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Analysis

A Critique of the Australian National Outlook Decoupling Strategy: A 'Limits to Growth' Perspective

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1. Introduction

This paper provides a critical commentary on the high profile Australian National Outlook (ANO) Report, published in late 2015 by Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) (Hatfield-Dodds et al., 2015a). The report's findings were also published in the prestigious, peer-reviewed journal *Nature* (Hatfield-Dodds et al., 2015c), suggesting that the conclusions are robust and should be accepted. The report argues that with collective effort and sound policy, Australia can 'achieve economic growth and improved living standards while also protecting or even improving our natural assets' (Hatfield-Dodds et al., 2015a: 12).[1] The report therefore aligns closely with a broader range of literature arguing that economic growth, no matter how environmentally damaging it has been historically, can be 'decoupled' from environmental impacts by way of technological innovation, resource efficiency improvements, pricing mechanisms, and conservation efforts (see Hatfield-Dodds et al., 2015a: 4; see also UNEP, 2011; Grantham Institute, 2013; Blomqvist et al., 2015). The findings of the report are underpinned by several scientific papers that will also be considered throughout our critique (Schandl et al., 2015; Hatfield-Dodds et al., 2015b; Hatfield-Dodds et al., 2015c; Baynes, 2015). We maintain that the ANO Report has not established a convincing case for the decoupling strategy, a conclusion that has implications beyond the Australian context.

In order to offer a balanced critique, we specifically focus on the report's most ambitious sustainability scenario (the '*Stretch*' scenario), which in effect represents the CSIRO's best case for 'green growth' via decoupling. If the *Stretch* scenario can be shown to fail from a sustainability and justice perspective, then obviously the less ambitious scenarios, which involve progressively more modest reductions in environmental impact, fail as well. After summarising the ANO Report, we outline a series of criticisms regarding major speculative assumptions contained within the *Stretch* scenario.

2. Overview of the ANO Report

The ANO Report includes 20 different scenarios for Australia's future development for the period 2010–2050, intended to provide guidance for Australian policy makers on the achievement of long-term 'sustainable prosperity.'[2] Each scenario is characterised in terms of multiple interrelated variables at both the national and global level, which together impact on sustainability outcomes. At the national level these variables include: energy and resource efficiency; agricultural productivity; individual consumption; working hours; and new land markets related to energy and ecosystem services. These national variables are then combined with four different levels of global greenhouse gas emission abatement effort (from 'no abatement' through to 'strong abatement'), to produce 20 future scenarios for Australia through to 2050. Each scenario has different environmental outcomes with respect to five main variables: greenhouse gas emissions, resource use, water stress, native habitat and biodiversity. Depending on the scenario, environmental impacts for each of these variables more than double, stabilise, or fall.

In the *Stretch* scenario, the input assumptions result in Australian GDP increasing by 2.6 times by 2050, compared with the 2015 baseline, while at the same time, dramatic absolute decoupling in carbon and resource use occurs (Hatfield-Dodds et al., 2015c: 14). From 2040 onwards Australia's net greenhouse gas (GHG) emissions fall below zero, mainly due to carbon sequestration, making Australia a 'net emissions

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[1] In Supplementary material the authors note that 'environmental pressures' do not factor in the potential for critical resource scarcities. This is potentially a key oversight given emerging concerns about resource scarcity generally (Bardi, 2014), and specifically the peaking of production rates for fossil fuels in the foreseeable future (e.g. Mohr et al., 2015). As the ANO authors write: 'in most cases the modelling accounts for environmental pressures but not the state of underlying environmental assets or natural capital, and so we are not able to provide a detailed stock-based assessment of sustainability (defined as non-declining stocks of human, built and natural capital)' (Hatfield-Dodds et al., 2015c, Supplementary methods SM-7, page 8. See:
http://www.nature.com/nature/journal/v527/n7576/extref/nature16065-s1.pdf).

[2] The report defines 'sustainable prosperity' as 'economic development that improves human wellbeing and social resilience, while significantly reducing environmental risks and damage to scarce natural resources and ecosystem services' (Hatfield-Dodds et al., 2015a: 4). This definition leaves open the possibility that environmental risks and damage could be 'significantly reduced' while environmental stocks on which the economy depends continue to deplete, only at a reduced rate.

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sink, withdrawing more GHG emissions than it emits' (Hatfield-Dodds et al., 2015b: 76). This huge reduction in emissions occurs despite a continuous rise in energy demand and ongoing fossil fuel use, albeit at a lower rate than in other scenarios, but still reaching approximately double current energy supply by 2050 (Hatfield-Dodds et al., 2015c: 25). The scenario also projects a 36% reduction in Australian domestic material extractions by 2050 (Hatfield-Dodds et al., 2015c: 50). Given the economy is forecast to multiply 2.6 times by 2050 this implies almost a 70% reduction in resource use per unit of GDP. Comparative data relating to GHG emissions and energy use are presented in a series of five tables contained in an appendix to this paper, in order to illustrate the scale of, and relative contributions to, the decoupling task envisaged in *Stretch*.

Despite the ambitious nature of these decoupling projections the ANO Report claims that this decoupling strategy is feasible, but only if dramatic government policy interventions, both in Australia and globally, are implemented urgently (see also, Hatfield-Dodds et al., 2015c: 12). This is mainly in the form of carbon markets that act to give individuals and businesses strong financial incentives to change their consumption and investment choices. The scenario assumes a global carbon price of $50/t is implemented from 2015 to 2020, which then increases by 4.5% per annum to reach $236/t by 2050. At the same time, landholders are given a financial incentive to plant fast-growing trees on previously cleared land, in order to biosequester carbon, with payment per tonne of carbon sequestered starting at 15% below the carbon price. These policies act to incentivise five main processes that it is claimed will together achieve the decoupling outcomes reviewed above:

1. *Carbon-sequestration* in the form of carbon and environmental plantings[3] covering up to two-thirds of Australian land within Australia's agricultural 'intensive use zone'[4] (Grundy et al., 2016: 71);
2. *Carbon capture & storage (CCS)* technology applied to the coal and gas stationary energy sectors;
3. *Energy and resource efficiency* improvements across the economy[5];
4. *Uptake of renewable energy*, for proportions of electricity and transport;
5. *Changes in individual work and consumption patterns*, such as a reduction in average working hours and a shift towards 'experiential' consumption choices (e.g. travel, eating out) that are assumed to be less energy and materially intensive.[6]

In the ANO Report the reliance on carbon capture in the form of both CCS and land, sequestration is crucial to the overall achievement of net zero or even negative emissions by 2050. Without these two strategies, the projected carbon reductions would not be possible given that all scenarios assume continued burning of significant amounts of fossil fuels through to 2050. The *Stretch* scenario, for example, still depends on over 1000 PJ in non-CCS fossil fuel use for the transport sector alone, which is only a small reduction on current fossil fuel use for transport (Hatfield-Dodds et al., 2015c: 55). The viability of these practices is thus critical to the CSIRO's decoupling strategy, as it significantly reduces the costs and problems associated with the transition away from fossil fuels and towards alternative, low-carbon energy sources.

The authors of the ANO Report argue that the above changes 'will not require a shift in societal values' (Hatfield-Dodds et al., 2015c: 52), let alone a challenge to growth-based global capitalism. Most of the changes in individual behaviour, for example, are said to result from financial incentives brought about through collective government policy. The report's lead author states that 'none of the scenarios we modelled assume change in values or a new social or environmental ethic' and it does not require 'rejecting consumerism' (Hatfield-Dodds, 2015).

Below we outline a range of reasons why the conclusions of the ANO Report are certainly not established. But even if they were, we argue that the report would still not have made a convincing case that 'green-growth' via decoupling is a plausible route to long-term sustainability and global justice.

3. A Critique of the ANO Report

3.1. The ANO Report in Historical Context

Lenzen et al. (2016) have shown with respect to the carbon intensity of the Australian economy that both the medium and high ANO abatement scenarios require a ten-fold acceleration in technologically driven emission intensity improvement compared to the trend rate over the last three decades. They point out that 'there was not a single country that, since 1990, has achieved technology-driven emission reductions anywhere near the level' required in those scenarios (Lenzen et al., 2016: 797). Malik et al. (2016) have shown that globally over the same period increases in both affluence and population outstripped technologically driven carbon efficiency gains, resulting in rising emissions. Contrary to the CSIRO, they conclude that supply-side efficiency gains are unlikely to be sufficient to achieve safe carbon reductions and 'governments may need to actively intervene in non-sustainable lifestyles to achieve emission reductions' (Malik et al., 2016, 4722).

The same historically unprecedented gains are required with respect to resource efficiency, with *Stretch* projecting a 4.5% p.a. improvement for the global economy through to 2050. By comparison, a review of the evidence found that resource efficiency improvement from 1980 to 2009 averaged 0.9% p.a. (Giljum et al., 2014).[7] Furthermore, as that review, as well as a more recent UNEP (2016) report found, this efficiency improvement rate masks a more recent efficiency *decline* since the turn of the century. That is, today the global economy uses *more* resources per unit of GDP than in the year 2000. This means that, far from decoupling – even in relative terms – over the last decade and a half the global economy has undergone a process of absolute material 'recoupling'.

If we narrow the focus to decoupling trends in OECD nations, it has often been claimed that substantial relative, if not absolute, decoupling of resource use has been achieved. However, Wiedmann et al. (2015) has shown that this is only true when using the 'domestic material consumption' (DMC) accounting measure which looks at natural

[3] Carbon plantings are defined as fast growing monocultures designed to rapidly absorb carbon i.e. *Eucalyptus* monocultures. Environmental plantings, by contrast, are typically mixed, local native species, designed to provide maximum biodiversity services in a given area (Bryan et al., 2015: 10).

[4] The most productive Australian agricultural land, totalling 85 million ha, 'stretching from central eastern Queensland to the wheat belt of southern western Australia' (Grundy et al., 2016: 71).

[5] According to the modelling done by Schandl et al. (2015) used by the ANO report, the 4.5% per annum resources efficiency rate is mainly driven by the carbon price, however, it should be noted that reference is also made to the need for 'additional measures at the company (product) and macro-economy level…to avoid unintended consumption growth enabled by efficiency gains' (Schandl et al., 2015: 47). Hatfield-Dodds et al. (2015c: 49) cite UNEP (2014) as the primary source in support of their view that 'substantial physical and economic decoupling is possible.' While UNEP (2014) provides historical evidence for absolute decoupling of water use and local air pollution from economic growth in response to policy measures including price changes, no such historical evidence in relation to resource and energy efficiency is provided. Absolute decoupling of economic growth from resource and energy use is presented as far more challenging, with complex requirements that would need to be satisfied for success.

[6] It should be noted that these changes to work and consumption patterns, which have already been underway for some time in rich countries have not led to much, if any, overall dematerialisation especially when the resources embedded within imports are taken into account (see e.g. Trentman, 2016; Wiedmann et al., 2015). That said, we agree that such changes will be important elements in the transition towards a sustainable economy. However, the analysis in this paper suggests that they will be insufficient if the commitment to ongoing growth in GDP, rising affluence and population etc. remains in place, as is taken for granted in all ANO scenarios.

[7] According to figures given in Giljum et al. (2014: 328) this represented a per annum efficiency improvement that was less than one third of the rate that would have been needed for 'absolute' decoupling, i.e., growth of GDP without any increase in materials use. As such, despite the efficiency gains, between 1970 and 2010 annual global material use trebled, reaching 70.1 billion t in 2010, up from 23.7 billion t in 1970 (UNEP, 2016: 31).