

Chapter 10

The carbon tax modelling: deficiencies

Introduction

10.1 This chapter of the report outlines the processes that have led to the development of the Treasury modelling that has underpinned the government's carbon tax. The chapter also outlines and discusses the shortcomings of the Treasury modelling.

The carbon tax modelling

10.2 On 10 July 2011, the Treasurer, the Hon. Wayne Swan MP, and the Minister for Climate Change and Energy Efficiency, the Hon. Greg Combet AM MP, released the *Strong growth low pollution: modelling a carbon price* (SGLP) report. The report contained the assumptions that underpin the modelling of the carbon tax.

10.3 An update to the SGLP report was released on 21 September 2011 which revised the policy parameters of the national and sectoral economic modelling in the SGLP report.

10.4 The update presents two additional scenarios: one that reflects the *Clean Energy Future* package endorsed by the Multi-Party Committee on Climate Change (MPCCC), with a starting carbon price of \$23/t CO₂-e instead of the \$20/t CO₂-e modelled in the SGLP report and one that also includes additional government policy measures.

10.5 According to the Treasury, the purpose of the modelling has been to:
... inform policy design and public discussion about carbon pricing. Treasury has modelled a range of scenarios which explore different environmental targets and design features of a carbon pricing scheme. The modelling provides important insights into the economic impacts of carbon pricing at global, national, sectoral and household levels.¹

10.6 Notably, however, the SGLP report does not include modelling results for the important case where Australia imposes a carbon tax but the rest of the world does not move to introduce carbon pricing.

1 <http://www.treasury.gov.au/carbonpricemodelling/content/default.asp>
(accessed on 26 September 2011).

Process issues and the development of the carbon tax

Release of the carbon tax modelling for public scrutiny

10.7 The Treasury has not released all of its modelling or the results of the modelling for public scrutiny. The Treasury has stated that this would amount to 'thousands and thousands of pages of modelling'.² Nor has it released the data inputs and specifications it used to modify the models it purchased from outside sources. A failure to do so was also criticised during the Senate Select Committee hearing into the Rudd Government's Carbon Pollution Reduction Scheme.³

Peer review and scrutiny by other experts

10.8 During the questioning of the Treasury officers about the modelling the issue of whether the model had been peer reviewed arose:

CHAIR: ... Did Treasury conduct any public workshops on its modelling involving other modelling experts and allowing them to critique Treasury's approach?

Ms Quinn: Are you talking about the analysis in the most recent or are you talking in the broad at different times?

CHAIR: The most recent.

Ms Quinn: In terms of the update that we published this week, no we did not have any workshops around that update.⁴

10.9 While the Treasury did not conduct peer review of its most recent analysis, the issue of whether such scrutiny had applied to earlier modelling was also covered:

CHAIR: What about the 2011 main modelling document that was released a month or two earlier?

Ms Quinn: We have conducted different types of consultation exercises on different parts of the modelling exercise. It depends a little bit on which component you are interested in. For example, it is very important to discuss what the technology options are in the electricity generation sector going forward. There is a great deal of interest in those assumptions from the electricity generation sector and very different views in the industry. So a consultation exercise was undertaken on that component of the modelling. There are other parts that we also went to experts and asked them for their input.

2 Dr David Gruen, Executive Director, Macroeconomic Group Domestic, the Treasury, *Committee Hansard*, 23 September 2011, p. 7.

3 Report of the Select Committee on Climate Policy, June 2009, pp 36 - 37.

4 Senator Mathias Cormann, Chair, Senate Select Committee on the Scrutiny of New Taxes, and Ms Meghan Quinn, General Manager Macroeconomic Modelling Division, the Treasury, *Committee Hansard*, 23 September 2011, p. 7.

In terms of the analysis on the MMRF model, which you have raised this morning, we engaged the Centre of Policy Studies to provide us with a review of the analysis that we have done to check the technical components of the modelling were to their standard.

CHAIR: How did you determine which aspects of the modelling you would go through a process where you would have like public workshops or opportunity for other modelling experts to critique the Treasury approach?

Ms Quinn: It partly depended upon the availability of experts outside—the types of people who were interested. It is based on our experience to the modelling in 2008, where we also undertook consultations before and after the modelling was released. So between 2008 and 2011 there was quite a lot of engagement between Treasury and experts on the various elements of the modelling. So based on all of that information we also went back to people where we thought it would be particularly useful to get input.⁵

10.10 As the Treasury is not the only organisation that undertakes modelling exercises for the government, a point of comparison was highlighted between the transparency surrounding the carbon tax and the work of the Productivity Commission. The Commission regularly undertakes comprehensive modelling activities for the government. One example is its review of the economic transformation package, the National Reform Agenda.

10.11 The exchange below highlights the different approaches to transparency:

CHAIR: I refer you to your answers to question 15 of the questions you took on notice on 10 August. It is in relation to the release of modelling results. In that answer you state:

'The set of information that has already been provided is more comprehensive than comparable reports by other organisations'

...

How can that be true, when the Productivity Commission has actually made the Monash modelling so files associated with its National Reform Agenda public? Is the Productivity Commission not a comparable organisation? Or is their modelling not comparable, even though it used the same modelling you did?

...

Ms Quinn: It comes down to what you mean by 'open and transparent' in the sense that we had provided at that stage, as this says, 200 or 300 pages of the modelling et cetera.

CHAIR: Sorry. I can tell you explicitly what I mean by 'open and transparent', and that is that the Productivity Commission has actually made

5 Senator Mathias Cormann, Chair, Senate Select Committee on the Scrutiny of New Taxes, and Ms Meghan Quinn, General Manager Macroeconomic Modelling Division, the Treasury, *Committee Hansard*, 23 September 2011, p. 7.

the Monash modelling files associated with its National Reform Agenda work publicly available, whereas Treasury has not.

Ms Quinn: The Monash University model is available in the public domain through Monash University.

CHAIR: But you have made adjustments to it for the carbon tax modelling.

Ms Quinn: That information has been incorporated into the MMRF model that is available. Models evolve through time. They change as people evaluate things, as they add in information et cetera. We worked with the Centre of Policy Studies. Just to make it absolutely clear, the 2008 exercise was published by the Centre of Policy Studies. Monash University professor Philip Adams published that analysis with Treasury. It was not Treasury using a model without the model builder being happy and content and actively reporting that analysis. Since that time, the changes to the structure of the model that we may well have undertaken have been incorporated into the MMRF model and are available to other people in the Australian community.⁶

Public access to the carbon tax modelling

10.12 At a public hearing on 10 August 2011, one month after the release of the Clean Energy Future Package, the following question was asked of the Treasury officers at a public hearing:

Senator BOSWELL: Will Treasury provide independent experts access to the modelling so that they can understand all assumptions and parameters?

Ms Quinn: As was the case previously, Treasury has provided comprehensive documentation, including 35 pages of assumptions, as part of the report that is on the web page. This is the most comprehensive documentation on modelling related to carbon pricing that is available in Australia. We have provided detail on the assumptions that are important for determining the results. Others are free to undertake modelling with their assumptions as they have done.⁷

10.13 The questioning continued:

Ms Quinn: In providing information to the public domain, we have provided a comprehensive amount of information. Treasury does not own these models, so it is not possible for us to hand over someone else's model. These models are publicly available. They are purchased and available from organisations within Australia. There is nothing preventing people picking up these models and doing modelling if they have a desire to do so.

6 Senator Mathias Cormann, Chair, Senate Select Committee on the Scrutiny of New Taxes, and Ms Meghan Quinn, General Manager Macroeconomic Modelling Division, the Treasury, *Committee Hansard*, 23 September 2011, pp 8 – 9.

7 Senator Ron Boswell, participating member of the Senate Select Committee on the Scrutiny of New Taxes and Ms Meghan Quinn, General Manager Macroeconomic Modelling Division, the Treasury, *Committee Hansard*, 10 August 2011, p. 29.

Senator BOSWELL: So, if Professor Ergas were to go with a cheque in his hand and say, 'I want the modelling and I am prepared to pay for it,' it would be available to him? Is that what you are saying?

Ms Quinn: He would be able to pay for the models used by Treasury and, yes, he would be able to receive those models.

Senator BOSWELL: Comprehensive models?

Ms Quinn: Yes, he would be able to obtain them from the providers of those models.⁸

10.14 When told that he could purchase the models used by the Treasury from their respective sources, Professor Ergas explained to the Inquiry why this was not as straightforward or beneficial an exercise as it seemed:

... what you can purchase, Senator, with respect, is two models. You can purchase a model called MMRF and a model called GTEM. But what they have done is they have taken hulls of MMRF and GTEM and they have then specified those. They have converted them into, as it were, a set of fully worked out equations and into that inputted very significant quantities of data. That then yields them these two fully specified models and then one must have means, though it is not clear what those means are, of rendering those models consistent with each other—in other words, synchronising the results. Without access to the actual model, including the datasets and the specifications, essentially what you are saying is that a person who wanted access to a Shakespeare sonnet is perfectly entitled to himself use the alphabet and an English dictionary. You are absolutely right, but there is a very long way and a lot of duplication of effort, and a huge amount of reinventing the wheel, absolutely pointlessly, that would be involved in taking that approach.⁹

10.15 Professor Ergas explained why access to the complete model and all the data is important to any scrutiny of the Treasury's reports:

(The SGLP Report) relies on numerous assumptions, not less the assumption of concerted global action.

In saying this, let me emphasise that it is absolutely fair for Treasury to have made those and other assumptions. That is in the nature of modelling. But it is also fair for there to be a full opportunity to assess the implications of varying those assumptions.¹⁰

8 Senator Ron Boswell, participating member of the Senate Select Committee on the Scrutiny of New Taxes and Ms Meghan Quinn, General Manager Macroeconomic Modelling Division, the Treasury, *Committee Hansard*, 10 August 2011, p. 30.

9 Professor Henry Ergas, Professor of Infrastructure Economics, University of Wollongong, *Committee Hansard*, 10 August 2011, p. 65.

10 Professor Henry Ergas, Professor of Infrastructure Economics, University of Wollongong, *Committee Hansard*, 10 August 2011, p. 61.

10.16 Further to the public hearing on 10 August 2011, the issue was again raised at a public hearing on 23 September 2011. Once again, the evidence highlighted ongoing frustration by stakeholders about a lack of access to the modelling:

Dr Gruen: Senator, if I might try and clarify, it is not up to us to object or not object. It is not up to us. We do not lay down the law about what other institutions can or cannot do.

Senator BOSWELL: Dr Gruen, that is helpful to know, but when people have turned up to purchase the model from ABARES, ABARES officials have said that, because Treasury has made modifications to the model, any decision to make the model available is a decision for Treasury. So what I am asking you is: you have no objection?

Dr Gruen: In respect of that statement that you have read out, our understanding is that it is not a decision for us, so I do not think that statement is correct.

Senator BOSWELL: All right. So you have no objection?

Dr Gruen: Sorry, I am not trying to be difficult here, but we do not go around having objections or not having objections.

Senator BOSWELL: Well, you are, you see, because ABARES are saying you have adjusted the model and therefore you will not let us sell it. So you are saying ABARES are wrong?

Dr Gruen: I am saying that the evidence, as you have read it out, does not make sense to us. We are not making those statements to ABARES.

Senator BOSWELL: So when people go down to ABARES—

Dr Gruen: It is up to ABARES and the government.

Senator BOSWELL: and ABARES say, 'Treasury won't let us sell'—we have it on the Hansard now—we can put it on the counter and say, 'Treasury has no objections.'

Dr Gruen: You can put it on the counter and say that it is a decision for ABARES and the government.¹¹

10.17 Based on this evidence it is the Committee's view that the Treasury officials provided incorrect advice to the Committee. Specifically, there was a categorical assertion that GTEM was publicly available. In fact, it was not. Moreover, Treasury's further replies on this issue were not helpful. What is being sought, is the release of the models used by the Treasury, along with all the data, specifications and assumptions that the Treasury put into those models, so that an appropriately qualified expert could examine the modelling of the carbon tax undertaken by the Treasury. The Treasury officials appear to be referring to the capacity of persons to purchase a licence to use the software for those models, without the data, assumptions and

11 Senator Ron Boswell, participating member of the Senate Select Committee on the Scrutiny of New Taxes and Dr David Gruen, Macroeconomic Group, the Treasury, *Committee Hansard*, 10 August 2011, p. 30.

specifications by the Treasury officials. But even on those limited terms, the reality, quite contrary to the evidence Treasury provided, is that the GTEM model on which it relied is not available to third parties. As a result, other experts are not in a position to seek to replicate and appropriately test, Treasury's modelling.

10.18 The failure by the Treasury to release the modelling for public scrutiny was also raised by the Centre for International Economics, in relation to an assessment of the international abatement assumptions made by the Treasury:

This very high reliance on the purchase of international abatement is a crucial feature of the Treasury analysis and flows through to all aspects of the results. That is, the industry results and the price results in particular depend upon particular outcomes in the international market for abatement.

It is natural, therefore, to ask how sensitive the results are to changes in cost of abatement in different countries (as well as to the changing composition of policies in different countries) and to any restrictions in abatement trade between countries.

Without access to the original model, it is difficult to undertake this analysis.¹²

Release of the update carbon tax modelling

10.19 As outlined above, the Treasury released some of its modelling on 10 July 2011. On 21 September 2011, the Treasury released the publication, *Strong Growth, Low Pollution: Modelling a Carbon Price Update* (SGLP Update). The release of the updated modelling was announced by a joint press release issued at 9:18am by the Deputy Prime Minister and Treasurer, the Hon. Wayne Swan MP, and the Minister for Climate Change and Energy Efficiency, the Hon. Greg Combet AM MP.¹³

10.20 The SGLP Update was released at the same time (9:18 am¹⁴) as the first Joint Select Committee on Australia's Clean Energy Future Legislation public hearing. The timing of this release was raised at the Joint Select public hearing:

CHAIR (Ms AE Burke): I declare open this public hearing of the Joint Select Committee on Australia's Clean Energy Future Legislation inquiry into the Clean Energy Bill 2011 and related bills. ... We have received a written submission to this inquiry from you. As you have all indicated you do not wish to make opening statements we will go to questions. I will kick

12 Centre for International Economics, *Notes on 'Strong growth, low pollution' – Modelling and related issues*, September 2011, p. 13.

13 Joint Media release, the Deputy Prime Minister and Treasurer, the Hon, Wayne Swan MP, and the Minister for Climate Change and Energy Efficiency, the Hon, Greg Combet AM MP, 'Carbon price update', issued on 21 September 2011 at 9:18am by email from subscribe@treasury.gov.au.

14 Joint Select Committee on Australia's Clean Energy Future legislation, *Committee Hansard*, 21 September 2011, p. 1.

off the questioning as the Treasury modelling has been released this morning.

Senator CORMANN: That is very convenient timing.

CHAIR: It is beyond my control.

Senator CORMANN: People who were suspicious would think the government had something to hide. It is hardly open and transparent government to release it this late.

CHAIR: Now is your opportunity.

Senator CORMANN: We do not have a copy. Where is it?

CHAIR: We are not proceeding with this inquiry under this—

Senator CORMANN: Have you got a copy?

CHAIR: No, I have not. All I have seen—

Senator CORMANN: How are you going to ask questions about modelling when you have not seen it?

CHAIR: I have not got a copy. That is why—

Senator CORMANN: That is ridiculous.

CHAIR: All I have seen is the press release.

Senator CORMANN: The government is treating this committee with contempt.

CHAIR: Fine, then we will not deal with the modelling if you do not wish to.

Senator CORMANN: It is absolutely ridiculous.

CHAIR: I was going to ask them to give us a quick briefing on it. All I have seen is the press release from the Treasurer this morning.

Senator CORMANN: The Treasurer is treating us with contempt.

CHAIR: No.

Unidentified speaker: That was minutes ago, Madam Chair.

CHAIR: It was literally minutes ago. It came through minutes ago so I was going to see—

Senator CORMANN: That is disgraceful.

CHAIR: Right, I am not going to allow this committee to descend into a farce at your convenience at the outset.

Senator CORMANN: It is the government that is making it a farce.

CHAIR: Order! I have authority as chair to exclude people from the hearing and as members know I have no harm in doing it in my role as deputy chair in the House. So, if you want to proceed in that manner we will not have a hearing. If you do not want to deal with the modelling we can wait and we will recall Treasury at a later stage. I will therefore hand to Senator Milne to kick off with relevant questions.

Mr TONY SMITH: You confirmed at the beginning of this public hearing that the updated Treasury modelling, which was promised to be released with the legislation, has been released minutes before the opening of this hearing. That has just occurred now and copies are just coming into the room now. It is quite reasonable that members of the committee regard that as an utter contempt of the committee and, also, disrespectful to you, Madam Chair. You are the chair of this committee and you have said just now that you—

CHAIR: The member for Casey will well know that this is an inquiry into the bills before us today. You have the bills—they have been there. This is additional information that goes with the bills. I will—

Senator BIRMINGHAM: Which was promised to be released with the bills.

CHAIR: We are not in question time. We are not in the various chambers. We are in a public hearing and we will treat it with the respect it deserves. In that matter—

Senator BIRMINGHAM: It would be nice if the government treated this committee with the respect it deserves.

CHAIR: Senator Birmingham, if you let me finish. In that matter I am going to treat you with the respect you deserve and therefore we will not deal with the modelling today. We will recall the Treasury officials on Monday. I think that is reasonable.

Senator BIRMINGHAM: Just what questions are we meant to ask?

CHAIR: I thought I was assisting everybody. My apologies!¹⁵

10.21 The Treasury did appear on Monday, 26 September 2011 at a public hearing conducted by the Joint Committee.

Committee Comment

10.22 The Committee is concerned by the almost complete lack of transparency about the Treasury modelling.

10.23 The modelling relies on a suite of models, and especially (for its assessment of the economy-wide effects) on two models – the Monash Multi-Regional Forecasting (MMRF) model and the Global Trade and Environment (GTEM) model – along with a data set developed by the Treasury. While the MMRF model is available commercially, the GTEM model, developed by the then Australian Bureau of Agricultural and Resource Economics and Sciences, is not, though Treasury categorically claimed it was in hearings of this Committee.

15 Senator Anna Burke, Chair Joint Select Committee on Australia's Clean Energy Future Legislation, Senator Mathias Cormann, Senator Simon Birmingham and the Hon. Tony Smith MP, *Proof Committee Hansard*, 21 September 2011, pp 1 -3 .

10.24 As a result, and given that Treasury's data set has not been released publicly, it is impossible for third parties to replicate, much less stress test, Treasury's results. Those results would therefore not be accepted for publication in any scientific journal, and are no more than claims Treasury makes.

10.25 This issue is made more acute by the lack of clarity on key technical issues. Thus, it is by no means clear (and is nowhere explained in the SGLP report) how the Treasury has inter-worked the GTEM and MMRF models. There is, with respect to these models, a 'double endogeneity' problem: each model's output is an input to the other. There is an almost complete lack of clarity in Treasury's documentation about how it has addressed that problem.

10.26 Moreover, there are issues with interpreting the differences between the models. For example, as discussed in greater detail below, the MMRF model imposes a cost on the diffusion of induced innovations (the output of the Marginal Abatement Cost (MAC) curves); in the GTEM model, the standard specification does not.¹⁶ However, the law of one price (which states that absent trade barriers and other trade costs, prices for identical goods will be equalised internationally) means that it is not possible, in a conventional trade model, for (say) the price of a scrubber for reducing emissions at cement plants to differ as between countries. But this must happen in Treasury's model given the difference in assumptions about the MAC curves. This suggests the modelling strategy may be conceptually flawed, but the Treasury has neither explained why that is not the case nor disclosed the information needed to assess it.

10.27 Similar issues of how the models inter-work, and what decisions have been made as to how the output of the models is combined, affect the modelling of the price impacts of the carbon tax. In essence, the price modelling on which the government's compensation package relies is based on the Price Revenue Incidence Simulation Model (PRISMOD), which is basically a calculator of the direct and indirect impacts of assumed input price changes. These results are likely to differ substantially from the price changes estimated in the general equilibrium modelling, which is used to assess the effects of the carbon tax on real incomes.

10.28 However, the Treasury nowhere discloses the price changes from the general equilibrium modelling, nor explains its implications for real incomes (that is, real living standards, which are the result of changes in prices and wages), nor reconciles the various sets of results.

10.29 Treasury seems to believe this is acceptable, given that a version of PRISMOD was used to model the GST. The Committee believes this is incorrect, for two reasons. First, general equilibrium estimates of the impact of the GST were available, as well as those from input-output models such as PRISMOD. Second, and

16 Professor Henry Ergas, "How marginal was my abatement?", at <http://catallaxyfiles.com/2011/07/page/2/> (accessed 4 October 2011)

even more important, the GST was expected to increase real incomes, as tax reform allowed the economy to become more productive. In contrast, even in Treasury's modelling, it is clear the carbon tax is expected to lower wages.

10.30 As a result, assessing whether adequate compensation is being provided requires understanding both the changes in prices and incomes. There is therefore no sensible reason why the full outputs of the modelling, in terms of prices and incomes, have not been released.

Regulatory Impact Statement process

10.31 As part of the legislative process, legislation that is introduced into the Parliament is required to go through a Regulatory Impact Statement (RIS) process. The government's *Best Practice Regulation Handbook* (June 2010 edition) establishes the process and requirements to be followed.

10.32 As stated by the former Minister for Finance and Deregulation, the Hon. Lindsay Tanner MP:

Well designed regulation has a vital role to play in overcoming some of the problems that lead to inefficient or inequitable market outcomes. However, 'well designed' is an important qualifier - poorly designed regulation may not achieve its objectives, and can impose costs on businesses and the community more broadly.¹⁷

10.33 The handbook is there to provide the impetus for agencies and governments to improve the quality of regulation and its impact on the Australian community and economy. Given the importance of RIS process, it is unsurprising that this matter was investigated by the committee.

10.34 At its hearing on 16 September 2011, the committee asked about the nature of the Department of Climate Change and Energy Efficiency's compliance with the RIS process:

Senator FIFIELD: I ask a few questions about the regulatory impact statement on the clean energy legislation. With such significant legislation, as a matter of course, these statements must be done. Has the department commissioned external work to estimate the compliance costs on businesses of the carbon tax?

Dr Kennedy: Well, as you know there was a regulatory impact statement completed and published as part of the introduction of the legislation. I will just hand over to Mr White, who may know a bit more detail about that.

Senator FIFIELD: Thank you.

Mr White: Senator, in preparing the regulatory impact statement, the department did not commission external device for the regulatory impact

17 <http://www.finance.gov.au/obpr/proposal/handbook/foreword.html>
(accessed 26 September 2011).

statement that was prepared this year. What was done was that two quite significant pieces of external advice were commissioned in relation to the Carbon Pollution Reduction Scheme proposal of a couple of years ago. And because the underlying mechanics of the schemes are similar, in terms of the reporting requirements, permit surrender requirements, so for business systems those reports we used as a basis for assessing their compliance costs and the resident was prepared this year.

Senator FIFIELD: Okay, so there has not been new analysis done.

Mr White: The department did not commission a new external analysis.

Senator FIFIELD: Okay. So you are relying on that 2008 work, fundamentally?

Mr White: Yes, updated by the department's own internal analysis.¹⁸

10.35 It is surprising that such a significant change to the economy through this carbon tax initiative was not subject to greater scrutiny as part of the RIS process:

Senator FIFIELD: Okay, I will just come back to the role of the department itself in undertaking the regulatory impact statement. The handbook also goes on to say that:

Where possible, quantify the impacts. At a minimum your analysis should attempt to quantify all highly significant costs and benefits to be assessed as adequate, and (the RIS) must have a degree of detail and depth of analysis that is commensurate with the magnitude of the problem and the size of the potential impact of the proposal.

Now, it is hard to (think) of an economic change, a policy change, a legislative change which would have a magnitude of impact greater than what is being proposed with the clean energy package. This is exactly the sort of scenario that the Department of Finance and Deregulation envisages detail and depth being gone into with a greater magnitude than in other situations. Given that requirement, it does strike me as suboptimal, to say the least, that it is 2008 work for a different legislative package and a different scheme which is fundamentally being relied upon to determine the compliance costs and the effects on business.

Dr Kennedy: As Mr White said, much of the mechanics of this scheme are similar to the mechanics in the former CPRS. Hence we took the judgment that we could rely on those significant early external assessments, and the OBPR was comfortable with that position.¹⁹

18 Senator Mitch Fifield and Dr Steven Kennedy, Deputy Secretary, Department of Climate Change and Energy Efficiency and Mr James White, Assistant Secretary, Department of Climate Change and Energy Efficiency, *Committee Hansard*, 16 September 2011, pp 12 – 13.

19 Senator Mitch Fifield and Dr Steven Kennedy, Deputy Secretary, Department of Climate Change and Energy Efficiency, *Committee Hansard*, 16 September 2011, p. 14.

10.36 While the RIS does not appear to have been substantially updated since the Carbon Pollution Reduction Scheme (CPRS), the carbon tax will introduce new compliance costs for business. As mentioned earlier, the RIS process is intended to contribute to the development of best possible legislation:

Senator FIFIELD: As part of the process, has the Department of Climate Change and Energy Efficiency undertaken a quantitative cost-benefit analysis?

Dr Kennedy: Of the carbon price emissions trading scheme?

Senator FIFIELD: Yes. And taking into account compliance costs as part of that.

Dr Kennedy: I suppose for this policy the Treasury modelling is the key modelling, particularly for the cost side. What this means for variations in growth for what it might be otherwise—

Senator FIFIELD: Let us come back to compliance costs. The Ernst & Young work in 2008 looked at compliance costs. Has that work been done again in relation to this package?

Dr Kennedy: As Mr White said earlier, the two earlier studies formed the basis of the compliance aspect of our assessment of this scheme.

Senator FIFIELD: So the answer is no, then. There has not been freshly commissioned work to look at the compliance costs for this scheme?

Dr Kennedy: I think Mr White has answered that question, yes.

Senator FIFIELD: The Treasury modelling does not cover compliance costs for business, does it?

Dr Kennedy: The costs and benefits of an emissions trading scheme? What the Treasury modelling covers at the macroeconomic level is the cost to the economy of imposing a carbon price. What it does not cover are the benefits that flow from mitigating climate change. So in a sense it is not a full cost-benefit analysis—it actually only focuses on the economic costs and the transitional adjustment from introducing a carbon price.

Senator FIFIELD: Under the requirements of the Office of Best Practice Regulation, when undertaking regulatory impact statements is it not the obligation of the department of climate change, in this case, rather than Treasury, to undertake that cost-benefit analysis?

Dr Kennedy: We are not talking about compliance now, we are talking about the entire scheme and all the costs and benefits of the scheme.

Senator FIFIELD: Yes.

Dr Kennedy: I think it is important that the whole of government looks at the policy. Treasury is the place that has the resources to most carefully examine and model the costs and transitions that come with carbon pricing. The benefit side of mitigating emissions has been looked at by the 2008 Garnaut review, not the most recent one, and Treasury was deeply involved in that exercise. It is really the only exercise in Australia that has tried to quantify the benefits of mitigating climate change or avoiding dangerous climate change. Some of those benefits are difficult to estimate but as a

policy, from a modelling perspective, the extent of the Treasury modelling and the Garnaut style modelling is probably the most extensive and long modelling that has ever been done on any policy. They were looking at costs and benefits over 100 years.

Senator FIFIELD: Back to compliance costs, did the Office of Best Practice Regulation advise you that a fresh analysis of compliance costs was not required for the RIS?

Dr Kennedy: I will ask Mr White to comment on that.

Mr White: We discussed the question of compliance costs analysis with the Office of Best Practice Regulation and they were satisfied with the approach we took.

Senator FIFIELD: Would the secretary of the department have to sign off that he was confident that all requirements had been met?

Dr Kennedy: The secretary or his delegate. I think in this case it may have been me.

Senator FIFIELD: It may have been you?

Dr Kennedy: I sign off on a lot of things, Senator. I am pretty sure I signed off on that one.

Senator FIFIELD: Okay, it is a pretty significant thing to sign off on. Thank you.²⁰

10.37 Leaving aside the surprising point that Dr Kennedy was uncertain whether or not he had signed off on so important a document, it is notable that in doing so he was unaware that the Treasury modelling explicitly does not include the compliance costs being discussed. As that document notes:²¹

The models do not capture transaction costs in reducing emissions, such as through regulating emission trading schemes. In the real world, implementing and monitoring emission markets has transaction costs ...²²

Concerns about the Treasury modelling

10.38 The Treasury's modelling of the government's carbon tax, has been widely criticised as highly optimistic and based on implausible assumptions:

The base case is meant to reflect a plausible reality, and I do not think anybody would imagine that the rest of the world is going to put a carbon price in place. To me, this is more an attempt to manipulate the outcomes of

20 Senator Mitch Fifield and Dr Steven Kennedy, Deputy Secretary, Department of Climate Change and Energy Efficiency and Mr James White, Assistant Secretary, Department of Climate Change and Energy Efficiency, *Proof Committee Hansard*, 16 September 2011, p. 14.

21 Department of the Treasury, *Strong growth, low pollution - modelling a carbon price*, 2011, p. 28

22 Department of the Treasury, *Strong growth, low pollution - modelling a carbon price*, 2011, p. 28

the model than to try to openly and transparently understand the effects of a carbon tax.²³

10.39 The Committee has identified a number of concerns about the Treasury modelling which has been publicly released:

1. Treasury has not performed a cost-benefit analysis of the effect of imposing a carbon tax;
2. it has not properly modelled the macroeconomic effects of the carbon tax;
3. unrealistic assumptions by the Treasury that other nations will cut their carbon emissions in line with commitments made under the Cancun, Copenhagen and Kyoto protocols and that credible and seamless international trading of permits will be available on anything like the scale envisaged by Treasury;
4. what flows from the assumption that the economy will maintain full employment, rather than the assumption itself; and
5. the decision not to model results at a regional level.

10.40 The fifth issue is addressed in Chapter 6 of the report.

Cost-benefit analysis

10.41 It is of great concern that Treasury has not performed a cost-benefit analysis of the impact of imposing a carbon tax on Australia. It is inevitable that any change of the size of the carbon tax will have effects on the economy as a whole.

10.42 In evidence cited above, Senator Fifield questioned the Department of Climate Change and Energy Efficiency officers on the conduct of a cost-benefit analysis. They admitted that no such analysis was conducted, but asserted that that responsibility rested with the Treasury. Regardless, the important thing is that it was not done.

10.43 Other chapters of this Report address evidence provided to the Inquiry about the knock-on effects to the economy of the government's carbon tax, particularly in regional areas. For example, there is evidence that it will affect jobs, not only in energy and mining, where the effects will be direct, but also in regions where power generation or mining are the major employers. There has been evidence that the increase in petrol prices, when it comes in, will affect how small businesses operate, as well as prices for towns reliant on road transport to bring in food and groceries.

23 Mr Daniel Price, Managing Director, Frontier Economics, *Committee Hansard*, 1 September 2011, p. 50.

Committee Comment

10.44 The Committee believes that Treasury's failure to perform the required cost-benefit analysis on the whole economy means that its modelling does not provide a full picture of the effect of the carbon tax.

Macroeconomic modelling

10.45 The models used by the Treasury 'do not capture transaction costs in reducing emissions, such as through regulating emission trading schemes'.²⁴ Nor has the Treasury captured the transition costs that would be imposed on the economy by restructuring as a result of the carbon tax. The modelling 'assumes labour and capital adjust perfectly across industries, and it does not capture as many of the transition costs as would be experienced in the real world'.²⁵ Further, the modelling treats all household assistance as a lump sum payment for simplicity. This means it does not reflect the distortions likely to be caused by the actual form in which that assistance is provided.

10.46 Therefore, it must be concluded that the modelling is likely to significantly underestimate the overall costs of the scheme.

10.47 In considering the macroeconomic costs of the carbon tax, Treasury has modelled the impact of the tax, in 'percentage deviation from baseline terms'. It has shown the results of the modelling for Gross National Income per person, the capital stock, real wages and Gross Domestic Product in Charts 5.10 to 5.13.²⁶ Those charts show the percentage cost of the scheme moving at a more or less steady pace, year after year, all the way to 2050.

Committee Comment

10.48 The Committee believes that the Treasury modelling is inadequate in its modelling of the macroeconomic costs of the carbon tax, with the risk that these costs are significantly underestimated. The modelling it has conducted relies on a chain of assumptions, many of them unrealistic. That said, it is true that all economic modelling relies on assumptions — indeed, that is the difference between a model and a life-size reproduction. However, any serious work tests the implications of varying at least those assumptions to which the outputs are likely to be most sensitive. In Treasury's report, on the other hand, there is little sensitivity testing, even compared to the work that was done for the CPRS.

24 Department of the Treasury, *Strong growth, low pollution - modelling a carbon price*, 2011, p. 16.

25 Department of the Treasury, *Strong growth, low pollution - modelling a carbon price*, 2011, p. 15.

26 Department of the Treasury, *Strong growth, low pollution - modelling a carbon price*, 2011, pp 86 - 89.

10.49 While Treasury's modelling has been presented as reflecting the economic impact of the government's package of measures, the Committee feels it is far from doing so.

10.50 To begin with, as set out in Chapter 8 dealing with the budget impacts of the government's carbon tax, Treasury's modelling does not cover the costs of the additional, unfunded, outlays associated with the package. As these will require a long run increase in taxes, they would normally be costed on a basis that includes the distortions induced by taxes, as required by the government's guidelines for cost-benefit appraisal. However, Treasury simply assumes the measures are budget-neutral, when they are not.

10.51 Moreover, Treasury's modelling does not reflect the economic costs of the compensation package. As indicated, it assumes households receive that compensation in the form of lump-sum payments, which (by definition) have no effect on decisions to work or save. However, in reality, the tax changes introduced by the government involve an increase in marginal tax rates for many tax earners. Additionally, the tax interaction effects between the carbon tax and the income tax for those high income earners who do not receive compensation amount to an increase in effective marginal tax rates. As a result, they will distort the economy, causing added economic losses. Treasury's modelling ignores those effects altogether.

10.52 As for Treasury's modelling of the electricity sector, it ignores the proposed shut down of generating facilities, and the economic consequences of the condition that the government has said will be imposed on generators accessing compensation payments. The effect of those conditions will be to distort, and hence further increase the cost, of electricity supply.

10.53 Nor does Treasury model the economic costs of the subsidies to renewables and other industries that will be provided by the Clean Energy Finance Corporation.

10.54 Finally, Treasury's modelling ignores the fact that the government has locked in compensation to households in what amounts to dollar terms by building that compensation into the tax and benefit schedules. However, future carbon prices, and hence revenues to government, are uncertain, which means that fiscal risk has increased. That fiscal risk has a cost to the community but that cost if not acknowledged, much less modelled, in Treasury's analysis.

Unrealistic assumptions about an international carbon trading scheme

10.55 On 10 August 2011, the Treasury officials were asked about its assumption in relation to international action on climate change. The Inquiry was told:

The analysis we have undertaken relating to international action on climate change indicates that countries that have made pledges at either Cancun or Copenhagen conventions through the UNFCCC process implement policies to achieve those pledges. For example, the United States has pledged to reduce its emissions by 17 per cent of its 1990 levels by 2020, and that is the

assumption that we have modelled in the 550 parts per million scenario. Where countries have identified a range in their pledges, we have taken the low-end pledges over the period to 2020. They are the international action assumptions that are embodied in the modelling.

For the more ambitious international action, we have assumed that countries have to achieve the highest of their pledges between now and 2016 and then countries have to take greater action than is currently on the table, because there is a mismatch between the pledges that are currently on the table and the stated agreement or aim of parties to the UNFCCC of achieving a two degrees or less warming of the world. There is a bit of an inconsistency at the moment between those two pledges.²⁷

10.56 The main criticism of this approach is that there is little evidence that the international community will, in fact, live up to all its promises on carbon reduction. It should be stressed that this does not mean no action will be taken to reduce carbon emissions. Rather, the assumption can be seen as at best overly optimistic, if not naive and unrealistic.

10.57 From Australia's point of view, there are significant doubts that some of our most important trading partners and resource competitors – China, the United States and India – will even try to meet their commitments. This point was made by Professor Henry Ergas in evidence to the Inquiry on 10 August 2011:

Treasury has modelled a scenario in which the rest of the world adopts such a scheme and we do too. It also models the somewhat irrelevant case in which the rest of the world acts and we do not. But it has not modelled, or if it has modelled has not released, the most relevant scenario, which is the one in which we impose such a scheme and our major resource competitors do not.²⁸

10.58 Criticism of this lack of additional modelling was also made by the Centre for International Economics:

The price pathway, the availability of international abatement to mitigate Australian costs, and the competitiveness implications for individual Australian industries all depend on the simulation configuration, data and parameters embedded in the international model (GTEM) used by Treasury. The reported analysis provides one particular scenario for global action based around one set of parameters. Unfortunately this provides little understanding of the overall sensitivity or risks associated with Australian policy making in the context of global action.

27 Ms Meghan Quinn, General Manager Macroeconomic Modelling Division, the Treasury, *Committee Hansard*, 10 August 2011, p. 14.

28 Professor Henry Ergas, Professor of Infrastructure Economics, University of Wollongong, *Committee Hansard*, 10 August 2011, p. 61.

Further, the simulation configuration has a number of implicit assumptions about how a world market for abatement may ultimately work. There is limited reported information to understand the effect of changes to these implicit assumptions.²⁹

10.59 It went on to raise another concern about the way the Treasury had modelled the international scenario for the carbon tax:

The Productivity Commission recently noted that most countries are not implementing carbon policies in the most cost effective way. This means that as policy is currently emerging, it is unlikely that the true cost of abatement will be revealed in international markets. This is similar to having distortions to the ideal market (as simulated by Treasury).

The effect of these distortions is similar to increasing the marginal cost of abatement so that distortions in the lowest cost abating countries will be most important from a risk perspective. Within a global trading framework, the costs to Australia are as much a function of the efficiency of other country policies as they are a function of domestic Australian policy.³⁰

10.60 The cases of Canada and the United States of America can be used to illustrate the flaws in the Treasury's assumption. Firstly, the Treasury has conceded that neither the United States nor Canada have met their theoretical targets under the Kyoto Protocol, even though it was adopted in 1997 and went into force in 2005.

10.61 When pressed in relation to action by Canada to meet its promised targets, Ms Quinn stated '(t)he Canadian government has still maintained its commitment to achieve its pledge of similar reductions to the United States'.³¹

10.62 However, the current Canadian government was elected on a platform of not implementing a carbon tax. It is true that it has stated it will achieve its abatement commitments in other ways, however, it has not shown any strong determination to do so. In fact, according to a Report released by a research group based at the University of Ottawa on 22 September 2011, 'Canada's federal approach to climate change has been characterised by its changing focus, uncertainty and lack of commitment'.³²

10.63 The United States has taken some steps to reduce its carbon emissions but a recent decision by the Environment Protection Agency to postpone the first round of

29 Centre for International Economics, *Notes on 'Strong growth, low pollution' – Modelling and related issues*, September 2011, p. 6.

30 Centre for International Economics, *Notes on 'Strong growth, low pollution' – Modelling and related issues*, September 2011, p. 15.

31 Ms Meghan Quinn, General Manager Macroeconomic Modelling Division, the Treasury, *Committee Hansard*, 10 August 2011, p. 15.

32 Mike De Souza, 'Canada moving away from ally on climate change action: Report', *Montreal Gazette*, 22 September 2011, <http://www.montrealgazette.com/technology/Canada+moving+away+from+ally+climate+change+action+Report/5444318/story.html> (accessed 27 September 2011).

planned greenhouse gas regulations has been described as 'the latest step in the Obama Administration's lengthy walk back of its promised climate policies.'³³

10.64 Asked about the possible effect of the United States not meeting its Cancun and Copenhagen commitments, which are greater than Australia's it must be noted, Ms Quinn was understandably unsure as to what might result:

In terms of the economic modelling, if the United States was not to take action to meet their Cancun agreement of a 17 per cent reduction relative to 1990 levels, it would then depend on what happened in other countries. Would other countries take more action to achieve an environmental outcome that would reduce dangerous climate change?³⁴

10.65 If the assumption that countries will meet their Cancun commitments is optimistic, then surely the hope that they will increase carbon reduction activities to take up the shortfall created by the United States' failure to meet its promises is patently unrealistic.

10.66 Treasury's modelling assumes not only that countries implement their Cancun commitments but continue on a rising abatement trajectory even after the Cancun commitment period ends. However, the Cancun commitments are entirely voluntary.

10.67 In modelling the consequences of these abatement assumptions, Treasury starts from the premise that an internationally uniform carbon price will emerge from 2016. Treasury officials were asked about how this will happen on 10 August 2011. It stated:

CHAIR: Lenore Taylor wrote in a recent article—and I think this is similar to what you just said:

The government says it is not assuming countries such as the US actually have an emissions trading scheme, but rather that they would try to reach their emission reduction targets at a cost no higher than the international price.

Do you agree with that?

Ms Quinn: Yes.

CHAIR: That is what Treasury is assuming? That is a fair reflection of your assumption?

33 Bryan Walsh, 'Al Gore and the Alternate Realities of Climate Change', Time, 20 September 2011, <http://www.time.com/time/health/article/0,8599,2093955,00.html>, (accessed 27 September 2011).

34 Ms Meghan Quinn, General Manager Macroeconomic Modelling Division, The Treasury, *Committee Hansard*, 10 August 2011, p. 33.

Ms Quinn: What we are assuming is that there are mechanisms in countries to achieve emissions that result in an implicit or explicit carbon price based on those economies. It does not mean it specifically has to be an emissions trading scheme within all countries. It is the case that we are assuming that there is a continuation of the international offset market which exists now in order for Australia to be able to purchase permits from overseas. So we are assuming that there is an arrangement, either through an international framework or through bilateral trades, such that Australian liable entities are able to purchase offsets overseas. That is not the same as saying that all countries have to sign up to an international binding agreement, and it would be inaccurate to make that statement.³⁵

Committee Comment

10.68 As stated above, the criticism of the assumption is not that no action will be taken, but that less than complete action is more likely – in particular from the major economies and Australia's direct trade competitors.

10.69 The Committee, therefore, believes it is legitimate to criticise the failure by the Treasury to model any scenario where the international community meets something less than all of its promised emission targets as a failure on its part.

10.70 The Treasury assumptions that countries will implement their Cancun and that there will be a rising abatement trajectory after the end of the Cancun commitment period are questionable. As noted above, those commitments are voluntary. Long experience in many other areas — including international trade and investment, as well as myriad environmental and social areas — shows that countries frequently under-deliver or renege on voluntary commitments. As a result, it is at the very least imprudent to assume those voluntary commitments will indeed be delivered, and is not the way modelling would be done for (say) defence decisions. As for the extension of those commitments, there is no reason whatsoever to assume that will occur.

10.71 Previously Treasury denied that this meant that an international carbon trading scheme would be in place by then. It now accepts that there will be some mechanism by which all the advanced economies trade emissions by 2016, will be able to trade – be it between firms, governments or both – using a settled carbon price. However, Treasury nowhere explains what that mechanism is, or why it is plausible that it will indeed be in place, and capable as acting as the means by which a uniform international price emerges, by that date. Rather, the Committee believes it is surely obvious that no such mechanism will be in place by that time, or indeed, any time soon after that.

10.72 To then examine how the abatement targets and associated carbon prices translate into economic activity, Treasury relies heavily on the MAC curves

35 Senator Mathias Cormann, Chairman, Senate Select Committee on the Scrutiny of New Taxes and Ms Meghan Quinn, Macroeconomic Modelling Division, Macroeconomic Group, the Treasury, *Committee Hansard*, 10 August 2011, p. 15.

mentioned above. In essence, these act as the representation in the model of induced technical change: that is, of innovation that is stimulated by progressively higher carbon prices. The greater the extent to which such innovation is stimulated, the lower will be the economic cost of reducing carbon emissions.

10.73 In itself, the assumption that higher carbon prices will stimulate emissions-reducing innovations is plausible. But it is apparent that the reason this mechanism works as well as it does in free market economies is that the price increases hold out the promise of profits to innovators who can develop products or processes that cost-effectively economise on the input whose price is rising. International intellectual property laws, reflected in Australia's international obligations, ensure innovators can charge prices for those innovations that capture for them the social value generated by their innovations.

10.74 The Committee believes that it is at this point, the Treasury model goes off the rails. In effect, it assumes for the GTEM modelling — which covers the entire world other than Australia — that the induced innovations are effectively available at no cost. This completely unrealistic assumption (which implies the rest of the world abandons currently binding commitments to intellectual property laws) is hardly innocent. Rather, it understates the extent to which carbon intensive activities must shrink to achieve emissions reductions targets and hence reduces the world income loss consequent on emissions reduction. In turn, higher world income improves Australia's terms of trade and hence the income levels we can achieve under various emissions reductions scenarios.

10.75 Unfortunately, there is no sensitivity testing in Treasury's report of the implications of the assumptions made with respect to these MAC curves. However, the sensitivity tests on this assumption reported in the CPRS modelling suggest the impacts of varying those assumptions would be very significant. Why that is not even mentioned in Treasury's report is a matter of concern. Indeed, it is not even made clear in Treasury's report that no cost has been imputed to induced innovations in the GTEM model (see below).

10.76 Additionally, Treasury's modelling assumes Australia can meet its abatement targets largely by importing abatement from developing countries. Moreover, a substantial share of those imports is projected to come from countries in the former Soviet Union and Asia that have low estimated abatement costs.

10.77 However, there is no reason to believe these countries will develop credible institutions that can assure the quality of claimed abatement efforts. This is especially important because trade in abatement differs from conventional trade in that both the parties to this trade have an interest in defrauding the government (who is the sole consumer of abatement). As a result, enforcing the quality of international transactions is especially complex and costly. But Treasury simply assumes those difficulties away, and takes it for granted that the seemingly intractable problems associated with corruption and low institutional competence in these countries have been solved.

10.78 Thus, there is no testing of the implications should the world not proceed on the path to coordinated global abatement while Australia remains locked in to the government's carbon tax. There is, in other words, no modelling of the implications of unilateral abatement, or of abatement by Australia not matched by abatement by our foreign competitors.

10.79 As for the assumptions about the availability of foreign abatement, it is in the nature of Treasury's modelling that abatement costs will be very much affected by the presence or absence of low abatement cost countries. In other words, including or excluding a source of abatement with low costs has a more than proportional impact on the overall estimated cost of achieving a given abatement target. As a result, it is likely that Treasury's estimate of the costs of the government's proposal are highly sensitive to the assumptions about the feasibility of buying abatement from a wide range of low cost sources overseas. However, Treasury does not provide any sensitivity testing in this respect.

The assumption of full employment

10.80 The modelling assumes 'in the long run that there is an adjustment of the labour market back to a structural rate of unemployment.'³⁶ In other words, full employment. The Committee accepts that this is a common assumption to make in economic modelling, but – even leaving aside the issue of whether or not this structural rate would be unaffected by actions to forsake much of Australia's comparative competitive advantage in low cost coal-fired power generation – it does not follow that the fruit of the assumption is beyond criticism.

10.81 Furthermore, the government continues to present what is a Treasury assumption underpinning the modelling as if it is a modelling result.

10.82 The Treasury modelling gives prominence to the claim that '(j)obs will continue to grow under carbon pricing. By 2020, national employment is projected to increase by 1.6 million jobs, with or without a carbon price.'³⁷ This additional employment will be particularly concentrated in the services sector.³⁸ Far less prominence is given to the concession elsewhere in the modelling that substantially lower real wages (relative to baseline) would be required to achieve such outcomes – almost 6 per cent lower by 2050 and still steadily declining.³⁹

10.83 The SGLP Report states:

36 Ms Meghan Quinn, General Manager Macroeconomic Modelling Division, the Treasury, *Committee Hansard*, 10 August 2011, p. 17.

37 Department of the Treasury, *Strong growth, low pollution - modelling a carbon price*, 2011, p. 1.

38 Department of the Treasury, *Strong growth, low pollution - modelling a carbon price*, 2011, p. 65.

39 Department of the Treasury, *Strong growth, low pollution - modelling a carbon price*, 2011, Chart 5.12: Real Wages – Change from global action scenarios, p. 101.

The shifts in jobs between industries caused by pricing carbon will be small compared to those caused by ongoing technological change and income growth. They will also be small compared to the usual churning of employment between firms and industries every year.⁴⁰

10.84 It goes on to say that '(t)he impacts of carbon pricing on output and employment growth vary widely across sectors, with some sectors growing faster, and others more slowly.'⁴¹ What this fails to acknowledge is that some sectors of the economy are truly national, whereas others are concentrated in a small number of regional areas. This is particularly so for the industries that will be most affected by the carbon tax – the power generation and the mining industries.

10.85 The Committee's concerns about the Treasury's assumptions concerning employment levels are:

1. having built the assumption into the modelling, claiming it as a result that shows full employment does not prove that this will in fact be the case;
2. the assumption does not reflect the medium and short term effects of the government's carbon tax policy; and
3. the assumption operates across the entire economy, but it does not follow that full employment will be maintained in all regions.

10.86 The actual effect of the government's carbon tax, as distinct from its assumed effect, has been addressed in submissions to the Inquiry from New South Wales Treasury⁴² and the Moe and District Residents Association.⁴³ It has been raised in public statements⁴⁴ and by witnesses from regional areas in their evidence to the Inquiry.⁴⁵ Chapter 6 examines the effect of the carbon tax on regional communities in more detail.

40 Department of the Treasury, *Strong growth, low pollution - modelling a carbon price*, 2011, p. 8.

41 Department of the Treasury, *Strong growth, low pollution - modelling a carbon price*, 2011, p. 103.

42 New South Wales Treasury, *Submission 81*.

43 Moe and District Residents Association, *Submission 99*.

44 For example, Department of the Treasury, Western Australian Government, *Preliminary Assessment of the Impact of the Proposed Carbon Tax on Western Australia*, 21 August 2011, http://www.treasury.wa.gov.au/cms/uploadedFiles/Treasury/Publications/Preliminary_Assessment_Impact_Proposed_Carbon_Tax_on_WA_August2011.pdf (accessed 22 August 2011) and Deloitte Access Economics report, at http://www.premier.vic.gov.au/images/stories/documents/mediareleases/2011/0_DAE_report.pdf, (accessed 22 September 2011).

45 See *Committee Hansard*, 3 August 2011 and 5 August 2011.

10.87 Treasury provides no sensitivity testing of its assumptions about the speed at which the labour market reverts to full employment. Additionally, Treasury implicitly but importantly assumes the equilibrium rate of unemployment is unchanged by the carbon tax, but this assumption is plainly incorrect - rather, the tax interaction effects discussed below (that is, the distortions that arise from the interaction of the carbon tax and the income tax) must mean that equilibrium rate rises. However, the Treasury provides no estimate of that increase or of the impact of varying its assumption on labour market outcomes.

10.88 The Committee is of the view that Treasury's modelling of the labour market effects of the carbon tax is unclear to the point of being misleading. In effect, the Treasury presents the results as if unemployment was continually at its equilibrium rate, in other words, it appears as if the labour market continuously provides what amounts to full employment.

10.89 However, subsequent to the publication of its report, the Treasury has accepted that in the MMRF model it uses, it takes the labour market 5 to 10 years to adjust to a shock such as the imposition of a carbon price. But there is no sign of that adjustment, and the associated unemployment, in its modelling results. This suggests Treasury has altered MMRF to ensure full employment, presumably by requiring the adjustment to be completed within a year; but it nowhere explains how it has do so, or more important, how that can possibly be justified.

Modelling of the effect of the carbon tax on regional areas

10.90 The downturn in manufacturing industries is already taking a toll on some regions of the country. In the areas most reliant on power generation and coal mining for employment the effects of the government's carbon tax will be accentuated. The carbon tax will also affect regional communities that are reliant on heavy vehicle transport.

10.91 The difficulties with the assumption of rapid, frictionless adjustment to these changes are shown up most starkly by Frontier Economics' report for New South Wales Treasury:

This *aggregate* employment result [that the effects on employment are expected to be only modestly adverse] masks the underlying structural adjustment necessary for the economy to achieve this moderate result, which requires employment and other resources to flow freely between sectors and/or regions.⁴⁶ [emphasis supplied]

10.92 It is also notable that some of the Treasury modelling explicitly does not capture all of the costs associated with such major structural adjustment. For example, it is stated of the GTEM model used by Treasury that:

46 Frontier Economics, *Carbon price modelling: A report prepared for the NSW government*, August 2011, p. 5.

GTEM assumes labour and capital adjust perfectly across industries, and it does not capture as many of the transition costs as would be experienced in the real world.⁴⁷

10.93 What is being assumed by the Treasury is that, even though there will be a loss of jobs in coal mining in the La Trobe Valley, for example, more jobs will be created in other areas and over all, employment will remain the same. This, it should be noted, is predicated on continued population growth to 35 million. The notion that people who have spent all their lives working as miners in Traralgon will be able to obtain work in service industries on the Gold Coast is a long bow to draw.

10.94 This is no disrespect to those workers, but merely the statement of an economic reality that disappears under the assumption being made by the Treasury.

10.95 None of this, of course, takes into account the knock-on effects of job losses in regions that are heavily reliant on emissions-intensive industries.

Modelling of price impacts of the carbon tax

10.96 In 2010 the government introduced legislation to split the renewable energy targets scheme (RET scheme) between small-scale and large-scale schemes. On 21 June 2010, the Minister for Finance and Deregulation, Senator the Hon. Penny Wong, told Parliament that this change was expected to increase electricity prices by around 4.4 per cent over four years.⁴⁸

10.97 In December 2010, Queensland's energy regulator estimated that these changes to the RET scheme would increase power prices in that state by 2.9% in 2011. Similarly, in January 2011 the New South Wales Independent Prices and Regulatory Tribunal (IPART) estimated that changes to the RET scheme would push its power prices up by 6% in 2011-12.

10.98 These figures were cited to Treasury when it gave evidence to the Inquiry on 10 August 2011. It was then asked about the accuracy and reliability of its modelling of power prices generally:

The point here is that Commonwealth forecasting of the impact of policy changes on the cost of electricity is not very good, is it? I am interested in what role Treasury had in assessing the impact of the RET on electricity prices moving forward.

Mr Raether: From memory, the report you are referring to was commissioned by the Department of Climate Change and Energy Efficiency. As to that particular report, you might do best to direct questions to them. I think that was a report by MMA—a consultancy—but I do not

⁴⁷http://www.treasury.gov.au/carbonpricemodelling/content/report/downloads/Modelling_Report_Consolidated_update.pdf, Chapter 2, p. 27. (accessed 2 October 2011).

⁴⁸ Senator, the Hon. Penny Wong, Minister for Finance and Deregulation, *Senate Hansard*, 21 June 2010, p. 3801.

know whether my colleagues want to comment on the extent to which Treasury provided comments on that exercise.

Ms Quinn: I want to provide some additional information. What Mr Raether says is true; it was done by the Department of Climate Change and Energy Efficiency. The number you referred to—the four per cent—was an average across Australia. There were variations within that across different states. It was the case that the expectation was that, as with the carbon price, there would be a front-loading of the increase as a result of the renewable energy target, there would be an increase in electricity costs as people adjusted and increases in future would be less.

...

Ms Quinn: We were talking about going from a renewable energy certificate of very low up to a large number. That initial step change can be quite large and then incremental changes over time are quite small. So you get a step change in the knock-on effect of that and so the percentage increase you get in the first year is larger than subsequent percentage changes in the next few years. I do not think you can draw your conclusion that in Queensland it is around 2.9 per cent and therefore the four per cent number is not accurate.

CHAIR: The four per cent number is over four years.

Ms Quinn: That is right.

...

Ms Quinn: ... the 2.9 is the first year and subsequent years are likely to be lower than that as a result of this step change implication. The other thing to note is that the policy framework has changed since the modelling you referred to with the separation of the renewable energy target into different elements, and that has implications for the costings.⁴⁹

10.99 Treasury took the question on notice. Its response did not directly address the question of the accuracy of its earlier predictions of the effect of the government's changes to the RET scheme on electricity prices. Nor did it address Treasury's role in the RET forecast. It can only be concluded that it stands by its modelling and its prediction.

10.100 The Committee is of the view that this modelling is unreliable. The public can have no confidence that power prices will only rise in line with Treasury predictions as a result of the changes to the RET and the carbon tax.

49 Senator Mathias Cormann, Chair, Senate Select Committee on the Scrutiny of New Taxes, and Mr Robert Raether, Principal Advisor, Industry, Environment and Defence Division, Department of the Treasury and Ms Meghan Quinn, General Manager Macroeconomic Modelling Division, the Treasury, *Committee Hansard*, 10 August 2011, p. 10.

Committee comment

10.101 The Committee believes that the evidence it has received shows that there are a number of quite significant shortcomings with the modelling conducted by Treasury:

- it has not modelled the quite probable scenario where Australia imposes a carbon tax and other countries, and especially Australia's major resource competitors, do not;
- it has not performed a cost-benefit analysis of the effect of imposing a carbon tax or a proper Regulatory Impact Statement;
- it assumes that the economy will maintain full employment;
- its estimate of the effects of changes to the Renewable Energy Target scheme is at odds with analysis conducted for the New South Wales and Queensland governments;
- it has not released any modelling of the impact of a carbon tax on specific regions of Australia; and
- it has not allowed public scrutiny of its full models, datasets and specifications.

10.102 Treasury's modelling has not been presented in a balanced and objective way, nor has Treasury answered the questions put to it in a manner that respects the importance of the Senate inquiry process.

10.103 First, with respect to the SGLP report, it is at times seriously misleading, including by not making clear the assumptions on which the analysis rests. For example:

- it never makes it clear how Treasury has modelled the labour market adjustment process but nonetheless emphasises that employment continues to grow and full employment persists;
- nowhere in the report is it made clear that some form of generalised international carbon trading has been assumed, and never is it explained what the form of that trading is or how it achieves a uniform world carbon price; and
- the report never explains that it assumes that for the purposes of the GTEM model, induced innovation is not fully costed.

10.104 Moreover, in answering questions about the modelling, Treasury withheld or misstated crucial information. Thus, as noted above, Treasury maintained categorically that the GTEM model was publicly available, when it was well known that that was not the case. Additionally, Treasury claimed that the MAC curves were fully costed, saying that statements by Professor Ergas, as cited above, were incorrect. It subsequently admitted that Professor Ergas' statement was indeed correct.

10.105 Indeed, even the written replies Treasury provided were in important respects seriously questionable. Thus, in replying to Professor Ergas on the MAC curves, Treasury said that its assumption of un-costed innovation was 'conservative', as:

raising the costs associated with the MAC curves in the GTEM model results in a lower world carbon price path to achieve any given environmental target as global high emission industries reduce emissions more quickly.⁵⁰

10.106 However, as is clear from the sensitivity testing Treasury reported in the case of CPRS, the economic costs of abatement efforts are much higher when the GTEM MAC curves are properly costed, as carbon intensive production shrinks much more quickly. By not stating this, but rather presenting its approach as 'conservative', Treasury was less than entirely forthright.

10.107 A similar misstatement occurs with respect to the assumptions about the labour market. There again, in replying to Professor Ergas, Treasury suggested that the impact of an ever-increasing carbon price would be slight, and that this would be clear in a forward looking model.⁵¹ (A model is forward looking if market participants form expectations about the future and act on those expectations.) This is problematic, if not entirely incorrect, for at least two reasons.

10.108 Firstly, it is not accepted, nor is it acceptable practice, to use a backward looking model (as Treasury has done) but then cherry pick a single area (in this case, employment) and pretend it can be assumed to behave as if it were forward-looking *without the other model outputs also changing*. Rather, all the modelling should be placed on a forward-looking basis if those inferences are to have any weight.

10.109 Secondly, even putting that aside, Treasury claims that:

... after the initial introduction of carbon pricing the year to year movements in the carbon price are expected to be relatively small, allowing the labour market to work through most of the initial adjustment over time.⁵²

10.110 This is, at best, unproven, as the carbon price is increasing more rapidly than the economy's growth rate, while the MAC curves Treasury uses appear somewhat front loaded (so reductions in the costs of abatement occur relatively soon). To that extent, the rising carbon price would be pushing against ever slower reductions in the

50 Additional information received, document 7: Letter to the Committee dated 30 September 2011, from Dr David Gruen, Executive Director of the Macroeconomic Group – Domestic, Department of the Treasury, received on 4 October 2011.

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marginal cost of abatement, necessitating increasing falls in real wages for full employment to persist.

10.111 The Committee again recommends as per Recommendation 1 that the carbon tax be opposed by the Parliament.

Recommendation 4

10.112 The Committee recommends that, should the government remain committed to proceeding with its carbon tax, before any vote the Senate should demand that:

- **the government release all of its modelling, including the actual models, datasets and specifications used by the Treasury, to allow third party review;**
- **the government establish an Independent Expert Panel to review its modelling approach and framework;**
- **the Productivity Commission be asked to undertake a cost-benefit analysis of the proposed carbon tax;**
- **the legislation should be amended to ensure that any increase in the tax or lowering of the emissions cap be made a disallowable instrument and to ensure that carbon permits are not private property.**