

POPULATION GROWTH AND AUSTRALIA'S 2020 GREENHOUSE GAS EMISSION COMMITMENTS

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The Australian Government has stated an unconditional commitment to reduce greenhouse gas emissions by five per cent on year 2000 levels by 2020. However, in the absence of new abatement measures, Treasury-led modelling indicates that Australia's emissions will grow from 553 million tonnes in 2000 to 774 million tonnes in 2020. This article disaggregates the Treasury modelling in order to estimate the contribution of population expansion to this growth. It shows that 83 per cent of the forecast increase in greenhouse emissions to 2020 will be attributable to population growth. The article concludes that it is very unlikely that Australia will achieve the five per cent reduction target by 2020 in the absence of attention to the population growth factor.

In its White Paper on the Carbon Pollution Reduction Scheme (CPRS) published in December 2008, the Australian Labor Government laid down its greenhouse gas abatement commitments and aspirations.¹

It affirmed the Labor Party's long-standing aspiration to reduce greenhouse emissions in Australia by 60 per cent on year 2000 levels by 2050. It also announced a new commitment to reduce Australia's greenhouse emissions by between five and 15 per cent below 2000 levels by 2020. These two endpoints are defined in the White Paper as CPRS-5 and CPRS-15 respectively. Henceforth, they will be referred to in these terms.

The White Paper states that:

The top of this range (5 per cent below 2000 levels) represents a minimum (unconditional) commitment to reduce emissions by 2020, irrespective of the actions by other nations. The bottom of the range (15 per cent below 2000 levels) represents a commitment to reduce emissions in the context of global agreement where all major economies commit to substantially restrain emissions and all developed countries take on comparable reductions to that of Australia.²

In this paper, the focus is on the Australian government's 'unconditional' commitment to a five per cent reduction in greenhouse emissions on year 2000 levels

(which were 553 million tonnes) by 2020, that is, CPRS-5. For this to occur, Australia's greenhouse emissions would have to fall to 525 million tonnes in 2020. The White Paper acknowledges that even this apparently modest goal will not be easy to achieve. It states that:

Australia's social and economic characteristics, especially our growing population and relatively emissions-intensive economy, mean that we will have higher adjustment costs than many other developed countries to reach ostensibly similar goals.³

It is easy to see why Australia will have difficulty arresting the growth of greenhouse emissions. Per capita economic growth has been growing rapidly, and so too has Australia's population, with the consequence that overall real economic growth (or Gross Domestic Product—GDP) has been growing by three to four per cent per annum, at least until the economic crisis beginning in 2008. Meanwhile, as the White Paper notes, Australia's 'relatively emissions-intensive economy' ensures that rapid economic growth translates into increased greenhouse emissions.

As part of the preparation for the White Paper, the Australian Government issued a separate report entitled *Australia's Low Pollution Future* (ALPF) in 2008.⁴ This reports the Treasury-led modelling for the

'business as usual' outlook for greenhouse emissions to 2020 and 2050. Subsequent references to the Treasury's modelling contribution to the White Paper refer to this report. The 'business as usual' or reference case (as it will be referred to subsequently) indicates Treasury forecasts of greenhouse emissions in the absence of new abatement measures, including the proposed CPRS or any other form of carbon tax. The forecast for this reference case is that Australia's greenhouse emissions will grow from 553 million tonnes (expressed as CO₂ equivalent gases) in 2000 to 774 million tonnes by 2020 or by 221 million tonnes.

The Treasury reference case is a product of highly detailed computable general equilibrium modelling, which takes into account a multitude of variables. However in presenting the results in ALPF, the Treasury summarises or reduces these variables to three factors. They are per capita economic growth, population growth and greenhouse emissions per dollar of GDP.

As is shown below, the Treasury expects both per capita economic growth and population growth to increase significantly to 2020 and 2050. On the other hand, it expects emissions per dollar of GDP to fall over the same period, even in the absence of the proposed CPRS. Since the expectation is that there will be overall growth in emissions of 221 million tonnes by 2020 it is evident that the forecast per capita economic growth and population growth offsets the expected decline in emissions per unit of GDP.

The reference case provides a measure of how difficult it will be to achieve any reduction at all on year 2000 greenhouse gas emission levels. Both the Labor Government and the Coalition opposition are committed to maximising Australia's per capita economic growth and neither have shown any inclination to challenge Australia's current high rate of population growth. The Labor Government has proposed that

the CPRS will serve as a mechanism to lower Australia's greenhouse gas emissions. But as discussed below, the Government has struggled to gain acceptance of this mechanism from either industry or the opposition parties.

Given this situation it is timely to investigate what the relative role of per capita economic growth, population growth and emissions intensity is in the reference case outlook for Australia's greenhouse emissions. The Treasury does not provide this information in ALPF. This paper seeks to fill the gap. It provides an estimate of the contribution of population growth to the forecast increase in greenhouse emissions of 221 million tonnes over the period 2000 to 2020. It does so by disaggregating the Government's modelling in order to identify the role of population growth in the level of greenhouse emissions by 2020 relative to other factors considered in the modelling.

There is a growing awareness about the lack of government attention to population growth in Australia's greenhouse abatement policy. As the climate scientist David Karoly has recently declared:

Australian governments' policies on population growth, encouraging immigration and an increasing birth rate, also make it more difficult to reduce emissions. This encouragement for increasing population in Australia is completely at odds with the claimed aims of tackling climate change.⁵

But, how important is the population factor? At present, the interested public is flying blind on the issue. Before proceeding with the analysis, we digress to examine the treatment of the population factor in recent policy discussions of Australia's greenhouse gas emissions.

DEALING WITH THE POPULATION FACTOR

It is sometimes argued that the growth of greenhouse emissions in Australia due to

the immigration component of population growth is not relevant because greenhouse emissions are a global problem and the particular national context in which the emissions occur does not matter. This is not true in Australia's case because of our very high per capita emissions level (see Table 1). As is shown below (Table 3) the bulk of Australia's projected population increase will come from net migration. Most of our migrants come from Europe, China, India and other parts of Asia, where per capita emission levels are a third or less of those in Australia. Once here, migrants rapidly adopt Australian consumption patterns and thus move to a similar greenhouse footprint to that of other Australian residents.

Given that it is Australian Government policy to maintain a very high migration program, one might think that the government would be attracted to emission reductions based on per capita targets, rather than to those expressed in aggregate national terms. Rapid population growth, as is documented in this paper, makes the attainment of even modest reductions to overall greenhouse emissions in Australia very difficult to achieve.

The per capita reduction strategy was recommended by Ross Garnaut in the *Garnaut Climate Change Review* presented to the government in September 2008. Garnaut's thinking is transparent. He has been an advocate of high migration levels for decades. He does not want to see immigration policy coming under critical scrutiny in the context of greenhouse gas abatement policy. Thus, at the outset of his inquiry, he excised population from the range of factors to be considered in achieving the ambitious targets that his inquiry ultimately recommended.⁶

As a consequence, Garnaut's final report has nothing to say about population, except to declare that the report assumes that Australia's population will reach 47 million by 2100. There is no analysis of the

contribution that population growth makes to the growth of emissions in his reference case, nor of the effect that any contraction in the 47 million assumption would have on greenhouse emissions in Australia.

Nonetheless, Garnaut was aware of the contribution population growth makes to Australia's emission growth profile and thus of the difficulty of achieving reductions in Australia's total greenhouse emissions. His solution is to recommend per capita emission targets. The key paragraph is as follows:

Australia's ongoing strong immigration and population growth means that it will be easier to cut emissions in per capita rather than absolute terms. Australia's population growth rate is above the world average. The Garnaut-Treasury reference case suggests that Australia's population will increase proportionately by almost three times global population through this century. If emissions entitlements and targets are framed in per capita terms, countries with growing populations will receive greater absolute allocations. Population growth considerations are centrally

Table 1: Emissions (tonnes CO₂e) per capita, 2005

United States	23.9
European Union	10.7
Australia	28.9
Rest of Annex B ¹	12.3
China	5.4
India	1.6
Rest of world	4.2
World average	6.0

Source: Treasury estimates in *Australia's Low Pollution Future*, Chapter 3, p. 6.

Notes: ¹ There are 39 Annex B countries under the Kyoto protocol. Under the protocol, these are emissions-capped industrial countries or economies in transition with legally binding emission reduction obligations.

important to equitable distribution of the adjustment burden among Australia and other developed countries.⁷

Garnaut appears to assume that the world will look kindly on the desire of Australian policy elites to rapidly increase the population and that the rest of the world will allocate the necessary greenhouse-emission indulgences to accommodate this aspiration.

In the event, the Labor Government's did not accept Garnaut's recommendation to make per capita emission targets the basis for evaluating Australia's progress on the issue. The White Paper does not explicitly say this. Rather, it simply ignores Garnaut's recommendations on the matter. The White Paper's proposals are all expressed in terms of national-level aggregate emission targets.

It may be that the politics of following Garnaut's recommendations frightened the Government. Garnaut recommended a strategic path of 'contraction and convergence' to the per capita emission levels prevailing in most undeveloped countries of around three to four tonnes per head by 2050.⁸ If this level was to be achieved it would require an implausible reduction in per capita emissions in Australia of almost 90 per cent. Not that Garnaut ever believed that such a contraction was possible in Australia. He assumes that by 2050, Australian polluters will be heavily reliant on the purchase of emission permits in the international carbon-permit market place.

A REPLICATION OF THE TREASURY REFERENCE CASE

The focus here, however, is not on the Garnaut review but on the Treasury's reference case to 2020 as published in ALPF. This is a product of highly detailed modelling. However, as noted, in presenting its analysis to the public, the Treasury reduces the factors shaping greenhouse emission levels to three. The first is the projected rate of

growth in per capita GDP. The more rapidly this grows, the greater the production of goods and services in Australia will be by 2020. If there is no change over this period in the amount of energy used and the carbon content of the fuel used in supplying this energy for the production of these goods and services, there will be a parallel increase in per capita greenhouse emissions.

The second is the number of Australian residents. The more their number grows, again, other things being equal, the more greenhouse emissions will grow. These two factors amplify each other, since Treasury assumes that any expansion of per capita GDP will apply to new residents as well as those currently present in Australia. The aggregate of these two factors is total GDP. This is obtained by multiplying the projected per capita GDP in 2020 by the projected population in that year.

The third factor is the greenhouse emission levels resulting from each dollar of GDP. This ratio has been falling, largely as a result of structural change in the Australian economy, as the share of services in total economic activity increases relative to goods. The production of services normally involves a much lower input of energy per unit of activity than is the case with goods. The Treasury led modelling also projects that there will be improvements in technology which will lead to less energy per unit of output, whether of goods or services.⁹

Greenhouse emissions in Australia by 2020 in the reference case are calculated by multiplying total GDP by Treasury's estimate of the weight in kilograms of greenhouse gases per dollar of GDP by 2020. As is detailed in Table 2, the total emissions by 2020 are forecast to be 774 million tonnes (up from 553 million tonnes in 2000).

In order to calculate the contribution of each of the three factors to the forecast greenhouse emission growth, information is required on each of these factors at the start-

ing date of 2000 and the completion date of 2020. Some of this information is provided in ALPF,¹⁰ though not the number of people that Treasury assumes will be resident in Australia by 2020, nor per capita GDP by 2020. As a result, an interested citizen would have difficulty doing any disaggregation of the Treasury forecasts. However Treasury did provide, on our request, the necessary information on the population and GDP per capita assumptions to 2020. The relevant data for the starting point in 2000 (shown in Table 2) were derived from publicly available Australian Bureau of Statistics releases. The estimate for emissions per dollar of GDP in 2000 is our calculation. It is computed by dividing total greenhouse emissions in 2000 by GDP in 2000. The estimate for greenhouse emissions in 2000 was provided by the Treasury.

As Table 2 shows, the Treasury assumes Australians will be very much richer (on average) by 2020 than we were in the year 2000. Real GDP per capita is projected to grow from \$44,532 in 2000 to \$62,357 in 2020. This outcome reflects Treasury's assumption that real GDP per capita will grow by 1.4 per cent per annum. Treasury also assumes that Australia's population will reach 25.2 million in 2020 and 33.0 million by 2050 (up from 19.2 million in 2000). As a result, aggregate real GDP almost doubles between 2000 and 2020 from \$885 billion to \$1,571 billion.

It will come as no surprise that this huge increase in economic activity results in significant growth in greenhouse emissions in the

reference case. However as Table 2 shows, the impact of this additional economic activity is offset somewhat by the results of the Treasury led modelling on greenhouse emissions per dollar of GDP. These are projected to fall from 0.625 kilograms per dollar of GDP in 2000 to 0.4927 kilograms by 2020.

THE ROLE OF POPULATION GROWTH IN THE EXPANSION OF GREENHOUSE GAS EMISSIONS IN AUSTRALIA

The replication of the Treasury modelling outcomes allows a calculation of the contribution of population growth, growth in per capita GDP and reductions in emissions per dollar of GDP to the growth of greenhouse emissions in the reference case. The

Table 2: Treasury assumptions for the calculation of the reference case level of greenhouse gases in 2020

	2000	2020
Population (million)	19.2	25.2 ¹
GDP per capita (A\$)	44,532 ²	62,357 ³
GDP (A\$ billions)	885 ⁴	1571 ⁵
Greenhouse emissions per \$GDP (kg)	0.625 ⁶	0.4927 ⁷
Emissions (millions of tonnes CO ₂ e)	553 ⁸	774 ⁹
Per capita emissions (tonnes CO ₂ e)	28.8	30.7

Sources: ¹ Australian Government Treasury, <www.treasury.gov.au/lowpollutionfuture/spreadsheets/report_charts/Annex%20B/Chart%20B.3%20-%20Australian%20population.xls>

² ABS, Australian National Accounts: National income, expenditure and product, 5206.0, June 2009, Table 1

³ Australian Government Treasury, <www.treasury.gov.au/lowpollutionfuture/spreadsheets/report_charts/Chapter%203/Chart%203.29%20-%20Australian%20GDP%20and%20GNP%20levels.xls>

⁴ GDP per capita multiplied by population

⁵ GDP per capita multiplied by population

⁶ Greenhouse emissions divided by GDP

⁷ Australian Government Treasury, personal communication

⁸ Australian Government Treasury, personal communication

⁹ GDP multiplied by greenhouse emissions per dollar of GDP

Note: CO₂e means CO₂ equivalent greenhouse gases

contribution of population growth can be assessed by asking what total greenhouse gas emissions would be in 2020 if per capita GDP and emissions per dollar of GDP were to reach the levels projected by the Treasury to 2020, but Australia's population were to remain unchanged at the 2000 figure of 19.2 million.

The answer is that if Australia's population had remained at 19.2 million in 2020, GDP would have been \$1,197 billion (19.2 million multiplied by per capita GDP of \$62,357). If emissions of greenhouse gases per unit of GDP fell to 0.4927 kilograms, as projected by the Treasury, total greenhouse emissions in 2020 would have been 590 million tonnes, an increase of only 37 million tonnes on the 2000 figure.

The implication is that the combined effect of Treasury's projected changes in GDP per capita and emissions per unit of GDP have only added 37 million tonnes to the 553 million tonne starting point in 2000. The rest of the 221 million tonne projected increase to 774 million tonnes, or 184 million tonnes, is a consequence of the extra six million people Treasury projects will be added to Australia's population between 2000 and 2020. That is, population growth is responsible for 184 million tonnes of the projected 221 million tonne increase, or 83.3 per cent.

The reason for the relatively low growth in emissions under the stable population scenario is that most of the increase attributable to growth in GDP per capita is offset by the projected decline in emissions per unit of GDP.

GREENHOUSE EMISSIONS IN A STABLE POPULATION SCENARIO

If Australia's population were to remain stable between 2000 and 2020, there would be many differences in the pattern of economic activity by 2020, compared with what would occur as the result of an additional six million residents. These could

affect emissions per dollar of GDP. We believe that emissions per dollar of GDP are likely to be lower in the stable population scenario. The reason is that the addition of six million persons is equivalent to adding an extra 17 Canberras to Australia's population (Canberra's population was 345,000 in 2008). These extra people would have to be accommodated and employed. The required city building activity would add a huge amount of energy-intensive economic activity to that which would otherwise occur should the population remain stable. If so, under the stable population scenario, greenhouse emissions are likely to be even lower than the 590 million tonne figure projected above.

Should Australia move towards a more stable population, this would deliver a double bonus in regard to lowering greenhouse emissions. Aggregate GDP would be lower, and so too would the emissions per dollar of GDP.

If Australia's population stabilised this might also affect the rate of per capita economic growth. The most recent thorough analysis of this effect is provided by the Productivity Commission's report on the *Economic Impacts of Migration and Population Growth*.¹¹ The Productivity Commission concluded that per capita annual income by 2024–25 would be slightly lower (by 0.71 per cent) in the absence of migration.¹² If so, greenhouse emissions are also likely to be slightly lower in per capita terms under the stable population scenario than under the rapid population growth scenario modelled by the Treasury.

IS POPULATION GROWTH AMENABLE TO POLICY ADJUSTMENT?

Population growth consists of natural increase and net migration components. The former, at least as far as births are concerned, is a product of individual family decisions, which government policy has

only limited power to shape. Migration, however, is almost entirely a product of Australian Government policy, since the inflow of migrants can be micro managed by decisions about the rules shaping eligibility for family reunion, skilled and humanitarian entry, and whether this entry is permanent or temporary.

Table 3 shows the components of population growth between 2006 and 2020, and 2050, which are attributable to natural increase and to net overseas migration. The starting point is 2006 rather than 2000 because we wanted to replicate the Treasury projection, which starts from this date. The projection in Table 3 has been prepared by the Centre for Population and Urban Research (CPUR). We could not replicate the Treasury projection fully because of limited information as to the demographic assumptions incorporated within it. The endpoint at 2050 of 33 million matches the Treasury forecast. Our figure is a little lower for 2020 than the 25.2 million projected by the Treasury.

This is of no great consequence. What matters is the extent to which natural increase and net immigration contribute to the population growth forecast. Table 3 shows that, between 2006 and 2020, some 63 per cent of population growth is due to net overseas migration. After 2020, the

Table indicates that almost all of Australia's population growth will derive from net overseas migration. This is because births and deaths converge after 2020.

PER CAPITA ECONOMIC GROWTH AND ENERGY EFFICIENCY FACTORS

The preceding analysis shows that Australian governments could have a major impact on controlling the growth of greenhouse emissions in Australia if the migrant intake was reduced. However, the Australian Labor Government and almost all of the green and climate advocate groups engaged in the climate-change debate have chosen to ignore the potential gains in reducing greenhouse gases through population policy adjustments. The implication is that they regard population growth as more important than the achievement of greenhouse abatement targets.

Our conclusion will be contested by climate abatement advocates. They believe that the CPRS-5 target can be achieved, even in a context of rapid population growth and rapid per capita growth in GDP. In other words, in their view, we can have it all ways. The basis for this belief is that it is possible to achieve a sharp and rapid reduction in emissions per dollar of GDP.

In principle they are right. If Australia's

Table 3: Population projections to 2020 and 2050, with and without net overseas migration ('000)

	2006	2020	2050
Population projection ¹	20,697	24,961	32,996
Projection with nil net migration	20,697	22,290	22,481
Population increase from 2006 due to natural increase	—	1,593	1,784
Population increase from 2006 due to NOM ² of 180,000 per annum	—	2,671	10,515
Total population increase	—	4,264	12,299

Source: Centre for Population and Urban Research

Notes: ¹ Assumes net overseas migration of 180,000 per annum and TFR of 1.8

² NOM = net overseas migration

coal-dependent economy was transformed to one using natural gas, nuclear and/or renewable energy, greenhouse emissions would contract sharply. A mandatory requirement for a sharp improvement in the energy efficiency of vehicles or in the fossil fuel energy used in buildings could similarly achieve major cutbacks. For example, if emissions per dollar of GDP in Australia were reduced from 0.4927 to 0.3 kilograms by 2020, Australia's greenhouse emissions would be 471 million tonnes by 2020 rather than 774 million tonnes, even if Australia's population reached the Treasury's projection of 25.2 million. If so, this would mean a reduction of 15 per cent below the year 2000 level of 553 million tonnes—which would be equivalent to meeting the CPRS-15 objective.

Emission levels per dollar of GDP at these levels are plausible. The Treasury report indicates that, within the European Union (EU), emissions per dollar of GDP were already at 0.37 kilograms in 2005. The Treasury projects that they will reach 0.3 kilograms per dollar of GDP in the EU by 2020.¹³

Sharp reductions in emissions in Australia could occur if the Labor Government legislates its proposed CPRS, including the emissions trading scheme (ETS) that is its centrepiece. The government will also have to implement a restrictive cap on the level of emissions allowed. This cap will have to fall to around 523 million tonnes by 2020 for CPRS-5 and around 464 million tonnes for CPRS-15.

However, as the Rudd Government has discovered, it is difficult to win acceptance of such legislation. There are too many powerful vested interests under threat. In addition, the cheapness of coal-based electric power in Australia relative to other sources of power generation, amplifies the cost penalties of an ETS (and associated restrictive cap on emissions) from the point of view of business. Reflecting these

interests, the proposed ETS scheme, which failed to win parliamentary support in early December 2009, was full of loopholes providing free permits to coal-based electricity generators as well as to other big polluters, including the agricultural sector. This was before the government had stated what the cap would be. The proposed legislation just provides the authority to set a cap. The real test of the government's resolve will come if and when it sets a carbon cap that would put Australia on the path required for the CPRS-5 or CPRS-15 target.

It is likely that, with a booming economy stimulated further by the huge recent level of population growth, a carbon cap designed to meet either the CPRS-5 or CPRS-15 pathways would lead to such competition for carbon permits that the price would rise precipitously. In this context, it is hard to see the Rudd Labor Government or any subsequent government implementing such a cap.

WHY POPULATION GROWTH IS SUCH AN IMPORTANT DRIVER OF GREENHOUSE EMISSIONS

In developed countries, the extra emissions that flow from an increase in per capita GDP tend to be offset by improvements in energy efficiency, as measured by kilograms of emissions per dollar of GDP. The Treasury modelling confirms this pattern for Australia. Table 2 shows that per capita GDP in Australia is expected to grow from \$44,532 to \$62,357 over the years 2000 to 2020, or by a massive 40 per cent. Yet, as indicated, if population remains at the 19.2 level, greenhouse gas emissions only increase from 553 to 590 million tonnes over the same 20 years. The explanation is that growth in GDP (and thus consumer capacity to spend) is largely offset by the expected reduction in emissions per dollar of GDP.

This relationship has been evident for a long time. Calculations by the World

Resources Institute (WRI) show that in developed countries where population growth is low, as was the case across most of Western Europe during the 1990s and early 21st Century, that there was little increase in total greenhouse emissions. The WRI's disaggregation of the sources of growth in greenhouse emissions show that this is largely because per capita economic growth has been offset by improvements in energy efficiency per unit of GDP. By contrast, countries like Australia and Canada where population growth was relatively rapid, show much higher rates of greenhouse gas emission growth.¹⁴ This is mainly because reductions in emissions per dollar of GDP in Australia and Canada tend to be negated by additional emissions attributable to population growth.

AUSTRALIA'S POLICY STANCE ON GREENHOUSE EMISSIONS

The Australian Labor Government likes to present itself as a global leader in the movement for greenhouse emissions reduction. Kevin Rudd has declared himself to be an impassioned believer in the need for a global compact on the issue in which developed nations state their willingness to cut greenhouse emissions. In a 6 November speech to the Lowy Institute, he attacked greenhouse sceptics as well as those who said Australia should wait until after the Copenhagen meeting before declaring its contribution. Rudd stated:

As we approach Copenhagen, it becomes clearer that the domestic political pressure produced by the climate change sceptics now has profound global consequences by reducing the momentum towards an ambitious global deal. The argument that we must not act until others do is an argument that has been used by political cowards since time immemorial—both of the left and the right.¹⁵

The Labor Government even says that:

It has committed to reduce Australia's carbon pollution by 25 per cent below 2000 levels by 2020 if the world agrees to an ambitious global deal to stabilise levels of CO₂ equivalent at 450 parts per million or lower by mid century.¹⁶

It is hard to see these commitments as anything more than symbolic goals, which no doubt the Government would like to achieve, but not at the price of threatening other valued ends.

This judgement stems from an evaluation of other policies which the government has pursued. The Labor Government has given the very highest priority to promoting aggregate economic growth in the interests of preserving and creating jobs. It has also shown great sensitivity about preserving Australia's emissions intensive export industries. Moreover, since taking office in November 2007 the Labor Government has pursued a record-high migration policy. The Prime Minister has stated that he welcomes the challenge this presents and values the 'big Australia' that will be the result. His government must know that this policy will diminish the likelihood that its greenhouse emission abatement policy will ever be fulfilled.

These priorities are evident in a recent statement by the head of the Treasury, Dr. Ken Henry, when discussing the forthcoming *Intergenerational Report* on Australia's population outlook. The *Report* projects that Australia's population will reach 35 million by 2049 and not 33 million as was assumed in the Treasury modelling discussed above. Dr. Henry expressed concerns about whether Australia's natural resource endowments are sufficient to sustain a population of 35 million, and about the loss of biodiversity. However, he had nothing to say about the implications of a population of 35 million for the attainment of the Australian government's emissions-abatement aspirations.¹⁷

CONCLUSION

The Australian Labor Government is in a diabolically difficult policy situation. It wants to be seen as an enlightened contributor to solutions to the global warming crisis. To this end it has given an 'unconditional commitment' to CPRS-5 by 2020 and flagged that it may be willing to introduce even greater cuts. It has the example of the EU which has committed to a 20 per cent cut in aggregate greenhouse emissions by 2020 relative to year 1990 levels. Even the United States Government has announced a commitment to reducing greenhouse gas emissions by 17 per cent by 2020 relative to 2005 levels.

The Australian Government will have to state its 'guaranteed emission targets' for 2020 by 31 January 2010 if it is to meet the terms of the Copenhagen Accord agreed to on 18 December 2009.¹⁸ If the government is unwilling to go beyond the CPRS-5 goal to 2020 it will be exposed as a pretender in climate abatement circles. Those involved know that much more severe cuts are required if atmospheric greenhouse gases levels are even to be stabilised.

Yet as this paper has shown, there is little prospect of Australia achieving even the CPRS-5 objective. The Treasury-led modelling shows that, under the reference case, Australia's emissions will increase from 553 million tonnes in 2000 to 774 million tonnes by 2020. This expansion will be driven by a booming minerals-led economy, as well as rapid population growth.

The Australian Government is riding this boom and thus is unlikely to enforce a cap on emissions which would achieve the CPRS-5 objective, even if it gets the CPRS legislation through the Parliament.

There is a relatively painless option available, which is a commitment to stabilising Australia's population. We have shown that population growth contributes 83 per cent to the total growth in greenhouse gases projected in the Treasury's reference case to 2020. Thus population stabilisation could massively ease the pain of achieving the CPRS-5 or even the CPRS-15 objective.

The simple arithmetic is as follows. If Australia's population had remained at 19.2 million to 2020 the achievement of the CPRS-5 goal would only have required a per capita reduction in greenhouse emissions from 28.8 tonnes per head in 2000 to 27.3 tonnes per head in 2020. But if Australia's population reaches 25.2 million by 2020 the achievement of CPRS-5 will require per capita emissions to fall to 20.8 tonnes. A fall of this magnitude over the next decade is not plausible.

The population option has been ignored by most participants in the greenhouse abatement debate, perhaps because few of them appreciate the crucial role of population growth in Australia's emission burden.

We hope that this article will at least remove the excuse of ignorance.

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