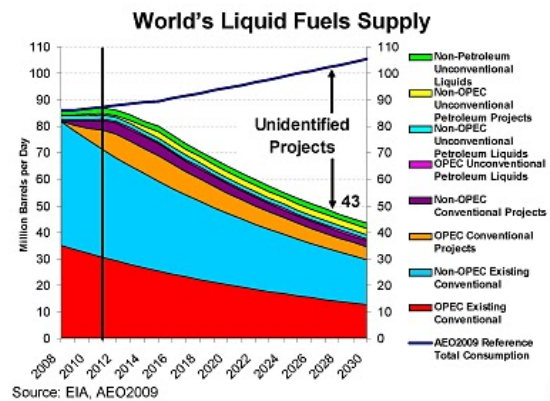


Food, Energy, Transportation, Urban Design, Climate for an Eternity without Oil!

Images to Strike Fear Into the Heart of Every Urban Planner



1. Why ever should pictures of the BP oil platform fire, and combine harvesters perturb in the slightest the average city planner? Because, in the near future, we won't have any, nor the wheat, nor the bread that enables only 4% of our population to produce staples, for ourselves, and for the world! The prime and primal issue of our times is the near future, within the next 60 years, and according to the International Energy's graph on the right, 1 year, when there will certainly be little petroleum, and all that is left must be preserved for the production of more durable goods, such as fertilizers, pesticides, pharmaceuticals, and plastics.



In such conditions, we will need to have already built a global infrastructure that gets all of its energy from nuclear and renewable sources, while providing access to food, energy and transportation. Rail and maglev trains will be preferred, as they use only 1/3 of the energy/passenger mile that cars and aircraft use, and can be powered by renewable sources! The sooner that we can get a novel rail based transportation network built, the more petroleum we will have for generations that will exist 2,000 and 4,000 years from now! **Please bear in mind that the last 2000 years can be reduced to only 20 times the 5 generations, grandparents to grandchildren, that we will have met in our own families (20 x 20 years/generation x 5 generations = 2000!).**

2. The specific challenges that we must all address are A) the production of food without petroleum – there were approximately 100 million Americans in 1915 and 21.5 million horses ($\approx 5:1$) to help us to produce food. Now we are 304 million Americans with only 6.9 million horses ($\approx 44:1$), few of which have ever seen a plow let alone pulled one! How will we produce food without their help, no petroleum and when much of the best farmland in the country has been paved over? B) Where do we get energy from when more than 40% of our total energy demands and more than 99% of the fuel we use in our cars, trucks and farm equipment that is currently provided by oil is gone? C) Can we do anything to slow down and reverse the global climate change that we have been so adept at creating? Can we create the world's first 100% sustainable infrastructure, knowing that everything that we make, use and do within the next 60 years must be 100% sustainable, including stabilizing the world's climates, if we want to maintain the world's populations at their current levels?! My project is one of the first to comprehensively address and design for all of these globally life threatening issues using currently available technologies!

3. Before the age of the automobile in 1900, 60.4% of the American population was classified as rural, and were reasonably able to walk into fields to cultivate their own food. Now, only 4% of rural residents make their living farming, the last time most Americans lived on farms was in 1880 and the last time the majority lived in rural communities was in 1920. We will have an enormous challenge to feed, clothe, employ and transport Americans when there is no more oil! We must use the most energy efficient transportation, trains, the only feasible long-term energy sources, renewables of all kinds and nuclear, and the close proximity of all residents of new buildings to food production areas, **which is only possible using linear-form cities!**

The "No Oil Era" is on our doorstep! Without intelligent action on the part of all who plan the future, we are condemning the babies of tomorrow to an almost certain death, as global populations shrink from their current level of 6.85 billion to the 1.6 billion that existed in 1900, before we began to use oil, or less with the present loss of valuable farmland to over-fertilization, over-salinization, over-asphaltization, and the conflicts that inevitably arise as all populations shrink! It may be noted that North Africa and the Middle East have witnessed significant drying trends in the last 10,000 years – the Sahara was once a savannah that was lush enough to support the workforce that built the pyramids, and what happened to the Hanging Gardens of Babylon and the Fertile Crescent, the birthplace of modern agriculture – are they the most peaceful areas in the world today?

4. With the end of petroleum, we are very likely to see the end of the coordinated, efficient and compact food production systems that allow Americans and global citizens to eat affordably today. In that vacuum, what are the chances that law and social order can be maintained, especially if the police themselves are deprived of petroleum? Even now, the US Defense

Department is the world's largest single consumer of oil! **How can a country that has only 2% of the world's oil on its territory, but consumes 20% of the world's supply continue to live in peace with all other nations!**

I. Land, Population, Transportation and Food without Petroleum:

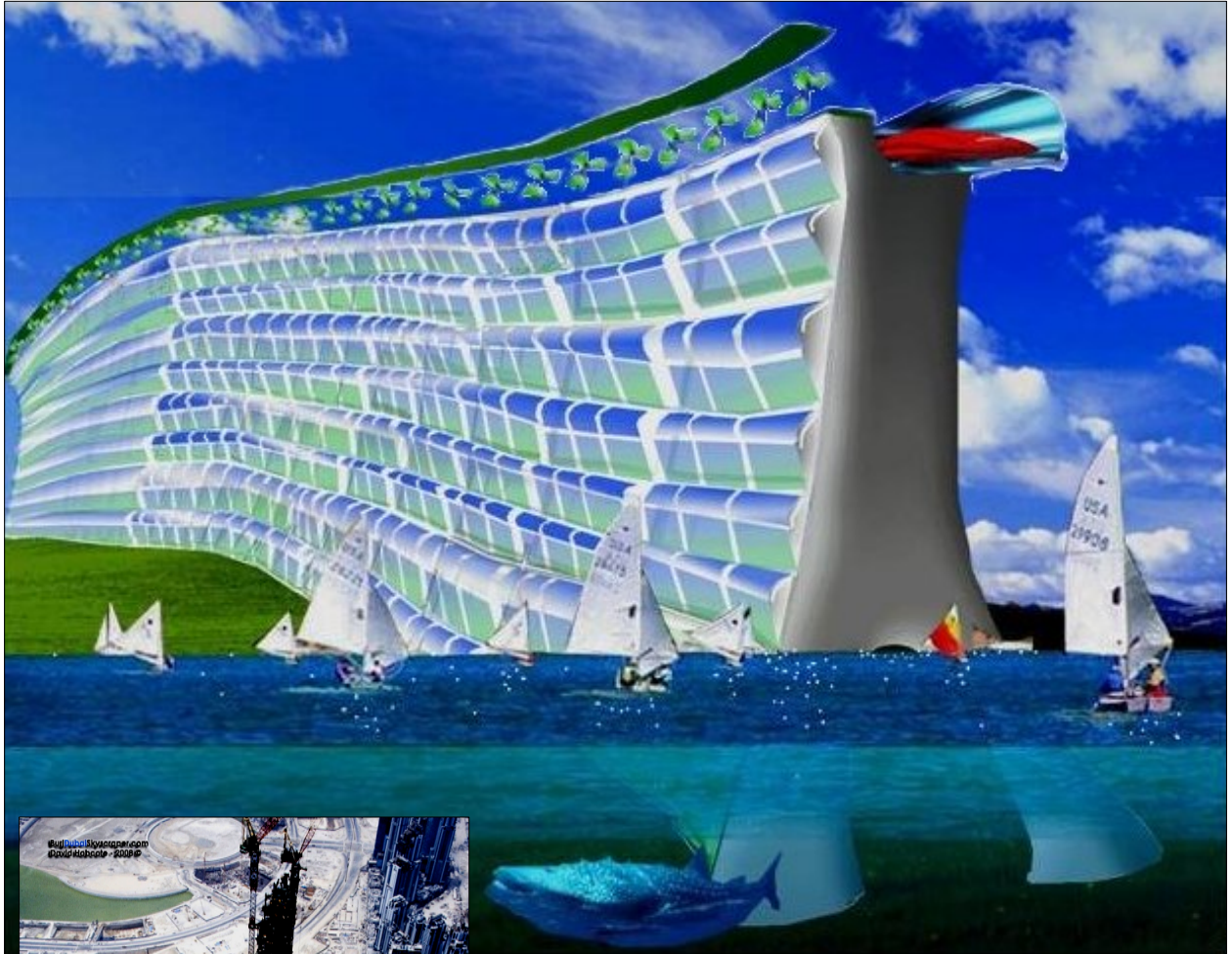
World and American populations are dispersed across the continents roughly as indicated in this satellite image of Earthlights at night, bearing in mind that we in the USA consume about 5 times the energy/person of those in Europe and 20 times those in the rest of the world!



The low-lying areas along the East and West Coasts, and Mississippi River Valley and Gulf Coast could all easily disappear under rising sea levels, to say nothing of European, Asian and Indian populations in low-lying areas!

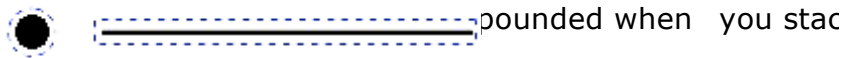
This is a mathematics problem: how to supply over 4 times the world's people on land and energy supplies that are likely to dwindle even more than they are now, and were in 1900!

There are ways to sail around this problem as sea levels rise, however, using modern technologies in novel ways, as follows:



Why live in a long ribbon, linear city when you can live in something as exciting as the Burj Dubai, for example? The answer comes down to simple, 7th grade mathematics: lines have a far greater perimeter than circles, which have the minimum that is mathematically possible.

Please compare the 2 figures below that have roughly the same area but vastly different perimeters - - - - - :



These differences are compounded when you stack the circles on top of each other to create the building on the left above, which is superb in the views and sense of power that it creates, but poor when all its inhabitants must

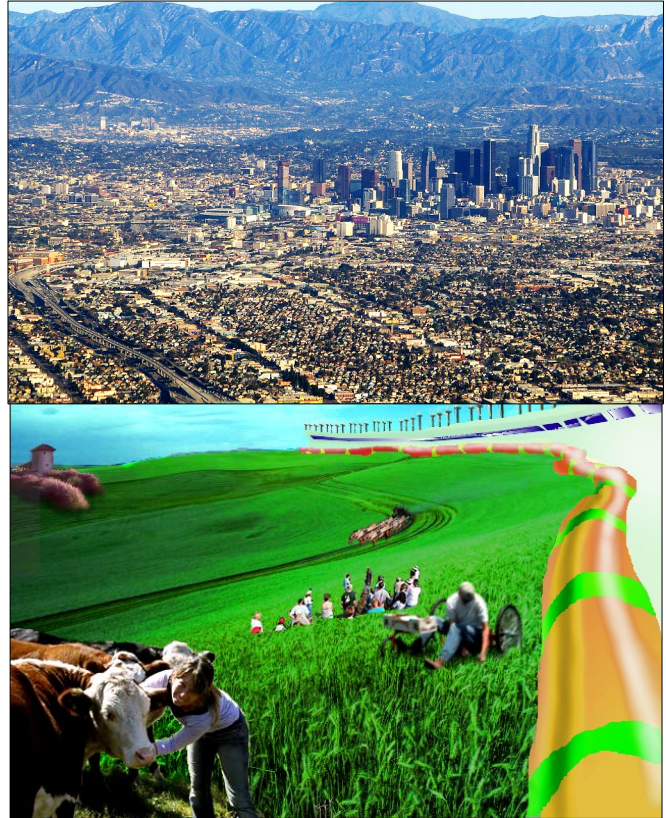
walk into fields to grow their own crops because there is no more petroleum to produce the food and bring it to where people can eat it! Please consider too that **all of our cities** are circular, not linear, forms that give few people access to fields to grow crops. Please see the image of Los Angeles on the right!

Why should this make a difference? After all, technology has been directing us toward the heights for at least a century, the same century that has been coincidentally driven largely by petroleum, and the mobility that it has given us.

I therefore propose linear cities like that on the right, where everyone can walk from where they live into open fields, both to grow their own food, and to supply those who are still stuck in existing cities, and towers like those above!

The tunnel bordering the fields contains high-speed rail, along with medium and low-speed lines, which are the only form of transportation outside of bicycles, ships and electric cars that can be driven by wind.

Everyone lives within a 10 minute walk of their own field, chickens and fruit trees, and all can very rapidly reach the existing cities using the high-speed rail link, which uses only about 1/3 of the energy/passenger mile that cars and aircraft use.



The wind turbines (at the top between nos. 2 and 3) along the edge of the north to south linear city capture the energy of the prevailing westerly wind that has been accelerated as it passes over its 3 – 5 stories. Expressways can be used to deliver building materials to build linear cities just alongside, as below, and we can start by installing conventional wind turbines first 1), followed by both high-speed rail and “high temperature” superconducting induction tracks in the roadway to drive electric vehicles, giving them unlimited range 2), followed by the construction of the linear cities themselves 3).

The sketches below show the same process, with the intermediate stage of elevated platforms a) for quick-change battery pit stops for autonomous electric vehicles. **All residents are within walking and cycling distance of fields, as below:**



The Linear Cities follow the expressways in the middle above, and go more directly between the existing cities on the right above. They run north to



south, at right angles to prevailing westerly winds as mentioned, except for B) below, and can be built into hillsides, onto land subject to floods, and along water-courses as in the aerial view at left above.

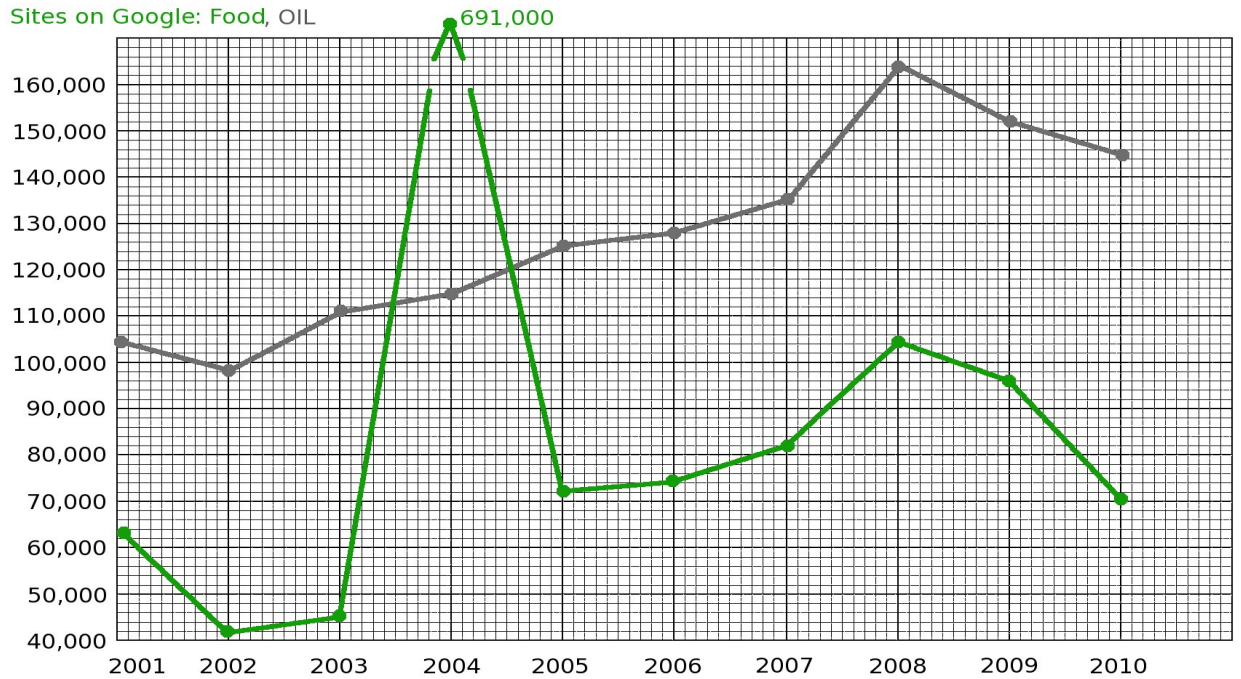
With the forthcoming certainty of the End of Oil, and a global food crisis looming, there are more and more who advocate much greater reliance on organic farming methods. Organic farming methods however are labor intensive, as mandated by the low-petroleum era, and resolved by the much greater proximity to the land that Linear Ecocities provide. This is one of the only ways to get the hands into the fields, as 80% of us now live in cities, far from food production areas! As Linear Ecocities run through cropland, all hands are either a 10-minute walk from where they may work for the day, or a short or long train ride from the field and seasonal crop that must be tended.

This article is dedicated to the components of the genes that we all carry, and that we have all shared throughout our history. Long may they live, 100% sustainably!

Please contact Mr. Kim Gyr at: humansolutions@greenmillennium.eu, 231 392 6511, or at 10057-3 Michigan Street, Empire, Michigan 49630-8505, and see many more details, including designs for cars that do not require gasoline and rapid, renewably driven craft for crossing oceans without petroleum, both on my website at: www.greenmillennium.eu or in any of the many chapters and essays that I have written by sending a request to any of the above contacts.

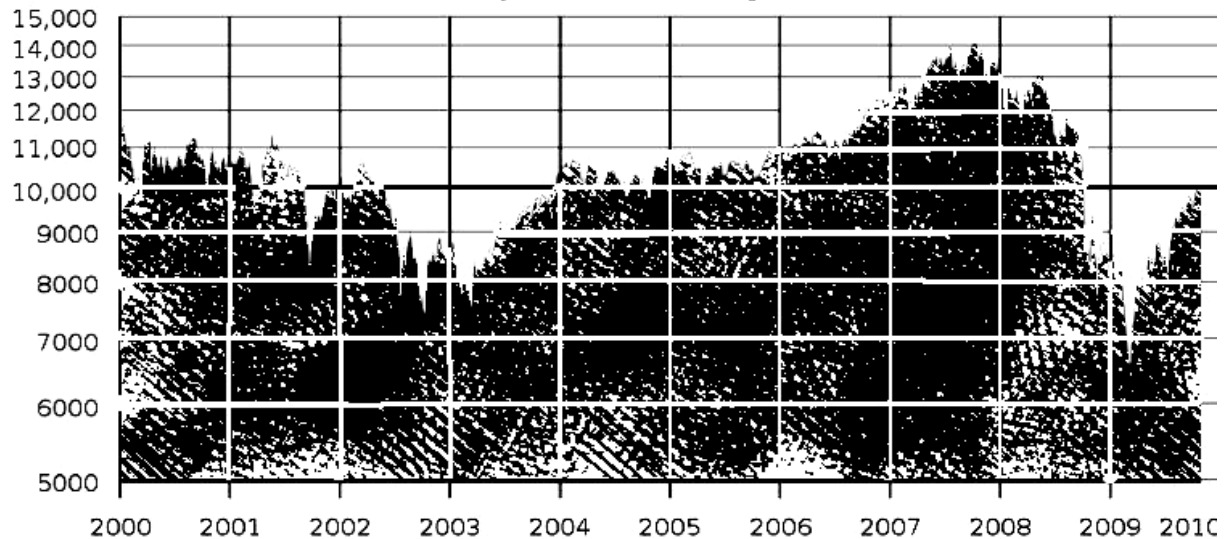
PS. The following is a comparison between the number of pages referenced by Google for the combination of “Wall Street” and “food production”, and “Wall Street” and “Oil Production”, and the Dow Jones Industrial Averages for the past decade. It seems that there is a reasonably close correlation between all four!

Sites on Google: Food, OIL



Is there a correlation between the number of pages that mention “oil production” and/or “food production” referenced by Google, and Wall Street’s performance?

Dow Jones Industrial Average



What may be interesting in examining the above is that a high occurrence of sites that mention “Wall Street”, and “oil production” and/or “food production” in the same article came *after* the crash in 2002-03, whereas it *continued and preceded* the crash this time, to rise far higher still after the crash. So, perhaps Wall Street learned just how important “oil production” and/or “food production” are to world economies, and has done its best to safeguard its own money, and the transfer of others’ money into their own accounts to “safeguard” that as well?

If we can render energy supplies and food production more predictable, steady, and subject to democratic influence, perhaps the world will be able to support more people with less waste, violence and volatility, more predictably!

Therefore Linear Ecocities because, in the end, we must imagine how to manage without a single drop of oil! And, we will more easily reach the goal of 100% sustainability the sooner that we start, and the quicker we progress!

I have constructed this model as a goal at the end of the first curve in an oval racecourse. I challenge anyone to provide a better, more sustainable model! At the same time, I am also happy to predict that all of us will not be living in Linear Ecocities like those that I illustrate in 1,000 years and 10,000 years. Just as car, medical and communications technologies have evolved rapidly, the Linear Ecocity will also be subject to rapid evolution, including paradigm change! At least, I hope so!