

Rural Development in the Knowledge-Based Society

Phil Turner, President ECOVAST

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Energy and its relation to rural well-being



EUROPEAN COUNCIL FOR THE VILLAGE & SMALL TOWN



Czech Republic



Znojmo

main activities:

- Villages and small towns
 - People and policies
 - Culture and heritage
 - Buildings and landscapes
 - Rural development
 - Management of land
-
- **Integrated - social, economic, environmental and cultural**
 - **Local people deciding their own sustainable futures**



**EUROPEAN COUNCIL FOR THE VILLAGE
AND SMALL TOWN**

Energy and its relation to rural well-being

ECOVAST's aim is to promote the well-being of the people and the heritage of rural Europe

This mission is a permanent commitment, but it has to be constantly updated as the forces affecting the rural areas change

One crucial area of change is in the field of energy, with rising public and political concern about long-term supplies of fossil fuels, the impact on the world's climate of continuing to burn those fuels, and the need to promote both energy conservation and alternative sources of energy

This wide agenda poses both a challenge and an opportunity to the people, the economies and the environment of rural Europe

Rural Europe

The rural regions of Europe are currently facing a period of significant change in the problems and possibilities that they must address and in the policies that apply to them

These forces vary from country to country, and from region to region

But many issues have wide application. These include :

- Change in systems of public support to farmers, which oblige farmers to focus more strongly on those products or activities for which there is a viable market

- Desire among many farmers to diversify their sources of personal or family income

...many other issues

Concern about unemployment, under-employment or low incomes in the rural areas, leading to out-migration from these areas ... and a consequent desire to create jobs in the countryside

Concern about poverty, social exclusion and other suffering in the rural areas

Desire to sustain the quality and accessibility of public services in the countryside

Desire to protect the quality of landscapes, wildlife and the cultural heritage of the countryside

The 'sustainability' agenda, with its focus on living within the environmental limits imposed by the planet

The energy agenda

Rapid growth in the world's population, coupled with extremely rapid economic growth in many countries

(notably China and India)

is causing a headlong rise in demand for energy, for use in construction, transport, heating and lighting, industry, agriculture and other economic activity

A very high proportion of this energy is provided by use of fossil fuels – coal, gas and oil. These fuels are mined or extracted in many parts of the world, and the total reserves of them could last for many decades ahead

But the financial and environmental costs of winning these fuels are rising, as are the political tensions and concerns about security of supply, for example in relation to the supplies in the Middle East and in Russia and the increasingly insatiable demand of China

These factors are reflected in rising prices of fossil fuels. Moreover, there is now almost complete consensus among scientists, and growing acceptance by the public and politicians, that burning of fossil fuels is a major contributory factor to the massive increase in emissions carbon and 'greenhouse' gases, which in turn are causing heating of the planet, leading to climate change which is already having catastrophic effect on the people and environments of many countries

It is becoming dramatically and painfully clear that, as a total species and on a planetary scale, mankind must radically reduce these emissions if global disaster is to be avoided

Governments vary greatly in their grasp of this truth

But throughout Europe, people are realising that – whether governments give leadership or not – patterns of energy consumption must change

There is rising interest in, and increasing practical commitment to, energy conservation and the use of alternative sources of energy

Connecting the two agendas

We believe that these two agendas – the well-being of rural areas, and a sane approach to energy – can and must be connected

There is a 'win-win' potential here that must be grasped

Key elements in this potential are :

- **Energy conservation**
- **Local generation of energy**
- **Use of biomass**
- **Solar energy, both passive and active**
- **Wind energy**
- **Water energy**
- **Thermal energy.**

Energy conservation

On a global scale, mankind must reduce its call on fossil fuels, which are non-renewable and which contribute heavily to global warming and climate change

Alternative sources of energy are available, or becoming so : but they cannot quickly meet the volume of demand for energy now served by fossil fuels

Therefore a global imperative is to cut down that demand as much as possible

At more local level, energy conservation can offer high benefits to those who live in rural areas

Where populations are sparse or scattered or distances between settlements are great, as applies in many rural areas, energy from external resources such as petrol or gas can be costly to deliver and may consume a high proportion of low average income

Thus the saving of energy may be driven by financial necessity as well as concern about the world's climate.

Efforts of energy conservation in rural areas can in fact draw upon long traditions of construction, self-reliance and use of local resources.

Buildings.

In many areas, the characteristic buildings are well suited – through the trial and error, the wisdom and skills of the people – to the saving of energy the avoidance of heat loss, and the economical use of fuels

Consider, for example, the thick timber walls of Scandinavian houses, the thatched roofs of German or Hungarian farms, or the thick stone walls and small windows of alpine buildings

These features, with their natural insulation, keep out the cold in winter and the heat in summer, thus minimising the need to use energy in heating or cooling

Action to sustain these building traditions can serve a double purpose – to maintain the distinctive character of buildings, settlements and landscapes in each region, and to conserve energy

Self-reliance

In past generations, rural communities were more introverted than they are now

With poor roads and slow vehicles, they could not go quickly and easily to distant towns to shop or work

Thus they relied on local services, such as the village shop, post office, doctor, miller or blacksmith

They did not depend on fossil fuel, as millions of rural people do today, to travel to towns or to receive goods sent to them from all over the world

They were practicing a form of communal self-reliance.

We cannot readily revert to life as it was before the tarmacadamed road and the internal combustion engine

But we can seek a modern version of this communal self-reliance

For social reasons, rural communities throughout Europe are seeking to sustain their local services, very often through communal effort such as the launching of community shops or community bus services

There is growing effort to create jobs in the villages, so that people do not need to travel to distant towns to find work

Such action can enrich social life and conserve energy.

Use of local resources

In past generations, rural communities used local resources to provide their energy

Most widespread was the use of firewood, which is still the main fuel for millions of rural households

In other areas, people used peat, oil-shale, surface coal, even mined coal

They harnessed the wind, or the power of water, for milling wheat, sawing wood, weaving, making paper, and many other craft and industrial purposes, all on a local scale

They used animals, rather than petrol-driven machines, for drawing ploughs, for powering fruit presses and for transport.

These resources, and these uses, are still with us today and are more widely available and viable than is sometimes realised

Our modern understanding, for example of the need to moderate carbon emissions and to safeguard wetland habitats, should oblige us to use resources in a sustainable way

This implies a focus on what is renewable, and on efficiency and avoidance of harmful side-effects

But the well-judged use of local resources can save the import of fossil fuels, and keep money and create jobs within the rural economies

Local generation of energy

The large-scale production of energy, and particularly of electricity, has brought enormous social and economic benefit to the people of Europe, indeed it has made possible the growth of cities

Rural people too have benefited from reliable supplies of electricity or gas coming by wire or pipe to their villages and homes; and this has prompted many millions of them to move away from use of local fuels for cooking, heating or lighting

Until quite recently, this flow of energy has been one-way, that is from the major regional power stations to the urban or rural consumer

But the rising costs of this energy, and the opening up of energy-supply markets, have recently prompted growing interest in the local generation of energy

Such generation is, in general far more easily done in rural than in urban areas, for the reason that the countryside offers the necessary space and resources

A growing number of rural communities or rural entrepreneurs are investing in heat-and-power plants, based on local waste materials or on biomass, or in water turbines, solar panel complexes, wind turbines etc, in order to meet local energy needs and also in some cases to feed into the regional or national grid, thus creating a two- way flow

This can save money and create jobs in the local economies and (if it became widespread) could obviate the need for yet more massive and increasingly problematic generation at regional or national level

Locally generated energy requires a heat station or small power station that can be sited within a built-up area or otherwise designed to minimise visual impact within the landscape, avoiding ugly electricity pylons

Combined heat and power (CHP) maximises the efficiency of heat stations by generating electricity and producing hot water for space heating in buildings

Distribution of hot water for district heating by means of a network of pipes throughout a small town or neighbourhood is a common feature of urban areas in many parts of central and eastern European states

There are examples in Denmark of District Heating, derived from many rural sources such as biomass and animal residues, that serves a wide area of a town

Use of biomass

Biomass is any substance containing non-fossilised carbon

The largest single source of energy for rural communities in most of Europe, up to one hundred years ago, was firewood

For millions of rural people, it is still the main source of energy for cooking and heating

It involves hard work for the user or the local supplier, but is a dependable and renewable resource

The continued use of firewood can sustain jobs in the countryside, stimulate the sustainable management of woodlands, keep money in the rural areas, and reduce dependence on fossil fuels and imported energy

Its adverse effects, including the release of carbon into the atmosphere, can be moderated by the use of modern techniques of preparation and combustion of fuel; and this innovation is now extending also to use of biomass fuels other than wood from traditional forest trees.

modern techniques include :

- the use of fuel-efficient stoves and boilers, such as the 'Jotul' stoves of Norway or the Swedish 'Aga'
- the introduction of wood-chipping machines and wood-pellet plants and of boilers fed by these fuels
- electricity generators based upon burning of biomass, which may be sawmill waste or crops (such as miscanthus or fast-growing willow) grown specially for the purpose
- extraction or distilling of methane or ethanol from biomass, such as sugar beet or animal manures
- Conversion of animal waste including carcasses, using heat and pressure to produce 42 gallons of hydrocarbons (diesel fuel) from one ton of carbons (fat, bone and protein).

Such techniques can have the added benefit that they offer to European farmers new markets for non-food products

The viability of the widespread application of these techniques has still to be proved, and their environmental impacts must to be closely scrutinised, but they appear to offer significant opportunity for many rural communities.

Solar energy, both passive and active

The sun is the indirect source of all the energy that we use
– coal, oil, gas, nuclear power, water, wind, biomass and geothermal energy

But its energy can also be used directly

For example, in Cyprus, almost every house has on its roof a solar panel and hot-water tank, which provides most of the hot water used by the household

Modern technology, and modern understanding of thermal systems, allows the sun's heat or light to be tapped, in 'passive' or 'active' ways, to provide energy for homes, businesses or whole communities

'Passive' solar energy is that which is caught, through the skilful design of buildings, in the structure of those building or in the air or water circulating within them, and which is then released over time or when needed

‘Active’ solar energy is that which is caught by photovoltaic cells or other mechanisms and converted into electricity or heat

These mechanisms are not dependent on sustained direct sunlight : they can draw energy from light or atmospheric heat even on over-clouded days

As fossil fuels, or electricity based upon those fuels, become more expensive, so the comparative costs of active solar energy fall

Solar panels on roofs are becoming increasingly common on both new and pre-existing buildings : with careful design, they can blend into the distinctive local patterns of the built environment which are part of the valued character of rural Europe

Wind energy

Europe – with its Atlantic coast, its mountains and broadly temperate but volatile climate – has tremendous resources of wind power

The wind has indeed been used for many centuries, for example in the corn mills of Crete or Majorca, with their sails of cloth, or the array of wind-driven pumps which sucked water out of the land below sea level in the Netherlands

But the modern technology of wind turbines has transformed the scale of this activity

It is now possible to generate great amounts of electricity from turbines mounted high on the windiest mountains, such as the ‘Gates of Hercules’ in south-west Spain, or on the flattest sea-coasts such as those of Jutland in Denmark.

Such turbines prompt a key question - 'who benefits?'

In the case of many big 'wind farms' (i.e. large complexes of turbines, installed and managed by large commercial companies – the benefits accrue mainly to those companies and to those who run or take electricity from the national grids)

At local level, there may be significant benefit in rental income for the owners of the land on which the turbines stand : but other local residents gain no benefit, no local jobs arise, and the local community must live with the visual intrusion of the turbines and associated transmission wires

The threat of this visual intrusion leads to strong opposition to wind farm developments in many places.

However, rural communities may gain far more benefit if they themselves initiate and manage the wind turbines

This pattern of local initiative was directly encouraged by the Danish government in the 1970s and 1980s, when the use of wind power was spreading in that country

The result is a landscape of small clusters of one to three turbines, on a farm or beside a village, controlled by the farm or local community, bringing income to local people or saving the cost of imported energy, and actually contributing also to regional or national supplies

Water energy

Water, like wind, is in plentiful supply in Europe. In terms of energy production, its most usable form is in mountain rivers

That is why the early use of water power, through water wheels of various kinds, was found in the hills, and why, for example, the industrial revolution in England had a major focus in the water-rich valleys of the Pennines

Today, the use of water power to drive corn mills, weaving factories and other works has mainly been superseded by other sources of energy. But in mountainous countries - such as Norway, Switzerland and Wales – water power is a major source of electricity.

The generators, like the big wind farms, are mainly controlled by big companies or public agencies, and the benefits to local communities may be few – although the reservoirs associated with hydro-electricity may actually serve to attract tourists, bringing jobs and income to the areas, and may be assets in terms of landscape and wildlife

However, water power, like wind power and other alternative energy sources, can be locally initiated and controlled

Modern water turbines, of small or medium size, can be installed even on modest streams and can bring savings or income to individual farmers, householders or whole rural communities

Thermal energy

Certain dramatic features of Europe – such as the hot springs of Iceland or the volcanoes of Etna and Vesuvius – remind us that the earth boils beneath our feet

This is a further source of energy which can be tapped

Thermal energy has indeed long been used, for example in the spa towns which use warm up-springing waters in the limestone regions of England, Hungary, Slovenia, Croatia and other countries

There is potential for more such uses of thermal energy in such regions

But the modern technology of heat exchange allows energy to be tapped from subsoil, groundwater or even air, in places where no extreme of temperature is found

Such technology can be wholly unobtrusive, built into the design of new buildings or into adaptation of earlier buildings

Once installed, it takes very little effort or applied energy to maintain.

Policy implications

1. There is need for increasingly close liaison and collaboration between those who are concerned with the well-being of rural communities and those who advocate the use of alternative sources of energy
2. Rural communities throughout Europe should accept that, as citizens of the world, that they share the responsibility to live within the planet's limits, to cut the emissions of carbon and 'greenhouse' gases and thus to moderate the potentially catastrophic change in the world's climate.

3. Rural people, collectively and individually, should therefore undertake energy audits of their homes, their businesses, their enterprises, services and transport

They should consider in a radical manner how they may reduce their use of energy (particularly that arising from fossil fuels); and how they may use the opportunities (which will vary from one rural area to another) to tap energy from local resources of biomass, sun, wind, water and thermal energy

4. Governments should review their policies related to energy production and distribution, transport, housing, agriculture, forestry, rural development and related sectors,
with a view to promoting energy conservation everywhere and the resourceful, imaginative and sustainable use of all sources of energy which will bring benefits both globally
(crucially in reduced emission of carbon and greenhouse gases)
and locally in terms of local control of energy generation, local income and jobs and sustainable impact on local resources, ecosystems and landscapes.

Michael Dower and Phil Turner ECOVAST (UK) 2006