FEDERATION FOR AMERICAN IMMIGRATION REFORM

IMMIGRATION, ENERGY AND THE ENVIRONMENT

A REPORT BY JACK MARTIN, DIRECTOR OF SPECIAL PROJECTS

INTRODUCTION

After food and water, energy is perhaps the most basic of all human needs. We use it to heat our homes, grow and prepare food, transport people and goods, refine ores into metals, pump water, and manufacture goods. Americans are frequently accused of being excessive energy users, but among nations there exists a strong correlation between per capita Gross Domestic Product (GDP) and energy consumption. One of the underpinnings of the standard of living enjoyed by Americans has been a reliable and relatively low-cost supply of energy.

As a result of the 1997 Kyoto U.N. Climate Change Treaty, considerable public attention has been focused on the issue of energy consumption. The U.S. signed, but has not ratified, this treaty that calls for the U.S. to reduce greenhouse emissions by seven percent below the level in 1990.[1] Limiting carbon dioxide emissions — the main greenhouse gas — Is particularly onerous on the U.S. because of its population growth and high per capita energy consumption. While European countries accepted a higher level of reductions (8%), they have relatively stable or, in several cases, declining populations. A look at the relationship between population growth and energy consumption/emissions is instructive.

## POPULATION SIZE AND ENERGY CONSUMPTION

Thermal energy is measured in British Thermal Units (BTUs). A BTU is the amount of heat required to raise the temperature of one pound of water by one degree Fahrenheit. U.S. energy consumption is usually expressed in quadrillion [10^{15}] BTUs. One quadrillion BTU is called a quad. Thus, in 2005 U.S. energy consumption was approximately 101 quads. Years 1973 and 1974 are of special interest. The October 1973 OPEC embargo on oil shipments to the U.S was not fully felt until early 1974. Thus, 1973 is generally viewed as pre-embargo and 1974 as embargo-impacted consumption. Of greatest signifi-

TABLE 1
RESIDENT U.S. POPULATION, ENERGY CONSUMPTION AND PER CAPITA ENERGY CONSUMPTION[2]

	Resident Population	Energy Consumption (Quadrillion BTUs)	Per Capita Energy Consumption (Million BTUs)
1973	210,839,000	75.81	360
1974	212,846,000	74.08	348
1980	226,542,000	78.44	346
1990	248,718,000	84.34	339
2000	281,422,000	99.04	352
2005	296,410,000	100.70	340
2007	301,621,000	101.54	337

POPULATION AND ENERGY CONSUMPTION

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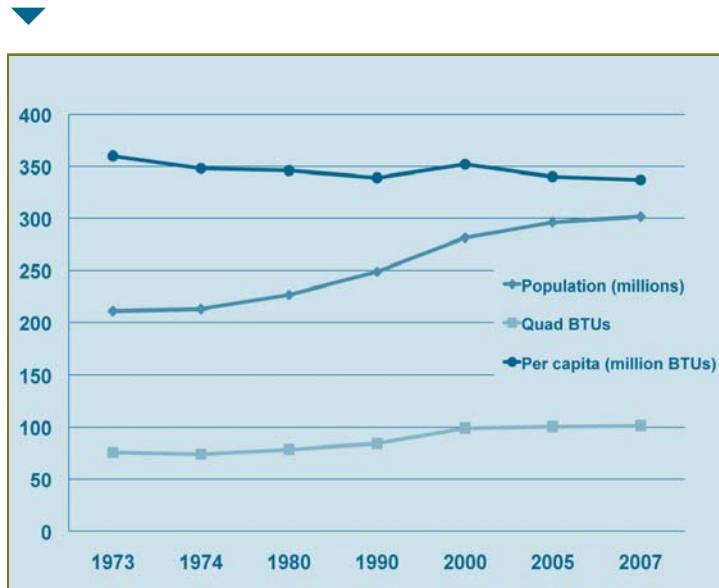
Source: U.S. Dept. Energy and Census Bureau

cance from the embargo was the higher oil prices it produced in the United States. The average price of crude oil imported into the U.S. jumped from $5.21 per barrel in 1973 to $10.91 in 1974. (A barrel of crude oil contains 42 gallons.)

As the chart to the left shows, per capita energy consumption has been relatively constant. It has decreased slightly (by 6%) from the post-oil embargo level of consumption. Thus, the nearly one-third increase in energy consumption during this period (25-quad) may be attributed to the two-fifths (85.6 million people) increase in the U.S. population.

IMMIMGRATION AND POPULATION INCREASE

Between 1974 and 2007 total immigrant admissions were 27 million persons. Thus direct legal immigration accounted for 31.5 percent of the U.S. population increase during this period. The share of population growth attributable to immigration is still higher when illegal immigration and the children born to the immigrants after their arrival are included.

The close correlation between increased U.S. energy consumption and increased population is further illustrated by the data in Table 3, which presents a breakdown of energy consumption by consuming sector. The table shows that per capita energy consumption in the residential sector remained virtually unchanged over the 1973–2007 period. Thus the entire 44.7 percent increase in residential energy use was entirely a factor of population growth.

By contrast, in the industrial sector energy consumption was virtually unchanged between 1973 and 2007 while per capital consumption actually declined about 30 percent. Several factors were responsible for this decline. In response to the increase in energy prices that commenced in 1974, U.S. industry installed more energy efficient production equipment. Secondly, some historically energy-intensive industries such as steel and basic materials have moved offshore. Finally, the decrease in per capita consumption in this sector reflects a basic structural change that has occurred in the U.S. economy.

Today, a greater percentage of GDP is derived from service "industries" such as banking, financial services, medical services, travel services, etc. Most of the energy used in these service industries appears in

TABLE 2
LEGAL IMMIGRATION INTO THE UNITED STATES | 1975 − 2007

	IRCA Legalization*	Non-IRCA Legalization	Total
1975	–	386,194	386,194
1976	–	398,613	398,613
1977	–	462,315	462,315
1978	–	601,442	601,442
1979	–	460,348	460,348
1980	–	530,639	530,639
1981	–	596,600	596,600
1982	–	594,131	594,131
1983	–	559,763	559,763
1984	–	543,903	543,903
1985	–	570,009	570,009
1986	–	601,708	601,708
1987	–	601,516	601,516
1988	–	643,025	643,025
1989	478,814	612,110	1,090,924
1990	880,372	656,111	1,536,483
1991	1,123,162	704,005	1,827,167
1992	215,614	758,363	973,977
1993	79,622	824,670	904,292
1994	40,096	764,320	804,416
1995	4,544	715,917	720,461
1996	4,819	911,081	915,900
1997	2,612	798,378	798,378
1998	955	659,522	660,477
1999	8	646,560	646,568
2000	476	849,331	849,870
2001	300	1,064,318	1,064,318
2002	112	1,063,620	1,063,732
2003	60	703,482	703,542
2004	150	957,733	957,883
2005	217	1,122,156	1,121,373
2006	234	1,266,030	1,266,264
2007	105	1,052,310	1,052,415

Source: Yearbook of Immigration Statistics
*Immigrants who were granted permanent residence under the amnesty program of the Immigration Reform and Control Act (IRCA) of 1986 and their dependents.

TABLE 3

U.S. ENERGY CONSUMPTION AND PER CAPITA CONSUMPTION BY SECTOR

	Resident Population (millions)	RESIDENTIAL USAGE		COMMERCIAL USAGE		INDUSTRIAL USAGE		TRANSPORTATION USAGE		TOTAL USAGE	
		Total quads	Per Capita (million BTU)	Total quads	Per Capita (million BTU)	Total quads	Per Capita (million BTU)	Total quads	Per Capita (million BTU)	Total quads	Per Capita (million BTU)
1973	210.839	14.93	70.81	9.51	45.11	32.65	154.86	18.61	88.27	**75.70**	**359.04**
1974	212.846	14.68	68.97	9.36	43.98	31.82	149.50	18.12	85.13	**73.98**	**347.58**
1980	226.542	15.79	69.70	10.56	46.61	32.08	141.61	19.70	86.96	**78.13**	**344.88**
1990	248.718	17.01	68.39	13.33	53.59	31.89	128.22	22.42	90.14	**84.65**	**340.35**
2000	281,422	20.49	72.81	17.18	61.05	34.76	123.52	26.55	94.34	**98.98**	**351.71**
2007	301.621	21.61	71.65	18.29	60.64	32.60	108.08	29.04	96.28	**101.54**	**336.65**

the commercial energy category in Table 3. Indeed, when per capita energy consumption data in the commercial and industrial sectors are added together, the total has still declined by about 16 percent while total energy consumption in these two sectors increased from 42.2 quads to 50.9 quads (21%). Thus, once again, this 8.7 quad increase may be attributable entirely to population growth.

In the transportation sector, there was a 9 quad increase in energy consumption between 1974 and 2007. However, in this sector, there was also a 9.1 percent increase in per capita energy consumption, a fact which likely relates to more cars per capita, increased purchase of less economical vehicles such as sport utility vehicles [SUVs] and Humvees, as well as the extended use of older, less fuel-efficient cars by population segments with limited means.

Per capita motor gasoline consumption in the U.S. was little changed between 1974 and 2005, i.e., a seven percent increase despite major improvements in the fuel efficiency of new vehicles.[3] However, total gasoline consumption increased over the same period by 53 percent. The driving factor behind gasoline consumption is vehicle-miles, which in turn is driven by population growth. Total vehicle-miles for passenger cars, motorcycles, light trucks and SUVs rose approximately 113 percent between 1974 and 2000.

The fact that the growth in vehicles-miles was more than 3 times as fast as the population increase should not be surprising. In the first place, as the population of an urban region grows, the urbanized

area increases in size, and the residential areas are almost always on the periphery of the urban region. Therefore commute distances are increased. Secondly, population growth has caused property values near some urban centers to rise dramatically. People with modest incomes who have been priced out of the housing market in these urban centers have been buying homes in small towns that, in some cases, are located considerable distances from their places of employment.

Finally, it should be noted that the fastest growing component of transportation energy has been jet fuel. Between 1974 and 2000, jet fuel consumption increased from 1.60 quads to 3.587 quads and per capita consumption rose from 56 gal. in 1974 to 94 gal. in 2000.[6] This increase in per capita consumption was responsible for about 1.5 quads of the 2.0 quad increase in jet fuel consumption between 1974 and 2000.

Looking at the total usage, population growth is again indicated as a primary factor in the overall 34.1 percent increase in energy consumption over this same period because overall usage per capita decreased by 6.3 percent.

HOW TO RECONCILE POPULATION GROWTH WITH EMISSIONS REDUCTION

As the United States considers policies to curb greenhouse gas emissions — particularly carbon dioxide (CO_2) — the impact of immigration on emissions levels cannot be ignored. The Kyoto Protocol standards adopted in 1997 have not entered into force for the United States because of the refusal by the U.S. Senate to ratify an agreement that would have an enormous impact on our economy while countries such as China and India, the two largest and also fast-growing countries, are exempt from any limitations on greenhouse gas emissions. Indeed, by the year 2020, the projected increase in CO_2 emissions in just the developing countries of Asia dwarfs the potential reductions in the U.S. Nevertheless, the U.S. will continue to be pressured in international fora to curb greenhouse gas emissions, particularly CO_2, especially with the arrival of the Obama administration. It is, therefore, important to look at the effect that immigration has on such efforts.

Suppose the U.S. were to accept the challenge of reducing CO_2 emissions seven percent below 1990 emissions. There may be some opportunities to buy emission credits from some countries, such as the former Soviet Union, which have unused credits to trade. There also may be opportunities to get emission credits by creating CO_2 sinks such as forests. However, these options are both expensive and unlikely to be available in proportion to the reduction requirement. While some reduction in CO_2 emissions could be achieved by fuel switching [primarily substituting natural gas for coal and oil], significant fuel switching would quickly drive up natural gas prices. Nuclear power reactors are unlikely to provide any additional energy in the near term because of the long lead times needed for siting and licensing reactors. In addition, nuclear reactors represent a safety threat, and the problem of radioac-

tive waste disposal further limits their role as an alternative to fossil fuels. Renewables are also unlikely to provide much additional energy. In 1973 renewables, excluding hydropower, contributed about 1.6 quads to the U.S. energy supply. [Table 1 data show that U.S. energy consumption in 1973 was 75.8 quads.] In 2000, the contribution of renewables, excluding hydropower, had increased to only 3.7 quads, and part of this was ethanol derived from corn that is used as a gasoline additive. The production of hydropower has remained relatively constant at about 3 quads, and while hydropower is a renewable resource, the prospect of diminished snowpack runoff because of global warming and environmental opposition to dams essentially precludes any significant additional hydropower capacity.

As the data in Table 1 show, U.S. energy consumption in 1990 was 84.3 quads. If the required seven percent reduction in CO_2 emissions were to be achieved entirely by reduced energy consumption, then year 2012 energy consumption will have to be reduced to 78.4 quads.

Let us next estimate the projected population growth to 2012. This growth will be comprised of the natural increase, i.e., births minus deaths, plus immigration. In order to estimate the natural increase, we calculate the natural rate of increase from birth rates and death rates over the two decade period 1980–2000. The average natural rate of increase has been is 0.8 percent per year. The continuation of that rate of increase implies a native-born population in 2012 of 274 million residents.

U.S. POPULATION | 1980-2012 (millions)
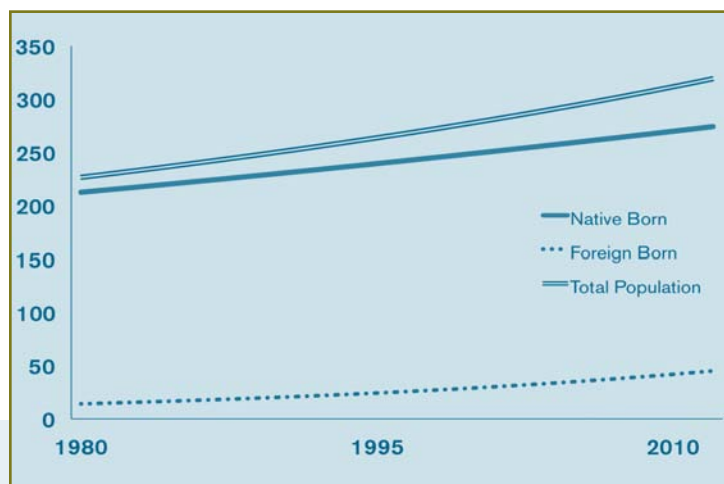
Over the same two decades, the foreign-born population has risen at an average annual rate of 3.7 percent. The continuation of that rate implies a foreign-born population in 2012 of 45 million residents. The total, thus, is projected to be 319.2 million residents. Note that during the 12-year period 2000–2012, the U.S. population likely will have increased by 40.9 million people — 3.4 million per year — of which 15.9 million or 39 percent are immigrants.

Suppose that U.S. energy consumption in 2012 is limited to 78.4 quads, i.e., the Kyoto target. Per capita energy consumption would have to fall to 245 million BTU, which represents a 37 percent reduction. A required reduction in energy consumption of this magnitude would necessitate major lifestyle changes for Americans and cause serious economic dislocations. Restrictions on CO_2 emissions will

translate into higher manufacturing costs for U.S. industry regardless of whether these reductions are achieved through taxes, fuel switching, and installation of more efficient equipment, trading emissions credits, or other means. U.S. industry will be disadvantaged in comparison to manufacturers in both Europe and Japan – which do not have a similar population growth – and undeveloped countries – which do have high population growth but no requirement of CO_2 emissions reduction. The nations of Western Europe and Japan, which on average have essentially stable populations, will therefore be able to meet restrictions on CO_2 emissions much more easily than the U.S., thereby gaining a major competitive advantage. Indeed, the U.S. Department of Energy projects a population growth rate in Western Europe as well as Eastern Europe and the former Soviet Union of zero through 2020.

Finally, it is important to note that immigration is also the principal reason the natural rate of population increase is so much higher in the U.S. than in Europe. The 2000 census data show that the Hispanic or Latino population segment, which has surged because of immigration in the past few decades, accounted for 12.5 percent of the resident U.S. population but 18.7 percent of all live births, The Census Bureau has estimated a total fertility rate of 2.049 for women of all races and 2.921 for women of Hispanic origin, i.e., 42.3 percent higher than for the general population.

The data show quite clearly that the United States will not be able to achieve any meaningful reductions in CO_2 emissions without serious economic and social consequences for American citizens unless immigration is sharply curtailed. Failure to address the immigration issue is only rendering the energy problem more intractable.

ENERGY, POPULATION AND THE FUTURE

Beyond the present situation in which we are challenged to reduce energy consumption to reduce CO_2 emissions in response to concerns about global warming, the other fact that must be kept in mind is that most of our energy consumption is of fossil fuels and that they are a non-renewable resource. The United States has become increasingly dependent on foreign sources of petroleum ever since we reached peak oil production in the United States in 1970, but consumption of fossil fuels has increased, and therefore imports have increased even more rapidly. This trend of declining domestic production would only be marginally changed by new production offshore and on the Alaskan North Slope.

U.S. PETROLEUM PRODUCTION (billion barrels)

Of even greater importance is the fact that geologists are already seeing depletion of reserves in major foreign oil fields that have been taking up the slack in U.S. production, i.e., in countries such as Saudi Arabia, Mexico and Great Britain. The prospect is for world production to now begin a downward slope, just as the U.S. has already experienced.

The same may be expected with regard to natural gas supplies and even coal, although coal reserves are projected to last much longer than petroleum and gas reserves. Current technology does not offer the prospect of replacing these non-renewable resources at a level that offers any hope for avoiding a major forced contraction in energy consumption per capita within a few generations.

Once again, the predicament for U.S. policymakers is how to grapple with the effect of a growing population not just in terms of CO_2 emissions, but also in terms of our growing dependence on foreign energy suppliers as global shortages develop. Like with greenhouse gas emission reduction, reduction of the nation's vulnerability to dependence on foreign nonrenewable energy exporters will depend heavily on the rate of change in the U.S. population. The longer we continue to grow at a rate of 3.4 million people per year the more precarious will become the existence of each of us and our children and the sooner that major forced adjustments will arrive.

CONCLUSION

There is general international agreement that reduction in greenhouse emissions is an important objective. There is also international agreement on the need to rein in the enormous rate of population growth. However, the interrelationship between these two objectives is not presently connected in the minds of the American public. Increased energy consumption and CO_2 emissions are not just the result of increased per capita energy usage; they are also directly related to the increased population size.

In the United States, efforts are underway to reduce greenhouse emissions, a prime example of which is the proposed "cap-and-trade" legislation. Although the United States accepted the objective of the Kyoto Protocol in reducing emissions, it rejected the unfair disadvantage in complying with the mandate of a seven percent reduction from the 1990 level. The disadvantage arises because the Protocol fails to consider that the United States has a fast growing population in comparison to other industrialized nations and that some growing competitors such as China and India are not required to make similar reductions under the Protocol.

Any effort by the United States to reduce greenhouse gas emissions must take population growth into account. The United States does not presently have an articulated population policy, but one should be developed in connection with any plan to reduce emissions. A central component of a population policy must include an effective and enforceable immigration policy that curbs immigration levels to the

point that it is no longer driving U.S. population growth. Immigration is a discretionary activity of government, not mandated by international agreement or our history. Few countries accept any significant level of immigration, and our history has seen both high and low levels of immigration.

Unless immigration is lowered in order to reduce U.S. population growth, emissions reduction as envisaged in the Kyoto Protocol is increasingly unattainable.

ENDNOTES

[1] The level of CO_2 emissions in 1990 was 18.9 metric tons per capita (about 4.7 billion metric tons). By 2004 the level had increased, according to the U.S. Department of Energy, to 20.4 metric tons per capita. Because over that same period the U.S. population increased by 18.1 percent, according to the U.S. Census Bureau (from 248.7 million to 293.7 million), the increase in total emissions was not the 7.9 percent increase in per capita usage, but 27.4 percent (to about 6 billion metric tons). Thus, a reduction of 7 percent in CO_2 emissions from the 1990 level of emissions (to 4.37 billion metric tons) had became by 2004 a requirement for a reduction of 37 percent. See (http://en.wikipedia.org/wiki/List_of_countries_by_carbon_dioxide_emissions_per_capita).

[2] DOE/EIA Monthly Energy Review, February 2009, Table 2.1 (http://tonto.eia.doe.gov/merquery/mer_data.asp?table=T02.01) and Table 3.4 (http://www.eia.doe.gov/mer/pdf/pages/sec2_11.pdf).

[3] U.S. Vehicle Miles, Table 1-29, Bureau of Transportation Statistics, U.S. Dept. of Transportation,(www.bts.gov/btsprod/nts/Ch1_web/1-29.htm).

ABOUT FAIR

The Federation for American Immigration Reform (FAIR) is a national, nonprofit, public-interest, membership organization of concerned citizens who share a common belief that our nation's immigration policies must be reformed to serve the national interest.

FAIR seeks to improve border security, to stop illegal immigration, and to promote immigration levels consistent with the national interest — more traditional rates of about 300,000 a year.

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