



**Building Designers Association
of New South Wales Incorporated**

SUBMISSION

SUBMISSION - AUGUST 2003

Standing Committee on Public Works

PEAK ELECTRICITY DEMAND

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“Come home to Australia’s favourite air”

Mark Taylor’s key marketing line for Fujitsu air conditioning

**Australia’s favourite air does not come from the
smokestack of a coal fired power station.**

BDA SUBMISSION SUMMARY

It is now abundantly clear from the many studies and surveys already completed that the single most critical factor affecting peak residential electricity demand in mainland Australia, is the extraordinarily rapid growth in the use of reverse cycle air-conditioning and other inefficient Heating Cooling and Ventilation (HVAC) systems.

BDA NSW believe that this is almost entirely due to poor design of residential buildings. Low electricity prices in combination with increasing affordability of these systems have created an absurd scenario **whereby it is easier and cheaper to maintain thermal comfort in housing by using mechanical systems than it is to do so through sound climate responsive design.**

New coal fired power stations are being planned and commissioned to meet peak demand spikes created by this unnecessary, greenhouse inefficient solution.

This situation is unacceptable, irresponsible and short-sighted.

The BDA urges the NSW Government to strengthen the work done by the Energy Smart Homes Policy and other NSW variations to the BCA (which generally exceed the requirements of other states), and to roll back the increasing dependence on artificial heating and cooling in the residential and commercial/retail sectors.

We suggest the following as first steps towards achieving this goal:

1. **Reduce current stamp duties** on housing and **replace this revenue stream with some form of carbon tax** levied above a certain threshold of household energy consumption.
2. Actively discourage GH inefficient HVAC systems. **A levy on the purchase price factored by the relative inefficiency of the appliance.**
3. **Actively support the uptake of existing commercial renewable energy production** through such things as rebates to private households, tax breaks to corporations etc.
4. **Support passive systems via appropriate policies, such as the Energy Smart Policies devised and administered by SEDA.** Commit funding to ongoing development of energy rating tools.
5. **Delay construction approval of all coal fired power stations for a period of 5 years**, by which time renewable energy technology viability will be more cost-effective and therefore be a viable option to coal fired electricity.
6. **Regulate the price of electricity to reflect the true cost of production** and long term maintenance, with up-sliding scales for higher consumers, thus rewarding low energy consumption.
7. **Support the research and development of renewable energy systems** such as advanced photovoltaics, solar thermal systems etc, **by means of research grants and tax breaks at commercialisation stage.**
8. **Hasten the completed development of the BASIX sustainability indicator tool**, ensuring it is consistent with existing SEDA policy and knowledge base, and implement its introduction as a regulatory device, within a consistent state-wide planning framework.

More detail is given on these points at the conclusion of this submission.

JUSTIFICATION

The symptoms

Peak demand for electricity has increased in the last 25 years beyond that expected for the actual level of population growth over the period.

The rate at which it has outstripped the ability of production and distribution to reliably cope and provide a margin has increased in recent years.

The residential luxury disease

In the residential sector, the increase in demand for electricity is linked directly to the increasing size of houses and their increased inclusion of and reliance on energy hungry appliances and services.

In 1960 the average Sydney residence was a detached brick house of approximately 115 square metres, with either a single gas heater or several small electric bar heaters, and no artificial cooling system.

In 2003 the average Sydney house is well over 200 square metres, with larger and more energy hungry heating systems, and up to 38% of homes now include air conditioning in some form or other. Given the market in portable and non-built in air conditioners, this figure is probably a lot higher in reality.

The above increase may be startling in its own right, but does not give an accurate picture of the reasons for the extreme spikes in electricity demand. The 1960s house was full brick, of modest size and with minimal glazing exposed to winter sun. This may have given them very poor winter thermal performance, but generally gave satisfactory average summer thermal comfort.

The average house built in the middle and outer suburbs since the 1970s, and increasingly in the 1990s and today, is well over 270 sq.m, and many are over 350 sq.m.

Glazing area as a proportion of floor area has increased dramatically, and the amount of that glass exposed to inappropriate sun has also increased. This can be seen in the trend to eliminate eaves without adding compensating pergolas or other shading devices.

Floor plans are more open plan than ever before, which denies the occupant any opportunity to 'zone off' parts of the house which are too hot or cold. It also means that any heating or cooling must be applied to the whole house.

Construction systems are almost universally brick veneer with little or no insulation. The Australian Greenhouse Office estimates that 70% of Australian

homes have no insulation. Tiled roofs are almost universally black or dark grey in colour, which acts as a house-wide heat sink. Sarking is commonly found only in the most recent houses in the sample, built under the Energy Smart Home Policy.

In certain significant growth areas of the Sydney basin, houses like these are being built for increasingly affluent owners who, not understanding the implications or the alternatives, are “ticking the box” on the sales order for reverse cycle ducted air conditioning. The north west corridor, Hills district, Camden and Campbelltown areas are the most significant of these areas. House sizes in the areas are commonly 400 sq.m and rarely below 250 sq.m.

The retail and commercial luxury disease

In these sectors similar trends have occurred to the residential sector. Shops have become almost universally air conditioned, with more large retail shopping centres being built with thousands of square metres of arcade space under air conditioned roof.

Commercial buildings are almost universally air conditioned, and often poorly insulated or shaded. This produces enormous heat loads on the various facades exposed to spring, summer and autumn sun.

The core of the boil

The domestic air conditioning market has grown at approximately 40% per annum since 1999 (source: SEDA, 2002).

It is these appliances more than any other which are responsible for the peak loads experienced during summer afternoons, and to an increasing extent during winter early mornings and evenings.

The tendency of occupants to run these appliances during periods of vacancy (while at work, etc) is common, usually justified by comments such “it keeps the house cool for when we get home”.

The new so called ‘smart control systems’ which allow appliances to be controlled via the internet or mobile phones are often quoted as being the solution to this problem, but do not deal with the root cause.

The root cause of this is the poor design and construction of these typical houses built during the entire post WW2 period, but accentuated in the 80s and after due to the increase in size and glazing.

The cure – first pill

The Energy Smart Homes Policy (ESHP) took an important first step in kerbing these unfortunate trends. Other measures have been taken by industry bodies such as the BDA in its continuing professional development program, educating members on the benefits of “better houses not bigger houses”.

The ESHP has broken through an important threshold – putting a basic level of energy efficiency on the radar screens of consumers and industry. In this process it has had to do battle with commercial forces such as multi-national industrial corporations such as those who stand to make substantial profits from sales of domestic air conditioning.

It has also relied heavily on a computer based thermal performance modelling and assessment program, NatHERS. Up until now, NatHERS has been an incomplete and inaccurate means of doing such modelling.. In commercial software terms, it has been at the pre-beta testing stage. The software is currently undergoing further development by the CSIRO and Australian Greenhouse Office. (The writer sits on the national Technical Advisory Committee, which steers that process.)

The inadequacies of the NatHERS software have led to sharp criticism of both it and the ESHP from various quarters in the design and development industry.

These criticisms are unjustified.

The fact that 5 years ago no one in the building industry knew what the term energy efficiency meant is testament to the impact it has had. It can go a lot further, and now would be a good opportunity to examine ways of increasing the level of thermal performance required.

Issues of national consistency must be examined, since thermal performance of the building envelope for Class 1 buildings is now mandatory in the Building Code of Australia.

The cure – the next pill

The Energy Efficiency Sub Committee of the Building Regulation Advisory Committee (BRAC) is currently steering NSW development industry progress towards a smooth transition and coordination between the BCA provisions and the existing ESHP council DCPs. The delays in the CSIRO's work on the upgrade of NatHERS have frustrated that progress, but in the long term will not thwart it.

Buildings must become more efficient in their use of energy, and more effective in their use of natural energy, such as passive solar design, and integrated renewable energy systems.

The expertise to design such buildings exists within ranks of Accredited Building Designers and many architects.

Marketing programs such as the Australian Greenhouse Office's *Your Home* project are seeking to lead the community by 'marketing desire'. The BDA and other organizations are working actively in programs such as this to educate and inspire consumers to aspire to better than "second best energy hungry design solutions".

The NSW Government must exercise its role in regulating where that is appropriate. BDA NSW sees these areas as being appropriate in that way:

1. Reduce current stamp duties on housing and replace this revenue stream with some form of carbon tax levied above a certain threshold of household energy consumption.

Stamp duties have increased dramatically in recent years with the accelerated growth in property values, yet there has been no proportional cost increase to government in relation to the administration or collection of these duties. This equates to a large windfall for the public coffers, often at the expense of first home buyers and lower income earners.

The impost on such property purchasers could be eased, and at the same time, a carbon tax should be introduced on all electricity sold by greenhouse emitting producers. This would apply across the board, except for residential consumers who would have a threshold of approximately 400kWH per annum, below which the tax would not apply.

2. Actively discourage greenhouse-heavy inefficient HVAC systems.

A levy on the purchase price factored by the relative efficiency of the appliance is an equitable way of achieving this.

A sliding levy of 25% for the least efficient systems such as portable air conditioners or large ducted systems, reducing to 0% on the purchase price of the most efficient (such as solar thermal), using existing star ratings as the yardstick.

Large ducted heat pumps are often claimed to be over 90% efficient, but this never accounts for the whole supply chain of the energy involved, only the

appliance itself. Additionally, occupants have the tendency to over-use these systems, since they are 'set and forget': it is too easy to just dial up 22° inside even though it might be only 25° outside. It is also reasonable to expect occupants to adjust their thermostats upwards in summer, but this is rarely done in reality.

This could easily be justified as a levy to fund community costs for constructing additional coal fired power stations to meet HVAC generated demand. It is a simple application of the "user pays" principles already being applied successfully in a range of initiatives including: motorway tolls; funding the development of community facilities through Section 94 contributions, etc.

3. Actively support the uptake of existing commercial renewable energy production through such things as rebates to private households, tax breaks to corporations etc. These should not be seen as subsidies but would serve to level the playing field for energy generating technologies and encourage private investment in greenhouse friendly alternatives.

There is strong community support for things like roof mounted solar power on residential buildings. SEDA's participation in the rebate scheme for this has been a significant boost to its public profile, and therefore its understanding and acceptance in the community.

Such rebates should continue in the medium term while the commercial affordability is still moderate. Affordability is a function of technological advances and scale of production. Research assistance works for technological improvement, rebates for purchasers works for scale of production.

4. Support passive systems via appropriate policies, such as the Energy Smart Policies devised and administered by SEDA, and commit funding for rating tools.

The Energy Smart Homes Policy was a critical first step in the process of turning 'business as usual' into better practise – and hopefully soon – into best practise.

The bar must now be raised – the existing 3.5 star ratings for thermal performance can be targeted for raising to 4 and ultimately 5 stars over a one or two year period.

Improvements in the rating tools such as AccuRate will enable this to be done with greater accuracy and meaning.

Further funding is required at a national level – supplied by both tiers of government – to continue the development and field validation of these rating programs.

A total of \$5m over an 8 year period should be earmarked for this task, shared pro rata between the different governments.

SEDA's other work on commercial and industrial energy efficiency should be supported and furthered.

5. Delay construction approval of all coal fired power stations for a period of 5 years, and apply the most stringent GGE emission standards to any new licence applications.

In this timeframe, carbon levies on GHGE inefficient generation and consumption in combination with the impact of Energy Smart design and construction policies would create an environment in which renewable energy technologies are a viable alternative to coal fired electricity. We require cleaner energy - not cheaper energy.

This timeframe will allow renewable energy technology viability will be more cost-effective and therefore be a viable option to coal fired electricity.

The current coal fired power stations in NSW are amongst the most greenhouse intensive in the world, and no more should be built.

Renewable energy development is increasing at such a rate that large scale renewables are increasingly viable. The newest wind farms are testament to that fact. SEDA's work promoting wind power should be fully supported and furthered by the whole of the NSW government.

Other forms of renewable power should be encouraged, and private sector involvement in the production of such facilities actively encouraged.

The current low cost of energy encourages inefficient use and cost does not reflect the real cost to the community in environmental terms.

6. Regulate the price of electricity to reflect the true cost of production and long term maintenance, with up-sliding scales for higher consumers, thus rewarding low energy consumption.

It has been estimated that the retail price of electricity in Australia is about 1/3 of its true cost of production. This is economically and environmentally unsustainable.

True cost must be charged now, or future generations will be left holding the economic and ecological consequences.

Higher energy prices also have a self-regulating effect on heavy users. Equity can be maintained by increasing the cost for increased quantity – whereas the current trend is to discount for bulk purchase.

The current inequities between domestic and industrial consumers – especially very large industrial consumers – must be addressed, so as to more truly reflect the true cost of production without destabilising industries which are viable and sustainable employers.

The aluminium industry would be expected to lobby heavily against such a move, but if done sensibly and gradually, the cost of aluminium products would rise marginally, reflecting the fact that it is actually a very expensive and high grade material, consumed and disposed of too cheaply by current practises.

7. Support the research and development of renewable energy systems such as advanced photovoltaics, solar thermal systems etc, by means of research grants and tax breaks at commercialisation stage.

Systems such as the hybrid solar thermal space heater / photovoltaic generator / hot water heater produced by NSW small business Sustainable Ingenuity requires large commitments of R&D funding, and in spite of having a truly wonderful piece of technology, such a company could face insurmountable obstacles bringing that to market without some government assistance.

The BDA submits that it is in the public interest for such credible businesses to be assisted by government in this way.

8. Hasten the completed development of the BASIX sustainability indicator tool, ensuring it is consistent with existing SEDA policy and knowledge base, and implement its introduction as a regulatory device, within a consistent state-wide planning framework.

The Sustainability Advisory Unit has developed a potentially very useful tool for a broader application than just building envelope energy. The final development of this tool in full and open consultation with the interested sectors of industry, and other government instrumentalities such as SEDA, should be supported and fully funded.

The current question marks over the completion of that work must be resolved.

It should also fit within a reformed and consistent state wide planning framework which sets not just the means by which planning is carried out (ie *how* we plan NSW) but also sets the ground rules for the content of that planning (ie, *what* we plan in NSW).

Plan First promised such a framework, and the BDA submits that the NSW Government should recommit to this excellent model, or at the very least continues to work toward achieving the goals which the original Plan First White Paper set forth.

END SUBMISSION.

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BDA MISSION

The Building Designers Association of New South Wales will strategically position its activities to become the primary focus group in the Building Industry

The Association will maximize its assets, which include Member's skills, strategic alliances, advanced technologies and communication to position Members as ***the*** responsible stewards of Building Design.