ClearWorld

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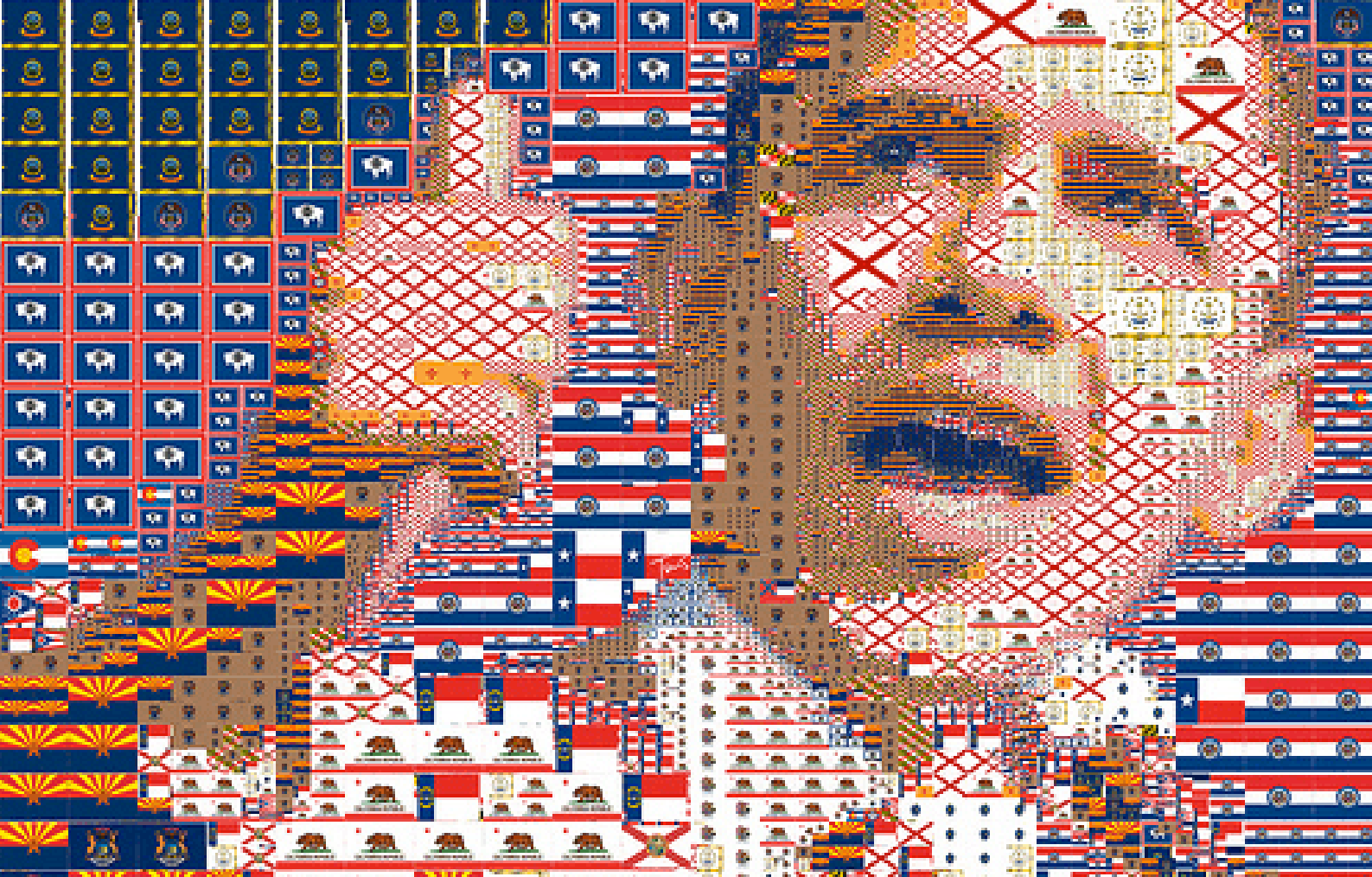
ENVIROMENTAL IMPACTS SHOW THE NEED FOR SOLAR POWER

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DEVELOPING MUNICIPAL SOLAR PROJECTS REQUIRES A DEFT POLITICAL HAND

Solar projects for municipal customers are typically on a similar scale as those for commercial enterprises but come with their own sets of rules. Developers seeking to serve this active and growing market must master a rigorous and often long procedure-driven process. Moreover, this process is by definition under intense and even skeptical public scrutiny because such projects are financed by taxes and bonds. Solar projects for municipal customers are typically on a similar scale as those for commercial enterprises but come with their own sets of rules.

Successful developers of solar projects for municipal customers report that preparing their own organizations for the effort is essential to play, let alone score winning bids and profitable outcomes. Such efforts include acquiring in-house expertise in public works that are specific to the style of county, city or town government involved. Securing local partners and project champions are also vital for successfully navigating the rules of the game.

"There are pros and cons to working with municipal customers," says Joe Harrison, senior project developer in the Boston office of San Diego-based Borrego Solar Systems. "The private sector is able to move quicker when they make a decision. On the other hand, the private sector is not obligated to follow through. You are always one phone call away from having the customer go with someone else."
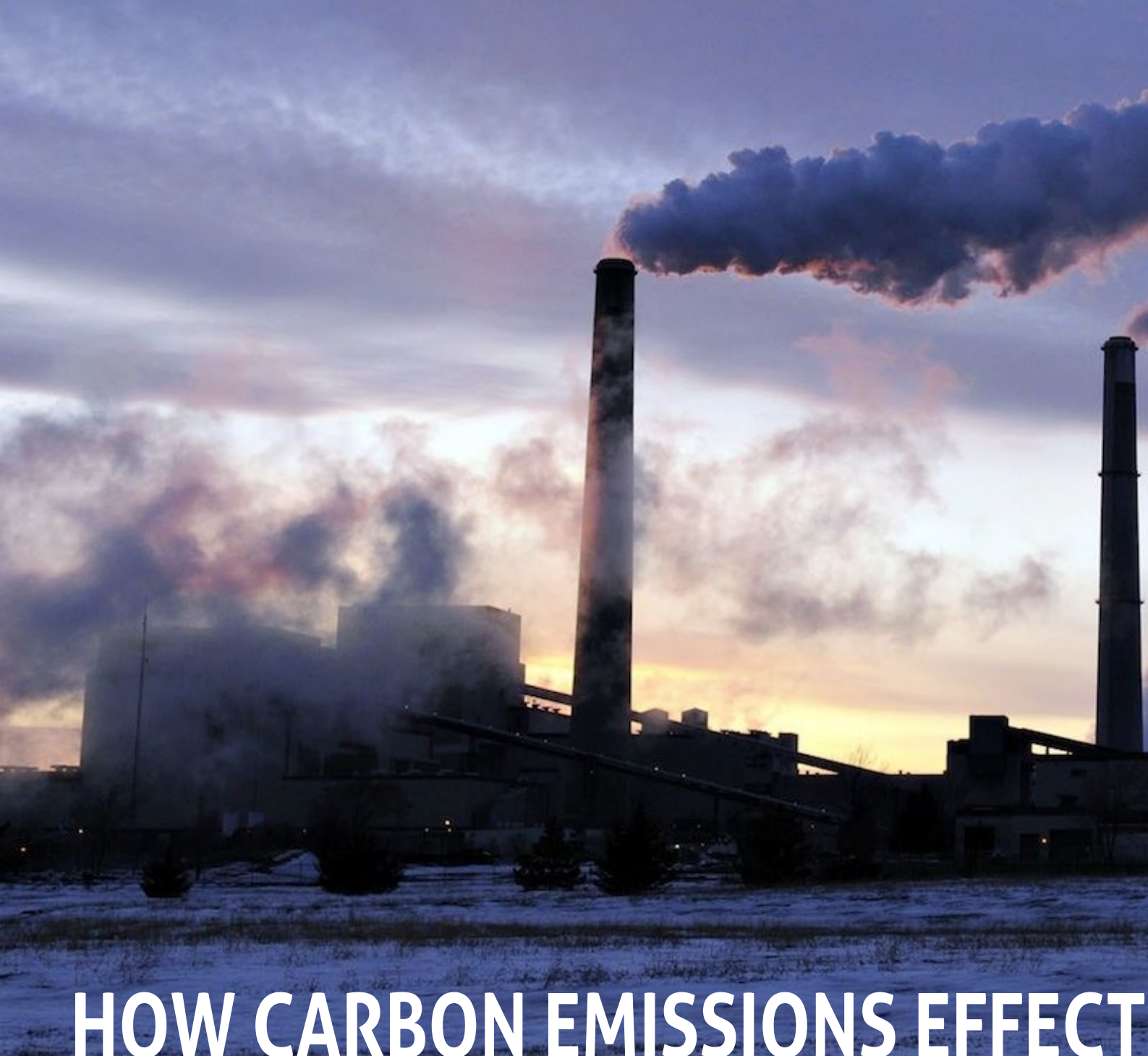
HOW CARBON EMISSIONS EFFECT

The current global warming trend is causing physical and biological changes to occur throughout the entire planet and is impacting regional climates, ecosystems, and the organisms that inhabit them in a number of ways. Animal species can only survive within specific ranges of climatic and environmental factors; if conditions change beyond the tolerance of species, or too rapidly for evolutionary adaptations, then animals may exhibit ecological responses to these changes. The threat of extinction to species who are unable to adapt or have limited habitat is expected to increase with climatic changes, and the extinction of some species has already been directly linked to climate change. Changes is animals phenology, such as migration, breeding and spring appearance, has occurred throughout the world and is linked to seasonal variability. Changes in the spatial distribution of animals, particularly poleward and elevational shifts, is occurring as suitable habitat disappears or extends beyond its current range.

Arctic and marine ecosystems are undergoing physical environmental changes that are effecting the species that inhabit them. Temperature change and melting sea ice in the arctic is adversely affecting the species of the region, and sea level rise, increased sea temperature and higher pH are among the issues changing the planets marine ecosystems. Spread of pests and disease are occurring as a result of milder temperatures. All of these changes threaten the planets ecological biodiversity and changes projected for the environment will increasingly affect all life on Earth.

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CLIMATE CHANGE AND ANIMALS

Greenhouse gas emissions have increased from year to year. Emissions can rise and fall due to changes in the economy, the price of fuel, and other factors. In 2016, U.S. greenhouse gas emissions increased compared to 2015 levels. This increase was due to a number of factors, including: cold winter conditions resulting in an increase in fuel demand, especially in residential and commercial sectors; an increase in transportation emissions resulting from an increase in vehicle miles traveled; and an increase in industrial production across multiple sectors that also resulted in increases in industrial sector emissions.

THE PRIMARY SOURCES OF GREENHOUSE GAS EMISSIONS IN THE UNITED STATES ARE:

Electricity:
Electricity production generates the largest share of greenhouse gas emissions. Approximately 67 percent of our electricity comes from burning fossil fuels, mostly coal and natural gas.

Transportation:
Greenhouse gas emissions from transportation primarily come from burning fossil fuel for our cars, trucks, ships, trains, and planes. Over 90 percent of the fuel used for transportation is petroleum based, which includes gasoline and diesel.

Agriculture:
Greenhouse gas emissions from agriculture come from livestock such as cows, agricultural soils, and rice production.

Industry:
Greenhouse gas emissions from industry primarily come from burning fossil fuels for energy, as well as greenhouse gas emissions from certain chemical reactions necessary to produce goods from raw materials.

ENVIROMENTAL IMPACTS
SHOW THE NEED FOR SOLAR POWER

Our environment is constantly changing. 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. However, this isn't the only environmental problem that we should be concerned about. 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.

- **Pollution:** 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.

- **Global Warming:** Climate changes like global warming is the result of human practices like emission of Greenhouse gases.

- **Waste Disposal:** The over consumption of resources and creation of plastics are creating a global crisis of waste disposal.

- **Climate Change:** 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.

- **Loss of Biodiversity:** 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.

- **Deforestation:** Our forests are natural sinks of carbon dioxide and produce fresh oxygen as well as helps in regulating temperature and rainfall.

- **Ozone Layer Depletion:** The ozone layer is an invisible layer of protection around the planet that protects us from the sun's harmful rays. Depletion of the crucial Ozone layer of the atmosphere is attributed to pollution caused by Chlorine and Bromide found in Chloro-floro carbons (CFC's).

- **Water Pollution:** Clean drinking water is becoming a rare commodity. Water is becoming an economic and political issue as the human population fights for this resource.

- **Public Health Issues:** 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.

- **Genetic Engineering:** 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.

The need for change in our daily lives and the movements of our government is growing. Because so many different factors come into play; voting, governmental issues, the desire to stick to routine, many people don't consider that what they do will affect future generations. If humans continue moving forward in such a harmful way towards the future, then there will be no future to consider. Although it's true that we cannot physically stop our ozone layer from thinning (and scientists are still having trouble figuring out what is causing it exactly,) there are still so many things we can do to try and put a dent in what we already know. 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.

SMART CITIES: Who it Affects

As the world becomes increasingly more urban, with 60% of its population forecast to live in cities by 2050, cities are becoming more technologically advanced. This type of city is known as a smart city and the goal is to improve the quality of the lives of citizens through better communication and the services offered while reducing overall costs. ClearWorld is working to bring the most advanced technology to cities around the country. The applications are endless and the benefits substantial. To see how our applications can make your city a smart city, hover over each tooltip.

The goal is to improve the quality of the lives of citizens.

There is a range of definitions of a smart city, but the consensus is that smart cities utilize IoT sensors, actuators and technology to connect components across the city. This connects every layer of a city, from the air to the street to underground. It's when you can derive data from everything that is connected and utilize it to improve the lives of citizens and improve communication between citizens and the government that a city becomes a smart city.

Who it affects.

This affects everyone, whether directly or indirectly. People who live in smart cities or who are visiting smart cities have the immediate benefit of being connected to the governing body for information and services. The quality of their lives can be improved with better traffic management, waste removal, snow removal and more. Those who don't live or visit a smart city are affected simply because of the lack of connected services and communication available to them.

A smart city also benefits the environment. Water and energy usage are sustainability issues, and a common thread across all smart city projects is how a city reduces CO_2 emissions.

Smart cities are part of the world of IoT, with everything from streetlights and parking spots digitally connected. ClearWorld is among those providing smart city solutions. Many cities first embark on becoming connected through streetlights because they offer a quick revenue return for municipalities with the use of LED reduced energy lighting.

Is There Room for Independent Developers in a Solar-Led Renewable Energy Sector?

Until now, most of the growth in large renewable energy installations has been carried out by independent developers. The typical developer business model is based on capturing the yield arbitrage between early stage projects and operating assets (or a middle point in the development process) due to different risk profiles. However, the collapse of SunEdison seems like the final nail in the coffin for this business plan.

In the last 15 years, developers have benefited from a significant reduction in development risks: wind and solar technologies and their respective supply chains matured, standardized procedures and contracts appeared, and capital became easily accessible. At the same time, government policies designed to support a high-risk industry (such as feed-in tariffs [FITs] and guaranteed grid access) remained in place. This increased the yield arbitrage between the development stages.

Most of the initial renewables development has happened in the wind sector. Areas suitable for wind development are limited, and resources need to be verified with local wind speed data for at least a year or two to be able to get financing for the project. In addition, wind turbines are distributed in large patches of land that are sometimes owned by different organizations and under different local authorities. Wind installations are also relatively complex to build, limiting the number of engineering performance contractors (EPCs) with the skills needed to build them. These barriers increase costs but also protect developers that are early to enter the market; they also make good wind projects relatively scarce.

Solar costs have reached a point where solar PV can now compete with wind deployments, and solar developments do not face the same barriers as wind. In solar, resource variability within the same region is not significant; projects can be deployed following land ownership or local authority limits, and their build complexity is low. All this means that a significant number of developments can quickly arise in the same market simultaneously. The first victims of solar were FITs; when solar costs were low enough to benefit from the tariffs, projects boomed. Governments tried to respond by lowering the FITs, but by then the costs of solar were even lower. The only way to stop the spiraling cost created by FITs was to eliminate them.

SMART CITIES:
ENHANCED COMMUNICATIONS

Enhanced communications expand the reach and intensity of solar through resilient power and high line of sight. Increased security with remote camera monitoring capabilities for intelligent parking, infrastructure for public WiFi expansion, and environmental sensors assist in the growth sector of our solar communities.

Smart cities will realize these opportunities by taking advantage of public/private partnerships in which telecom service providers and investment tax credits (ITC) solution providers bring in their assets, expertise, and experience. ClearWorld is working to bring the most advanced technology to cities around the world. The applications are endless and the benefits substantial.

Once the foundation is laid out, there is ample opportunity to optimize the city's public infrastructure, including buildings, public space, roads, traffic lights, parking, etc. Optimization contributes to a sustainable environment. Elements like a smart grid helps reduce CO_2 footprint and energy bills, and wireless sensors can continuously monitor and control pollution, lighting, and waste.

DESIGNING FOR SOLAR
WHAT EVERY ARCHITECT SHOULD KNOW

While researching solar technologies, we heard from solar installers who all seem to think that architects are hard to work with. So, we spoke with Fernando Valenzuela of Alter Systems in Berkeley, CA about how to design a solar-ready home. Note that only about 5-10% of Alter Systems' customers are owner/architect teams. Usually it's the homeowners approaching them directly because they want to "go solar".

So... why are architects hard to work with? "They have a groupthink... they like design, the look, but they don't understand systems. They ask questions like 'why can't we use this roof' without realizing that you can't split up an array. Their projects aren't always quick, either, and rebates that were designed for may be gone by the time the project gets through approval." Valenzuela went on to provide various design tips, as well as insights into new technologies, best-of-breed products, the difference between grid-tied and off-grid systems, costs and returns compared with conventional power, financing options, and the importance of grid parity.

Consider building shape, roof planes, and orientation: With a remodel, people engage with an architect after the house is already built. It's really best to take solar into account and design for it from the start. This may include choosing a lot or site that allows for a good solar orientation. Assuming that you do have some power to determine the shape of the building envelope, just make sure you include a nice un-shaded patch of south facing roof around 20 x 30 feet for your PV arrays.