and then wait for the sun to warm the water to a level that is comfortable to swim or play in. Sunlight is used for solar systems to provide hot water in environmental friendly homes. The common solar water heaters are either evacuated tube collectors or glazed flat plate collectors. Unglazed plastic collectors are used for heating many new swimming pools. The use of solar water heaters is increasing rapidly. If you plan on installing it in your home a hot water professional can help you with your required needs. Backup water heaters powered by gas or electricity are also present but used only when cloud cover or high usage limited the solar produced hot water. This is perhaps the main reason why solar energy is important today for builders, homeowners and environmentalists. Using a company such as White Plains roofing , who are experienced with installing solar panels to your roof, can optimize your energy production and consumption. Their help can change your drafty, energy leaking roof, into an eco-friendly one. Cement, stone and water have the ability to absorb heat from the sun during the day and keep a room warm at night as the heat is slowly released into the air. This reduces the amount of electricity or gas necessary to maintain comfort in the home. One innovative concept is a solar or thermal chimney. This is a narrow, vertical shaft connecting the inside of a building with the outside. The sun warms the chimney and the heated air rises naturally creating an updraft of hot air that is released to the outdoors. As this solar heated air rushes up the chimney it draws cooler air into the bottom of the structure and creates air flow. In a way, this is a modern adaptation of the greenhouse method. Natural plants are also part of an architectural design for solar energy use. Perhaps one of the most useful ways to harness solar energy is in processing water. Large areas of the world suffer from annual drought conditions. Drinking brackish or polluted water spreads bacteria and disease that can decimate a small village in a developing nation. When water is scarce, people tend to drink whatever water they can find. Filling two liter PET bottles with water from a stream and laying those bottles on their side to provide maximum exposure to the sun can provide safe drinking water. We are accustomed to water from a tap and seldom think of the processes and chemicals used to provide that clean, safe water. Summary Why is solar

energy important? Perhaps because of the potential that is only now being realized. Harnessing that energy can help protect the delicate balance of our environment. Solar energy is important not just for what it can be harnessed to do for us but in what it does not do as well. The biggest drawback of using energy produced by processing coal, oil and natural gas is the dangers posed to our natural environment. These energy processes have dangerous side effects as the production and use of this electricity creates pollutants.