

For Discussion
on 20 December 1999

Legislative Council Panel on Economic Services

Implementation of Demand Side Management

INTRODUCTION

This paper seeks Members' views on revised arrangements for implementation of the demand side management (DSM) programmes.

BACKGROUND

2. At the meeting of the Legislative Council Panel on Economic Services held on 24 May 1999, the Administration informed Members about the arrangements made to implement DSM programmes including their related costs and benefits. A copy of the paper issued to Members for that meeting is at the Appendix.

3. At the above meeting, some Members expressed concern in several areas of the proposed programmes, including their administrative costs, the payment of incentive earnings to the power companies as well as the need for the public to pay a DSM charge. We agreed to consider the views expressed and revert to Members on the DSM programmes before implementation. We have since consulted the two power companies and other relevant parties with a view to addressing Members' concern as far as practicable.

REVISED ARRANGEMENTS

Reduction of Administrative Costs

4. Having reviewed the administrative costs for the original DSM programmes, we decide to adopt a modified publicity package

which would result in some cost savings. Government is planning to produce new television and radio announcements of public interest (APIs) on energy efficiency and broadcast them at Government airtime to help promote the concept and benefits of DSM. This would enable the power companies to cut back some of their advertising costs. They expect that if the broadcasting of these new APIs could be timed with the launching of the DSM programmes, comparable audience coverage could be achieved to maintain the effectiveness of the original publicity plan. It is estimated that this could save about \$12 million for the three-year programmes.

Abolition of Incentive Earnings

5. In the light of Members' concern, we have urged the two power companies to consider foregoing the incentive earnings, totalling \$76 million for the two companies. After much discussion, the two power companies accepted this suggestion to show their goodwill and commitment to the project. However, both companies are firmly of the view that if they are not getting any return from the DSM programmes, it is only fair that they should not be penalized in shortfall in target savings.

6. To address possible concern about whether they would proceed in earnest with the DSM programmes without penalty arrangements, the power companies agree to review with the Government the performance of the DSM programmes against some interim target savings in generating capacity at the end of each programme year and to step up their efforts as necessary. On balance, we feel that this alternative arrangement could be considered having regard to the significant savings to customers through abolition of the incentive earnings.

Reduction in DSM Charge

7. We estimate that the two measures explained in paras. 4 to 6 above would be able to reduce the DSM charge by about 20%. For a typical household, the new DSM charge would be about \$27-\$63 over the three-year programmes, or around \$1 to \$2 per month.

8. The overall tariff impact of DSM charge is small in percentage terms - well below 2% over the three-year programme period. However, in the light of concern expressed by Members at the last meeting, we have also obtained the agreement of the power companies to waive the DSM charge for customers registered with the power companies for concessionary tariff. Customers aged 60 or above who live either alone or with other similarly qualified elderly, and who are relying on or entitled to Comprehensive Social Security Assistance (CSSA), are eligible. This should address Members' concern regarding the application of the DSM charge to non-participants particularly those elderly people receiving public assistance.

ALTERNATIVES CONSIDERED

Deferral of the Rebate Scheme for the Residential Sector

9. The Hong Kong & Kowloon Electrical Appliances Merchants Association Ltd. has expressed concern that launching of the rebate scheme for domestic appliances would make it difficult for its members to sell their stock of electrical appliances without energy labels. It is concerned that this would severely affect the trade. The Association has suggested that the rebate scheme should not be introduced and we should leave it to the trade to gradually put more energy efficient appliances on the market.

10. The Economic Services Bureau and the Electrical and Mechanical Services Department (EMSD) have had several meetings with the Association in the past few months. We explained to its representatives the rationale behind the DSM programmes and the various efforts of EMSD in assisting the trade in obtaining energy labels for their appliances. The Association has advised that while it supports the objective of promoting energy efficiency and environmental protection, its members would like to have more time to reduce the old stock. The Association has advised that the percentage of energy-labeled products among imported room coolers and refrigerators has been on the rise, as follows-

	Ratio of room coolers with energy label	Ratio of refrigerators with energy label
January 1999	9%	10%
June 1999	24%	16%
November 1999	33%	29%
Estimate for 2000	51%	47%

11. While the above figures illustrate that the percentage of energy-labeled products has been on the increase, they also show that a majority of newly imported products are still without energy label. We believe that introduction of a rebate scheme would likely help to transform the market at a quicker pace having regard to the significant increase in the availability of energy-efficient products since the announcement of the DSM programmes. We also believe that the introduction of the rebate scheme should have some positive impact on the trade as it would help to encourage customers to upgrade to energy efficient products. Moreover, since this is only an incentive scheme, the trade may continue to sell their stock of non-energy-labeled products in the market.

12. Notwithstanding the above, we have, in view of concern expressed about the rebate scheme for domestic appliances, explored with the two power companies an alternative option for implementing the DSM programmes whereby the rebate scheme for the residential sector would be deferred say for one year. The two power companies have indicated that they could strengthen their work on the non-residential customers in order to maintain the overall target generating capacity savings of 33MW as set out in the original DSM programmes. If this option is adopted, the electrical appliance traders should be urged to continue to increase the proportion of energy-efficient appliances in the market. The need for reviving the rebate scheme for the residential sector could be reviewed in one year's time in the light of the result of the voluntary efforts of traders and the effectiveness of the programmes for the non-residential sector.

13. The advantage of the alternative option is that while the DSM saving target would be maintained, the DSM charge on all residential customers would be removed and concern of the electrical appliance trade could be addressed to a great extent judging from our

discussion with them. In addition, this would enhance the overall cost effectiveness of the DSM programmes because under the original programmes, the residential sector accounts for some 25% of the programme costs but contributes to only about 15% of the generating capacity savings. In short, it would cost about twice as much to save one megawatt under the residential sector as compared to the non-residential sector. On the other hand, if this alternative option is adopted, the residential customers would not be able to enjoy the rebate in purchasing energy-efficient appliances until application of the scheme is extended to cover the residential sector. Moreover, the value of the DSM programmes in encouraging the public to be more conscious of energy efficiency and environmental protection through the rebate scheme would also diminish.

Legislation

14. We have explained in the paper at the Appendix that mandating through legislation the use of energy efficient appliances is not preferred because prohibiting the use of a particular type of electrical appliance would normally be done for safety reason. Since the meeting of the Panel held on 24 May 1999, we have discussed with the Planning, Environment and Lands Bureau (PELB) the possibility of legislating for mandatory labeling for energy efficiency of electrical appliances.

15. PELB advised that it had included a new initiative in its 1999 Policy Objectives to introduce statutory requirements on energy efficiency and conservation. It had obtained resources to conduct research and examine the matter in detail in the next financial year. The intention is to consult the community in 2001 on the proposed statutory requirements, which could cover a wider scope than just electrical appliances. The legislative work, if any, would then follow.

16. Given this time frame, there might be merits in proceeding with the proposed DSM programmes in the interim to encourage people to contribute to energy efficiency and environmental protection in the next few years. Such programmes may also help to provide an impetus to gradually transform the electrical appliances market in the run up to the implementation of any mandatory scheme.

WAY FORWARD

17. Members' views on the revised arrangements as set out in paras 4 to 8 above as well as on the alternative option set out in para. 12 are invited before we further consult the Energy Advisory Committee and decide on the best way forward. It is expected that after a decision is taken, it will take a few months to finalize detailed implementation arrangements with the power companies and make the necessary revision to their DSM Agreements and DSM Resource Plans. It is therefore unlikely that any revised DSM programmes could be implemented before May 2000.

Economic Services Bureau
December 1999

Legislative Council Panel on Economic Services

**IMPLEMENTATION OF
DEMAND SIDE MANAGEMENT**

INTRODUCTION

This paper informs Members about the arrangements made to implement demand side management (DSM) programmes, the related costs and benefits and the initial reaction of interested parties to the proposed programmes.

BACKGROUND

2. DSM is a means of encouraging people to contribute to energy efficiency and environmental protection through making more efficient use of electricity. If the community uses electricity more efficiently, the power companies will burn less coal and natural gas as fuel and be able in due course to defer or avoid installing additional generating capacity. In the long run, this will save money for consumers and help to minimise the emissions from power stations and their environmental impact. The long term DSM impact on capacity requirements is very roughly illustrated conceptually at *Annex A*.

3. In 1996, the Government initiated a consultancy study by the Burns and Roe Company to identify the demand side management (DSM) programmes and technologies and related tariff requirements most appropriate to the different electricity consumption sectors in Hong Kong and the DSM incentive arrangements most suited to those programmes and local circumstances. The consultants, after taking into account experience with DSM in the US and elsewhere, recommended a DSM Plan for Hong Kong that included -

- Arrangements (incentive earnings) to “compensate” the power companies for reducing electricity demand and consumption and ultimately the return on investment in generating capacity.
- A portfolio of cost-effective DSM programmes involving rebates to the consumer on presentation to the power company of proof of purchase of energy efficient appliances and equipment. All of the programmes are to be implemented in parallel so as to maximise participation and minimise cross-subsidisation among different groups of consumers.

- Arrangements for measurement and verification of DSM performance.
- A regulatory framework to support the above arrangements.

4. As regards the impact on consumers, the consultants advised that DSM would put *upward* pressure on tariffs in the short term, because DSM programme costs always precede energy savings, and *downward* pressure on tariffs in the longer term as the programmes gathered momentum and substantial savings materialised. The consultants proposed that the companies should not be allowed to increase tariffs by more than 2% above what they would have been without DSM and that DSM programme costs and incentive earnings should be recovered through a DSM account debit on consumers' bills.

5. In September 1996, the Energy Advisory Committee advised that the consultants' recommendations could be accepted as a basis for the Government to enter into negotiations with the power companies. The Government subsequently concluded formal DSM Agreements with Hongkong Electric (HEC) on 5 November 1997 and CLP Power (CLP) on 7 February 1998. The Government has since approved detailed DSM programme proposals submitted by the companies for the next three years. Abridged versions of the approved "DSM Resource Plans" will be published nearer the time that the programmes are launched.

IMPLEMENTATION OF DSM

6. The DSM programmes will be implemented by the power companies, who will offer, simultaneously, rebates to all residential customers who buy energy efficient lighting, refrigerators and room coolers and to non-residential customers who buy energy efficient lighting or energy efficient air-conditioning equipment. The programmes will also include a time-of-use tariff for non-residential customers and general education and informational programmes on DSM.

Programmes to be offered

Residential sector

7. The power companies will write to all of their residential customers offering them rebates for the purchase of energy efficient compact fluorescent lamps (CFLs), refrigerators and room coolers. The companies will explain that -

- Only lighting, refrigerators and room coolers that have obtained an "Energy Label" under the Government's "Energy Efficiency

Labelling Scheme” for household appliances will be eligible for rebates.

- All energy-labelled CFLs will be eligible for a rebate, as will refrigerators and room coolers with the “Energy Label” of Grade 1 (the highest grade of energy efficiency) and Grade 2.
- Each customer can purchase a maximum of two CFLs from any shop(s) at the retail price at any time within the 3 years from the date of the launch of the DSM programmes and then claim the rebate by sending copies of his electricity bill and the purchase receipt, together with the original flap of the CFL packaging, to the power company concerned at a special PO Box number.
- Each customer can also purchase a maximum of one refrigerator and two room coolers from any shop(s) at the retail price at any time in the same 3 year period and then claim the rebate by sending copies of his electricity bill, the purchase receipt and the appliance’s warranty card, together with the original delivery note, to the power company concerned at a special PO Box number.
- A customer who purchases after the programme launch date a particular model of bulb, refrigerator or room cooler which has not been awarded an energy label, but which subsequently is awarded one in the next three years, may then claim the rebate in the normal way (the customer should therefore keep the relevant receipt, packaging and warranty card).
- Rebates will take the form of a credit item shown on the concerned customer’s electricity bill.
- Rebates towards the purchase of the energy efficient appliances as specified in the programmes are available upon the conditions that the documents submitted for rebate applications are confirmed by the applicant to be true and correct and the applicant, if invited, agrees to participate in a subsequent consumption survey to be carried out by the relevant power company’s personnel or authorised agents.

8. The power companies will offer the same rebates to developers who install energy efficient lighting, refrigerators and room coolers in new residential buildings. Developers will be invited to apply to the power companies for approval on a project basis and will need to submit proof of purchase, Occupancy Permit and Certificate of Compliance/Practical Completion to the power companies on project completion.

9. The power companies' proposed rates of rebate for respective residential programmes are identical, and are as follows:

Household Appliance	Rebate per unit
CFL	\$20
Energy efficient refrigerator	\$300 for Grade 1
	\$150 for Grade 2
Energy efficient room cooler	\$200 for Grade 1
	\$100 for Grade 2

Non-residential sector

10. The power companies will write to all of their non-residential customers inviting them to apply to join the DSM programmes. After initial assessment of the cost-effectiveness of the application, the power company concerned may arrange pre-installation audit to verify the quantity of eligible energy efficient equipment to be purchased and the corresponding rebate.

11. If the pre-installation audit confirms that the project will be cost-effective, the power company will approve the application and the customer can proceed with purchase and installation of the energy efficient equipment required. After installation, the power company will inspect whether the agreed quantities and makes of the energy efficient equipment have been installed, before paying the agreed amount of rebate.

12. The power companies' proposed rates of rebate for non-residential lighting programmes are identical, and are as follows -

DSM Measures	Rebate per unit
CFL (New)	\$20
CFL (Retrofit)	\$30
EE Fluorescent Tube (New)	\$2
EE Fluorescent Tube (Retrofit)	\$7
Electronic Ballasts (New)	\$50
Electronic Ballasts (Retrofit)	\$100

13. For heating, ventilation and air-conditioning (HVAC) rebate programmes, both power companies will offer rebates to customers for purchasing energy efficient HVAC equipment/installations on a project-by-project basis taking into consideration the cost-effectiveness of the individual project.

14. No DSM programme will be implemented unless it is assessed in advance to be cost-effective (i.e. the savings in capital investment on generating units and the related operating costs should exceed the costs for implementing DSM

programmes). The initial 3-year period of DSM is estimated to achieve target total savings of generating capacity of 33MW by the two power companies. Arrangements have been agreed with the power companies for verification and auditing of the actual savings.

Incentive for the power companies

15. As the power companies are in business to sell electricity and earn a return on their investment in assets such as generators, it is reasonable that they should not be worse off because they have been asked to make serious efforts to encourage their customers to save electricity. The DSM Agreements between the Government and the power companies, while obliging the companies to pursue DSM, also enable them to earn a return comparable to the return that they would have earned if, instead, they had added generating capacity and transmission and distribution facilities. This return is referred to as “incentive earnings”.

16. The companies will not be able to earn the full incentive earnings and recover the full programme costs from the DSM scheme unless they achieve a minimum level of performance. The programmes must be cost-effective and achieve more than 50% of the planned target.

COSTS AND BENEFITS FOR THE CONSUMER

Costs for the consumer

17. Implementing DSM programmes will entail costs, including the rebates, the promotional expenses and DSM incentive earnings for the power companies. Accordingly, these costs and the incentive earnings will be recovered from all consumers as a monthly or bimonthly DSM charge, separately identified on electricity bills, starting in January 2000.

18. The DSM programmes will also reduce the volume of sales of electricity and thereby lower tariff revenue. As such revenue is needed to meet the cost of supplying electricity, it will be made up in future tariff adjustments.

19. The overall tariff impact of implementation of DSM is expected to be well below the maximum of 2% proposed by the consultants (paragraph 4 above).

Benefits for the consumer

20. Consumers will benefit immediately from DSM as follows -

- Through the rebate programmes, they will be able to achieve savings in purchase of energy efficient lighting, refrigerators, room coolers and HVAC equipment/installations.
- Participants' own electricity bills will be lowered, as energy efficient lights, appliances and equipment cost less to run.

21. Consumers will benefit further from DSM in the longer term. Electricity savings accumulated through DSM will in due course enable the power companies to defer or avoid installing new generating capacity. For any new plant that is avoided, there will be no capital or operating costs to pass on to the consumer and no impact on the environment. DSM will thus save money for all consumers, including those who may not have participated in the DSM programmes, and benefit the environment for the whole community.

22. To illustrate the main costs and benefits to consumers, a rough and ready estimates assessing particular scenarios is at *Annex B*.

AVAILABILITY OF ENERGY-LABELLED PRODUCTS

23. There are currently 8 brands and 133 models of CFL, 6 brands and 26 models of refrigerator and 14 brands and 91 models of room cooler for which energy labels have been issued. Applications for energy labels for a further 10 brands and 316 models of CFL, 7 brands and 29 models of refrigerator and 4 brands and 23 models of room cooler are being processed by the Electrical and Mechanical Services Department (EMSD). Consumers will therefore have a wide range of energy efficient brands and models to choose from when DSM is launched. Information on the energy-labelled models will be posted on EMSD's internet homepage.

CONCERNS EXPRESSED

Concerns expressed by the trade

24. The power companies and EMSD have maintained close contact with the electrical appliance suppliers and traders over the implementation of the DSM rebate programmes for many months. The trade is aware of the forthcoming launch of DSM and the need to position itself for it, in terms of stocking sufficient energy-labelled CFLs, refrigerators and room coolers to meet market demand. The trade has nonetheless expressed concern that, once the DSM scheme is launched, it may not be able to sell products already in stock that are less energy-efficient than those

which qualify for an energy label. We wish to address this concern to the extent possible. We have therefore -

- (a) deferred the launch of the DSM scheme by several months to allow more time for existing stock to be sold; and
- (b) agreed with the power companies that, in respect of models of CFL, refrigerator or room cooler which do not bear an energy label at the time of purchase after the start of the DSM scheme but are subsequently awarded one in the three years following the launch date, retrospective claim of the relevant rebate will be allowed.

Concerns raised by the Consumer Council

25. The Consumer Council has raised the following concerns -

- (a) whether it is worthwhile to pursue DSM as opposed to mandating through legislation the use of energy efficient appliances;
- (b) whether the cost of administering the DSM programmes should be borne by consumers; and
- (c) whether there might be an inflationary effect on retail prices for eligible appliances.

26. As regards (a), the use of a certain type of electrical appliance would normally only be prohibited for safety reasons. The Government's existing policy towards promoting energy efficiency and conservation is to proceed through negotiation and mutual agreement with energy suppliers or through the issue of voluntary codes of practice on the efficient use of energy in buildings and through public education and publicity.

27. As regards (b), it is considered reasonable for the costs of implementing DSM to be borne by all consumers, including those who do not participate in the DSM programmes, as these programmes will benefit every consumer in the long run through tariff savings and environmental improvements.

28. As regards (c), the large number of brands and models of energy-labelled energy efficient CFLs, refrigerators and room coolers in the market will ensure that consumers will have an adequate choice of energy efficient appliances and that market forces will ensure that there is adequate competition and that prices remain stable.

Other concerns expressed

29. Other parties have asked -

- (a) whether consumers who may not be able to afford rebated energy efficient appliances should have to bear part of the programme costs; and
- (b) whether DSM will result in extra profits for the power companies compared with supply-side investment.

30. As regards (a), the reasoning in paragraph 27 applies equally here. Every consumer will benefit from DSM in the long run through tariff savings and environmental improvements.

31. As regards (b), as explained in paragraph 15 above, the DSM Agreements only enable the power companies to earn a return comparable to the return that they would have earned if they had added the equivalent generating capacity instead of promoting energy savings.

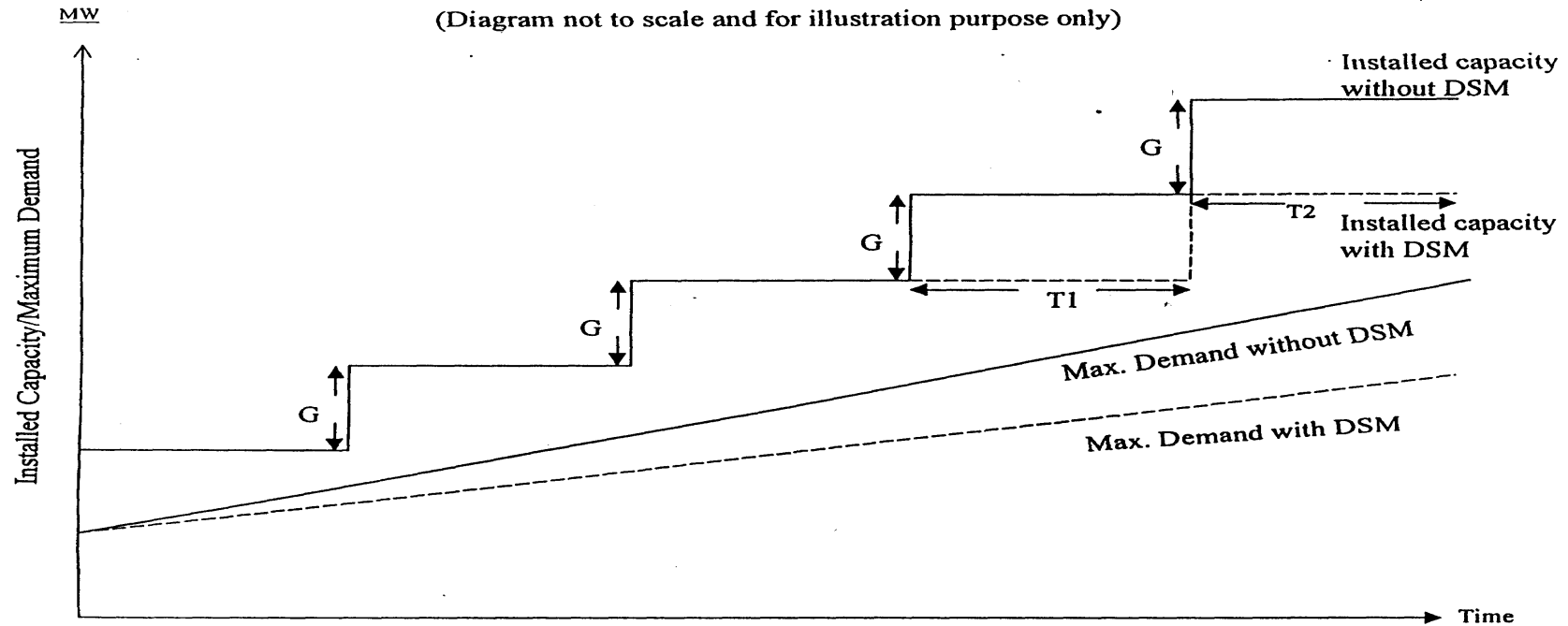
DSM LAUNCH DATE

32. From an energy efficiency and conservation perspective, we wish to launch the DSM programmes as soon as possible. The power companies are making detailed plans to launch their DSM programmes, in close consultation with the Economic Services Bureau and the Electrical and Mechanical Services Department. The launch date will be set once all the arrangements are in place. The power companies will start their DSM programmes immediately thereafter, together with publicity and educational programmes.

Economic Services Bureau
May 1999

Illustration of Long Term DSM Impact on Capacity Requirement on a Conceptual Basis

(Diagram not to scale and for illustration purpose only)



Legend : G represents the capacity of an additional generator.

T1 + T2 +... represents the time the additional generator could be avoided with DSM.

DSM Programmes: Cost-benefit analysis for illustration purpose

	Participant	Non-Participant
Potential Benefits under the 3 year programme		
Rebate* (note I.A)	Max. \$740	-
Estimated annual savings in electricity charges* (note I.B)	2 CFL: around \$160/year 1 Refrigerator: around \$240/year 2 Room-Coolers: around \$300/year	-
Costs under the 3 year programme		
Estimated average annual DSM charge for a typical household mention in Note I.B* (note II.A & II.B)	Around \$35 to around \$80	
Estimated participant cost/(savings) per measure* (note II.C)	CFL: \$6 to \$25 Refrigerator (\$120) to \$300 Room-Coolers \$0 to (\$50)	-
Long Term Benefits		
Estimated notional savings in capital investment (note I.C)	around \$360M	
Estimated notional savings in operating costs (note I.D)	around \$240M	
Estimated environmental benefits (note I.E)	Around 4% reduction in emissions of CO ₂ , SO ₂ , NO _x & particulates	

* The benefits and costs relate only to residential programmes.

Explanatory Notes

I. Benefits

A. Rebate (on energy efficient appliances and equipment)

- (i) Maximum amount of rebates to a residential consumer is \$740 over the first 3-year DSM Programmes Period.
- (ii) The amount of rebates to the non-residential consumers will depend on the agreed project.

B. Savings in electricity charges

Indicative reductions in electricity charges achievable by using energy efficient appliances for a typical domestic household with average monthly energy consumption of 301-700 kWh and tariff charge of \$250 - \$630 is as follows :-

		2 CFL (11 Watt)	1 Refrigerator (220 litres, Grade 1)	2 Room Cooler (0.75 hp, Grade 1)
1	Average demand saving (Watt)	49× 2=98	30	140× 2=280
2	Operating hours	5/day	24/day	1200/year
3	Annual energy saving per measure (kWh/year)	89× 2	263	167× 2=344
4	Annual saving in electricity bill per measure (\$/year)	160	236	300
5	Monthly saving in electricity bill per measure (\$/month)	13	20	60 (during the 5 summer months)

(Note : All figures in the table are estimation only.)

C. Savings in capital investment

Energy and capacity savings from the DSM programmes can avoid capital investment in new generating plant and transmission and distribution facilities in the long term, and thereby the permitted return thereon that can be earned by the power companies under the Scheme of Control Agreements. The estimated total nominal value capital investment to be avoided by the implementation of the power companies' current DSM Resource Plans is around \$360M.

D. Savings in operating costs

Implementation of DSM programmes also saves the operating costs (i.e. fuel cost and operation and maintenance cost) associated with the avoided generating plant and transmission and distribution facilities. The estimated total nominal value of operating cost to be avoided by the implementation of the power companies' current DSM Resource Plans is around 240M.

E. Environmental benefits

The savings in electricity will reduce the amount of fuel used for power generation, thereby reducing gaseous and particulate emissions from local power stations. This will contribute to efforts to limit production of greenhouse gases and improve air quality. Over the 3-year DSM period, it is estimated by the Environmental Protection Department that there would be a total reduction of about 4% in emissions as follows :

Reduction in emissions (tonnes)

	<u>Total</u>
CO ₂	813,000
SO ₂	2,300
No _x	2,410
Particulates	194

II. Costs to Consumers

A. DSM programme costs

The programme costs for implementing the power companies' DSM programmes include rebate, advertising cost, administrative cost, measurement and verification (M&V) costs and other expenses. The total estimated programme costs of the two power companies are summarized as follows:

Rebate (\$M)	Admin. and Advert. (\$M)	M&V and Others (\$M)	<u>Total Programme Costs</u>
			Nominal value (\$M)
158	123	20	301

B. DSM incentive earnings

The estimated DSM incentive earnings, inclusive of tax, based on the avoided capital investment arising from all installed energy efficient lighting and appliances over their lifetime is \$76M.

C. Participant Cost

Participants in the DSM programmes would need to bear the difference in cost between the purchase price of the energy efficient and the non-energy efficient lighting or appliance concerned and the relevant rebate. This difference is referred to as participant cost. It may be a saving or a cost to the residential participants depending on the measure concerned. The total nominal participation costs estimated by the power companies' DSM Resource Plans are around \$54M.