

# Improving Greenhouse Accounting Protocols

Barney Foran

Indigo Shire Environmental Advisory Group

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## Summary

Greenhouse accounting methods, especially for corporations, are evolving to include the full greenhouse implications of all the goods and services purchased by an institution in the delivery of its mission. This has important implications for Indigo Shire Council in meeting its greenhouse reduction goals and will require a strong focus on all procurement and contracting activities. The same 'whole of system' greenhouse accounting will impact on household emissions through the planned emissions trading scheme, or its successor. Total emissions of a business or household are underestimated by a factor of two or three in the current systems which measure direct combustion and electricity (Scope 1 and Scope 2) but mostly ignore purchased goods and services (Scope 3). Behaviour and built infrastructure will have to change significantly in response to full-chain greenhouse accounting and related environmental issues of embodied water use and land footprint. New infrastructure designs need to accommodate advanced greenhouse mitigation (reduction) and climate change resistance (dealing with extremes) while improving amenity and liveability values. Behavioural change, both at work and home, will need to focus on alternative ways of achieving the same ends, increasing personal responsibility and delving into the complex impacts of simple purchasing choices. Indigo Shire remains well placed to implement advanced greenhouse responses and to generate green commerce and local employment from those actions.

## Full Production Chain Reporting

Greenhouse accounting protocols for institutions and households will evolve in the next decade in two important ways. The first is to measure the complete production chain and include Scope 3 emissions (purchased goods and services) in addition to the Scope 1 (direct combustion) and Scope 2 (electricity) that are currently the core of most accounting schemes (Figure 1). The second is that institutions and households will be required to take responsibility for their purchasing/consumption activities, and to actively change the volume and composition of goods and services consumed.

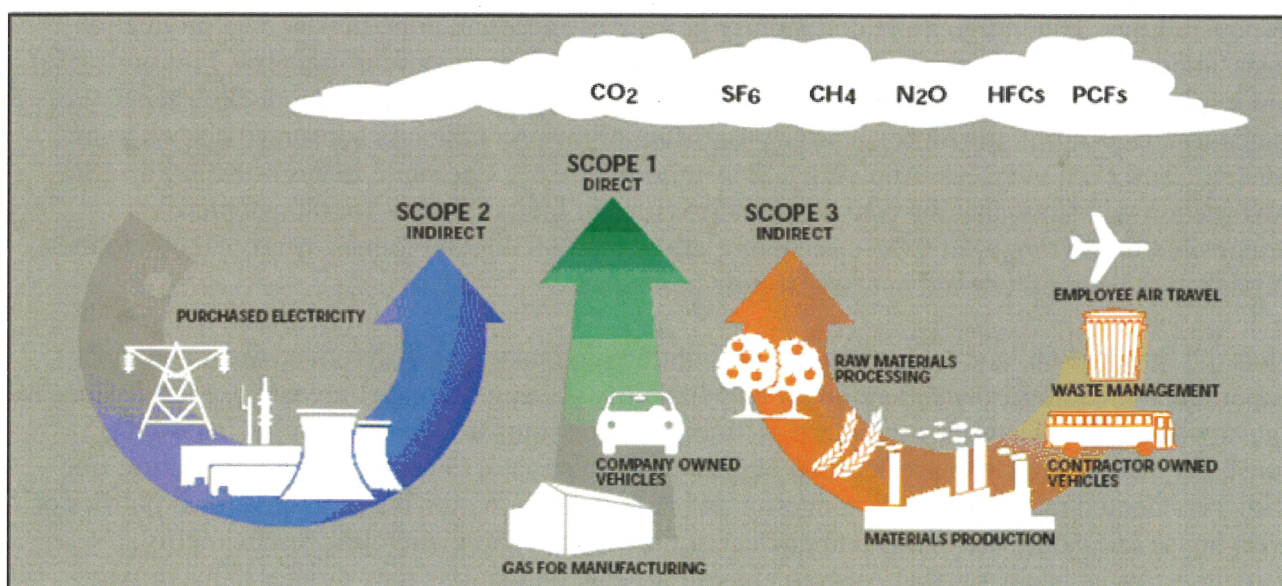


Figure 1. Schema of improved greenhouse gas accounting protocols that are gradually being introduced for corporate reporting globally. Scope 1 (direct combustion) and Scope 2 (electricity) are included in Indigo Shire reporting systems now. Scope 3 (indirect emissions for all goods and services purchased by a reporting entity) will be phased in using the economy-wide knowledge of the greenhouse content for dollar activity in each sector of the economy.

Using Indigo Shire Council as an example, the current Scope 1/2 emissions reported for the 2006 base year are 3,190 tonnes. If the Council's total budget of approximately \$20 million is converted with an economy-wide greenhouse intensity of economic activity of 0.5 kg CO<sub>2</sub>-e per dollar, the emissions budget over which the Council decides is now 10,000 tonnes, or more than three times the level reported by the current reporting protocols. While the current greenhouse reduction strategies are robust and defensible, the 'full chain' accounting principles now moving into corporate reporting will require much more attention be paid to procurement policies. These are generally part of Federal and State<sup>1</sup> government policy, have some simple implementation schemes<sup>2</sup> but are generally not well underpinned by quantitative analysis.

Moving to more holistic or full-chain accounting protocols is necessary for three reasons. Firstly it avoids the outsourcing or leakage of emissions whereby a firm or institution can avoid its greenhouse activities by stopping local production and importing a cheaper good from China or computer services from India. Secondly this approach can be used for broader CSR (corporate social responsibility) or TBL (triple bottom line) accounting which can help for example justify higher local emissions, if they also entrain local employment and retain economic activity in the Shire. Thirdly, this full chain accounting can be used as a source of competitive advantage in marketing and sales, if a local production chain is seen to have distinct advantage over its competitors. Rain-fed organic wine from Indigo Shire has less resource impact overall than large irrigated big brand varieties, as well as returning higher margins per unit and using Shire labour.

There are a number of practical worked example of this full-chain accounting approach for a hypothetical bakery<sup>3</sup> and for Norfolk Island<sup>4</sup> and the methodology<sup>5</sup> developed by Sydney University is now being developed into a global accounting standard by a major software firm<sup>6</sup>. One of Australia's big four banks has recently been analysed and the report will be made available in the near future.

### **Issues with Current Community Reporting**

For greenhouse mitigation purposes the major problem with current accounting protocols is that they mix up both **production** and **consumption** activities and give a cacophony of overlapping responsibilities. The Indigo Shire community greenhouse account, done mostly on a production basis, allocate nearly two thirds or 260,000 tonnes of emissions to agricultural (169,772t or 41.8%) and industrial (89,320t or 22%) activities. While this is correct in a focused production sense (i.e. the emissions occur in the Shire), a large proportion of the production is consumed elsewhere in Australia and even overseas. Applying a 'consumption' lens to the same issues of emissions, the next section will show that the consumption activities of Indigo Shire's 15,480 people are responsible for 20 tonnes of CO<sub>2</sub>-e each, or a grand total of 309,600 tonnes, nearly 50,000 tonnes more than the agriculture and industry sectors combined.

Thus the 'production' and 'consumption' accounting protocols give different answers and most importantly encourage a large amount of responsibility shifting. Informal greenhouse discussions to date always end up blaming agriculture as "Indigo's emissions leader" while allowing each consumer and citizen (with greater total emissions in aggregate) to escape almost obligation free with a residential target of 63,000 tonnes or 16% of total. The national and international politics of greenhouse mitigation are messy and unclear at the moment and avoid clear responsibility guidelines. What is clear is that Australia has significant obligations now or later to make large emissions reductions. An Indigo greenhouse policy that focuses only on producers and avoids consumer responsibility is inequitable. Additionally, a large part of dairy, sheep and beef emissions is due to methane. It is possible in a physical sense that this cannot be reduced and that international negotiations will allow livestock industries an absolute volume to allow meat and dairy production

for domestic consumption. Current accounting procedures, while well meaning, may thus give false targets for mitigation policies.

### Indigo Household Emissions

Indigo Shire's citizens are on average, each responsible for 20 tonnes of CO<sub>2</sub>-e emissions per year through their lifestyle and consumption decisions (Figure 2). This emission level is below the 28 tonnes per person often quoted at a national aggregate level, and omits the emissions embodied in our exports (which are consumed elsewhere) and those due to government activity (education, health, defence, foreign affairs). When the Indigo Shire community base year emissions of 406,495 tonnes are divided by the Shire's population of 15,480, the resultant average of 26.3 tonnes per person lies between the full accounting approach and the national average.

This Indigo emissions data are sourced from a national and global analytical base developed by a Sydney University<sup>7</sup> group and were used to develop the Environmental Atlas<sup>8</sup> for the Australian Conservation Foundation. Simply put, the emissions contained in dollar expenditure sourced from a life cycle analysis<sup>9</sup> of the Australian economy are applied to household consumption data collected by the Australian Bureau of Statistics. The data for Indigo Shire contain both good and bad news. As emissions over the full production chain are driven primarily by income and expenditure, the figure reflects firstly the medium-level affluence of the Shire. In some ways, moderation has its benefits. The bad news is that the dominance of brown coal in Victoria's electricity supply saddles us with 5 tonnes per person more emissions than say Tasmania (the blue dots at the bottom of Figure 2) where electricity is mostly hydro.

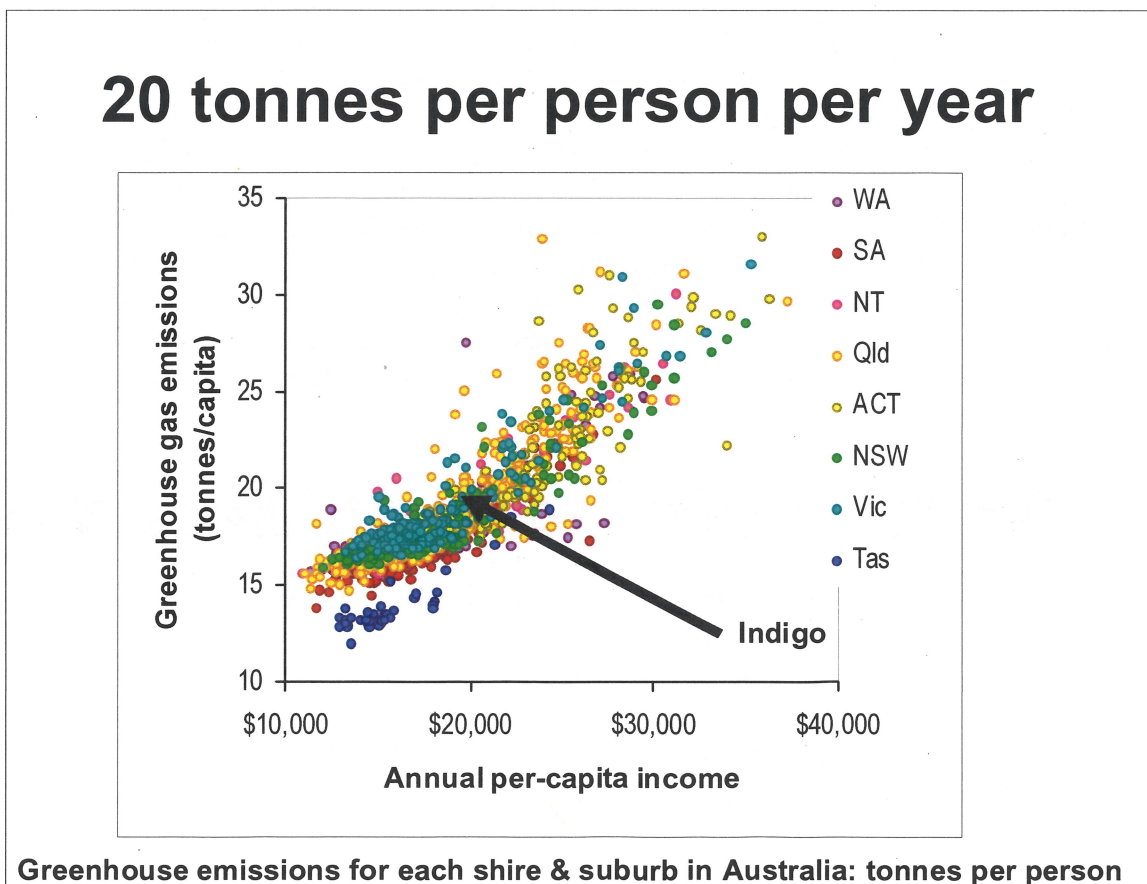


Figure 2. Per person greenhouse emissions in CO<sub>2</sub> equivalents for each shire and suburb in Australia based on the yearly personal consumption activities. At 20 tonnes per person, Indigo Shire lies in the middle range of total Australian values.

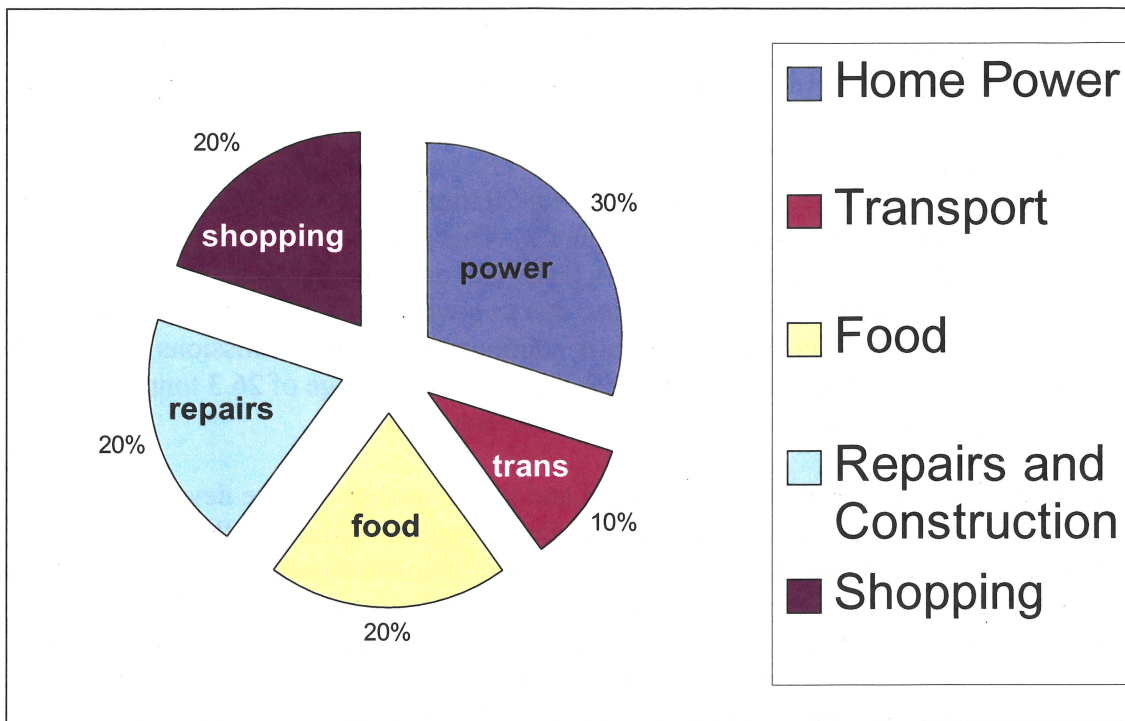


Figure 3. Composition up of the full-chain greenhouse emissions for the personal consumption budget of each person in Indigo Shire. (per person emissions are 20 tonnes of CO<sub>2</sub>-e which equates to about 50 tonnes per typical household).

The makeup of Indigo's per capita emissions (Figure 3) suggests pathways for greenhouse reduction strategies that can be used on an individual and household basis (Table 1). Only 40% of per person greenhouse emissions in Indigo are due to Scope 1 (direct combustion) and Scope 2 (electricity) activities. The Scope 3 activities have the remaining 60%, with one third each due to food, general shopping and home maintenance/renovation. There are two key issues here. The first is the limited view of national and state greenhouse mitigation policies which focus only on Scope 1 and Scope 2 activities and to date, have not promoted change in those areas aggressively enough. The second more important issue is that Scope 3 activities (consumption in general) drive economic growth and employment. Thus changing the composition and volume of Scope 3 activities may impact on a wide range of accepted social and economic 'goods' and essentially the nature of modern capitalist economies. How to make these changes and still maintain viable and active communities is the topic of widespread thought and comment worldwide, the best of which is the highly accessible report *Prosperity Without Growth*<sup>10</sup>, recently released by the UK's Sustainable Development Commission.

Table 1. Household activities that will help reduce Indigo Shire's per person greenhouse emissions

Consumption area	Greenhouse reducing activities
Home power 30% or 6t/person	<ul style="list-style-type: none"> <li>• Solar hot water or heat pump</li> <li>• Wood heating with plantation produced wood</li> <li>• Highest level insulation and retain maximal warmth or coolth</li> <li>• Check and replace energy using machines (light bulbs, white goods etc.)</li> <li>• Turn all appliances off at the wall when not in use</li> </ul>
Transport 10% or 2t/person	<ul style="list-style-type: none"> <li>• Maximise activities for each trip, and share transportation for longer trips</li> <li>• Walk or cycle locally</li> <li>• Replace current car with low fuel consumption option around 5-6 litres per 100 kms</li> </ul>

	<ul style="list-style-type: none"> <li>• If diesel, use Barnawartha bio-diesel which has almost carbon neutral life cycle due to its ingredients</li> <li>• Use train-bus for city trips to Melbourne</li> </ul>
Food 20% or 4t/person	<ul style="list-style-type: none"> <li>• Eat less red meat and less meat generally</li> <li>• Buy local where possible, and buy Australian mainly</li> <li>• Supply 30% of vegetables and fruits from the home garden and dig compost back into garden beds</li> <li>• Use mainly fresh ingredients (non-factory foods) and consume 3-4 vegetarian main meals per week</li> <li>• Reconcile life cycle analysis of food types with healthy living recommendations</li> </ul>
Maintenance and renovation 20% or 4t/person	<ul style="list-style-type: none"> <li>• Do it right first time to at least 7 star standards moving to 10 star by 2015</li> <li>• Use pre-loved components where possible</li> <li>• Balance high greenhouse materials (concrete, aluminium etc) with the design's ability to reduce long term energy/water use</li> <li>• Choose long life and non-faddish designs and materials with a style suited to maintaining real estate values</li> <li>• Seek our local experts who have already learned the lessons</li> </ul>
Shopping (non-food) 20% or 4t/person	<ul style="list-style-type: none"> <li>• Shop less, save more and reduce debt levels on credit cards and mortgages</li> <li>• Buy preloved houses, cars, white goods, furniture and clothes</li> <li>• Shop locally and buy Australian-made for enduring style and resale</li> <li>• Buy highest star ratings for appliances and focus on long lived items</li> <li>• Use time for community, family and friends rather than for shopping and retail therapy</li> </ul>

At a strategic level, Table 1 makes three important points as follows. The first is the importance of structure and doing things correctly the first time. The 30% of total per person emissions made up by the home power sector will be mostly made up by hot water and space heating. In most households lighting and appliances are fairly minor contributors with air conditioners bucking this trend a bit. In both regulation and education terms it is essential that all new buildings have at least seven star rating and move steadily to ten star by 2015. Given the correct building structure, solar or heat pump hot waters should be mandated, while integrated wood heating with plantation wood should be encouraged for reasons of both greenhouse mitigation and to promote local economic activity and employment.

The second is that transport emissions are very difficult to change apart from promoting Barnawartha biodiesel for diesel cars and trucks. On a per person basis, transport emissions are one third of home power and one half of the food, shopping and home maintenance categories. This does not lessen the need to advance Indigo's requirement for good transport connectivity, car pooling, planning for the advent of the electric car and so on, but there are other important categories to tackle before transport.

The third is that a range of community responses already well established in Indigo Shire will be important to retain economic activity and ensure community cohesion and resilience. As (or if) greenhouse mitigation activities begin to bite on what has been traditionally perceived as the 'right to a country lifestyle', Indigo Shire's strengths of local food production, farmer's markets, community groups, diversity of practical skills and so on will come to the fore. On the negative

side, it could be that 'individual vehicle tourism' might decline and tourist activity needs to be enhanced by public transport connections.

## Structural Issues Resulting from Complete Greenhouse Accounting

### Institutions

- Systems for financial accounting will need to be fully integrated with environmental accounting by coding systems that differentiate impacts e.g. travel may need to separate out air travel, car hire and accommodation as one dollar spent in each has different greenhouse contents
- Decision making may change as high greenhouse activities can no longer be outsourced (out of sight out of mind) to contractors. Decisions that are now made on a 'best cost' basis might change to be 'higher cost but lower greenhouse' ones.
- Institutions may broaden the boundaries of their greenhouse influence by taking an active interest in the consumption activities of their employees. Within a boundary that includes the institution and its employee households, it may be more greenhouse advantageous to offer alternative 'journey to work' transport, or to cost share on the provision of household energy retrofits

### Households

- Purchase of newly-built and previously-built housing will be strongly guided by an audited energy/greenhouse estimate on a moderate lifestyle basis i.e. the yearly running cost will be an important complement to the capital cost as a decision point.
- Systems for 'integrated energy management' will become commonplace with particular emphasis on winter systems where local plantation wood is used to fuel 'one furnace' space heating and hot water systems
- The pricing and labelling of food items will gradually change to reflect the greenhouse content of their full production chains. This will alter lifestyle choices and suggests an emerging niche for Indigo Shire businesses with a niche of localisation and environment.

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