

Switzerland and the 2,000-Watt Society

By K. John Morrow Jr., Ph.D., and Julie Ann Smith-Morrow, Ph.D.

Drastic reductions in energy consumption—to 2,000 watts per capita per year by 2050—are now under consideration in Switzerland. Representing a 63 percent reduction in the current level of energy consumption, a “2,000-watt society” is being promoted at the federal level by the Department of Environment, Transport, Energy and Communication whose head, Federal Councilor Moritz Leuenberger, describes it as “a goal toward which the Federal Council will be working over the next couple of decades.”

Initially conceived as an academic exercise, the 2,000-watt goal appears to be gaining momentum, although its parameters are so draconian they would be looked upon in many circles as fantasy, and distasteful fancy at that. Yet the proposal arises out of serious reflection on the challenges facing first-world countries as they try to limit their energy consumption in the face of growing demands and increasing populations. The problem is compounded by the threat that any gains in energy-saving technologies made in industrialized countries will be buried by huge increases in fossil fuel consumption among third-world countries undergoing rapid industrialization. Leuenberger, however, asserts that the plan can be achieved without sacrificing economic growth or comfort.

The rather catchy title of “2,000 watts” works out to the less iconic number of 17,000 kilowatt hours

per person per year. The concept was developed in 1998 by researchers at the Swiss Federal Institute of Technology (Eidgenössische Technische Hochschule Zurich, or ETHZ) in Zurich and reflects their vision of Switzerland moving from its present level of 5,500 watts per capita to reach the current world average of 2,000 watts (see Fig. 1). The ETHZ program is coordinated by Novatlantis (www.novatlantis.ch), an agency within the university that translates basic research into practical applications.

Currently, 60 percent (or 3,000 per capita watts) of Switzerland’s energy needs are met by fossil fuels, principally oil and natural gas. Another 1,000 watts come from nuclear power, and the remaining 1,000 watts come from renewable resources, primarily hydropower. The Swiss plan calls for cutting the demand for fossil energy in half by 2050, a reduction rate of 10 percent per decade. Viewed from this vantage point of a 1 percent rate of improvement per year, the goal does not appear to be unreasonable, provided advances in construction and transportation technology move ahead at the forecasted rates.

Estimates made by the ETHZ have confirmed the feasibility of the program, based on unexploited energy savings from efficiency improvements in vehicles, appliances, and buildings. Nevertheless, the designers of the program present a 50- to 100-year timeline to reach the 2,000-watt goal, due to the long time lag in replacement of large infrastructure, especially buildings.

More specifically, the 2,000-watt society “white book” (*Steps Toward a Sustainable Development*; Eberhard Jochem, Editor; ETHZ Press, 2006) discusses the fact that a huge proportion of the primary energy generated, around two thirds, is lost as a result of the conversion process and is not used. Many mechanisms that provide more efficient conversion are proposed, and all of these are up for review.

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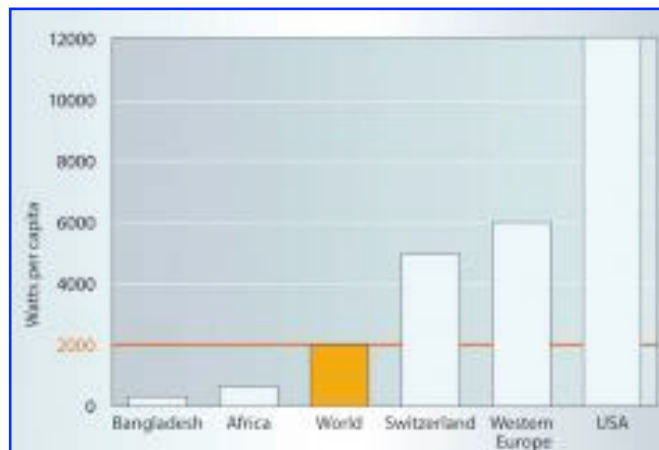


Fig. 1. Energy consumption per capita for different world regions. Compare the world average of 2,000 watts with other regions, such as the United States, which has six times the per capita expenditure of energy.

Source: Novatlantis

from the transportation sector through improved propulsion systems, and from the commercial, agricultural, and information technology sectors. Improved material efficiency and substitution, recycling, and intensification of product use will all reduce the demand for energy.

Many of these advances are highly cost-effective and would be pursued in the absence of any guiding overall plan. If this is true, then American supply-siders would argue that the plan is simply hapless government meddling. The 2,000-watt society program, however, provides a coordinated, long-term series of goals and milestones, and focuses on the most feasible and acceptable changes to energy consumption. The concept was developed primarily as a vision that would drive a long-term, sustained approach to the management of energy resources in Switzerland. Without such a goal, it was felt that time and assets would be squandered on short-term projects of questionable merit. Indeed, researchers at the ETHZ suggest that it may not be possible to reach the 2050 goal, but that its enunciation will drive the project forward and garner public support.

A rigorous promotion of the 2,000-watt society creates a risky situation for adherents of the concept. Parliamentary elections took place last fall in Switzerland, and the issue of global climate change and what to do about it was hotly debated. Five major parties battled for dominance in the fall's elections: the right-wing People's Party, the center-right Liberal Party, the Christian Democrats (the other center-right party), the center-left Social Democrats, and the Greens, who were the big winners, with their number of seats in the house increasing from 14 to 20. The left-wing parties, including the Green Party, want a concrete platform based on a firm commitment and benchmarks for moving the program forward. It is unlikely that more right-wing political parties will embrace such a strong level of commitment, especially given the level of scientific uncertainty about whether these goals are obtainable. As the right-wing people's party also scored gains, it is difficult to foresee the political future of the program.

The acceptance of the 2,000-watt society program and its implementation will require that voters be convinced that this sort of reduction will affect their lives in a positive way. People throughout the world are invariably unmoved by moral admonitions to conserve energy if it means disturbing accepted norms of behavior. Thus, approval at the polls will require packaging that emphasizes the positive features in terms of quality of life, lowered energy costs, and, most important, rapid and discernable progress toward all these goals. There is a fear that immediate implementation of all the guidelines of the 2,000-watt society plan could result in severe dislocation and that public support could evaporate in the face of painful increases in energy costs.

Is the 2,000-watt society really workable? Professor Alexander J. B. Zehnder, president of the Swiss Federal Institute of Technology board of directors, maintains that pilot studies have successfully supported the feasibility of the program. As an example, the energy required for operating the average residential dwelling is about 1,400 watts per person, whereas a house built with the Minergie Schweiz Association's "Minergie-P" standard technology (a private certification providing building standards in Switzerland) requires only 350 to 550 watts per person. Efficient building design is just one of many pilot projects carried out under the Basel pilot region project, initiated in 2001. The program, a cooperative effort between the city of Basel and ETHZ researchers, evaluates energy usage optimization of urban development and mobility issues in a real-life environment. This provides a critical test of new building technology and other demonstration projects.

While the 2,000-watt society program or some similar plan may well guide Switzerland's energy development for the next half century, such an ambitious reduction does not yet stand any chance of serious consideration on this side of the Atlantic. It is difficult to see how the United States could go from a 12,000- to a 2,000-watt society without actions that would be much more radical than anything the Swiss have in mind. The design (or lack of design) of American cities over the last 60 years, the size and building specifications of houses and cars, the distance between venues, and air-conditioning demands are greater in the United States than in Europe. These all mitigate against a sustainability plan based on massive changes in the infrastructure and the economy.

The standard right-wing political argument used against conservation as a way of reaching sustainability is based on three premises: 1.) conservation would have little impact on overall energy budgets; 2.) it would require deep, painful, and uncomfortable sacrifices; and 3.) it would stifle economic growth. The architects of the 2,000-watt society reject all these arguments. If the Swiss model of development of energy resources turns out to be as effective as its designers promise at delivering an overall higher quality of life, then the objections of U.S. proponents of an aggressive, pro-energy policy become moot.

Moreover, if the more pessimistic assessments of the rate of global warming and its negative ramifications turn out to be true, the U.S. citizenry may change its perspective toward a 2,000-watt society. As data collection, climate modeling, and trends in climate change become more robust in the next five years, conditions may force the American electorate and its political representatives to face some extremely difficult choices. Ultimately, the United States may be dragged, kicking and screaming, into the maw of the 2,000-watt society.



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