

Energy Basis for Florida Trends

Energy is the requirement for all things and the basis for human existence. The energy of the sun working over the seas ~~is~~ ~~xxx~~ separates freshwater from the salts of the sea bringing the rains to Florida. Fresh water is not often thought of as energy, until it must be made in a desalination ~~is~~ process. Pure water does have a high energy content. Some ~~is~~ energies like solar energy, although abundant, are dilute and of low quality. These energies serve men only after they have been concentrated by plants, and much of the energy is ~~is~~ used in the process. Water, however, is a concentrated energy. The energy of the sun already has been concentrated by the weather systems that transform the dilute solar energy to the concentrated energy of the rain. To measure the ability of energy to do work in support of humanity, we can represent each type of energy in terms of the ultimate Calories of solar energy ~~xxxxx~~ required to develop it. The energy flow in water is an important indirect energy flow from the sun. Because Florida is blessed with much rain it is receiving more of the energy of the sun in upgraded form as water than it receives directly. Little wonder that water is ^{the} precious, controlling resource in Florida, for water carries much of the basic energy, as the chemical energy of water purity that supports the Florida economies, past, present, and future.

In Indian times energy from the sun, growing the plants ^{and} indirectly

the animals, supported humans as hunters, fishermen, gatherers of shellfish, and growers of corn on a small scale. The Indian economy was a solar energy economy ~~th~~ and the population which could be supported in this way was ~~xxx~~ small. The environmental systems for maintaining luxuriant life were, however, self maintaining. For example, swamps were a natural means for holding water in any season and keeping water quality high.

Another energy principle helps explain, in energy terms, how the colonists displaced the Indians and how the English colonies eventually displaced the Spanish influence in Florida. A culture which develops a system with more energy flow takes over from one with less flow of energy. The colonists were ~~h~~ able to control more energy in developing their cultural system than the Indians, partly because they could draw initially on the very high quality energy of their weapons. Concentrated energies doing work miles away in Europe were directed into more firepower and more concentrated social organization in Florida. The diseases of the colonists, in addition, apparently hurt the Indians more than Indian diseases hurt the colonists.

The imported colonial cultures also used the capital stored in the Indian system--the virgin forests, the virgin soils, and the wildlife--as temporary energy sources to establish their new pattern. In depleting these resources, they took energy away from the Indian system. By the time these special stores were exhausted, the colonists had another energy source going, their more ~~xxxx~~ extensive agriculture and, later, fuels.

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The Spaniards exchanged search and shipments of gold and other products back to Spain for their energy needs. The English colonies, however, emphasized the development of assets in this country, especially agriculture, and drew on a broad source of energies from the new continent. As a result, economically and militarily, dominance went to the English colonies and their independence from the mother country developed early. This influence ultimately displaced the Indian system.

Fortunately for the American colonists (or unfortunately, depending on the time scale of your view), new sources of energy were found as the colonists were running out of virgin soils and timbers. Instead of leveling off the economy, energy use and populations could continue to grow as coal came into general use and then oil and natural gas. These new fuel resources were available in local areas, like Texas and Appalachia, so that states like Florida had to purchase ~~them~~ them. To attract an income with which to buy the fossil fuels (and the goods and services made in distant cities with fossil fuels), Florida began to export remaining cypress timbers, winter agricultural products, range cattle, oysters, phosphate fertilizers, staves from natural pine flatwoods, and other ~~resources~~ rural resources. New energy directly and indirectly began to flow into Florida due to energy discoveries miles away. These new ways carried more energy flow and thus displaced or added to the older ways.

Growth continued as the twentieth century opened. Some industries began to develop in Florida, using the fossil fuels within the state and selling the products for money to buy the fuels. Fuels were priced cheaply because they were close to the surface and cost little to pump and transport. Even agriculture and forestry shifted.

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A pattern based only on sun, wind, rains, and the geological input of the rocks to form soil changed to one with a more intensive role for men. Fossil fuels were used directly and indirectly to provide planting, weeding, fertilizing, insecticiding, harvesting, and special care for high yielding but delicate plant varieties. Fossil fuel agriculture emerged along with pine forest plantations to supply paper for a business world in bustling new cities based on fossil fuels.

As the rich fossil fuels poured into industrialized areas to the north, there were great energy excesses compared to less developed countries elsewhere in the world. The lead of the United States in tapping this energy excess and connecting it to useful work through technology brought unparalleled levels of energy per person, a high standard of living that included the energy to travel, to be a tourist, and to retire from work before death. Florida became one of the places where this energy was used, for tourism, for retirees, and for the expenditure of the luxury energies of the northern cities. The attraction in Florida for the luxury energies was really the sun and, based on the sun and water, the beautiful Florida ecosystems, the beaches, the palms and cypress greenery, the swamps, the springs, fishing, the feeling of green panorama and the mild climate. Soon special facilities and man-made tourist attractions were added making Florida the vacation image and retirement center.

New incomes from tourists, retirees, and developers anticipating incomes from these sources poured into the state, in some places dominating everything else. These monies bought more fossil fuel,

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and fossil fuel developed goods and services that Florida used to accelerate its growth. In a sense the large money inflow for military bases and the space program was another consequence of general energy richness in the United States as a whole. These funds, were focussed in Florida because of the good weather and solar energy. Agriculture shifted to luxury products, a greater percentage of high quality beef, heavier emphasis on citrus and winter vegetables for northern luxury markets, and more pine trees for luxury packaging and advertising.

As the United States and other western countries accelerated their growth on the rich fossil fuels, they began to exhaust their own easily reached resources, leaving themselves with fuels only deep in the ground, far at sea, or dilute in their distribution in the rocks. The only rich, easily tapped fuels remaining were in other countries, especially the Near East. As the energy spent in getting energy increased everywhere, the cost of energy began to rise. Then those with the richer sources found they had a monopoly on cheap fuel and could jump the price. Since Florida was buying much of its energy incomes based on other activities, the four-fold-rise in fuel prices in the fall of 1973 suddenly reduced the energy basis for Florida. It had to send out more goods and services per unit of energy obtained than before. The excess energy inflow that had been generating rapid growth was stopped. Furthermore, the luxury part of the Florida income began to decline as the fuel pinch affected northern monies for vacations, retirement funds, and the purchase of luxury products from Florida. Reduction of energy is a reduction of the work a dollar does, a

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reduction of its buying power. Energy reduction generated inflation and reduced the real income to Florida from savings and retirement funds.

So finally in 1974 the energy budget turned down and with it the flow of real money. There was high unemployment in those industries related to growth, like construction, and luxury, like tourism.

Many thoughtful people had worried about running out of fuel before, and nuclear energy was developed at great cost to supply a substitute. Several giant plants were built in Florida. The hidden energy subsidies, however, from the fossil fuels that made nuclear energy look economical, began to disappear. The fossil fuels and everything they supported became more expensive. Nuclear energy was analyzed and found to barely supply more energy than it takes to process it. It is not as rich an energy source as it was originally thought. Huge capital is required to build a nuclear energy plant, and the ultimate resources run out as soon as fossil fuels do. Nuclear energy is not easily ~~xxx~~ usable in the flexible ways that fossil fuel is used--for transportation, heating, and industry, ^{because} because much energy is lost in the extra step of converting to and distributing electricity.

As soon as there as a fossil fuel shortage and the fossil fuels and everything they supported became more expensive, ^{there} there was also difficulty in making the new nuclear plants pay for their construction costs, let alone the unknown costs for the waste disposal and safety protection often discussed in public forum. The use of electricity by consumers often had been for luxuries, and the demand for electricity decreased as energies became more expensive.

Although many people could not believe growth had stopped for good,

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the energy situation suggested that a new pattern was ahead. Leaders would admit it in private but not mention it in public fearing public backlash. The situation was a little like the time before the Civil War when shifting energies from agrarian sunlight to fossil fuels for industries was tipping power to the North: this reality was outside the experience of Southern people and it took a terrible war to bring home the energy reality, and still they did not understand. Now again, at this bicentennial time, there are changing realities of energy ~~in~~ in Florida.

If the fuels continue to be more and more costly as the oil rich countries go deeper and deeper, and if the far-out~~proposition~~ proposition for energy are not very rich in their contribution of net energy, energy beyond what they use in the process, then Floridians must face a long range future of once again running on renewable resources: the sun, the waters, some fuels, and small amounts of minerals that are moved upward each year by the slow turn of the geological cycles. There is no reason why a fine cultural pattern for humanity cannot be built in balance with the energy flow that is available, but it will not be one of explosive growth and it will not have so much luxury. ~~It~~ For Florida, the luxury state, this may eventually mean drastic changes.

A regime of men on renewable resources will have some of the features of the earlier Indian system, but will have man in a much larger role in ~~interaction~~ interaction and use of all the resources. Ultimately, there may be more people dispersed and working on the land again, and cities may be less concentrated. The steady state which may come later is fascinating, but the reality of need

is now, the time of transition. The immediate need is for leadership in making that transition.

Toward whatever ~~happens~~ comes, uphill and downhill, Americans have always faced challenges with enthusiasm and enterprise. Floridians are called upon to do this again, but in a new way and with a new energy ethic. It is an opportunity for the next 200 years.

Figs will
carry captions.





