Effectiveness of electricity retailers' strategies for reducing greenhouse gas emissions

Performance Audit Report 1999–2000

February 2002

NSW EPA

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Executive summary

The *Electricity Supply Act 1995* (the Act) requires the NSW Environment Protection Authority (EPA) to audit the effectiveness of electricity retailers' strategies for reducing greenhouse gas (GHG) emissions at intervals of no more than three years. This performance audit report covers the findings of the first EPA audit covering the 1999–2000 financial year. The EPA audit covers 16 retailers holding a NSW Retail Supplier's Licence, and who have negotiated GHG emission reduction strategies with the Minister for Energy. Such retailers cover 85% of the electricity supplied in NSW.

Under the Act, retail suppliers of electricity are required to develop and negotiate with the Minister for Energy GHG emission reduction strategies setting out the measures proposed to reduce GHG emissions. Measures to reduce emissions fall into two broad categories: those that promote cleaner power generation ('supply-side' measures) and those that reduce power consumption ('demand-side' measures). A third category, 'GHG emission credits' for carbon sequestration, will come into effect in 2000–01 following an amendment to the Act.

Retailers were required to implement these measures to reduce emissions associated with the electricity they supply, in line with emission benchmarks to reduce GHG emissions to 5% below the 1989–90 per capita level by 2000–01.

The objective of the EPA performance audit is to determine the effectiveness of the GHG emission reduction strategy measures implemented by the electricity retailers on the basis of information provided by the retailers in their greenhouse reports and by independent verification reports (IVRs) supporting the emissions savings estimates.

On the basis of an examination of IVRs the EPA has produced audit opinions on the sufficiency and appropriateness of the data contained in the IVRs.

Adequacy of information

The EPA is of the opinion that four retailers' supplied information of sufficient quality to provide the EPA with reasonable assurance that the GHG emission data reported was reliable and accurate.

The sufficiency of information of the rest of the retailers varied considerably between IVRs and was generally considered inadequate. Particular issues existed in regard to:

- the definition by the independent verifiers of the grading methodologies applied. It was not always clear what criteria were being applied by the independent verifiers to retailer data
- poor documentation in the IVR of the documentary evidence referred to during preparation of the IVR
- a low level of independent verification of claims for Electricity Sales Forgone (ESF).

Audit results

On the basis of an assessment of the extent of implementation of each strategy, audit opinions are expressed in this report on the effectiveness of the individual measures and the overall strategy.

All electricity retailers operating in NSW purchase most of their electricity from coal-fired power stations. In 1999–2000, approximately 4% of their purchases were from categories of low-emission generation ('supply-side' measures), including wind, hydro, biomass/biogas, solar, large cogeneration, coal seam methane, and other generation purchased and 'assigned' to the retailer.

Supply-side strategy measures implemented by Citipower, Origin Energy Electricity Ltd, Advance Energy, Integral Energy and Powercor Australia Ltd have achieved a high level of effectiveness (> 70% of forecast) in reducing GHG emissions against forecast. AGL Electricity Ltd and United Energy Ltd have achieved a medium level of effectiveness (35%–70%). The rest have achieved a low level of effectiveness (< 35%).

Overall, the EPA is of the opinion that hydro and coal seam methane generation measures implemented by retailers achieved a high level of effectiveness (> 70% of forecast GHG emission reductions), and that wind generation, biomass/biogas generation and other measures implemented by retailers achieved a medium level of effectiveness (35%–70% of forecast GHG emission reductions) in 1999–2000. Retailers who implemented solar and large cogeneration measures achieved less than 35% of forecast GHG emission reductions.

The implementation of strategies based on the purchase of electricity from low-emission generation sources in 1999–2000 saw electricity retailers in NSW achieving an overall reduction in GHG emissions of 3217 kilotonnes of carbon dioxide equivalent (CO_2-e), which is 58% of the reductions forecast in their strategies and achieving a **medium level of effectiveness** (35 – 70% of forecast).

In 1999–2000, demand-side strategies based on ESF claims represent approximately 0.4% of total notional 'sales' in NSW. ESF claims are made by improving end-use energy efficiency through activities such as customer-based energy audits, high-efficiency street lighting, internal energy efficiency and general promotion of energy efficiency.

In 1999–2000, electricity retailers in NSW achieved an overall ESF GHG emission reduction of 174 kilotonnes of CO_2-e, which is only 32% of forecast. Thirty-nine per cent of the claims for ESF have been made through use of the NSW Sustainable Energy Development Authority's (SEDA) deeming clause, which allow retailers to claim ESF on the basis of historical expenditure on generic activities related to end-use energy efficiency.

Demand-side strategy measures implemented by Advance Energy, Yallourn Energy Pty Ltd, Origin Energy Electricity Ltd and Australian Inland Energy have achieved a high level of effectiveness (> 70%) in reducing GHG emissions against forecasts. AGL Electricity Ltd and Integral Energy have achieved a medium level of effectiveness (35%–70%). The rest have achieved a low level of effectiveness (< 35% of forecast GHG emission reductions attributable to demand-side management measures).

Overall, the EPA is of the opinion that NSW electricity retailers' demand-side strategies for reducing GHG emissions achieved a **low level of effectiveness** (< 35% of forecast) in 1999–2000.

The EPA also is of the opinion that the NSW electricity retailers' combined supply-side and demand-side strategies achieved a **medium level of effectiveness** in reducing GHG emissions during 1999–2000, having achieved a total emission reduction of 56% against forecast.

For the 1999–2000 period only two retailers (Integral Energy and Origin Energy Electricity Ltd) performance was better than the benchmark having reduced GHG emission levels below their benchmarks; the GHG emission levels of eight retailers (Advance Energy, AGL Electricity Ltd, Australian Inland Energy, Citipower Pty Ltd, EnergyAustralia, Ferrier Hodgson Electricity Pty Ltd, United Energy Ltd, and TXU Electricity Ltd) exceeded their benchmarks by up to 10%; and the GHG emission levels of six retailers (ACTEW Retail Ltd, Ergon Energy, Great Southern Energy, Northpower, Powercorp Australia Ltd and Yallourn Energy Pty Ltd) exceeded their benchmarks by up to 15%.

Future actions

The Government has released a position paper about setting compulsory benchmarks for greenhouse gas emission reductions for the electricity industry. This process is part of the Government's comprehensive strategy to reduce GHG emissions that are designed to ensure future compliance. Key aspects of the strategy include the following:

- Establishment of the Sustainable Energy Development Authority (SEDA) which has initiated:
  - Cogeneration Development Program
  - Building Greenhouse Rating Scheme
  - Energy Smart Business
  - Energy Smart Government
  - Renewables Investment Program
  - Green Power Accreditation Program
- Government Energy Management Policy
- Other initiatives under the *Electricity Supply Act 1995*

- Initiatives under the *Gas Supply Act 1996*
- Introduction of the *Carbon Rights Legislation Amendments Act 1998*.

1 Introduction

The production and supply of energy accounts for over half of Australia's greenhouse gas (GHG) emissions (AGO 2000). Therefore, the reduction of GHG emissions is one of the critical challenges facing the energy sector today. As part of the NSW Government's contribution to reducing GHG emissions, NSW electricity retailers are required to develop strategies that enable them to reduce their GHG emissions to a benchmark emission target. This performance audit examines the effectiveness of those strategies.

The electricity industry in Australia has undergone substantial restructuring since 1991. The reform has centred on the development of a national electricity market with multiple competing players at the generation and retail levels. The market spans a loosely interconnected transmission network stretching across much of Queensland, NSW, the Australian Capital Territory, Victoria and South Australia. Market participants include both publicly and privately owned retailing and generation companies.

The *Electricity Supply Act 1995* (the Act) was seen as the key instrument in implementing electricity industry reforms within NSW. A key objective of the NSW reforms is to improve the environmental outcomes for the electricity industry through reduced levels of principal GHG emissions and increased utilisation of environmentally superior generating technologies and energy efficiency in consumption.[1]

The Act imposes a number of licence conditions with respect to GHG emissions upon electricity retailers conducting business in NSW. Licence conditions under the Act require electricity retailers to develop (and then implement) strategies to reduce GHG emissions associated with their sales of electricity. Retailers must develop 1-, 3- and 5-year plans for energy efficiency and demand management, as well as strategies for purchasing electricity from renewable sources. They are required to report information on electricity purchases, GHG emissions and implementation of demand management. The NSW Government also set a policy target of reducing GHG emissions arising from the supply of electricity to NSW customers by 5% per capita by 2000–01 (based on 1989–90 levels).

[1] Section 3.2.1, *Electricity Distributors' and Retail Suppliers' Licence Guidelines and Requirements Policy*, NSW Department of Energy, last revised 15 May 1997.

The Act requires the NSW Environment Protection Authority (EPA) to conduct an audit ('the EPA audit') of the effectiveness of the electricity retailers' GHG emission reduction strategies at intervals not exceeding three years (see Appendix 4 for details).

The EPA audit is restricted to those retailers holding a NSW Retail Supplier's Licence, and who have negotiated GHG emission reduction strategies with the Minister for Energy. The EPA audit does not cover electricity generators.

This report contains the findings of the EPA's first audit of NSW electricity retailers as required under Section 6 (4) (b) the Act.[2] Sixteen electricity retailers have produced licence compliance reports for 1999–2000. These reports contained standalone greenhouse gas reports, copies of which were provided to the EPA by the Ministry of Energy and Utilities (MEU) to undertake the audit. A number of additional retailers have not reported, and hence are not covered in this audit. The audit covers the 1999–2000 financial year only, but where historical data is available, performance is compared with previous years.

Outline of the legislative requirement

Under the Act, retail suppliers of electricity are required to develop GHG emission reduction strategies in accordance with licence conditions imposed by the Minister for Energy. Requirements relating to GHG emission reductions are set out in Schedule 2 of the Act, the licence conditions applying to retailers and the *Further Environmental Guidelines and Requirements* (1997).[3] Retailer strategies are required to set out the measures proposed in order to satisfy the licence conditions (e.g. programs to implement energy efficiency, renewables, and low-emission sources), to include independently verified emission savings estimates and to be negotiated with the Minister for Energy.

Retailers are required to reduce emissions associated with the electricity they supply in line with emission benchmarks set out in the *Further Environmental Guidelines and Requirements*. The sector-wide benchmark is a reduction of GHG emissions to 5% below the 1989–90 per capita level by 2000–01. Interpolated benchmarks for years preceding 2000–01 are also set out. The sector-wide benchmarks are apportioned among retail suppliers in proportion to their market share (calculated by reference to both actual electricity sales and electricity sales forgone [ESF] through demand-side measures).

Retailers are required to submit annual reports to the Independent Pricing and Regulatory Tribunal (IPART) (formerly the Licence Compliance Advisory Board [LCAB]) by 31 August each year, detailing (inter alia) the implementation of their strategies and the GHG emissions arising from the production of electricity supplied. Methodologies have been developed to help retailers report the emissions arising from the electricity they supply, and for the emission savings resulting from demand-side measures. These are the (revised) *Emissions Workbook* (February 1999) and the *Framework for Calculation of Electricity Sales Forgone* (February 1999).[4] Independent verification is required for both the emission estimates used in the retailer strategies and the emission levels

[2] Of the 16 retailers reporting in the 1999–2000 period, 6 are owned by the NSW Government and the rest are either private corporations or owned by other jurisdictions.

[3] NSW Department of Energy, 1997. Available at http://www.doe.nsw.gov.au/.

[4] Available at http://www.doe.nsw.gov.au/

reported in annual licence compliance reports. Upon receiving the retailers' annual reports, IPART is required to report annually to the Minister for Energy on the extent to which retailers have complied or failed to comply with their licence conditions. The Minister must table the report in Parliament. The first such report was tabled in Parliament in March 2001.

A separate role is allocated to the EPA (see *Electricity Supply Act 1995*, Schedule 2, clauses 6 (4) (b) and 6 (7)). The EPA is required to audit, at intervals of no more than three years, the effectiveness of electricity retailers' GHG emission reduction strategies (Schedule 2, clause 6 (4) (b)). A report on each audit prepared by the EPA must be sent to IPART, tabled in both houses of Parliament and made publicly available at EPA offices.

The GHG emission benchmarks

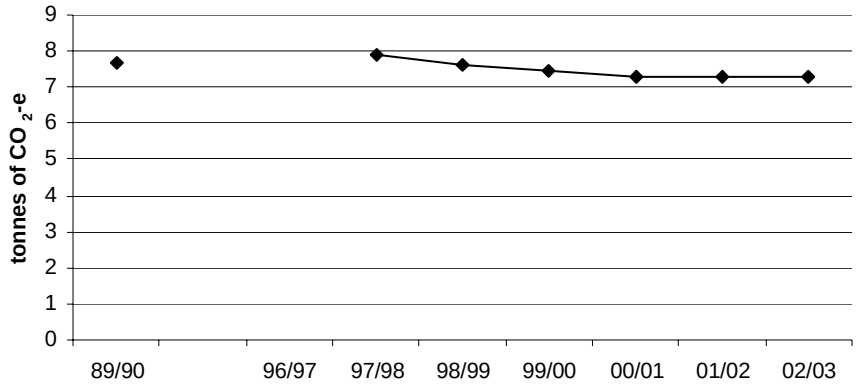
The document *Further Environmental Guidelines and Requirements*, released by the NSW Department of Energy (now the MEU) in 1997 outlines the 'guideline emission benchmark' for NSW electricity retailers.

In summary, the GHG emissions benchmark for the NSW electricity sector 'is a reduction in the emission of the principal greenhouse gases (carbon dioxide, methane and nitrous oxide) to 5% below the 1989–90 per capita level (NSW) by the year 2000–2001. For the purposes of these guidelines, the NSW electricity sector covers both sales to retail suppliers and sales to wholesale customers who are not also retail suppliers'.[5]

The 2000–01 benchmark for the NSW electricity sector has been set at 7.27 tonnes of CO_2-equivalent (t CO_2-e) per capita. Interim benchmarks have been established by interpolation at 7.62 tonnes of CO_2-e per capita for 1998–99 and 7.44 for 1999–2000. For the purposes of the five-year plans the benchmark will remain constant for the two years after 2000–01 (in accordance with Section 3 of the *Further Environmental Guidelines and Requirements*). The benchmarks beyond this date will be subject to review.

The projected variation in the per capita emission benchmarks (targets) is shown in Figure 1.1.

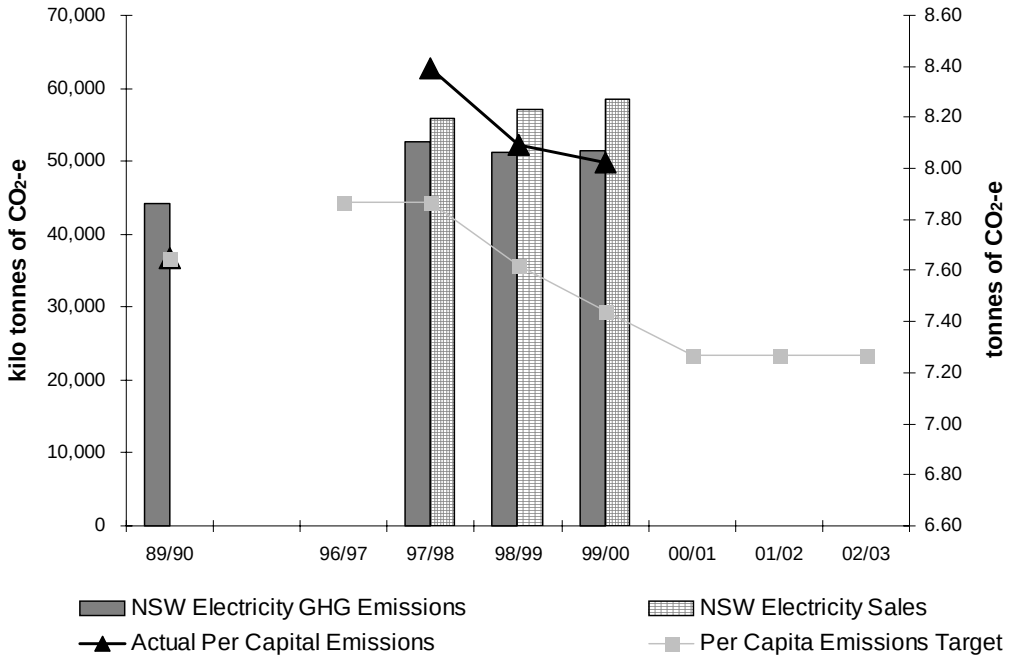
Figure 1.1 Per capita emissions target



[5] *Further Environmental Guidelines and Requirements*, NSW Department of Energy, 1997. Available at http://www.doe.nsw.gov.au/.

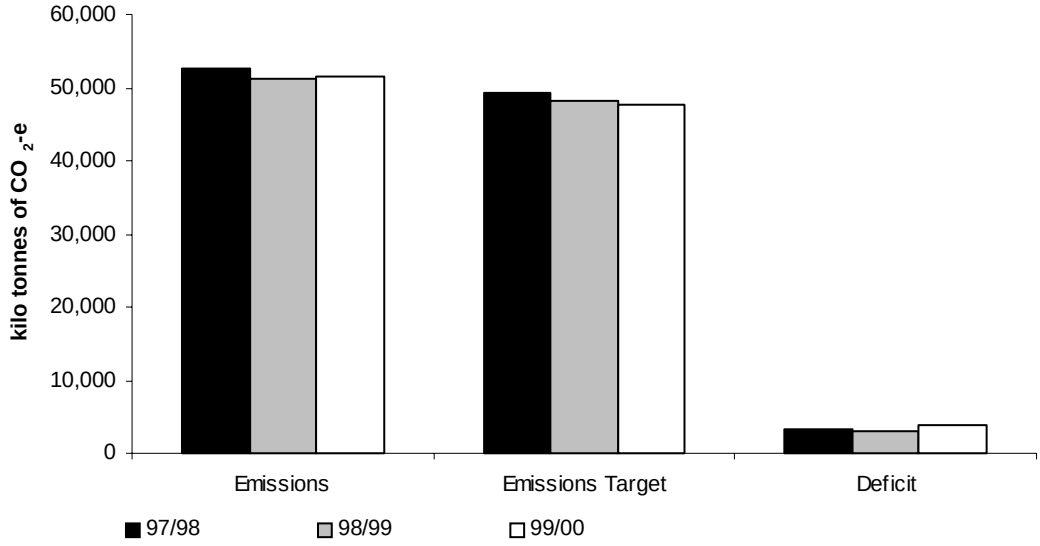
Using data provided in the IPART *Licence Compliance Report 1999–2000* and previous Licence Compliance Advisory Board reports, Figure 1.2 shows the electricity sales in NSW (the sum of sales by retailers and direct sales), the associated GHG emissions and benchmark targets.

Figure 1.2 NSW electricity sales, emissions, and per-capita emissions and target



Accounting for population changes, Figure 1.3 shows the actual NSW electricity GHG emissions, emission targets and the difference between the two (deficit).

Figure 1.3 Actual and target emissions



2 Audit approach

Audit methodology

An audit methodology was developed by the EPA as a guide for undertaking the performance audit of electricity retailers' GHG reduction strategies. The audit methodology sets out the objectives, scope, audit criteria, timetable and audit approach. To ensure transparency of the audit process, the draft audit methodology was mailed out in March 2000 to approximately 100 organisations, including those in the electricity and energy sectors and environmental groups. The audit methodology was revised in response to comments received from 28 stakeholders including electricity retailers.

The EPA audit methodology was prepared in accordance with and conforms to existing auditing standards, the requirements of the *Electricity Supply Act 1995*, relevant subordinate licence conditions and ministerial guidelines. An independent opinion on the audit methodology given by Ernst & Young (June 2001) states: 'In our opinion, the EPA's Methodology for Auditing the Effectiveness of Electricity Retailers' Greenhouse Gas Emission Reduction Strategies dated May 2001, is reasonable and appropriate in accordance with applicable Auditing standards and the requirements of the *Electricity Supply Act 1995*, and relevant subordinate licence conditions and ministerial guidelines in force at May 2001.'

Although the requirement for retailers to prepare GHG emission reduction strategies entered legislation in December 1995, the guidelines and procedures for this were not finalised until early 1997. Taking 1997 as the effective start date, and given the requirement for the EPA to audit at 'no more than three years', the first audit was scheduled to be done after the 1999–2000 reporting period. The EPA began the audit process by conducting preliminary audits for the 1998–99 reporting period. These preliminary audits were used to test the audit process and to uncover any immediate issues with data provision. Feedback from this process was provided to all NSW electricity retailers in an EPA letter distributed by the MEU, so that reporting could be improved for the 1999–2000 reporting period.

Scope of the EPA performance audit

The audit was limited to a review of NSW electricity retailers who:

- hold a NSW Retail Supplier's Licence, and
- have negotiated GHG emission reduction strategies with the Minister for Energy, and
- covered the 1999–2000 reporting period.

During 1999–2000, 16 NSW retailers both held Retail Supplier's Licences and had negotiated GHG emission reduction strategies with the Minister for Energy.

The objectives of the audit are:

- to determine the sufficiency and appropriateness of the evidence cited in the retailers' IVRs to support the EPA's conclusions, and
- to determine the effectiveness of the strategy measures implemented by the retailers.

The GHG emission reduction strategy measures that were examined by the EPA audit fall into two specific categories. The first category relates to supply-side measures, where electricity is obtained from low-emission sources, including:

- hydro
- landfill gas
- biomass
- wind
- solar
- coal seam methane
- cogeneration.

The second category relates to actions for reducing electricity sales that give rise to a claim for ESF. The allowable actions are:

- energy efficiency
- cogeneration at customer site
- fuel substitution
- off-grid, remote-area power supply

A third category relates to GHG emission 'credits' for carbon sequestration (for example from forestry), which is beyond the scope of this audit.

How is a performance audit conducted?

The EPA audit of the GHG emission reduction strategies is a an environmental performance audit based on the principles espoused in 'AS/NZS ISO 14010: 1996—Guidelines for Environmental Auditing—General Principles' and auditing standards 'AUS 806—Performance Auditing', 'AUS 808—Planning Performance Audits' and 'AUS 606—Using the Work of an Expert'.

The audit is a two-stage process. The first stage consists of collecting and examining the retailers' GHG emission reduction strategies, 1-, 3- and 5-year plans, IVRs and greenhouse reports (a standalone attachment to a retailer's licence condition compliance annual report). The EPA's level of assurance on the reliability and accuracy of retailers' GHG emission data and sales forgone data is determined by a desktop examination of the IVR that should accompany each retailer's greenhouse report. The EPA assesses the sufficiency and appropriateness of the expert audit evidence contained in the IVRs. Any reporting deficiencies or anomalies identified during the EPA's examination of the retailers' greenhouse reports and IVRs are reported to MEU or IPART and through them to the retailers to provide the required data.

During the second stage of the audit, the EPA assesses the effectiveness of the individual strategies (both supply and demand side) of each retailer, and the aggregate of each retailer's strategies in achieving the apportioned 'guideline emission benchmark' for that retailer.

For a full description of the stages of the audit process, see 'How and What Does the EPA Audit?' in Appendix 1.

Limitations

In undertaking the performance audit the EPA was faced with a number of significant limitations. These limitations can be broadly classed into two major groups. The first relates to the adequacy of the data available to the EPA to undertake the audit in relation to:

- direct electricity sales
- performance summary table
- independent verification reports
- GHG emission reduction strategies
- 1-, 3- and 5-year plans and revisions.

The second group relates to some grey areas in the existing guidelines on how electricity retailers could make claims in relation to:

- electricity sales forgone, including the use of the NSW Sustainable Energy Development Authority's (SEDA) deeming formula
- Energy Smart Business
- Greenpower assigned generation and other schemes
- the status of 1-, 3- and 5-year plans and revisions that do not lead to compliance.

Direct electricity sales

The 'direct electricity sales' are sales contracted directly between electricity generators and very large consumers who take supply at high voltage. These consumers take supply directly from the high-voltage transmission grid (primarily operated by Transgrid in NSW) as opposed to the medium- and low-voltage distribution grids (operated by distribution groups such as Integral Energy and EnergyAustralia).

For national electricity market purposes, these direct sales are attributed to a 'retailer' deemed to be associated with the generation group concerned. Examples are Pacific Power and Macquarie Generation, both of whom held NSW Retailer Supply Licences throughout 1999–2000 and continue to do so (note that Eraring Energy has now inherited the licence formerly held by Pacific Power).

The NSW EPA has not received greenhouse gas reports for the 1999–2000 compliance period from these direct retailers. As a result, the EPA is unable to audit the effectiveness of the greenhouse performance in respect of these direct sales. The *Further Environmental Guidelines* prepared by the Department of Energy (now the MEU) state: 'For the purposes of these guidelines, the NSW electricity sector covers both sales to retail suppliers and sales to wholesale customers who are not also retail suppliers.'[6]

In 1999–2000, the total electricity sales in NSW were as shown in Table 2.1.

Table 2.1 Breakdown of direct and retail sales in NSW in 1999–2000

Total electricity sales in NSW 1999–2000	58,492 GWh
Retail sales	49,811 GWh
Direct sales	8,681 GWh

Thus, approximately 15% of the electricity sales in NSW in 1999–2000 were direct electricity sales.

Because the EPA did not receive information on the performance of the groups involved in direct sales in terms of improving the GHG emissions of the electricity supplied, the EPA performance audit has been limited to only 85% of the NSW retail electricity sector.

Performance summary tables

As mandated by Section 3.3.1 (c) of the *Guidelines and Requirements Policy* (footnote 1), each retailer is required to 'report on its performance on the implementation of its strategies for audit by the EPA . . .'. While generally this information is collected for other purposes to facilitate the assessment of the effectiveness of GHG emission reduction strategies, the EPA through the MEU requested retailers to include a performance summary table (PST) in their annual greenhouse report covering the 1998–99 and 1999–2000 reporting periods and forecasts for at least the 2000–01 reporting period.

The PST would include negotiated GHG emission reduction strategies, forecasts of electricity sales and sales forgone for each strategy, GHG emissions and GHG emission reductions associated with each strategy, self-assessment of the effectiveness of each strategy and the extent of implementation, and any changes to the strategies and forecasts.

[6] *Further Environmental Guidelines and Requirements,* NSW Department of Energy, 1997. Available at http://www.doe.nsw.gov.au/.

Thirteen of the 16 retailers' greenhouse reports either did not include PSTs or contained PSTs with insufficient information to enable a performance assessment by the EPA of the individual GHG emission reduction strategies of each retailer. One retailer has not negotiated a GHG reduction strategy with the Minister for Energy.

One of the key pieces of information in the PST used by the EPA in assessing the effectiveness of retailer strategies is the cost of measures implemented.

Section 9 (g) of the *Further Environmental Guidelines* mandates that retailers supply information on the cost of each GHG emission reduction measure (i.e. strategy) both in total and as an estimate of dollars per tonne of CO_2-equivalent saved. This information is treated as commercial in confidence. The cost data is used to:

- determine whether particular types of measures are proving more cost-effective than others on average
- examine differences in reported costs between retailers implementing similar measures
- highlight unusually high or low costs, which may then merit further EPA investigation.

In the greenhouse reports originally supplied to the EPA by the MEU, most retailers had neglected to supply cost data for each GHG emission reduction measure, both in total and as an estimate of dollars per tonne of CO_2-equivalent saved.

The EPA accordingly asked IPART to forward a letter to all retailers highlighting the need for providing the EPA with the PST data, including the cost data, and ten of the retailers obliged.

However, the PST supplied in some cases was not complete, or some retailers declined to provide cost data for measures implemented, citing the data as being 'commercial in confidence'.

Since the data in the PST, including the cost data, is an intrinsic part of assessing the effectiveness of implementation, the non-conformance by retailers with this licence requirement greatly hampers the EPA in making an objective assessment of retailers' GHG emission reduction strategies.

Independent verification reports

To facilitate the transfer of information to the EPA for auditing purposes, each retailer is required to prepare a greenhouse report including independent verification as a standalone attachment to their Licence Condition Compliance Annual Report. Each retailer is required to engage the services of an independent verifier in respect of the greenhouse report, and to include the IVR in the greenhouse report forwarded to the regulator.

The requirements for independent verification are outlined in:

- the *Electricity Supply Act 1995*
- Section 8 of the *Further Environmental Guidelines* [7]
- *Guidelines for Independent Appraisal* [8].

In a letter sent to all NSW retailers on 9 September 2000 by the MEU, EPA has provided feedback on the IVRs reviewed during the preliminary audits of the 1998–99 reports. Key comments in that letter[9] were as follows:

- The IVRs examined in the preliminary audit (the 1998–99 IVRs) 'generally appeared to be incomplete in that they did not contain all the information required by mandatory reporting requirements.'
- 'The sufficiency of information varied considerably between IVRs and was generally considered unsatisfactory.'

That letter outlined the requirements for an IVR and the information requirements for the EPA audits. The EPA uses the IVRs as expert audit evidence that the GHG emission data reported by retailers in their annual greenhouse reports are reliable and accurate.

The independent verifier must include sufficient detail on each of the reporting requirements in the IVR that have been mandated in the Minister for Energy's *Guideline for Electricity Retail Suppliers on Licence Condition Compliance Annual Reporting*, dated 30 June 1999. These Ministerial guidelines require each retailer '. . . to prepare the greenhouse report including independent verification (licence conditions 3.1.1–3.1.5) as a standalone attachment to the Licence Condition Compliance Annual Report. This section will also be provided to the EPA for future audit purposes.'

Mandatory reporting requirements for the IVR include the following:

- the methodology used for verification of emissions, emission reductions and ESF
- what was verified (with examples where practical)
- how and when it was verified and any assumptions made
- references of records, documents or other information used as evidence for verification
- who did the verification and their qualifications and experience.

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[7] Further Environmental Guidelines and Requirements: Retailer Suppliers—Greenhouse gas reduction strategies, NSW Department of Energy, July 1997.

[8] Guideline for Independent Appraisal for Electricity Distributors and Retail Suppliers, Ministry of Energy and Utilities, 30 June 1999.

[9] Letter to all NSW retailers from Dr R. Bosler, Assistant Director of MEU, 9 August 2000. Attached to this letter was a discussion by the EPA of the 'information required for EPA audits'.

The IVRs supplied with the retailers' greenhouse reports (see Section 3 for details of IVRs), although an improvement on the 1998–99 IVRs, did not contain all the information required by the mandatory reporting requirements. The sufficiency of information varied considerably between IVRs and was generally considered inadequate to give the EPA confidence in using the underlying data reported by the electricity retailers.

GHG emission reduction strategies

Under the Act and in accordance with electricity retailers' licence condition 3.1, retailers were required to negotiate environmental strategies with the Minister for Energy to reduce GHG emissions from electricity they will supply to benchmark emission levels by 2000–01.

To audit the effectiveness of individual GHG emission reduction strategies, the EPA requires that retailers provide sufficient information about individual strategy measures. However, many of the retailers' GHG emission reduction strategy documents did not contain sufficient specific information. The strategies did not provide firm enough quantified targets for the action items proposed to allow the EPA to conduct a formal performance audit of the effectiveness of individual strategy measures against forecasts.

As required by the *Further Environmental Guidelines*, the inclusion in future strategy documents of outlines of specific measures, budgeted costs for those measures and specified key performance indicators would provide an appropriate base against which to assess effectiveness.

Electricity sales forgone

ESF is a concept developed to overcome a loss of revenue for retailers who consider helping their customers either to become more energy efficient or to generate some of their own electricity on their premises (for example, by installing a solar panel or a small cogeneration plant). The cause of this loss of revenue is illustrated by the example in Box 1.

Box 1: What is ESF?

Consider a factory consuming 10 GWh of electricity per annum (this corresponds to an annual electricity bill of approximately $500,000). Given that the greenhouse intensity of the NSW electricity pool was 0.866 kg CO_2-e per kWh[10] in 1999–2000, this amount of electricity would represent around 8.6 kt of CO_2-e emissions.

Inspired by the GHG emission reduction requirement in the retailer licence conditions, the electricity retailer for this factory conducts an energy audit of the factory and identifies the potential to reduce electricity use by upgrading a piece of equipment. The factory owner agrees, for example, to replace an electric boiler with a high-efficiency gas boiler and purchase gas from a different retailer.

[10] Electricity Distribution and Retail Licences: Compliance Report for 1999–2000, p. 25, IPART.

As a result, the electricity consumption of this factory fell to 9 GWh of electricity per annum. Although the factory owner would still have to pay for the gas (which would be around $20,000), the annual electricity bill would have dropped to around $450,000, so overall the owner would be saving $30,000. However, the electricity retailer would receive $50,000 less sales revenue than previously.

In terms of an environmental outcome this is a good result, leading to reduced GHG emissions. However, the retailer's revenue has fallen substantially, and clearly the retailer has suffered a financial disadvantage from having worked with the customer to achieve a good environmental outcome. It is doubtful that any commercially focused retailer could afford to act in such a manner.

ESF was developed as a policy mechanism to offset this disincentive. The effect is that a retailer who has conducted activities giving rise to ESF obtains a higher benchmark, which allows it to sell more electricity under the benchmark than would otherwise be the case. This enables retailers to compensate for the lost revenue resulting from providing a service to customers that reduce GHG emissions.

The concept of ESF was first described in *Further Environmental Guidelines and Requirements, Retailers Suppliers—Greenhouse Gas Reduction Strategies*, July 1997, which stated that: 'For the purposes of these guidelines, "market share" means actual electricity sales (GWh) to customers in NSW by a retailer, plus electricity sales forgone through end use energy efficiency programs undertaken by that retailer, expressed as a proportion of total electricity sales and total electricity sales forgone by retailer energy efficiency programs in NSW in the same period.'

The greater a retailer's market share is, the higher is its allowable emissions benchmark. The concept of ESF is intended to remove the disincentive for retailers to undertake activities that reduce actual electricity sales, since a demonstrable increase in ESF would lead to an increase in benchmark emissions, all else being equal.[11]

However, there are some complications in this definition. The definition of market share assumes that all claims for ESF are equally valid, and of an equivalent value (in unit terms) to electricity sales.

Thus, in calculating any individual retailer's market share, and hence its benchmarks, an important variable is the total ESF of all retailers in the market.

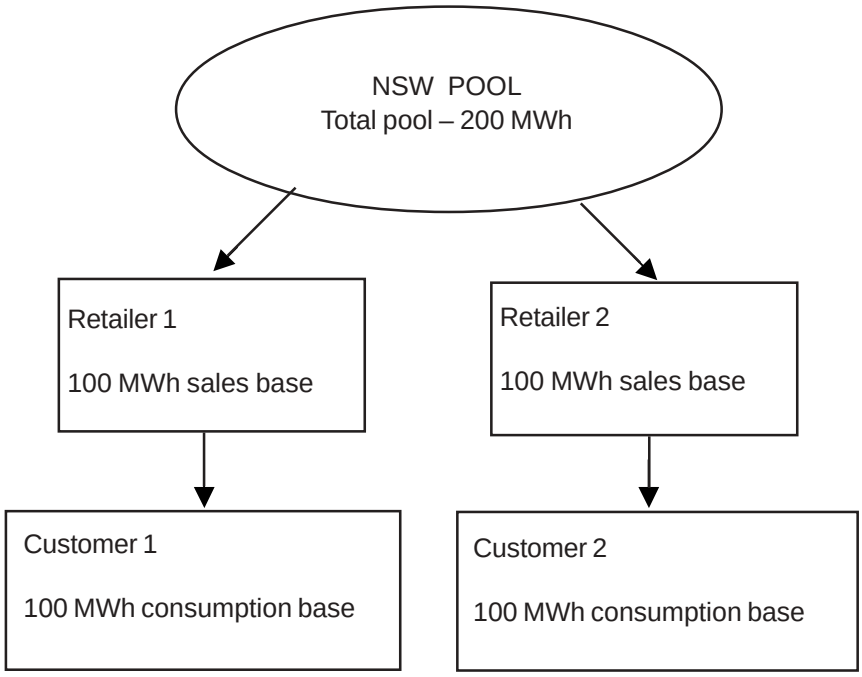
As a general comment, the level of reliability of retailer ESF claims observed by the EPA during this performance audit is highly variable. In many cases the lack of robust measurement and verification calls ESF claims into question, even if they are indeed valid.

[11]Greenhouse Gas Emissions from Electricity Supplied in NSW: Framework for Calculation of Electricity Sales Forgone, p. 3. NSW Department of Energy, February 1999.

It is thus worth considering the effect of including quantities of questionable ESF in the market share calculation process. The hypothetical example in Box 2 of a (much simplified) two-retailer, two-consumer electricity market illustrates how the ESF affects market share calculations.

Box 2: A 2-retailer, 2-consumer electricity market

In the base case, with neither retailer claiming ESF, all ESF values are zero, and the calculated market shares (CMS) are:

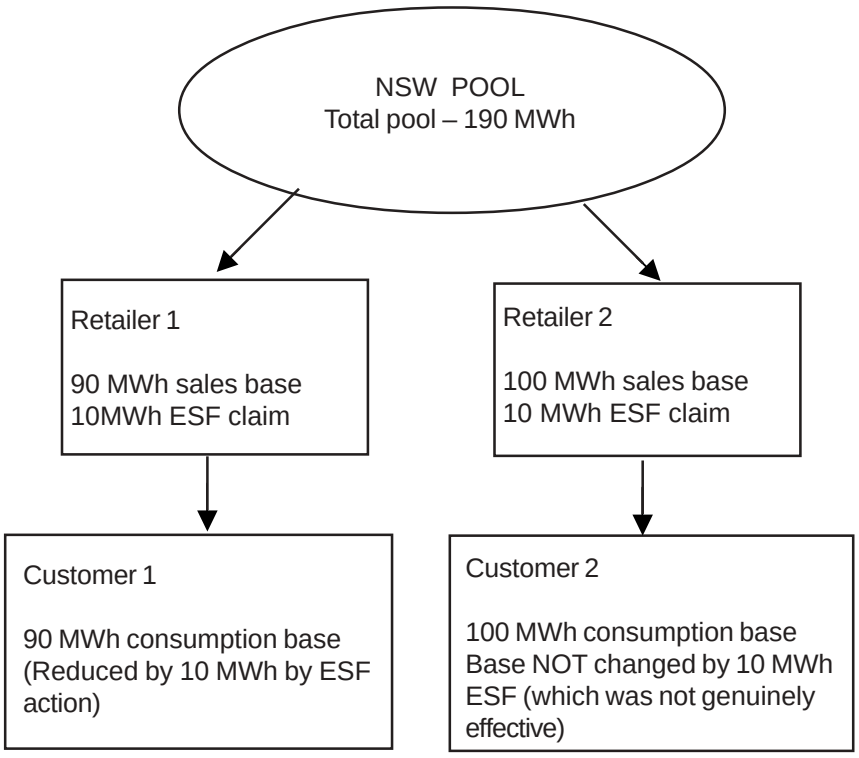


Retailer 1 CMS = (R1 sales + R1 ESF)/(total sales + total ESF) = 100/200 = 50%.

Retailer 2 CMS = (R2 Sales + R2 ESF)/(total sales + total ESF) = 100/200 = 50%.

These market shares would then form the basis of calculation of emission benchmarks for the purpose of the current scheme.

Now consider the case where Retailer 1 and Retailer 2 each claim 10 MWh of ESF. However, R1's claim is genuine (i.e. the customer consumption base has indeed been reduced), and R2's claim is not (i.e. there has been no change in customer consumption from the base level).



The calculated market shares are then as follows:

Retailer 1 CMS = (90 + 10) / (190 + 20) = 45%

Retailer 2 CMS = (100 + 10) / (190 + 20) = 55%

That is, the effect of the false claim is to give R2 a larger market share (and hence a larger proportion of the benchmark) than R1.

For the reason explained in Box 2, it is particularly important that all ESF claims be verified to a known standard that is consistent with that applying to supply-side measures. If the auditing standard of ESF claims is lower than that for supply-side claims, the effect is to reward those with less reliable claims at the expense of those with more reliable claims.

The EPA notes that the ESF claims are not generally of a standard to allow a high level of reliably to be attributed.

The *Framework for Calculation of ESF*[12] makes clear that the minimum reporting requirements are forms ESF1 and ESF6. Retailers do not appear in general to be meeting these minimum reporting requirements for ESF claims.

In cases where significant claims for ESF arise from a single client, the *Framework for Calculation of ESF* recommends the use of ESF7, which is an ESF equivalent to an Assigned Generation Declaration on the supply side.

Only one of the retailers used form ESF7, although a number of significant ESF claims have been made. In some cases, claims have been based on alternative procedures (such as claims under other government programs such as the SEDA Energy Smart Business program). Although such procedures do not fall within this framework, in some cases the EPA accepts the validity of such claims.

Uncertainty as to the validity of ESF claims undermines the validity of the benchmarks as applied in 1999–2000, and this may in turn affect the compliance (or otherwise) of several retailers.

It is interesting to note comments by some retailers in their strategy documents that energy efficiency activities cannot be sustained in the competitive market.

The SEDA deeming formula and its use in ESF claims

SEDA has provided a deeming formula to allow retailers to claim ESF on the basis of historical expenditure on generic activities related to end-use energy efficiency. The EPA was represented on the working group that developed the formula. The intention was to allow retailers to be given some recognition for significant energy efficiency actions taken in the past, even though they may not have kept records to the standard required under the guidelines.

The SEDA deeming formula has become the dominant mechanism for claiming ESF under the guidelines. In some cases, a claim made under the deeming formula represents the only ESF claim made. Sometimes an ESF claim made with the deeming formula is the only claim for abatement made by the retailer.

Most retailers have not provided adequate information about the nature of the expenditures giving rise to a claim under the deeming formula. The EPA is frequently unable to determine whether the expenditure was for some relevant energy efficiency activity (such as a series of information brochures distributed to customers) or some other activity (such as a series of glossy marketing brochures seeking to sell more electricity, distributed to customers).

In general, the EPA is concerned that the SEDA deeming formula has been misapplied and overused. Originally intended as a supplementary measure to encourage generic activity related to improving end-use energy efficiency, the deeming formula has become one of the most common methods for supporting ESF claims (39%). It is very difficult to audit claims made under the deeming formula, but in a general sense the reliability of these claims appears to be low.

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[12] Greenhouse Gas Emissions from Electricity Supplied in NSW: Framework for Calculation of Electricity Sales Forgone, *NSW Department of Energy, February 1999*.

Greenpower, assigned generation and other schemes

Greenpower is a national accreditation scheme allowing retailers to 'brand' an electricity product as supporting low-emission generation. SEDA introduced an accreditation scheme in NSW in the late 1990s and now acts as the national accreditation and administrative body in cooperation with other states.

In simplified terms, a low-emission generator (such as a wind turbine) is accredited by SEDA. An electricity retailer who is marketing a Greenpower product may then purchase the output from this generator. The amount of Greenpower purchased by the retailer over a 12-month period must exceed the amount sold by the retailer under the Greenpower label. SEDA organises a periodic audit of the sales and associated purchases for all accredited products. Such an audit was performed by the environmental engineering consultancy of Environmental Resource Management for the period 1999–2000. A public audit report is available from SEDA.

There is some overlap between Greenpower and the concept of **assigned generation** in the guidelines. Assigned generation refers to generators (whose emissions will be lower than the NSW electricity pool average, but need not be zero or negative) whose output is **assigned** to a particular retailer by the owner of the generator (presumably at a price).

All accredited Greenpower generators would be eligible to be assigned generators. However, not all assigned generators would be eligible for Greenpower accreditation.

The result has been that the guidelines treat Greenpower as follows:

- A retailer may claim Greenpower sales in NSW towards its licence compliance benchmark at 100% value.
- Any output from accredited Greenpower generators purchased by the retailer and surplus to its Greenpower product sales may be claimed by the retailer as assigned generation.
- If claimed as assigned generation, only power generated inside NSW may be claimed at 100% value. Surplus Greenpower purchases from outside NSW are 'devalued' using a scaling factor related to the proportion of NSW sales by the retailer compared with the retailer's total sales.

This has a couple of important implications for the current audit process:

- Retailers may claim Greenpower as an eligible measure only in regard to their sales of Greenpower product in NSW. Sales of electricity under an accredited Greenpower product in another state are of no value in this audit framework. At least one retailer (TXU Electricity Ltd) has attempted such a claim, and the EPA (and the MEU previously) has disallowed it. This makes the difference between TXU Electricity Ltd being compliant (when the out-of-state Greenpower sales are included) and non-compliant (when the out-of-state Greenpower sales are removed.)

- The national Greenpower audit report does not provide a breakdown of the sales of retailers' Greenpower product by state. As a result, the EPA has no information with which to check retailers' claims for Greenpower sales in NSW and must rely on the independent verification process. However, in practice the EPA has assumed that retailers have not made false claims for Greenpower sales in NSW, even though the independent verifiers have usually not verified these claims.

Energy Smart Business program

A number of electricity retailers participate as program support managers (PSMs) with the SEDA Energy Smart Business program. Under this program, SEDA pays a PSM to provide energy efficiency advice to corporate clients who have signed up with SEDA, and generally help those clients to identify and implement energy-related projects that reduce GHG emissions. The payments by SEDA to the PSM have two components—a base fee for the consultancy services, and a performance-based component on the basis of the amount of CO_2-e savings that they are successful in having their designated clients make.

The Energy Smart Business program was not designed (in terms of audit, verification and recording of claims) in a manner that is directly consistent with the guidelines concerning the retailers' GHG reduction licence conditions. Given that the retailer is paid by SEDA for delivering energy efficiency services to customers, it could be argued that claiming these savings under the retailer's licence condition represents a form of double-dipping. It could also be argued that the retailer has no right to the resulting 'credits' at all.

On balance, for the current period, the EPA feels that a claim for ESF arising from a retailer's PSM role is acceptable and reasonably robust, given the SEDA program verification requirements. However, it is an area that deserves a clear determination under future guidelines.

1-, 3- and 5-year plans that do not lead to compliance

In some cases retailers have provided strategy plans that do not target compliance with the announced targets. That is, the plans do not contain sufficient measures to achieve compliance in the stated timeframe, even if every measure in the plan was implemented with 100% effectiveness.

The EPA has (where sufficient information has been provided) attempted to audit the effectiveness of all measures contained within the strategy document against actual implementation. However, the existence of some plans that target 'non-compliance' means that a retailer could achieve a high EPA assessment of effectiveness, and yet still be non-compliant against the target benchmark. This situation simply indicates that the retailer has been effective in implementing the measures as outlined in the plan, but had insufficient measures in the plan to actually achieve the benchmark emissions.

The EPA has attempted to identify where this situation arises, but in some cases the strategy documents are lacking in the data required to determine whether this is the case.

3 Summary of audit results

Summary of assessment of independent verification reports

An assessment of the IVR for each retailer is given in Section 4. The table below summarises the outcomes of this assessment.

In assessing the IVRs for 1999–2000, the EPA has reviewed each IVR against the criteria listed in Figure 3.1. A score of high, medium or low has been assessed against each criterion.

As applicable, the grading system as outlined in the MEU *Guideline for Independent Appraisal for Electricity Distributors and Retail Suppliers* (June 1999) has been used to assess each IVR against the criteria listed in Figure 3.1. A high corresponds to an 'A' grading, a medium to a 'B' or 'C' grading, and a low to a 'D' grading in the MEU Guideline.

Figure 3.1 Criteria against which IVRs were assessed

	Methodology	What verified	How and when verified	References	Qualifications
ACTEW	Med	High	Low	Low	High
Advance	High	High	High	High	High
AGL	High	Med	Med	Low	High
AIE	High	High	High	High	High
Citipower	High	Med	Med	Med	Med
Energy Australia	High	Med	Med	High	Med
Ergon	Med	Med	Low	Med	Low
Ferrier Hodgson	Med	Med	Med	Med	Low
Great Southern	High	High	High	High	High
Integral	High	High	High	High	High
Northpower	Med	Med	Med	Med	Med
Origin	Med	Med	Med	Med	Low
Powercorp	Med	Low	Low	Low	Low
TXU	Low	Med	Low	Med	High
United	Med	Med	Med	Low	High
Yallourn	High	Med	Med	Med	Low

Although they represent an improvement over the 1998–99 IVRs, many of the 1999–2000 IVRs of the GHG emission data appeared to be incomplete. The IVRs did not generally contain an assessment of all the information required for verification under licence conditions 3.1.4 and 3.1.5.

Many IVRs also do not comply with the MEU *Guideline for Independent Appraisal for Electricity Distributors and Retail Suppliers*. This document was issued on 30 June 1999, with the purpose of 'ensuring that appraisals are conducted in an independent, rigorous and consistent manner.'

It is important to note that the size and complexity of an IVR does to some extent depend on the quality of the underlying licence compliance report and the level of implementation occurring.

One consistent theme with the IVRs is that verifiers have not adequately identified when an omission in the IVR is due to lack of data being supplied or lack of action being undertaken by the retailer, as opposed to simple omission on the part of the verifier.

The EPA has attempted to distinguish between these cases by providing the retailers (and via them the independent verifiers) with initial feedback and a request for additional data before preparing this audit report. However, it is ultimately the verifier's role to provide a thorough report that identifies any concerns about lack of data or lack of reliability of data provided by the retailer.

In respect of the reliability and accuracy of the GHG emission data reported, the EPA is of the opinion that only Advance Energy, Australian Inland Energy, Great Southern Energy and Integral Energy provided IVRs that contained a **high quantity** *of appropriate information to provide the EPA with reasonable assurance that the GHG emission data reported is reliable and accurate.*

The sufficiency of information varied considerably between IVRs and was generally considered inadequate to provide the EPA with confidence in using the underlying data reported by the electricity retailers.

Three particular issues exist:

- Definition by the independent verifiers of the grading methodologies applied. Not all verifiers used the grading system outlined by the MEU in the *Guideline for Independent Appraisal*. Nor was it always clear what criteria were being applied by the independent verifiers to retailer data
- Documentation in the IVR of the documentary evidence referred to during preparation of the IVR. The EPA retains the right to review the IVR by examining the primary source materials from the retailer, and hence clear provision of a document trail is required. The general rule should be for the independent verifier to reference all documents used in the preparation of the IVR, so that should the EPA conduct a review it is possible for it to replicate the verifier's work
- A low level of independent verification of claims for ESF.

Summary of audit on retailers' performance in reducing GHG emissions against strategy forecasts

The EPA has sought to use the data provided in the standalone greenhouse report contained in the licence compliance reports produced by the electricity retailers, the summary performance tables and strategy documents, and the 1-, 3- and 5-year plans as the basis for assessing effectiveness against strategy targets. However, if retailers have not provided data as required by the Act and related guidelines, the EPA is hampered in undertaking its performance audit.

Effectiveness of supply-side strategies

All electricity retailers operating in NSW purchase most of their electricity from coal-fired power stations. In 1999–2000, approximately 4% of their purchases fell into categories of low-emission generation, including wind, hydro, biomass/biogas, solar, large cogeneration, coal seam methane, and other generation purchased and 'assigned' to the retailer. The implementation of strategies based on the purchase of electricity from low-emission generation sources in the 1999–2000 saw electricity retailers in NSW achieving an overall reduction in GHG emissions of 3217 kilotonnes of carbon dioxide equivalent (CO_2-e), which is 58% of the forecast reductions given in their strategies.

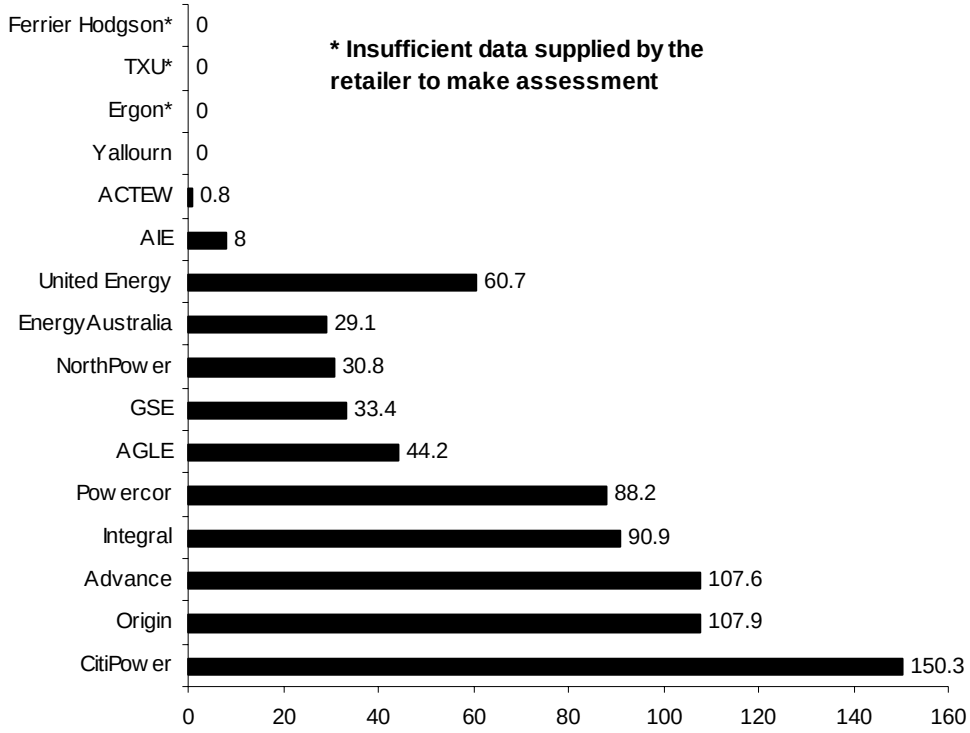
An assessment of the supply-side GHG emission reduction strategy for each retailer is given in Section 4. The following EPA audit opinions summarise the outcomes of this assessment.

Hydro and coal seam methane generation measures implemented by retailers have generally achieved a high level of effectiveness (> 70% of forecast GHG emission reductions), and wind generation, biomass/biogas generation and other measures implemented by retailers achieved a medium level of effectiveness (35%–70% of forecast GHG emission reductions) during 1999–2000. Retailers who implemented solar and large cogeneration measures achieved less than 35% of forecast GHG emission reductions, thereby attaining a low level of effectiveness in reducing GHG emissions during 1999–2000.

Figure 3.2 shows the NSW electricity retailers' supply-side performance against forecast.

Supply-side strategy measures implemented by Citipower, Origin Energy Electricity Ltd, Advance Energy, Integral Energy and Powercor Australia Ltd have achieved a high level of effectiveness (> 70% of forecast) in reducing GHG emissions. AGL Electricity Ltd and United Energy Ltd have achieved a medium level of effectiveness (35%–70%). The rest have achieved a low level of effectiveness (< 35% of forecast).

Figure 3.2 Supply-side performance against forecast (%)



Effectiveness of demand-side strategies in 1999-2000

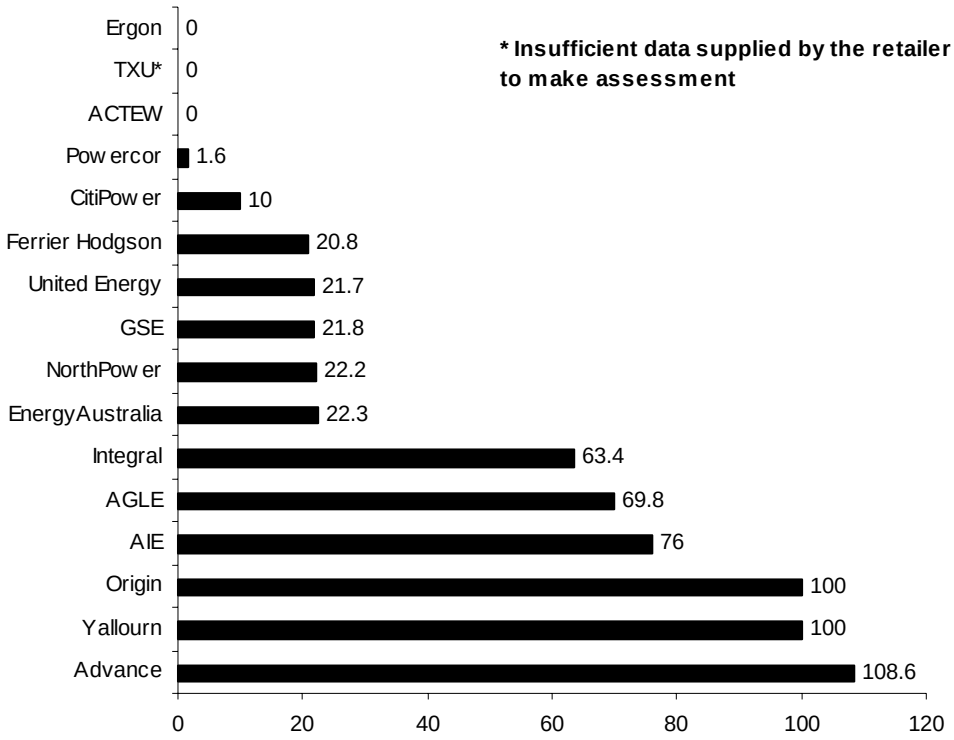
Demand-side strategies based on ESF claims represent approximately 0.4% of total notional 'sales' in NSW. ESF claims are made by improving end-use energy efficiency through activities such as customer-based energy audits, high-efficiency street lighting, internal energy efficiency and general promotion of energy efficiency.

Electricity retailers in NSW achieved an overall ESF GHG emission reduction of 174 kilotonnes of CO_2-e, which is only 32% of forecast reductions in their strategies. Thirty-nine per cent of the claims for ESF have been made through the use of the SEDA deeming clause, which allows retailers to claim ESF on the basis of historical expenditure on generic activities related to end-use energy efficiency.

Figure 3.3 shows the NSW electricity retailers' demand-side performance against forecast.

Demand-side strategy measures implemented by Advance Energy, Yallourn Energy Pty Ltd, Origin Energy Electricity Ltd and Australian Inland Energy have achieved a high level of effectiveness (> 70%) in reducing GHG emissions against forecast). AGL Electricity Ltd and Integral Energy have achieved a medium level of effectiveness (35%–70%). The rest have achieved a low level of effectiveness (< 35% of forecast GHG reductions attributable to demand-side management measures).

Figure 3.3 Demand-side performance against forecast (%)



Overall, the EPA is of the opinion that NSW electricity retailers' combined supply-side and demand-side strategies achieved a **medium level of effectiveness** *in reducing GHG emissions during 1999–2000, having achieved a total emission reduction of 56% of that forecast in their strategies as negotiated with the Minister for Energy.*

Only 2 retailers (Integral Energy and Origin Energy Electricity Ltd) achieved GHG emission levels equal to or lower than the benchmark; the GHG emission levels of eight retailers (Advance Energy, AGL Electricity Ltd, Australian Inland Energy, Citipower, EnergyAustralia, Ferrier Hodgson Electricity Pty Ltd, United Energy Ltd, and TXU Electricity Ltd) exceeded their benchmarks by up to 10%; and the GHG emission levels of six retailers (ACTEW Retail Ltd, Ergon Energy, Great Southern Energy, Northpower, Powercorp Australia Ltd and Yallourn Energy Pty Ltd) exceeded their benchmarks by up to 15%.