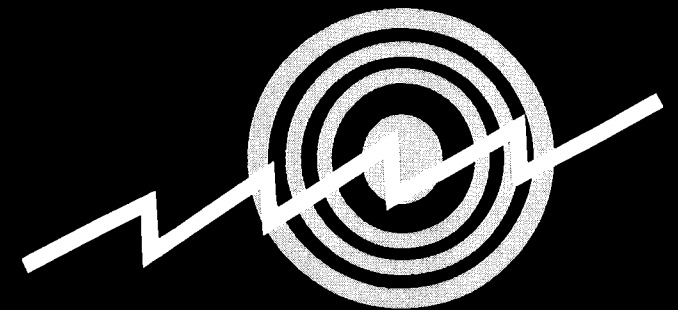




SOLAR ENERGY AND SOLAR COGENERATION OF ELECTRICITY

A DISCUSSION PAPER

BY

**THE STANDING COMMITTEE
ON CONSERVATION,
HERITAGE AND ENVIRONMENT**

NOVEMBER 1991

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HERITAGE AND ENVIRONMENT**

NOVEMBER 1991

Australian Capital Territory

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PREFACE

Electricity is available easily and cheaply from the NSW power grid. But it is all somewhat of a false convenience for the ACT. In the process, regrettably, some 65 per cent of our electricity is generated by coal burning which adds to the greenhouse effect. And while electricity demand expands there is a corresponding growth in greenhouse emissions. If we have a genuine concern about the environment now as well as the rights of future generations, a start has to be made on examining, and developing, alternative renewable energy sources.

The purpose of this discussion paper therefore is to assist the process of turning around the community's approach to energy use in homes and workplaces. Government's have already done a lot to encourage the conservation of energy but, surprisingly, little to promote and capitalise on developing the significant advances being made in Australia and abroad in solar, cogeneration and renewable energy technology and research.

As the ACT imports all its energy, this new technology is particularly relevant because we are ideally positioned to use it to reduce energy imports. With imaginative policy encouragement by government, ACT householders and businesses would be able to not only generate electricity but also feed surplus production into the ACT power grid. It must be an imperative of the government that it and its agencies facilitate the further development and use of photovoltaic cells and other means of generating solar energy rather than impeding these developments through competition with conventionally produced electricity.

The single most important factor is that ACT Electricity and Water be given responsibility for finding ways to credit ACT householders and businesses for solar generated electricity fed into the power grid. The time could well come when electricity generated by households and businesses will have the effect of winding the electrical meter backwards. Through some periods the electricity authority might actually pay for such electricity produced above the needs of the household or the business. The questions raised by this are the point of the discussion paper. How can we use energy more efficiently? How can we encourage householders and businesses to switch to solar heating and generate solar electricity?

So the challenge is to encourage a more energy efficient community in the ACT and to develop the means of producing solar energy. Hopefully this discussion paper will act as a catalyst in getting that process underway.

Michael Moore MLA

Presiding Member

CONTENTS

	Committee members	i
	Preface	iii
1.	INTRODUCTION	1
2.	ENERGY SUPPLY AND DEMAND	3
	ACT Energy Resources and Consumption	3
3.	ENERGY CONVERSION, WASTAGE AND CONSERVATION	5
	Conservation	5
	Energy Audits	7
	Preliminary conclusions	8
4.	ALTERNATIVE ENERGY SOURCES	9
	Renewable Energy	9
	Solar Energy	9
	Photovoltaics	12
	Cogeneration of Electricity	12
	Barriers to Renewable Energy Resources	13
	Buy-back of Electricity Generated from Renewable Energy	13
	Preliminary conclusions	13
5.	PASSIVE SOLAR BUILDINGS	15
	Preliminary conclusions	16

1. INTRODUCTION

1.1 Early in the committee's life it was given a reference to inquire into and report on an integrated energy resources and environment policy for the ACT, and as part of that reference was required to cover emission standards for wood burning stoves integrated with management of fuelwood plantations, housing design standards to conserve energy and alternative proposals for balanced energy use.

1.2 The committee's report on fuelwood heating in the ACT, Tabled in the Legislative Assembly on 19 September 1991 made recommendations on emission standards for solid fuel heaters, fuelwood plantations and energy efficient housing. That report followed the publication by the committee of a discussion paper in April 1991¹ which sought the views of the ACT community and others on most of the issues. The public response to the discussion paper was invaluable to the committee in making its final recommendations.

1.3 In the light of that experience, the committee again seeks the views of the ACT community on the viability of the proposals canvassed in this discussion paper. The proposals and views are not presented as the final position of the committee. Indeed the intention is to draw out and stimulate further comment on a matter which in the committee's opinion is worthy of very serious consideration by governments.

1.4 The importance of efficient energy usage in all sectors of the ACT community and its economy has to be recognised and understood. That understanding will, the committee trusts, lead to a greater focus on an integrated energy policy for the ACT and, in particular, on issues such as renewable energy and solar generation of electricity. The objective is that increasing demand for energy should as far as possible be met from renewable energy resources.

1.5 In preparing this paper, the committee has benefited from submissions and evidence provided by ACT individuals and organisations on the broad energy reference mentioned earlier. The committee has also had access to the Victorian Department of Industry Green Paper "Renewable Energy and Energy Conservation Strategy", February 1990 and the summary of submissions received, the NSW Government Minerals and Energy Committee report "Review of Energy Conservation and Management Policies and Programmes", November 1990, and the Ecologically Sustainable Development Working Group Draft Reports on Energy Use, July 1991 and Energy Production, August 1991.

1.6 The committee invites comment and views on the matters discussed. Comments should be made to the secretary of the committee by 3 February 1992.

¹ The Standing Committee on Conservation, Heritage and Environment, Sept 1991, Fuelwood Heating in the Australian Capital Territory, Report No 4

2. ENERGY SUPPLY AND DEMAND

2.1 Expenditure on fuel and power, excluding transport related costs, accounts for nearly three per cent of the total income of Australian households. The residential sector represents around 12 per cent of final energy consumption in Australia and consumption has been growing over the past 16 years by two per cent a year and is projected to grow by 2.4 per cent over the next 14 years. This rate of growth has been outstripping population growth (1.3 per cent a year) due to factors such as increased real household incomes, penetration of energy using appliances and increased formation of households. Natural gas and electricity consumption growth has outpaced growth in the use of other energy forms, although there has been a dramatic growth also in solar energy use between 1973/74 and 1989/90 of some 30,000 per cent, albeit from a very small base.²

2.2 In 1986 the source of energy used by ACT households for all purposes was estimated at about 60 per cent from electricity, 17 per cent from solid fuel (including fuelwood), 14 per cent from oil and 9 per cent from gas. Figures showed that the percentage of households using oil and electricity for space heating had been declining while wood burning and natural gas consumption were increasing.³

ACT Energy Resources and Consumption

2.3 Households in 1988 used some 50 per cent of the natural gas supplied to the ACT. Government enterprises and administration used 30 per cent and other commerce and industry the balance.⁴

2.4 Electricity for the ACT is supplied by the Electricity Commission of NSW power grid. Most of this electricity is generated by the burning of black coal, although some 9.5 per cent of NSW electricity is generated by the Snowy Mountains hydroelectric scheme. Under the terms of the NSW Seat of Government Surrender Act 1909 and the Commonwealth Seat of Government Acceptance Act 1909, the ACT has a reservation of power from the Snowy Scheme, currently amounting to 35 per cent of its electrical energy needs. There is no capacity to significantly change the amount of electricity from this source.⁵ Increased electricity consumption in the ACT will therefore mean a greater use of black coal generated electricity.

2.5 Household energy usage varies considerably depending on the type, size and

² Ecologically Sustainable Development (ESD) July 1991, Energy Use Working Group, Draft Report, AGPS, pp 2, 12, 13, 52.

³ AGL Canberra Limited, 1989, Submission to the Standing Committee on Conservation, Heritage and Environment, p8.

⁴ *ibid*, p10

⁵ Act Electricity and Water, 1989, Submission to the Standing Committee on Conservation, Heritage and Environment, p3.

siting of houses, insulation and the types of appliances used. According to ACT Electricity & Water (ACTEW), end use energy for a typical 3 person household over a year is:-

- . 50 per cent for space heating
- . 26 per cent for hot water
- . 7 per cent for cooking
- . 6.5 per cent for refrigeration
- . 4 per cent for lighting
- . 4 per cent for miscellaneous electric power
- . 2.5 per cent for TV, VCR, radio etc.⁶

With some 75 per cent of electrical power consumed on heating and hot water, the question must be asked to what extent can cogeneration and renewable energy be employed to supplement or replace electricity provided by burning black coal so as to reduce through backward linkages the amount of carbon dioxide emissions produced by NSW power stations.

2.6 Australia's electricity sector is presently almost totally dependent on fossil fuels and accounts for half of Australia's emissions of carbon dioxide resulting from human activities. Renewable energy technologies, including wind, solar thermal and photovoltaics offer significant, and potentially attractive future sources of electricity supplies, with little if any associated emissions of greenhouse gases and generally significantly less environmental impacts than for fossil fuel energy sources.⁷

2.7 The committee recognises that any action taken by the ACT to reduce greenhouse gas emissions by power stations in the Hunter Valley of NSW will be of minimal effect taken in isolation. However, the ACT is a significant discrete community which can stand as a model for other communities which, by following its lead, could collectively make an important total contribution to the reduction in greenhouse gas emissions through reduced demand for coal generated electricity.

⁶ *ibid*, p4

⁷ Ecologically Sustainable Development (ESD) Working Groups, August 1991, Draft Report – Energy Production, AGPS, p xxix.

3. ENERGY CONVERSION, WASTAGE AND CONSERVATION

3.1 Primary forms of energy must be converted to more convenient energy forms, say coal to electricity, and delivered to end users. Converting primary energy to final usable energy is itself a major user of primary energy. Electricity generation is the largest single user of energy in Australia, accounting for 38 per cent of total domestic energy use in 1990, with about 35 per cent conversion efficiency.⁸ Around two thirds of the energy input to power stations is lost in the form of heat produced during the conversion process.

3.2 The committee was advised that energy losses in the electricity transmission system are about 4 per cent of the total energy transmitted, and that energy loss in the distribution system also totals about 4 per cent.⁹ These losses reflect the often large distances over which electricity is often transmitted. Control of these losses so far as the ACT is concerned is largely beyond the responsibility of ACTEW, although the committee was informed that authorities are continually attempting to minimise these losses. Losses in natural gas transmission and distribution are significantly lower at less than 2 per cent.¹⁰

3.3 At this stage, the ACT's capacity to generate electrical power is limited to small hydroelectric plants, possible wind generation, natural gas turbine generators and cogeneration by major institutions. ACTEW advised the committee that, for the most part, these facilities would cost substantially more than the purchase of electricity from NSW.¹¹

Conservation

3.4 Energy conservation covers energy efficiency improvements at the point of end use through appliance and equipment efficiency, building standards and other technical measures. It covers promotion of the most appropriate energy source for specific uses, and also behavioural changes in consumer demand such as saving electricity, increasing recycling and reducing urban sprawl.

⁸ *ibid*, p18

⁹ ACT Electricity and Water, *op cit*, p 19.

¹⁰ ESD Working Groups, *op cit*, p 21.

¹¹ ACT Electricity and Water, *op cit*, p 20.

3.5 Any significant reduction in the demand for electricity in the ACT would require considerable effort by commercial and domestic customers. The State Electricity Commission of Victoria has estimated that a reduction of 12 per cent of demand could be achieved with input from industry¹². There is no equivalent industrial base in the ACT, but savings are possible in areas such as:-

- (a) residential appliance efficiency- including energy efficient appliances and efficiency labelling,
- (b) domestic hot water storage and space heating- including off-peak electricity and solar water heaters,
- (c) energy efficient houses,
- (d) energy efficient streetlighting,
- (e) commercial lighting systems in existing buildings,
- (f) more efficient air conditioning systems in existing buildings,
- (g) better design of commercial buildings to reduce heat loss and air conditioning demand, and
- (h) floodlighting of government buildings.

The committee would welcome comment and practical proposals for its consideration in developing these themes further.

3.6 Energy savings can result simply from behavioural changes and avoiding wasteful use of energy or reducing demand for a particular energy service. They do not necessarily involve technical changes. They can be as simple as drying clothing on washing lines with less use of clothes driers. Thermostats can be turned down, and washing machines can be used only when full. However, the committee notes that behavioural change of this nature tends to be temporary in nature because the incentive for change loses impetus over time, or because the energy saving behaviour is perceived as a reduction in living standards¹³.

¹² *ibid*, p 15.

¹³ ESD, *op cit*, p 57.

3.7 Whether behaviour change is seen as sensible or as a burden depends on how it is presented, how significant a behaviour change is needed, and whether the new behaviour is reinforced through cost savings or other less direct benefits. It would seem to the committee that there is scope for the Government to promote a greater awareness in the ACT community of the need to conserve energy through behavioural change. Again, the committee would welcome views on the possibilities of educating the community in the responsible use of energy.

3.8 Increasing electricity tariffs have provided an incentive for energy labelling elsewhere in Australia. NSW and Victoria have introduced a uniform energy labelling scheme. Energy labelling is designed to provide customers with information to allow them to select the more energy efficient products. By reducing their energy consumption consumers benefit directly through lower electricity bills. Cost savings for domestic consumers in Victoria have been of the order of \$80-120 a year in the operation of labelled refrigerators, freezers, room air conditioners and dishwashers¹⁴. The committee considers that the ACT should enact legislation consistent with NSW and Victoria to require efficiency rating labelling of these and other appliances as the system is expanded.

Energy Audits

3.9 ACTEW provides an energy audit service to customers on request. The objective is to assist in reducing their energy consumption, to assist in ensuring that electricity is used in a cost effective way and to increase public awareness of the need for energy management. In recent years, however, use of the service has been minimal, but ACTEW advised the committee that in line with the need to reduce greenhouse emissions through electricity generation consideration was being given to improving and publicising the service.¹⁵

¹⁴ ACT Electricity and Water, *op cit*, p 18.

¹⁵ *ibid*, p 18.

3.10 The committee notes that ACTEW provides general advice on efficient energy use when issuing its electricity bills, and that it can advise on the costs of operation of domestic appliances. The committee commends these actions as positive and responsible measures to conserve energy and reduce costs for consumers. However, as outlined in the following section of this paper, the committee sees a need for ACTEW and the Government to ensure that electricity conservation policies do not discriminate against the development of viable alternative means of producing energy such as solar heating.

3.11 Preliminary conclusions reached by the committee are:-

- (a) that there should be a public information campaign sponsored by the Government in conjunction with ACTEW and other relevant organisations as appropriate, including manufacturers and retailers of electrical appliances, to promote greater awareness of the benefits to households and the broader community of conserving energy, and advising how this can be done responsibly,
- (b) that school curriculums provide for tuition in the responsible usage of energy,
- (c) that legislation be enacted in the ACT, consistent with legislation in NSW and Victoria, to provide for energy efficiency rating labelling of certain domestic electrical appliances,
- (d) that ACT building regulations be amended as necessary to provide for energy efficient design, and to ensure an appropriate standard of efficiency for lighting, air conditioning and other energy systems for commercial buildings,
- (e) that the floodlighting of Government buildings be allowed only where this is essential for ceremonial or security reasons, and
- (f) that ACTEW upgrade and publicise its energy audit service.

4. ALTERNATIVE ENERGY SOURCES

4.1 There is a range of new and developing technologies offering a high potential for reducing emissions of greenhouse gases from electricity generation. How feasible they are differs according to location and the extent to which they receive demonstration and development support from governments and industry. With considerably improved storage systems and advanced batteries, renewable energy could supply a high proportion of Australia's energy needs.¹⁶

Renewable Energy

4.2 Renewable energy covers resources such as solar, hydro, wind, biomass, fuelwood, electricity cogeneration, landfill gas and geothermal resources.

4.3 The committee's report on fuelwood heating in the ACT dealt with the issue of fuelwood as a renewable resource as distinct from non renewable fossil fuels. The committee recommended, inter alia, the development of hardwood plantations to meet future fuelwood demand.

4.4 For the purposes of this paper, the committee has focused on renewable energy in those areas which are capable of action by the ACT Government and community having regard to the natural resources of the ACT, its present population, the size of its industry, and its capacity to generate viable biomass and landfill gases. Accordingly, the committee has given specific attention to the possibilities associated with solar energy and solar cogeneration of electricity.

Solar Energy

4.5 The potential for solar energy usage in Australia is extraordinarily impressive. The solar energy falling on the Australian land mass in one year is more than 12,000 times its annual primary energy use. If solar photovoltaic cells were to be placed on the roofs of all Australian houses, they would provide 15 per cent more electrical energy than the total Australian electricity use in a year¹⁷. Solar energy has the potential to save in excess of 60 per cent of the energy used for water heating using conventional technologies. Similarly, solar industrial process heating could potentially provide a significant contribution of energy for industry.

¹⁶ ESD Working Groups, op cit, p 106.

¹⁷ *ibid*, p 16.

4.6 Realistically, however, direct use of solar power can contribute to a reduced demand for electricity, and can be used for

- . solar hot water systems
- . passive and active solar designs in buildings
- . the replacement of low grade heat systems with solar systems
- . solar heat pump systems for hot water

4.7 Notwithstanding the potential for solar power to dramatically transform Australian energy production and consumption, large scale or widespread adoption of solar technology has been restricted by the high costs of equipment and the requirement for short payback periods.¹⁸

4.8 Indeed the high capital cost of solar hot water services, in the order of \$2,500 in 1989 for domestic systems in Canberra compared with about \$500 for a conventional electric hot water system at that time, appears to be the main reason why a greater number of houses have not converted to solar. ACTEW advised the committee that on the basis of total capital, maintenance and operating costs, solar hot water units were found to be significantly more costly than either conventional, off-peak electrical or gas hot water services¹⁹. However, the cost differences are somewhat artificial as the committee notes that ACTEW is presently aggressively marketing its "New Age Electric" "Half Price Hot Water" with a \$150 cashback to encourage greater usage of off-peak electricity.

4.9 The use of solar energy through the utilisation of active solar devices in NSW, particularly household water heaters, has achieved only a low level of market penetration. The most recent data available (1985/86) indicates that only 3.5 per cent of NSW households had solar hot water heaters. Of these, 92 per cent were electric boosted.²⁰

4.10 In Victoria solar water heating is used in about 1.5 per cent of households. Sales had been low due to a combination of factors including the perception (claimed to be incorrect) that Victoria has a poor solar climate, the relatively low price of conventional energy used for off-peak water heating, and the cost differential between solar and conventional water heating systems. However, sales are now increasing. Solar pool heating is particularly cost-effective with running costs minimal by comparison with electrical heating. Solar represents over 80 per cent of new pool heater

¹⁸ Dept of Industry, Technology and Resources (Victoria), Feb 1990, Renewable Energy and Energy Conservation Strategy, Green Paper, p 33.

¹⁹ ACT Electricity and Water, op cit, p 21.

²⁰ Government Minerals and Energy Committee (NSW), 1990, Review of Energy Conservation and Management Policies and Programmes, p 10.

sales in Victoria, and approximately 100 public, institutional and commercial pools use solar heaters, either as stand alone units for outdoor pools or as fuel savers for indoor pools.²¹

4.11 The committee notes that new developments are underway in Australia and overseas on cost-effective solar hot water heaters and that new materials, production techniques, system design and installation procedures are expected to reduce costs and result in payback periods of five years or less.²² Solar hot water, based on flat plate collectors, is an export industry for Australia and is widespread for domestic use in Western Australia and the Northern Territory. However, the expansion of solar systems will continue to be held back by low prices charged for off-peak electric hot water produced by coal burning power stations and by the strong promotion of natural gas.²³

4.12 A substantial potential market is available for solar industrial process heat. A system developed at the University of Sydney, using seasonally adjusted parabolic trough concentrators, produces steam at temperatures up to about 200 degrees centigrade. Preliminary calculations indicate that the system is already competitive with electrically produced steam and, when mass produced, is likely to be competitive with steam from liquefied petroleum gas. On a still larger scale of production, it could possibly become competitive with steam from natural gas.²⁴

4.13 The committee is concerned that the obvious benefits to the environment and the conservation of Australia's natural resources by the use of solar water heating are not apparently being fully explored by the ACT Government and its agencies. The committee considers that greater and more innovative efforts are needed to encourage existing householders to switch to solar systems and to have them incorporated in new houses. There is clearly scope for promotion of solar systems and the provision of price incentives of a kind similar to those being offered by ACTEW to encourage greater off-peak use of conventional electrical appliances and equipment.

²¹ Dept of Industry, Technology and Resources (VIC), op cit, p 81.

²² *ibid*, p 83.

²³ ESD, op cit, p 64.

²⁴ *ibid*, pp 64,65.

Photovoltaics

4.14 Photovoltaics directly convert sunlight to electricity. The University of NSW has taken a leading role in the development of these systems and their innovations are licensed to a number of Australian and overseas manufacturers. Since 1986, the Victorian Solar Energy Council and the State Electricity Commission of Victoria have been running a feasibility study of a photovoltaic facility capable of producing 50 or 100 kw into the grid system. Overseas demonstration plants are operating successfully on the basis of large scale connections to the grid and for single houses and groups of houses.²⁵

4.15 In Australia, photovoltaic cells are already being used to power homes, communities, signals, telephones and navigational lights which are isolated from the grid. They are a preferred alternative to diesel generators for some users because they need lower maintenance. At this stage photovoltaics are too expensive for grid connection, but their cost is steadily decreasing. It is the committee's view that the Government and ACTEW should examine the feasibility of excess photovoltaic power generated by individual ACT homes and commercial buildings being fed into the ACT power grid, and for those producers to be rebated for the value of such power supplied to the grid.

Cogeneration of Electricity

4.16 Cogeneration involves the generation of electricity as part of some other industrial or utility service process which involves heat energy. The objective is to reduce greenhouse gas emissions through the simultaneous production of electricity and utilisation of waste heat resulting in higher thermally efficient use of fuels. Overseas experience is that waste heat from central power stations can be used for district heating.²⁶

4.17 The ACT has no base energy resources of a size with which to undertake significant generation of electrical power. However, the production of electrical and usable thermal energy from the one combustion process may be a feasible means of saving and using presently wasted heat generated within commercial buildings, hospitals, shopping plazas, offices and even possibly private houses, should the technology be sufficiently refined to allow this²⁷. The committee considers that there is substantial scope for more work to be done on developing cogeneration technology with regard to institutional and commercial buildings in the ACT.

²⁵ Dept of Industry, Technology and Resources (VIC), op cit, p 84.

²⁶ ESD Working Groups, op cit, p 151.

²⁷ AGL Canberra Limited, op cit, p 11.

Barriers to Renewable Energy Resources

4.18 While renewable energy potentially provides a very attractive means of reducing greenhouse emissions and maintaining the level of energy services, various barriers affect their widespread adoption.

4.19 There is presently a general low level of operating experience with renewable energy technology, especially wind energy. Despite its climate and potential, Australia has no commercial scale solar thermal energy projects to produce electricity, although there have been developmental projects. Despite the rapid technological advances, the cost of renewable energy is still significantly higher than for conventional fossil fuel production of electricity for supply to electricity grids.²⁸

4.20 Considerable distortion exists in the relative pricing between fuels in Australia. Fossil fuel prices are relatively low and this diminishes incentives towards improved energy efficiency and developing and adopting renewable energy sources. At the domestic level, householders tend to buy appliances on the basis of current fuels and technology, with decisions having a long term impact on energy use in the home. For example, the decision to buy an electrical or solar energy water heater is likely to be based on the current pricing structure of electricity. Potential long term economic advantages of conservation and efficiency measures are, in these circumstances, overridden in the reality of current prices and by the lack of concern in the future.²⁹

Buy-back of Electricity Generated from Renewable Energy

4.21 The committee notes that feasibility studies into the capability of photovoltaics to feed electricity into the grid have been underway in Victoria over several years, and that there are operational grid feeds from photovoltaics overseas. The committee considers that the ACT Government should examine the feasibility of providing for buy-back of electricity from ACT householders and businesses where this electricity is produced by solar, photovoltaic or cogeneration systems and when it is surplus to the needs of the household or business.

4.22 Preliminary conclusions reached by the committee are:-

- (a) that the installation of household solar hot water and ther systems be encouraged by price and cashback incentives similar to those offered by ACTEW to encourage off-peak use of electricity,

²⁸ ESD Working Groups, op cit, p 78.

²⁹ ESD, op cit, pp 84, 85.

- (b) that the promotion of electricity generated by conventional power stations does not discriminate against the development of viable alternative means of producing energy or generating electricity,
- (c) that the Government investigate the scope for developing cogeneration of electricity by institutions, public and commercial buildings and shopping plazas in the ACT, and
- (d) that the Government and ACTEW examine the feasibility of buy-back of solar, photovoltaic and cogenerated electrical power produced by ACT households and commercial buildings.

5. PASSIVE SOLAR BUILDINGS

5.1 Passive solar buildings are energy efficient buildings which catch the sun in winter and exclude it in summer. Appropriately designed buildings can reduce the cost of winter heating by 60–90 per cent and add to comfort in summer. The committee's report on fuelwood heating in the ACT included a chapter on energy efficient housing and made a number of recommendations about solar orientation, insulation, weathershielding, glazing, ventilation and publicity to ensure that the maximum thermal benefit was achieved for ACT housing³⁰. However, the committee considers that the issue is worthy of further examination in the context of this discussion paper.

5.2 Solar efficient design has been subject to considerable development, demonstration and other promotional work in Victoria. The "Five Star Design Rating" scheme, the "Solar Energy Reports" in the media, and other campaigns have raised public awareness, but only a small percentage of all new houses being built at this time are "solar efficient". Nevertheless, the Victorian Green Paper noted that solar efficient design is very cost-effective in the domestic building sector. The Victorian Government estimates that with high market acceptance, aided by legislation to make insulation compulsory for new houses, new houses and retrofitting of existing houses could lead to a decrease in total heating energy use of 15 per cent and cooling by over 20 per cent by the year 2010.³¹

5.3 More rapid proliferation of passive solar housing could be achieved if new suburbs and housing sites were to be solar oriented, and if governments developed and implemented energy performance standards for new buildings. The committee understands that the University of Sydney is developing a new solar heating system which focuses sunlight on to roof top solar collectors which can produce room heat, hot water and superheated steam for cooking. This system, if it proves to be economic, could be fitted to existing houses and small commercial buildings.³²

5.4 The committee considers that in addition to the recommendations contained in its report on fuelwood heating, the ACT Government should examine the feasibility of introducing incentives such as reduced electricity charges associated with the operation of solar systems, cashback payments for solar systems and land rate discounts in order to encourage and expedite the adoption by householders of solar heating systems.

5.5 The committee makes two further observations, namely:—

that the Government should seek to join with research being undertaken in the ACT and elsewhere in Australia into improved solar heating and electrical energy generating systems as well as into cogeneration of electricity with a

³⁰ The Standing Committee on Conservation, Heritage and Environment, op cit, pp 28, 29.

³¹ Dept of Industry, Technology and Resources (VIC), op cit, pp 79, 80.

³² ESD, op cit, p 64.

view to ensuring that the needs of the ACT in these important areas are fully accommodated.

that the Government should legislate to provide the right for a householder to retain continued access to solar exposure in relation to shading from adjoining buildings.

5.6 Preliminary conclusions reached by the committee are:-

- (a) that the Government examine the feasibility of introducing a package of measures such as reduced electricity charges associated with the operation of solar systems, cashback payments for solar systems and landrate discounts in order to encourage and expedite the adoption by householders of solar heating systems, and
- (b) that the Government seek to associate the ACT with research being undertaken elsewhere in Australia into alternative electricity generating systems, cogeneration and solar heating with a view to ensuring that the particular needs of the ACT are taken into account and that the ACT secures maximum benefit from such research.

Michael Moore MLA
Presiding Member