

# Chapter 16

## ENERGY

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# Chapter 16

## ENERGY

An elaborate energy efficiency campaign, launched by the Hydro-Electric Commission in April 1990, was received favourably by consumers. This appeal for responsible use of electricity came at a time when protracted near-drought conditions in 1989-90 forced the Commission to operate the expensive oil-fired power station at Bell Bay as the only alternative to power rationing.

Notable events in 1990-91 were consideration of the possibility of inter-connection with the South-Eastern Grid and an investigation into the prospects of bringing natural gas to Tasmania. Incorporation of Tasmania into the S-E Grid would provide increased energy to Tasmania from the mainland at critical periods of great domestic consumption in addition to satisfying the needs of large industrial users.

The search for an alternative to local hydro-based generation has become a priority for the HEC. Ongoing weather patterns unfavourable to hydro-electric generation have resulted in



Bell Bay.

Photo: Tasphoto Services

### 16.1 ENERGY CONSUMPTION, BY INDUSTRY, TASMANIA, 1986-87

Type	Amount (terajoules)	Proportion (%)
Electricity	24 402.9	46.0
Automotive petrol	3 147.6	5.9
Automotive diesel	5 281.0	9.9
Liquefied petroleum gases	971.0	1.8
Fuel oil	5 269.9	9.9
Black coal	8 615.2	16.2
Wood	3 980.9	7.5
Other	1 433.3	2.7
Total	53 101.8	100.0

(Source: ABS Catalogue No. 8217.0).

Tasmania's power supply being supplemented by polluting, oil-burning, steam generators.

A full-scale feasibility study was commissioned to evaluate natural gas as a proven means of electricity generation. This may provide a way of supplementing and/or replacing existing energy sources.

The Australian Bureau of Statistics conducted a survey of all industries except agriculture to determine the level of energy consumption in the 1986-87 financial year. About 20 000 industrial and commercial establishments were included in the survey. Data was collected on the source of the energy consumed and the purpose for which it was used.

Nationally, the estimate of total energy consumption was 2 790 554 terajoules. The Tasmanian energy consumption component of the national total was 53 102 terajoules, or just under two per cent. Since Tasmania's population represents about three per cent of Australia's, Tasmanian energy usage per capita falls below the national median.

It should be noted that in the estimates of energy consumption by industry an element of double counting exists. Fuels, used to generate electricity, such as coal and natural gas, were counted in the consumption figures for those fuels as well as in the figure for electricity.

Not surprisingly, the Tasmanian pattern of energy consumed differed markedly from the national pattern. Some 46 per cent of energy (24 403 terajoules) consumed in Tasmania was electricity (mostly from hydro schemes). Nationally, only 12 per cent of energy consumed was electricity: the main source of energy was black coal (31 per cent of all energy consumed), followed by natural gas (16 per cent). Of the 856 800 terajoules of energy from black coal, 88 per cent was consumed in the electricity and gas supply industry, primarily for electricity generation.

In Tasmania, black coal accounted for 16 per cent of energy (8615 terajoules), while natural gas was not reported as an energy source used. Other major energy sources were automotive diesel (5281 terajoules) and fuel oil (5270 terajoules), 9.9 per cent each, wood (3981 terajoules or 7.5 per cent) and automotive petrol (3148 terajoules or 5.9 per cent). This contrasts with national consumption figures of only 2.6 per cent for fuel oil and 0.6 per cent for wood.

The manufacturing sector combined with electricity and gas used 72 per cent of all energy consumed by industry in Tasmania during 1986-87. Because the energy consumption figures for certain sectors of those industries are confidential, exact quantities for individual activities are not available.

Around one-fifth of total energy used by the manufacturing industry was used by the paper, paper products, printing and publishing industry class (10 872 terajoules or 20.5 per cent). If the 3084 terajoules energy consumption of the wood, wood products and furniture class (which includes sawn timber and woodchip production) is added, then these two industry groups used about one quarter of the total energy consumed by the manufacturing sector. Nationally, these

### 16.2 ENERGY CONSUMPTION BY INDUSTRY DIVISION, 1986-87

Industry	Tasmania		Australia	
	Terajoules	%	Terajoules	%
Mining	3 931	7	125 265	4
Manufacturing, electricity and gas	38 099	72	2 182 501	79
Water, sewerage and drainage	144	..	7 083	..
Construction	818	..	35 140	1
Wholesale trade	1 060	2	30 189	1
Retail trade	1 131	2	45 212	2
Road transport	2 143	4	76 574	3
Rail, water, air and other transport	1 420	3	118 891	4
Storage and services to transport	374	1	13 212	..
Communication	150	..	6 840	..
Finance, property and business services, and public admin.	1 102	2	60 618	2
Community services, recreation, personal and other services	2 730	5	89 028	3
Total	53 102	100	2 790 554	100

(Source: ABS Catalogue No. 8217.0).

two industry classes used only two per cent of the total energy consumed by manufacturing.

Other major manufacturing energy users in Tasmania were food, beverages and tobacco (2685 terajoules or 5.1 per cent) and cement, concrete and other non-metallic products (2211 terajoules or 4.2 per cent).

Other principal industry consumers of energy were mining (seven per cent of total energy consumption); community services, recreation, personal and other services (five per cent); and road transport (four per cent).

Major non-manufacturing industrial users of electricity include the mining sector (1468 terajoules) and community services, recreation, personal and other services (1572 terajoules). The road transport sector consumed 34 per cent of the 5281 terajoules of automotive diesel fuel used by industry in Tasmania and only eight per cent of the automotive petrol used.

### 16.3 AVERAGE WEEKLY HOUSEHOLD ENERGY EXPENDITURE, TASMANIA (\$)

	1988-89	1984
Average weekly household income	541.32	392.47
Household fuel and power -		
Electricity (selected dwelling)	12.10	8.81
Electricity (other dwelling)	0.19	0.13
Total electricity	12.28	8.94
Mains gas	0.08	0.09
Bottled gas	0.48	0.53
Total gas	0.56	0.62
Heating oil	0.52	0.48
Kerosene and paraffin	0.03	0.10
Wood (for fuel)	0.55	0.76
Fuels n.e.c.	n.a.	n.a.
Total other fuels	1.10	1.35
Total fuel and power	13.95	10.91
Motor vehicle fuel, lubricants and additives -		
Petrol	21.70	15.98
Diesel fuel	0.23	0.12
LPG and other gas fuels	n.a.	n.a.
Oils, lubricants and additives	0.74	0.32
Total	22.72	16.43

(Source: ABS Catalogue No. 6535.0).

In 1987-88, Tasmania produced 404.8 kilotonnes of washed black coal, while in 1988-89 production dropped to 356.3 kilotonnes. In the 1986-87 industry energy survey, the Australian Bureau of Statistics estimated that one tonne of Tasmanian black coal would provide 22.8 gigajoules of energy.

Gas is only a minor energy source in Tasmania, though production continues to increase. Town gas is manufactured and reticulated in Launceston only. In 1990-91, Tasmania produced 68 million megajoules of gas (available for issue through the mains). Bottled LPG is a minor domestic, commercial and motor fuel in the State.

## 16.1 HOUSEHOLD ENERGY EXPENDITURE

The 1988-89 Household Expenditure Survey (HES) estimated that Tasmanian households spent an average of \$13.95 a week on household fuel and power (2.6 per cent of average weekly household income) and \$22.72 a week on motor vehicle fuel, lubricants and additives (4.2 per cent of average weekly household income). This compares with estimates for Tasmanian households from the 1984 HES of \$10.91 (2.8 per cent) for household fuel and power and \$16.43 (4.2 per cent) for motor vehicle fuel, lubricants and additives.

In Hobart, where 1988-89 average weekly household income was estimated at \$557.73, \$14.28 was spent on household fuel and power and \$19.31 on motor fuel, lubricants and additives. This compares with estimates from the 1984 HES of \$11.58 and \$18.46 respectively, from an average weekly household income of \$443.34.

## 16.2 PETROLEUM PRODUCTS

The total sales of petroleum products in Tasmania in 1990 was 1074.2 megalitres or 2.8 per cent of all Australian sales. (Tasmania has 2.7 per cent of the Australian population).

In 1990, sales of petrol (leaded and unleaded) reached 43.3 per cent. Nationally, petrol sales made up 44.3 per cent of all petroleum products.

### 16.4 FRANCHISE LICENCE FEES, TASMANIA, (\$m)

Year	Automotive		Total
	Petrol	diesel	
1985-86	13.3	3.2	16.5
1986-87	29.4	7.1	36.5
1987-88	29.6	7.6	37.2
1988-89	30.2	8.0	38.2
1989-90	30.8	8.6	39.4

(Source: Petroleum Gazette 1990/2 and 1991/2).

Unleaded petrol sales accounted for 23.4 per cent (108.9 megalitres) of all petrol sales in Tasmania, showing the steady increase in its use from 1985 when it was introduced.

Between 1989 and 1990 there was a 1.7 per cent rise in sales of petrol in Tasmania. Total sales of all petrol in 1989 were 457.8 megalitres and 465.6 megalitres in 1990. Nationally, petrol sales decreased 0.5 per cent from 17 239 megalitres to 17 148 megalitres over the same period.

Petrol and automotive diesel sales are substantial revenue earners for the State government. Since 1984-85, franchise fees levied on petrol and automotive diesel sales have provided a massive 183.4 per cent increase in revenue to the Tasmanian government.

## 16.3 ELECTRICITY

Tasmania's electricity requirements are provided by the Hydro-Electric Commission from a system based almost entirely on hydro installations. The total installed generator capacity at June 1991 was 2.315 million kW, of which 90 per cent (2.075 million kW) was supplied by the hydro network. Total capacity has remained unchanged for four years following a boost in hydro-generated capacity from 1.931 million kW to 2.075 million kW in 1986-87, an increase of 7.5 per cent. An oil-fired thermal station of 240 000 kW is located at Bell Bay. Its capacity has not changed at this time.

### 16.3.1 Supply and finance

In 1990-91, total energy generated was 9026 GWh, an increase of 5 GWh (0.6 per cent) on the figure for 1989-90. External suppliers fed 4347 MW hours into the HEC system in 1989-90. Total energy sales for the financial year 1990-91 amounted to 8404 GWh, an increase of 101 GWh (1.2 per cent) on the 1989-90 period.

During 1990-91, the net number of HEC customers connected to the HEC system rose by 5114 (about two per cent) to 224 283. The HEC's share of the Tasmanian energy market

### 16.5 CONSUMPTION OF PETROLEUM PRODUCTS, TASMANIA

Product	1990		1989	
	Megalitres	Per cent	Megalitres	Per cent
Liquefied petroleum gas	1.1	0.1	1.6	0.1
Aviation gasoline	3.1	0.3	3.7	0.4
Petrol (leaded and unleaded)	465.6	43.3	457.8	52.4
Aviation turbine fuel	32.1	3.0	27.5	3.1
Lighting and power kerosene	1.4	0.1	1.8	0.2
Heating oil	13.0	1.2	15.2	1.7
Automotive diesel fuel	270.2	25.2	262.3	30.0
Industrial/marine diesel fuel	—	—	2.3	0.3
Fuel oil	261.3	24.3	72.4	8.3
Lubricants	10.4	1.0	12.7	1.5
Bitumen	15.6	1.5	16.4	1.9
Other	0.4	—	0.5	0.1
All products	1074.2	100.0	874.0	100.0

(Source: Petroleum Gazette 1990/2 and 1991/2).

### 16.6 ELECTRICITY CONSUMERS, TASMANIA

Consumers	Number	
	1990-91	1989-90
Residential	182 340	178 291
Public utilities	4 902	4 885
Industrial	18 596	18 037
Commercial	16 531	16 138
Major industrial	21	21
Miscellaneous	1 893	1 797
Total	224 283	219 169

(Source: HEC Annual Reports).

rose from 36.4 per cent at 30 June 1989 to 37 per cent at 30 June 1990.

Trading income for 1990-91 was \$428.6 million, an increase of seven per cent over the figure for 1989-90 of \$401.6 million. The net loss for the year was \$15.2 million while 1989-90 returned a net profit of \$1.5 million.

An increase in retail tariffs, together with continued small growth in energy consumption, contributed to an increase of 12.4 per cent in income from the retail sector in 1990-91. Income rose from \$235.1 million in 1989-90 to \$264.3 million in 1990-91.

Income from the major industrial users decreased 0.2 per cent from \$125.9 million in 1989-90 to \$125.6 million in 1990-91.

### 16.7 ELECTRICITY SALES, TASMANIA (million kWh)

Purpose	1990-91	1989-90
Residential	871.3	955.1
Industrial	578.9	572.7
Hot water	604.4	567.4
Off-peak	267.5	242.8
Lighting	n.a.	n.a.
Commercial	610.8	411.3
Bulk commercial	20.7	61.8
Major industrial	5 396.0	5 440.3
HEC use, unread meters	54.0	51.7
Total	8 403.7	8 303.1

(Source: HEC Annual Reports).

### 16.3.2 Water Storage

Total water storages at the end of both 1990-91 and 1989-90 were 24.3 per cent of the amount required for full energy production. Although the energy potential of some water storages increased in 1990-91 others diminished considerably.

The total energy equivalent in HEC water storages was 3505 gigawatt hours at 1 July 1991. This compares with 3496 gigawatt hours the previous year.

Because of the continuation of long-term, lower than average rainfall, Tasmania's major hydro catchments are at levels similar to those of late 1966, just prior to the disastrous 1967 bush fires. Lake Gordon in the Southwest is able to produce only 21 per cent of its full energy potential as is Lake King William. Despite the general low level of water in catchments, power continues to be available for 99.95 per cent of the year.

The HEC had to fire up its generators at Bell Bay throughout 1989-90 and 1990-91. Although it cost over \$83 million this measure was considered preferable to the introduction of power rationing.

Bell Bay can supply 20 per cent of the State's power needs but uses more than 30 000 tonnes of fuel each month, at a cost of \$2 million a week. Low-sulphur fuel for the power station is shipped from the United States and stored at the 45 000 tonne storage tanks at Bell Bay. Cloud-seeding reduces dependence on Bell Bay to a considerable extent.

### 16.3.3 Operating Expenses

In 1990-91 total operating expenses increased by 36.8 million to 186.7 million, an increase of 24.5 per cent on the previous year's total. Financial charges decreased by 3.4 per cent.

During this period \$157.2 million was spent on capital works bringing the total capital expenditure to date to \$2524.4 million. In 1989-90, \$129.4 million was spent on capital works. This resulted in a total capital expenditure as at 30 June 1990 of \$2367.2 million, up from \$2237.9 at 30 June 1989.

Overseas borrowings in foreign currencies have been eliminated (external borrowings have generally been reduced) thus cutting a large interest burden.

**16.8 POWER STATION OUTPUT  
(excluding King and Flinders Islands)**

Power station	Energy (MW.h)		Average load (MW)		Peak load (MW)	
	1990-91	1989-90	1990-91	1989-90	1990-91	1989-90
Waddamana	4 132	4 171	0.5	0.5	20.2	20.4
Butlers Gorge	65 816	45 823	7.5	5.2	10.5	8.9
Tarraleah	600 530	448 171	68.6	51.2	91.0	91.0
Lake Echo	24 524	98 057	2.8	11.2	34.0	34.2
Tungatinah	378 254	466 005	43.2	53.2	132.5	132.5
Liapootah	392 226	343 702	44.8	39.2	87.0	87.0
Wayatinah	240 730	207 534	27.5	23.7	44.5	43.5
Catagunya	210 047	178 146	24.0	20.3	48.0	48.0
Repulse	135 614	113 391	15.5	12.9	33.0	32.0
Cluny	82 058	67 665	9.4	7.7	20.0	19.0
Meadowbank	162 085	131 537	18.5	15.0	42.0	42.0
Poatina	1 088 243	1 889 200	124.2	215.7	342.0	345.0
Trevallyn	392 452	528 155	44.8	60.3	83.0	83.0
Tods Corner	8 582	12 717	1.0	1.5	1.5	1.5
Fisher	201 305	192 803	23.0	22.0	46.0	47.0
Rowallan	39 687	31 114	4.5	3.6	11.0	10.8
Lemonthyme	278 076	242 701	31.7	27.7	58.0	58.0
Wilmot	117 458	106 132	13.4	12.1	33.0	33.0
Cethana	385 601	327 166	44.0	37.3	100.0	100.0
Devils Gate	279 707	244 029	31.9	27.9	66.0	66.0
Paloona	121 837	106 656	13.9	12.2	32.5	32.0
Gordon	1 045 699	1 189 063	119.4	135.7	354.0	360.0
Bell Bay (thermal)	992 455	714 586	113.3	81.6	242.0	241.0
Mt Lyell	5 070	279	0.6	—	6.8	5.0
Mackintosh	373 967	265 621	42.7	30.3	91.0	89.0
Bastyan	391 809	279 098	44.7	31.9	82.0	81.0
Reece	1 008 020	787 585	115.1	89.9	240.0	234.0
Total system	9 025 984	9 021 107	1 030.4	1 029.8	1 445.0	1 427.3

(Source: HEC Annual Reports).

### 16.3.4 Major Construction Projects

During 1991 construction work continued on the King River and the Anthony power developments, both on Tasmania's West Coast. Capital expenditure on the two undertakings totalled over \$124 million in 1990-91, an increase on the \$101 million expenditure of 1989-90.

To take into account the availability of capital and a lower load forecast, the Commission had reprogrammed the completion dates of the King River scheme to May 1992 and the Anthony scheme to mid-1994. However, it is now estimated that the King River scheme will be completed in 1992-93, while Anthony may continue to 1994-95.

### King River Power Development

In 1989-90, 800 000 cubic metres of rock fill and gravel was placed at the Crotty dam site. Tunnel spoil and gravel from the gravel floor provided this material. The clearing of the Lake Burbury area continued on schedule during 1989-90, when 65 per cent was completed.

At the King River Power Station, the superstructure was completed in 1990; preparations for the installation of the turbine continued, the spiral casing was assembled, tested and embedded in concrete.

The creation of Lake Burbury meant that the Lyell Highway had to be diverted. It was

re-routed to cross the lake at its narrowest point, where a major new bridge will span the lake. Six reinforced concrete piers were constructed in mid-June 1990, on time and under budget mainly because of purpose-built formwork.

### Anthony Power Development

At the Henty Dam, the final concrete pour was completed in May 1988 and the diversion closure took place in July 1988. Water was diverted to Lake Murchison via the Henty Canal and the Anthony River for the Pieman River Power Development.

The Henty Canal is also receiving water from the newly completed White Spur Dam and Canal. Tunnelling for access to the Anthony underground power station concluded in 1990, and the seven kilometre-long Anthony headrace tunnel was excavated to the 1200-metre mark by mid-1990.

The Newton Dam was completed in 1990, the diversion tunnel being closed in mid-October 1989. At Newton Creek, the pump station building was completed, commissioned and handed over.

### 16.10 HYDRO-ELECTRIC COMMISSION CAPITAL EXPENDITURE (\$m)

<i>Project</i>	<i>1990-91</i>	<i>1989-90</i>
Anthony Power Development	41.86	40.62
King River Power Development	82.37	60.60
Gordon Power Station No. 3 machine	—	—
Bass Strait islands reticulation	0.39	0.38
Power station extensions	3.39	1.37
Substations	0.82	1.04
Transmission lines	6.82	3.98
Distribution systems & services	21.28	21.79
Sundry buildings	4.00	0.91
Stores, general plant etc.	1.51	3.69
Construction equipment	-5.22	-5.03
<b>Total</b>	<b>157.21</b>	<b>129.35</b>

(Source: HEC Annual Reports).

### 16.3.5 Future Expansion

Annual load growth has fluctuated markedly in recent years. There have been shifts between high and low growth in both the major industrial and retail sectors. State population growth is slow and unemployment relatively high. These factors, together with higher foreign exchange rates and high interest rates, have created an economic climate in which industry is having

### 16.9 HEC WATER STORAGES AT 1 JULY

	<i>Useful water in storage (megacubic metres)</i>		<i>Energy equivalent (gigawatt hours)</i>		<i>Proportion of full energy (per cent)</i>	
	<i>1991</i>	<i>1990</i>	<i>1991</i>	<i>1990</i>	<i>1991</i>	<i>1990</i>
Lake Augusta	9	2	19	4	43	9
Great Lake	615	719	1 310	1 531	20	23
Arthurs Lake	108	151	192	268	26	37
Lake St Clair	161	159	216	214	82	81
Lake King William	112	126	152	171	21	24
Lake Echo	233	167	407	292	46	33
Tungatinah	35	27	47	37	42	32
Lake Mackenzie	12	4	27	9	61	20
Lake Rowallan	48	20	46	19	40	16
Lake Pedder	106	172	40	64	25	41
Lake Gordon	2 634	2 132	983	787	21	17
Lake Murchison	47	49	25	26	75	79
Lake Mackintosh	78	141	41	74	28	52
<b>Total</b>	<b>4 198</b>	<b>3 869</b>	<b>3 505</b>	<b>3 496</b>	<b>24.3</b>	<b>24.3</b>

(Source: HEC Annual Reports).



### 16.11 HEC FORECAST EXPANSION, TASMANIA (MW)

Year	1995	2000
Average load	1 160	1 227
Peak load	1 598	1 691

(Source: HEC Annual Report 1989).

difficulties reaching decisions about new developments.

Under these conditions an annual load growth of between one and two per cent would be a reasonable forecast. The Commission reviewed its long-term load forecast during the 1987-88 year. However, at this stage there is insufficient evidence to upgrade the previous forecasts and overall it remains unchanged.

Investigation of future power scheme options is an ongoing function. Investigations continued to define the cost and scope of such hydro-electric options as the Lower King, Que, Lake Augusta and King Racelines, and potential redevelopment of old existing schemes at Tarraleah and Lake Margaret. Current attitudes indicate that the era of new large dams in Tasmania has concluded.

Analysis continued on the costs of energy production from a range of options including thermal, wind and wave power. Also considered were the prospects of improving the efficiency of the system by reducing generation and transmission losses.

#### Energy Planning

The Hydro-Electric Commission continued investigation of the State's energy resources during 1990.

Priority has been given to the means of reducing the extent to which the State is dependent on imported liquid fuels.

Two discussion papers, *Liquid Fuels from Oil Shale in Tasmania* and *Liquid Fuels from Oil-seed in Tasmania*, cover the use of local resources as possible sources of transport fuels.

A discussion paper on *Demand for Firewood for Domestic Use in Tasmania* complements an earlier report on *Energy from Wood in Tasmania*. These may be used to form the basis for

policies which will improve the reliability and cost stability of firewood supplies in the State.

A further discussion paper *Battery-Powered Electric Vehicles in Tasmania*, issued during 1989, has contributed to the discussion of electric-powered automobiles and commercial vehicles as complementary to oil/diesel-powered vehicles and/or as possible replacements in the future.

The HEC Energy Advisory Centre has conducted a Government Energy Management Program which has reduced electricity costs in State government buildings by about \$3.2 million annually (from the base year 1981-82).

The HEC has become involved in energy audits at large companies, including PasmincOEZ at Risdon, and in smaller businesses. The audit involves a survey of what power a firm uses, how it is used and how it could be used more efficiently.

An energy efficiency campaign, launched in April 1990 under joint Government-HEC sponsorship, proved very successful with consumers, from domestic users to major industrial clients of the HEC. At least one significant conservation measure was undertaken by 57 per cent of all Tasmanians, attributable in part to an effective television campaign.

The Commission continued to represent the State on a number of national bodies concerned with energy matters. These include the National Advisory Committee, the National Fuels Emergency Consultative Committee, and the National Oil Supplies Advisory Committee.

## 16.4 RESEARCH

**The Hydro-Electric Commission, together with research institutions such as the University of Tasmania, is involved in ongoing energy research programs. These programs have looked at ways of improving the efficiency of energy use in Tasmania as well as alternative sources of energy.**

HEC programs have investigated wave, wind and solar power as alternative energy options; evaluated industrial wood-fired energy systems; monitored the performance of domestic heat pumps and collected and analysed data on

distribution load patterns for transformer substations and on individual domestic residences.

Environmental problems experienced by customers may be solved, often simply and cheaply, by seeking advice from the HEC's experts. The output of 'greenhouse' gases is reduced considerably by the hydro-electric generation of electricity.

### Wave Power

Several years ago, following discussion and exchange of information with several organisations, the HEC received three proposals for the construction and operation of a wave power plant on King Island.

After some years' research and negotiations, arrangements were finalised with a Norwegian company, Norwave, to study the feasibility of the construction of a wave power plant on the island. If built, the plant will be a first for Australia and will supply a considerable part of the island's electrical energy requirements.

The proposed development would be similar to one built on the west coast of Norway. Wave energy is used to lift sea-water up a tapered concrete channel into a small reservoir. From here it is released through a hydro-electric power station back into the sea.

### Tidal Power

To harness the power of tides, large barriers need to be built across tidal estuaries and bays. Reversible flow turbines make use of incoming and out-going tides. An average of about eight megawatts could be obtained by harnessing the tidal power of the Tamar Estuary.

### Wind Energy

The performance of the operational privately-owned wind turbine now operating on Flinders Island is being monitored as part of the HEC's continuing wind power studies.

Problems associated with generating electricity from wind relate mainly to lack of control over when the wind blows. Electricity is not produced on still days. Large areas of land are needed for wind farms, and some people object to their appearance and the noise they make. Despite these problems, wind turbines are now cheaper than other ways of generating power in some remote areas.

### Data Loggers

These units, developed within the HEC to help measure customer load patterns, are also proving useful in other areas.

Gathered data is being used as a basis for simulating loads on distribution transformers. This will result in better use of feeder and transformer capacity. In 1990, 275 customers had data loggers installed at their premises to measure energy use under the different tariffs.

### Natural Gas Power Station

A new power station, using natural gas from the Yolla gas and oil field, is being considered for the North-West Coast. The Yolla field, discovered several years ago, is 90 kilometres north of Burnie. If built, the new station is likely to be sited near Burnie and cost more than \$150 million. The Yolla field is rich in light oils, enough to meet 40 per cent of the State's petroleum and 140 per cent of its LPG requirements.

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