



# **POWER FOR THE PEOPLE: RENEWABLE ENERGY IN DEVELOPING COUNTRIES**

A Summary of Discussion at the Renewable Energy Forum,  
Canberra, 18 October 2000

Hosted by the Australian Agency for International Development  
(AusAID)

This Paper presents a summary of discussion at the forum. The views expressed are not necessarily those of AusAID or the Australian Government.

# POWER FOR THE PEOPLE: RENEWABLE ENERGY IN DEVELOPING COUNTRIES

## INTRODUCTION

Energy is central to economic development — there is a clear correlation between energy consumption and living standards. More than half of the world's population living in rural areas still has no access to modern forms of energy<sup>1</sup>. In recognition of the need to find sustainable solutions to this lack of access to energy in developing countries, AusAID's Environment Consultative Committee<sup>2</sup> called the forum to discuss the following issues:

- the future for renewable energy in developing countries;
- constraints to mainstream adoption of renewable energy technologies in developing countries; and
- the role of Australia's overseas aid program in promoting renewable energy.

The audience included representatives from AusAID, the Australian Greenhouse Office (AGO), the Department of Industry, Science and Resources (DISR), Environment Australia (EA), non-government organisations (NGOs) and private industry.

Chairing the morning session was Professor John Morrison of the Department of Environmental Science at the University of Wollongong. Mr Richard Beresford, Business Development Director of Woodside Energy Ltd and Dr Frank Reid, Managing Director of the Australian Co-operative Research Centre for Renewable Energy (ACRE) talked on *technological and business perspectives on the future of renewable energy*. Associate Professor Graham Redding of the Department of Energy and Environmental Management at the Royal Melbourne Institute of Technology (RMIT) then spoke about *economic and institutional barriers to renewable energy in developing countries in Asia and the Pacific*.

The afternoon session, chaired by environment consultant Dr Ron Black, included responses to the morning session by three panellists: Ms Donella Bryce of Appropriate Technology for Community and Environment (APACE); Mr Phil Harrington of AGO; and Dr Peter McCawley, Deputy Director General of AusAID. A general discussion followed and the meeting was then closed by comments and summation from Dr Black.

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<sup>1</sup> Economic and Social Commission for Asia and the Pacific, "Policies and Perspectives on Energy for Sustainable Development: Review of Strategies and Draft Action Programme for Promoting Sustainable Development, 2001-2005" E/ESCAP/SO/MESD/2, 26 October 2000.

<sup>2</sup> AusAID's Environment Consultative Committee (ECC) consists of representatives from a cross section of areas interested in development and the environment. It meets twice yearly and provides a forum for information exchange and advice on environmentally sustainable development.

## **WHY RENEWABLE ENERGY FOR DEVELOPING COUNTRIES?**

Renewable energy can be particularly appropriate for developing countries. In rural areas, particularly in remote locations, transmission and distribution of energy generated from fossil fuels can be difficult and expensive. Producing renewable energy locally can offer a viable alternative.

Interest in renewable energies has increased recently due to environmental concerns about global warming and air quality, a decline in the cost of the technologies for renewable energy and improved efficiency and reliability.

### **Environmental aspects**

Fossil fuels cause major environmental problems. It is generally accepted that the emission of greenhouse gases from fossil fuels causes global warming and declining air quality. Renewable energies generally do not cause pollution or cause greenhouse gas emissions.

A meeting of the Framework Convention on Climate Change in 1997 established the Kyoto Protocol, which set firm targets for greenhouse gas emissions for developed countries. Also agreed at Kyoto was the clean development mechanism (CDM) which allows developed countries to meet targets for reducing emissions by gaining certified credits from projects undertaken in developing countries.

### **Decrease in cost**

Cost has been a major inhibitor to the widespread adoption of renewable energy. Over the past decade there has been a substantial decrease in costs. A recent article in *The Economist*, suggested that the cost of renewable energy technology is set to fall even further. One large power equipment company expects the cost to fall to \$1,000 per kw, the cost that is currently achieved by coal-fired power stations<sup>3</sup>. Coupled with changes in market forces and improvements in technology, this has created new opportunities for renewable energy.

### **Increased range of technologies**

There are many different types of technology, appropriate for different locations and applications:

- hydropower — established, suitable for small (micro-hydro) and large-scale applications;
- windpower — established and cost-effective, particularly on a large scale;
- biomass (forestry, crop residues etc) — established and cost-effective, particularly on a large scale;
- solar photovoltaic (PV) — established, close to diesel in economic terms on a small-scale, expensive on a large-scale, can be appropriate for remote rural electrification but auxiliary equipment often not reliable;
- solar thermal — established for hot water systems;
- marine (wave/tidal) — needs more developmental work, has been commercialised but not been widely adopted (limited number of suitable sites); and

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<sup>3</sup> see *The Economist*, 5 August 2000

- geothermal — has been used in Asia and New Zealand; not yet applied in Australia but hot/dry rock geothermal energy is being investigated for the future.

## **CONSTRAINTS TO MAINSTREAM ADOPTION OF RENEWABLE ENERGY TECHNOLOGIES**

### **General**

Slow technical progress over the past decades has been a major constraint to the mainstream adoption of renewable energy. In Australia, this has been exacerbated by the commercial context, as electricity generated from fossil fuel is very cheap and subsidised.

For industry, the regulatory framework in Australia distorts the renewable energy market and poses a barrier to entry. Also, there has tended to be a “technology push” rather than a “market pull”, with inventors looking for a market for their product, rather than responding to consumer demand.

### **Project design**

Renewable energy, particularly in the form of solar power, has been around for decades — the remains of failed renewable energy projects can be found throughout the developed and developing world. Initiatives have suffered from lack of quality on implementation and from problems of maintenance and sustainability. In Australia, there have been similar experiences with projects to provide renewable energy for indigenous people and remote rural communities.

Some of the major problems with past projects are outlined below.

- *Wrong focus.* Generally the focus has been on technologies rather than outcomes — technical and financial issues are taken into consideration, but social issues such as land rights and cultural issues are not.
- *Lack of applicability.* Often, the technology used is not appropriate. The focus has traditionally been on solar power when other solutions may be more applicable; for example, micro-hydropower is appropriate for many parts of Asia and Pacific Island countries.
- *Failure to meet needs.* Energy projects often fail to adapt to meet the needs of the target community. For example, in an electrification project in Indonesia, individuals wanted access to a small, affordable amount of electricity (around 20 watts, enough to power two 10-watt bulbs, giving a great improvement on candles). The smallest amount of energy the utility would offer was 100 watts — too expensive for most people, who were therefore unable to take up the offer.
- *Technical problems.* Lack of reliability and problems of servicing and maintenance have been major concerns with past projects. Insufficient power is another frequent complaint; often, once communities have access to an energy supply, they then want to use more energy.

## **DESIGN ISSUES FOR AID ACTIVITIES**

### **Renewable energy solutions**

There may be many ways to meet energy needs but where possible, solutions should include renewable energy to promote environmental sustainability.

The Clean Development Mechanism (CDM) could be an important impetus to adoption of renewable energy in developing countries. However, to meet CDM criteria, a project has to satisfy a number of requirements — environmental, technological, economic and others — creating a substantial increase in administration. The issue of how carbon credits would be shared between the donor country and the recipient also has to be resolved. The increased administrative load and the complications of carbon credit allocation may act as barriers to the implementation of renewable energy projects.

### **Project design and implementation**

A successful project is one that:

- links energy with social aspects
- meets needs
- uses appropriate technology
- is reliable and sustainable
- is economically viable.

### **Linking renewable energy with social aspects**

Access to renewable energy will not alleviate poverty unless it is seen as a development issue rather than an energy issue. Communities will not automatically gain income benefit from renewable energies. For example, a Pacific island may power lamps using kerosene, delivered every six months. When the supply runs out the community has no lights until the next delivery. Access to solar power (properly installed and maintained) could provide a more permanent supply of power for lighting and the use of appliances. However, this in itself does not provide cash income or increase the community's capacity to contribute to upgrading the system.

To achieve economic development, renewable energy needs to be linked with, or be part of, another project that improves development, such as a solar-powered fish drier, or a coconut drier for making soap. Communities also need entrepreneurial skills to benefit fully from the economic opportunities provided by these projects. However, in situations where a community has a viable life-style that does not involve cash, renewable energy is a social issue, not an economic development one.

### **Meeting needs**

The pre-implementation phase is vital, in order to understand the economic and cultural needs of the target community. Renewable energy will only be of interest to communities in developing countries if it can meet their needs.

The needs of all the stakeholders in the community must be considered. The involvement of women and young people is critical to the development of an energy policy. In developing countries, women often have the most deeply thought out views on energy needs and uses. For example, a community in a sensitive forest area that relied on a micro-hydro system for power was under pressure from a company to allow logging. The women opposed the loggers and took them to court — aware that their hydroelectricity depended on the river and worried about the implications of logging higher up the river.

### **Appropriate technology**

Projects need to go beyond the narrow view of the village level project with rural electrification and solar cells, to look at what is applicable for the target community and what resources are available. It is not sufficient to simply take hardware for renewable energy from Australia and put it into a developing country. The technology must be appropriate and adapted to the needs of the target community. Often it is useful to look at what is currently being done and ask ‘What minor changes could be made that would be effective?’

### **Reliable and sustainable**

Ensuring that only proven technology is exported can improve reliability. Technology transfer at the community level is important for sustainability, as it provides locally trained technicians to maintain and service equipment. Past experience suggests that taking training to the bush is more effective than bringing people to the city for training (which often results in them not wanting to return to their home area). In rural areas, men are often away from home working, so it is important to consider training women. A further advantage of local training is that people may make additional use of their skills by opening up local businesses.

### **Economically viable**

In the past, projects often involved outsiders simply coming in with technology; however, the new approach is to involve the community in the pricing. All stakeholders need to be involved in a tariff-setting process. Incentive solutions are needed to allow cashless communities to contribute to the cost of the energy supply.

In the long term, commercial prospects for an industry based on subsidies are not good, as the market can suddenly collapse if a change in policy leads to a subsidy being withdrawn. However, at present there is not a level playing field, because of subsidies for fossil fuels.

### **Policy Constraints**

The energy industry needs to see people in developing countries as energy consumers and respond with packages tailored to meet their needs. These packages would be linked to increases in productivity, pro-market and able to supply small, affordable quantities of power. They would also raise awareness of subsidies.

Subsidies to the energy sector have been huge. They probably amount to more than the total aid budget for some countries. As the primary consumers of energy, subsidies have favoured the rich people in urban areas. In the early 1990s, subsidies of governments in the Asia Pacific region for conventional energy has been estimated at US\$350-US\$400 billion per year. By the mid 1990s the subsidies had decreased to US\$250-US\$300 billion per year<sup>4</sup>. Subsidies need to be reoriented to benefit the poor and considered in the light of the requirement for renewable energy projects to be economically viable, discussed above.

## **INDUSTRY ROLE IN AUSTRALIA**

### **A changing perspective**

Renewable energy is an industry in transition. Previously, the energy industry was based on large, conventional power utilities, where renewable energy was at the demonstration

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<sup>4</sup> See Economic and Social Commission for Asia and the Pacific, *Energy and Sustainable Development in Asia and the Pacific: Situation Analysis and Policy Review*, E/ESCAP/SO/MESD/1, 25 October 2000.

level. There was a strong focus on research, development and technology, and little focus on exports. Now the industry is regrouping around market opportunities. Industry and the Government have developed a Renewable Energy Action Agenda. The current focus is on how to provide clean, efficient, reliable products that people want.

Companies dealing in fossil fuels initially saw renewable energy as a threat. In recent years they have begun to participate in the renewables sector, realising the need to move beyond hydrocarbons. A good example is the reinvention of BP as 'beyond petroleum'. Rather than labelling fossil fuels as *bad* and renewable energy as *good*, combinations of the two are being investigated. Oil and coal are both in decline; however, use of gas is growing rapidly. Gas is commercially attractive and produces much less carbon dioxide than oil, so it has the potential to reduce global warming and improve air quality. Gas can be useful in the transition from fossil fuels to renewable energy.

#### **Australian Greenhouse Office (AGO)**

The AGO, whose mission encompasses the promotion of renewable energies, is supporting the Government's Renewable Energy Action Agenda. It is also promoting large-scale projects, as these will be important in meeting its target of annual sales of \$4 billion for renewable energy by 2010.

The AGO is tackling problems in the energy industry that impede the adoption of renewable energy, such as poor development of the supply chain, communication problems and lack of information. In collaboration with industry, the AGO is focusing on management systems for training and for servicing and packaging solar energy. An AGO project to put in place a laboratory to look objectively at different renewable energy systems should facilitate the matching of needs and solutions in projects both locally and in developing countries.

#### **Industry and developing countries**

There is a continuum between Australia and developing countries — the solar powered cool box used in Australia to provide cold beer at a barbeque may be used in a developing country to transport vaccines. The applications are different but the technology is the same.

There appears to be a lack of interest from Australian power utilities in investing in developing countries. Asia represents a huge potential market for Australian companies to expand into areas traditionally supplied by the state such as education, health, transport and energy. But there are barriers to investment in developing countries by the energy industry. Some companies are not free to invest in Asia; for example, those owned by offshore groups may not have a choice over where they invest. However, there are now some independent companies starting up in Australia who do have opportunities to invest in developing countries.

For more information, please contact the Director, Rural Development, Infrastructure and Environment Section, SECTORS Branch, Australian Agency for International Development, ph: 02 6206 4055.

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