



Lessons From a Small Island

By Walt Patterson

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My wife and I have just returned from our latest sojourn on a tiny island in northern Greece. When we first visited the island, in 1965, its village had a population of about 500 people, one good well and no electricity. The islanders scratched out a precarious existence by fishing and farming. Each exhausting day's work began before the sun rose behind Mount Athos, and ended long after it set, plunging the island into darkness broken only by dim oil lamps, expensive butane lamps or terrifying petrol lamps.

In 1978, however, Greece's Public Power Corporation laid a cable across the bay from the mainland. Soon most village houses had electric light, and four towering street-lamps lighted the village square. House martins immediately plastered mud nests across the bottoms of the lamps, blocking almost all the illumination, and the lamps had to be redesigned; but such minor glitches only helped to underline the dramatic changes set in train by the arrival of electricity on the island.

Twenty years later, in 1998, the island is prosperous, not mainly from fishing and farming but from three frenetic months of tourism every summer. Some paved roads and a car-ferry certainly helped; but without electricity the island's tourist boom would never have happened. Outsiders like my wife and me may lament the island's lost tranquillity; but for its hard-working year-round inhabitants the benefits of electricity have been inestimable. In the past two decades electric light, power tools, washing machines, computers, office equipment, television, and essentially all mod cons have eased the daily workload dramatically, and given village children educational and employment opportunities their parents never dreamed of.

The experience of one tiny Greek island illustrates a misconception now far too widespread. If you allude to the 'environmental impact' of electricity, almost everyone will assume you mean carbon dioxide and acid rain from fossil-fueled power plants, or flooded settlements and ecological disturbance from hydro dams, or radioactive waste and safety hazards from nuclear plants, or visual intrusion from transmission lines. The environmental impact of electricity is now taken automatically to be negative, by precisely those people who simultaneously derive enormous environmental benefit from the ready, reliable availability of electricity services in



their own lives. Throughout the past century the impact of electricity on the environment of human society has been not negative but overwhelmingly positive.

All too often, nevertheless, the environmental dimension of electricity policy appears to be summed up thus: electricity has major environmental impacts, therefore environment imposes constraints on electricity. The issues boil down to 'electricity versus environment'; more electricity means lower environmental quality, and vice versa. This is nonsense on stilts. The interactions between electricity and environment are complex and multifarious, some beneficial, some detrimental; and they, like every other aspect of world electricity at the turn of the millennium, are now in tumultuous upheaval. As the tide of change sweeps through electricity systems worldwide, every aspect of electricity generation, delivery and use is up for reappraisal, including interactions between electricity and environment. No one can yet be certain how they will evolve; but one corollary is already clear. With appropriate policies, electricity and environment are not adversaries but allies. Moreover, the changes now in progress may actually foster closer convergence between the objectives of electricity policy and environmental policy.

As electricity is liberalized, the traditional electricity system, in which electricity is generated in enormous, remote central stations and delivered long distances over high-voltage transmission lines, now faces major problems that are first and foremost financial, not environmental. If a gigawatt-scale power station, whether hydro, coal-fired or nuclear, has to compete successfully in a market context for twenty years to cover the investment and earn a return, it becomes a very risky investment - and the risk falls not on captive customers but on shareholders and bankers. Even the tentative first-stage liberalization of independent power production, apparently covered by long-term contracts, can prove to be hair-raisingly risky, as investors in Pakistan, Indonesia, Malaysia, and elsewhere now know to their cost.

The environmental problems of traditional large-scale generating technologies and the transmission lines they necessitate have seldom hitherto severely hindered their construction anywhere. In a monopoly context, long-term amortization, with captive customers providing the revenue stream, has made financing easy and nominal electricity costs low, overriding even the most severe environmental objections. However, if environmental and financial considerations both weigh on the debit side, traditional large-scale plant becomes a much less attractive option –



especially when other options offer both better financial terms and better environmental performance.

The seemingly inexorable rise of gas-turbine stations burning natural gas is testimony to this. Their modular design, offering rapid construction and cash-flow, is attractive in itself. Their environmental attributes make them easier to site, closer to users and indeed on their sites, notably for cogeneration. In coming years the trend will be to yet more decentralized configurations, using not only gas turbines, soon available down to tens of kilowatts, but also fuel cells and many varieties of small-scale modular renewable generating technologies, supported by increasingly potent information technologies. Local generation in turn will stimulate optimization of entire local systems, with high-efficiency end-use equipment to minimize generating requirements.

For financial and environmental reasons alike, innovative decentralized technologies and the optimized local systems they foster may be the way to provide the benefits of electricity to the two billion people still waiting for them. Twenty years ago, when our tiny Greek island at last got electricity, it came from the mainland, subsidized by the Greek government and other Greek taxpayers, under the monopoly franchise of the Public Power Corporation. Twenty years hence, an optimized local system on the island itself, controlled and paid for by the islanders, will probably be more attractive both financially and environmentally. We hope we'll be there to see it.