



4 Global Consequences of Automobile Dependence

We have seen the damage done to our health by automobile-oriented development, and in this section we discuss the harm it causes to the world around us. Here we examine the consequences of two more problems associated with automobile dependence.

Mankind's impact on the environment can be measured using ecological footprints (Wackernagel, 1996):

The Ecological Footprint concept... accounts for the flows of energy and matter to and from any defined economy and converts these into the corresponding land/water area required from nature to support these flows.

Wackernagel estimates that the total footprint of all people living on the earth exceeds global carrying capacity by 30%, and, furthermore, that the wealthiest fifth of the earth's population have a combined footprint slightly greater than global carrying capacity. In other words, we are consuming natural resources much faster than they can be replenished. Many aspects of the western lifestyle contribute to this unsustainability: our consumption and subsequent disposal of large quantities of materials, our highly mechanized methods of food production, our inefficient use of land, and our overuse of fossil fuels.

Climate change and the depletion of oil reserves are inextricably linked: mankind's overuse of fossil fuels causes both problems, and a gradual but sustained reduction in fossil fuel use will mitigate them. We are already experiencing the consequences of excessive fossil fuel use. However, the problems facing the world in the twenty-first century will be greater than those we have experienced thus far, and will far outweigh any possible benefits of continuing to use more fossil fuels. These are long-term problems with long-term solutions: it may be decades before ordinary people notice significant changes in their local climate or the price and availability of oil. The task of reducing our dependence on oil, and shrinking our ecological footprint, may take the better part of this century.

4.1 Climate change

There is overwhelming scientific evidence that human activities are affecting the world's climate. The sun heats the earth's surface, and part of this heat is radiated back into space. Carbon dioxide and other gases in the atmosphere trap some of the re-radiated heat, a mechanism known as the greenhouse effect. Until the industrial revolution, carbon dioxide emissions were balanced by absorption of carbon dioxide by plants. When humans started to consume significant quantities of fossil fuels and cut down

large areas of forest, levels of carbon dioxide and other greenhouse gases in the atmosphere started to rise. Stationary sources like power plants are partially to blame, but increasing car use has caused much of the upsurge in greenhouse gas emissions over the past decade. As greenhouse gas levels continue to rise, the earth's average temperature is rising with them. Over the past century, worldwide temperatures have increased by 1.1°F; over the next century, temperatures are predicted to rise between 2.5°F and 10.4°F (IPCC, 2001).

Scientists have observed frightening environmental effects from the relatively modest amount of global warming that has already taken place. Glacial melting, plant and animal species living in places previously too cold to support them, and recent severe weather events like droughts, floods, and hurricanes have all been linked to global warming. These effects result from carbon that was emitted decades ago; the carbon we emit now will still be impacting the environment for years to come. This is why we must implement the precautionary principle: unless we can measure the effects of our actions, use resources and pollute very conservatively, if at all.

The climatic effects of continued global warming could be catastrophic. Sea levels would rise, threatening coastal regions. If the Gulf Stream were to be disrupted, northern Europe would become significantly cooler, while other parts of the world would get warmer and drier. Biodiversity would be threatened by the disruption of plant and animal habitats. Crop yields would suffer, making it harder to feed the world's growing population. Reductions in agricultural output would hurt the economies of all nations.

While the earth's temperature will continue to rise for some time due to the lengthy carbon cycle, an immediate reduction of the levels of greenhouse gases in the atmosphere could avert the worst climate change scenario. The 1997 Kyoto Protocol adopted by the United Nations would require nations to cut emissions of carbon dioxide by 2012. The protocol must be ratified by enough nations to account for a total of 55% of carbon dioxide emissions. So far, only 33 nations have ratified the protocol, conspicuously not including the U.S. and most other industrialized nations.

The carbon dioxide component of our ecological footprint can be reduced in many ways. Fossil-fuel power plants can be made more efficient. Wind, solar, geothermal, and hydroelectric technologies can generate

electricity with zero emissions. Energy-consuming devices, from cars to computers, can be made to consume less energy. On the other side of the carbon balance equation, planting trees can increase the amount of carbon dioxide re-absorbed by the earth.

The built environment offers perhaps the greatest opportunity for carbon dioxide emission reduction. Compared to walkable development, automobile-oriented development not only consumes land that could otherwise be forested, but is extremely wasteful of fossil fuels. Walkable development is more efficient than automobile-oriented development because:

- More journeys are made by the zero-emission modes of walking and cycling;
- Public transit is more energy efficient than driving a car, and, in the case of electric trains and trolleys, can use renewable energy sources;
- Errands that are made by car can be combined, reducing the number of cold starts, when car engines are least efficient;
- Because densities are higher, land uses are mixed, streets are interconnected, and most journeys are shorter, regardless of transportation mode;
- Multistory buildings require less energy for heating and cooling than single-story buildings;
- Lower automobile use means lower automobile production, which itself consumes a great deal of energy and produces greenhouse gases;
- Less paved area and shorter runs of utilities are required, so less energy is consumed in the construction of new development, particularly where infrastructure already exists;
- Less mileage of utilities means less energy is lost in conveyance; and
- Less paved area means that less heat is radiated back into the upper and lower atmospheres, reducing the amount of energy needed to cool buildings.

4.2 Depletion of oil reserves

Over the course of hundreds of millions of years, reserves of the fossil fuel oil built up in the earth. In a little over a hundred years, humans have consumed a sizeable portion of this finite resource. We cannot easily determine how much of the world's oil reserves remain, and new reserves are still being discovered. Most oil drilled to date has come from large, easily accessible fields, but as these fields become depleted, oil companies will turn to the smaller, harder-to-drill fields. This oil will be slower, more expensive, and more

environmentally harmful to extract. World oil production will eventually peak and then decline; unless world oil consumption also declines, oil prices will rise dramatically (Campbell, 1997). No one knows exactly when world oil production will peak, but it may already have happened.

The world is dependent on oil for energy, transportation, detergents, and an array of products such as plastics, detergents, and fertilizers. If oil consumption continues to increase while oil production declines, the consequences for the world economy will be disastrous. By reducing our demand for oil, we can make the best use of remaining supplies and prepare for the coming world where oil is no longer easily accessible and cheap.

4.3 Conclusion

Automobiles and automobile-oriented development make a significant contribution to our ecological footprint. The unsustainability of western transportation and land use patterns is a global problem. If fossil fuel use is not reduced, everyone in the world will suffer the consequences, regardless of whether they contributed to the problem. The task of reducing fossil fuel use must be carried out on a global level. Every unit of government, from the United Nations down to the smallest municipality, must strive for energy efficiency. Every citizen must strive to reduce his or her ecological footprint.

While the current federal administration shows no intention of reducing fossil-fuel use, smaller governmental units can initiate sensible energy policies. Orange County could become an example for municipal, county, and state governments nationwide by encouraging the use of renewable energy sources and building communities that require less energy for construction, heating, cooling, and transportation.

4.4 References

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