
Emergence of a Green Economy: An Australian Case

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Introduction

Green Economy is defined in this paper as “one in which the vital links between economy, society, and environment are taken into account and in which the transformation of production processes, production and consumption patterns, while contributing to a reduction per unit in reduced waste, pollution, and the use of resources, materials, and energy, waste, and pollution emission will revitalize and diversify economies, create decent employment opportunities, promote sustainable trade, reduce poverty, and improve equity and income distribution” (An Introduction to the Green Economy Report, 2010).

Despite such a comprehensive description, the global financial crisis narrowed the focus of attention to environment and employment aspects of a modern economy causing an inadvertent effect of bipolarization of issues related to climate change and development pursuits. Discussions involving the global financial crisis eventually ended up in economic-environment bipolarity and impacted on deliberations related to green economy in at least two areas that concerns this paper. The pace towards moving to a green economy as we have come to know in the mainstream was expedited. Such increases in tempo propelled global movement and modern economies initially to adopt discontinuous innovative strategies and move towards a green economy. In short, the global finance and climate crisis has resulted in propelling urgent actions to examine simultaneous delivery of twin objectives – environmental betterment and economic prosperity through labor market involvement. Australia, the focal point of this paper, was no exception in responding to these global concerns.

This paper is about emergence of a green economy in Australia. It narrates some of the initiatives taken to simultaneously achieve stable sustainable economic growth and promote environmental stewardship. The paper is not an attempt at providing a detailed and comprehensive listing of actions taken in Australia for creating green jobs as much as it is about providing a compendium of events and evidences of several attempts at greening the Australian economy. All of these attempts are firmly situated within the wants-efforts-satisfaction nexus. Wants, efforts and satisfaction have all assumed different levels of complexity over the years as “the ability to defy nature and change environment” (Heaton, 1936, 3) is markedly different over the last 200 years.

The paper is organized into four parts. The first part of the paper presents a brief description of responses for greening the Australian economy. The second part provides taxonomy of the hues of green that one can observe in the economy. Part three explains some of the reasons why such shades of green exist in the Australian economic landscape. The final part of the paper provides a justification why these responses are necessary for creating a greener Australian economy.

Australian Response to Greening the Economy

A cursory examination of the Australian economic history is full of narratives about the age long primary pursuit of wants through effort to achieve satisfaction. Majority of these pursuits were conditioned by finding ways to adapt to climate changes in the first instance.

Adapting to climate change has been an inherent trait in Australia amongst its very first inhabitants, the Indigenous people. Aboriginal Australians have been adapting to changes to climate although the relationship between peoples actions and adapting to the environment was not a clear cut one. Many lived and worked with the environment.

They construct shelters appropriate to climate conditions using the materials available in the local environment. Desert-living Aborigines, for example, construct summer shelters oriented towards east-west which at the top exclude the sun and at the bottom have open supports to allow wind – a constant feature of the desert climate – to pass through. ..Other behavioral adaptations to desert living include

sleeping in shade during the middle part of the day, and during summer travelling at night rather than during the day. As well as this desert Aborigines remain near a waterhole during the hot part of the summer, and in the cooler months move about over wider areas, combining hunting in different places with congregating for ritual ceremonies. (Kirk, 1986, 152)

People's adaptation to climate has neither been uniform in nature nor unique in content.

Strategies to adapt to climate were more a result of functionality rather than purposefulness.

“...the interplay between the habitat and the choice of hunting techniques and equipment is striking. Frequently their habitat was such that all techniques known to Aborigines were not used uniformly. The decision to employ particular methods and make specific adaptations depended on the Aborigines, and although it was made in reference to the conditions prevailing in the local environment, the element of human choice is a striking phenomenon of ‘ethno historic’ Australia.” (Lawrence, 1971, 260).

Australian economy in the pre colonial stages of its modern evolution could be regarded as a green economy where jobs and activities related much more to functioning of an economy geared towards working with the natural elements than controlling it.

There is evidence that contact with European settlers and the subsequent birth of modern economy led to increased ability to harness nature for human pursuit of development. This does not imply that there was no human footprint on the ecology of the Australian continent prior to colonization. It simply suggests that human pursuit to address the wants-efforts-satisfaction nexus took different directions in the evolution of the economy.

A modern economy emerged in Australia founded on rich traditions of Europe that was by and large shaped by European environmental conditions and historical experiences. Modern economy was founded by those who had “sunshine without drought, rainfall that was not a deluge, heat and cold that were never unbearable: mountains, but not too high: plains, but not too wide or flat; rivers that were navigable, seas split up into bays and sprinkled with islands: countries where the shepherd could find grass for his flocks, the labourer soil to till the plant, and

the hunter forests full of game: countries large enough for those who wish to wander, and small enough for those who wished to settle down” (Thomson).” (Heaton, 1936, 9)

There are many narratives of interactions that took place between Aboriginal economy and the modern economy. What one observes in the modern day Australian economic landscape are features of mainstream economy alongside of regional and spatial complement. For example in the case of the Northern Territory of Australia, where according to 2006 Australian census 14 percent of NT’s usual residential population was born overseas, bringing in new ideas, and Indigenous populations constitute 31.6 per cent of Territory’s total population, there are “hybrid economies” (Altman, 2001). There is also a mainstream component of the Australian economy based on a post industrial society that has emerged where the services and informational economic activities dominate.

In the context of economic emergence one observes economic transformations that have far reaching implications. These changes create new political and economic geographies that continue to challenge the conventional economic wisdom of pursuing growth and equity through competitive advantages. What has eventuated are policy responses that address ‘people and places prosperities’ and at the same time raise concerns for “creating an environment for Australia’s growth” (O’Connor, Stimson and Baum, 2001, 51).

There was recognition but not necessarily universal acceptance that a relationship can exist between growth and greenness. For instance, there was a realization that permanent jobs could be created in industries that can serve to satisfy the energy needs.

Certainly a green future will provide more employment. In the context of the proposed Tully Millstream hydroelectric project in north Queensland, I looked at the option of using more solar energy for hot water. As a legacy of past policies, the fraction of households using solar energy in the Sunshine State is actually smaller than in Canberra! A ten-year program to bring Queensland up to the level of Western Australia, where solar energy has 25 per cent of the market, would on my estimation create about 1500 permanent jobs. Such an approach would also save more electricity than Tully Millstream would supply. (Gayle and Lowe, 1991, 86)

There have been many such assertions made in the contemporary economy of Australia. All of these observations point towards evidence of continued emergence of the green economy in Australia. The underlying forces of emergence are basically associated with phenomenon involving evolution of structures, processes and forms that were built on past experiences but did not qualitatively differ from development aspirations stemming from the wants-efforts-satisfaction nexus.

The overwhelming reaction to the economic and climate crises has shunted the evolutionary process towards green economy transformation towards adopting a discontinuous path based on dichotomizing the economy from the environment. What one observes in the contemporary Australian economy is resurgence of interest in the intersection of economy and environment. The initial response was to create niche jobs in Australia by asking questions progressively about the intersection between economics and environment.

The progression towards intersection and greening of the economy was possible mainly due to repeated attempts made by governments at all levels to create green jobs by adopting more integrated and interdisciplinary approaches for promoting sustainable development of natural environments.

In the mainstream these jobs were based on adopting a multi layered approach to greening the economy. The first layer relates to the firm. The Commonwealth government through the financial rescue package supported “businesses to reduce their carbon pollution, to create new green-color jobs of the future and to transform our economy” (Department of Climate Change and Energy Efficiency, 2010a). Incentives were offered and expenditures incurred to propel people into green jobs. Green employment was considered in broad sense to include occupations that contribute directly to technological changes but also those working in promoting change at firm behavior including converting traditional blue and white collar to green workers. “Through the Climate Change Adaptation program, the Government has funded a number of projects and assessments to improve our knowledge of the impacts of climate change strengthen the capacity of decision-makers to respond and address major areas of vulnerability” (Department of Climate Change and Energy Efficiency, 2010b). It is suffice to say in the context of this paper that the

Commonwealth government of Australia has taken seriously the notion that creation of green jobs is indeed a sustainable development strategy that will deliver the twin objectives of economic engagement and environmental stewardship. A host of programs are currently under consideration and are at various stages of implementation to achieve the twin objectives. Some of these are: Climate Change Action Fund, Australian Carbon Trust, National Carbon Offset Standard, Greenhouse Friendly™, Skills training to meet the carbon Challenge.

There is also evidence of private sector participation in greening the economy through adopting energy efficient machinery and commercial appliances, energy efficient lighting in commercial and residential properties, sustainable fleet management initiatives, and the like.

Australia's response to Greening the economy is based on several pillars. They are: (1) A belief system; (2) Adopting a broad definition of what we mean by green jobs; (3) Employing market based instrumentation

Belief system

Australia's response is found on a belief system shaped by values and conviction that modern economies are built on unsustainable foundations and there is a need for evidence based decision making. This has resulted in taking head on challenges to prescribe policies to green the economy which are marred by complexities of historical, cultural, political and economical nature.

A resultant effect of such a belief system is that the foundations on which green economies are considered in Australia are by creating conditions of sustainability. As a result the green economy is based on jobs that businesses can create for reduce, reuse, recycle and replenish environmental capital while being engaged in production, consumption and distribution. Preference to evidence based decision making has propelled into action renewed claim for undisputed evidence of climate change in Australia. "The CSIRO and the Bureau of Meteorology say the evidence is unquestionable, climate change is real and the link with human activity is beyond doubt." (ABC Lateline, 15/3/2010) This is based on almost century's worth of climate record.

Adopting a Broad definition of Green Jobs

Like in most of the developed parts of the world, in Australia, a broader notion of jobs being considered that contributes to benefiting human endeavors to pursue long term sustainable development. One of the reasons for adopting such a broad definition is based on historical experiences by virtue of contact and interaction with Indigenous Australians and resultant cultural influences where greening the economy became synonymous with creating green jobs including green color jobs.

By adopting a broad notion of green jobs, there is every possibility that ultimately all jobs will be green jobs of one type or the other. This has elicited an Australian response to greening the economy by answering questions of sustainable development conservatively and providing solutions through conservatively expanding jobs to both environmental 'goods and bads'. Good environmental jobs are those that contribute to enhancing environmental management, while bad jobs are those that restore environments. In effect, green jobs, good or bad, are considered to be those that "contributed to better environmental outcomes or increased sustainability" (ACF).

Market Based instrumentation

Australia continues to use market based instruments to create a green economy. Nowhere is this more noticeable than in adopting a scheme for Payment for provision of Ecosystem Services (PES) to create an economy based on integration of economic, cultural, social, political, and environmental aspects of human endeavor.

PES has been used extensively as a Natural Resource Management (NRM) tool which is based on five principal elements. These include: (i) it is based on a voluntary, negotiated contract between suppliers of environmental services and a buyer; (ii) a well defined service provision; (iii & iv) involvement of at least one buyer and one supplier/provider and finally (v) payment is conditional on the supplier meeting the service delivery specifications (Wunder, 2005).

These principal elements are further being used to generate a Green economy. PES is seen as a way forward to promote sustainable development through appropriating NRM practices to the underlying conditions of Indigenous Australians in areas where large land masses still exist with great environmental diversity of plants and animals associated with habitats. Most economic

opportunities exist for Indigenous people through managing their lands and utilising their plant and animal resources (SRRATRC, 1998). PES as a tool builds on not only recognised but also acknowledged traditional ecological knowledge base. It is also seen as a tool by those who have traditional ecological knowledge to be able to participate in commercialisation of land management activities. PES is also seen as a facilitating tool that enables integration of the scientific know-how with traditional ecological knowledge. Attempts to integrate the two knowledge systems have resulted in explicit recognition of the significant role played by the Indigenous Natural Cultural Resource Management practices. It is therefore not surprising that many believe PES to be a tool that can be used effectively by Indigenous rangers to contribute to reduction in environmental degradation.

As PES appears to be part of a growing wave of Corporate Sustainable Responsibility (CSR) that is being exercised by business institutions and industry in response to public concerns over the state of global health, jobs created through these schemes are seen as Green jobs. Rather than addressing purely profit driven motives, many organisations see the advantage of PES as addressing the “triple bottom line” of social, environmental as well as economical objectives.

PES is seen by many Indigenous people and rangers as payment for activities undertaken that stem from adopting a broader perspective than merely an economic one. It is viewed as a progression for self empowerment through environmental stewardship where information, self regulation, commercial influences and rewards all are combined strategically to contribute to prevention of environmental harm.

Table 1 indicates the types of programs that create green jobs through PES.

Table 1: PES Programs Carried Out by Indigenous Rangers Groups

Environmental Service	Industry Consumers	Local Vendors	Geographic Area in the Northern Territory
Disease monitoring - ants, mosquito, pigs, buffalo monitoring	Australian quarantine Inspection Service, Department of Agriculture, Fisheries and forestry	Adjumarllarl Community Rangers, Djelk Rangers, Larrakia Rangers, Mardbalk Rangers, Malak Malak people, Manwurk Rangers, Ngaliwurru Wuli Land management, Yirralka Rangers, Yugal Mangi	Gunbalanya, Maningrida, Darwin, Goulbourn Island, Woolianna, Kabulwarnamyo, Timber Creek, N.E. Arnhem Land, Ngukurr
Patrols for illegal, unreported and unregulated fishing	NT Fisheries	Mardbalk Rangers, Gumurr Marthakal Sea Rangers, Djelk Rangers, Lianhawirryarra Rangers, Thamarrurr Rangers, Tiwi Rangers, Anindilyakwa rangers, Yugal Mangi Landcare	Goulbourn Island, Elcho Island, Maningrida, Borrooloola, Wadeye, Melville and Bathurst, Groote Island, Ngukurr
Illegal Fishing vessels	Australian Customs and immigration	Djelk Rangers	Arnhem Land Coastline
Ghost net surveillance management	Carpentaria Ghost Nets Programme	Dhimirru, Gumurr Marthakal Sea Rangers, Numbulwar Rangers, Yirralka, Yugal Mangi	N.E. Arnhem Land, Elcho Island, Roper River, Blue Mud Bay, Ngukurr
Monitoring and eradication of yellow crazy ant infestations	CSIRO	Dhimurru Rangers	East Arnhem Land
Landscaping and re-vegetation	Alcan Refinery, Nhulunbuy	Gamarrawa Nuwul Landcare	Nhulunbuy
Fire abatement	ConocoPhillips and NT Government	Jawoyn Rangers, Djelk Rangers, Demed Rangers, Manwurk Rangers, Mimal Rangers	Maningrida - Katherine
Fire management	Neighbouring pastoral properties	Minyerri Rangers	Roper River

Source: Gorman and Vemuri (2010, forthcoming)

Green Taxonomy

In the economic landscape of modern and Post Copenhagen Australia one can witness simultaneous existence of several types of green jobs. Employment shifts are taking place on a regular basis and at rapid rate. In some sectors of the economy new green jobs are being created, while in others there is re- alignment of white and blue collar jobs to green jobs. These alternative paths are neither restricted to any specific industry nor uniformly witnessed within an industry.

Take for instance the Energy industry. Energy industries have emerged as the greatest emitter of green houses gases in Australia. The percentage of energy emissions in the energy sector is 54.3

in 2007 in comparison to 49.96 in 1990. Black coal currently sources 60% of electricity generation with forward industry projections still placing greater reliance upon it. New jobs in the energy sector will be related to production and consumption of cleaner energy, greener properties and continued commuting, living and working practices. The Cleaner Energy Initiative is an example of strategic thinking that aims to create clean energy sources with creation of new technologies and skills.

Another illustration of deliberations based “on analysis of 30 green industries globally, Australian businesses are particularly well positioned to succeed in the following six key markets:

- Renewable energy
- Energy efficiency
- Sustainable water systems
- Biomaterials
- Green buildings
- Waste and recycling

In these six key industries, the creation of strong domestic markets supported by strong climate change and other policies could result in an additional 500,000 jobs in Australia by 2030 above a business-as-usual baseline.” (Green Gold Rush, 2008)

There is a general feeling that there is much more discussion about greening the economy occurring post Copenhagen than before. However there are fears of an announcement effect where the feeling is that so long as one considers the issues of greening the economy they have done something about sustainable development no matter how unsustainable the effects of their ensuing actions are. This has resulted in formation of a continuum related to several hues of green jobs.

At one end of the continuum there are deep green jobs that represent a deep ecological phenomenon. At the other end of the continuum are slight tinges of green. This end of the scale represents environmental skeptics who believe that any human action necessarily will have an environmental influence and hence all jobs are green jobs.

As a result, at any point in time one can observe different degrees of greenness in the labor market. Differentiation of greenness is more related to the mind set and perception of the individual rather than an analysis of impact measures of employment effects. At one end of the spectrum there are those that provide an integrated approach to job creation, adaptation and mitigation based on the principles of ecologically sustainable development. The other end of the spectrum represents thinking of those that depict a more explicit economic orientation to decisions about human impacts of climate change.

Explaining shades of green

Parry & Carter (1998) identify four stages of iteration for Climate impact and adaptation assessment to take place. They are: (a) feasibility, (b) assessment of biophysical impacts, (c) assessment of socio-economic impacts, and (d) evaluation of adaptation options. Each of these stages in turn is involved with a series of steps. These steps relate to (1) Problem identification, (2) Selection method, (3) Sensitivity analysis, (4) Scenario mapping, (5) Impact Assessment, (6) Assessment of autonomous adjustments, and (7) Evaluation of strategy adaptation.

Because of the steps involved and enormity of challenge for societies to adapt to information about climate impacts, at any point in time many shades of green will be prevalent. These shades of green are all inherent in a modern economy.

Shades of green exist because as new climate information is made available, a more pronounced green emerges in the first instance. What is considered a green job depends on the interpretation of how work will be mapped out in the future. Post Copenhagen summit has already generated projects in Australia to consider the way job classification will be established in the green economy in Australia.

Occupational characteristics represent a mindset that will shape the way one conceives a green jobs in the future. These categories will evolve either as outcomes of reactions and remedial measures as proactive responses or through products, processes, practices, prices that stake a claim to be green.

Several shades of green exist and will continue to exist in the landscape of Australian economy. Few reactions proceed monotonically through total transformations. Transformation to a greener economy is an iterative process.

Justification of responses

All these responses are a result of the way one considers emergence. According to Blume and Durlaf (2006), emergence in economics “has come to be associated with phenomenon involving evolution of economic structures into qualitatively different forms.” Understanding the green economy warrants a study of two interrelated aspects of the process of evolution namely, economic structures and manifestation of forms that can be associated with green economies.

The one approach that does not make any headway is the one that creates bipolarity between economics and the environment. There are several other approaches to choose from that focus on the process of economic evolution such as one that adopts a process and emergence. This is also known in the literature as the Santa Fe approach. Green economies exhibit complexities very similar to the ones pointed out by Arthur, Durlaf and Lane (1997) when describing features of an economy and suggesting application of Santa Fe approach. Complexities that engulf the green economies emergence are: (1) Dispersed interactions, (2) No Global controller, (3) Cross-cutting Hierarchical Organization, (4) Continual Adaptation, (5) Perpetual Novelty, and (6) Out-of-Equilibrium Dynamics.

It is abundantly explicit that what happens in the green economy of Australia is determined by sets of reactions and interactions amongst many factors and actors. There is a process of co-creation that dominates the formation of a green economy. As a result interactions are prevalent and dispersed. These actions are not controlled by any one single entity. As a matter of fact they are negotiated and mediated through institutions that enable non monopolistic behaviors. There are several organizations that typically are pillars of influence in the formation of green economies. There is also evidence of adaptation by agents and actors that are directly and indirectly, as well as explicitly and implicitly, involved in the discourse about green economies. Green economies are providing opportunities for creating niches related to new products,

processes, innovations and inventions. Finally any observation at a point in time is far from being in an optimum-optimorum position.

As a result emergence of green economy, like its predecessors the agricultural, the industrial economy, the knowledge economy, to cite a few, operate on the basis of what John Holland (1987) refers to as adaptive non linear networks. We need to understand the emergence of a green economy by emphasizing “the *discovery* of structure and the *processes* through which structure emerges across different levels of organization.” The challenge in the case of understanding the emergence of a green economy is to move from determinism towards evolution by experimentation. In so doing it is better to embrace diversification which is the hall mark of human existence.

In the words of a senior Aboriginal elder from an outback Australian community, it is wise to “start from reality, deal with reality and end with reality.”

References

- ABC Lateline (15/3/2010), “CSIRO backs global warming Science”,
<http://www.abc.net.au/lateline/content/2010/s2846667.htm>(Last accessed on 19/3/2010)
- ACF, Green Jobs Fact Sheet, http://www.acfonline.org.au/articles/news.asp?news_id=1963
(Last accessed on 26/02/2010)
- Altman, J.C. (2001) Sustainable Development Options on Aboriginal Land: The hybrid economy in the twenty-first century, Centre Aboriginal Economic Policy Research Discussion Paper 226, Australian National University, Canberra, Australia
- An Introduction to the Green Economy Report, The Green Economy Initiative,
[http://www.unep.ch/etb/publications/Green%20Economy/GER%20brochure%20\(normal\)](http://www.unep.ch/etb/publications/Green%20Economy/GER%20brochure%20(normal))
(Last accessed on March 18, 2010)
- Arthur, W.B. , S. Durlauf and D. Lane (1997) The Economy as an Evolving Complex System II, http://tuvalu.Santafe.edu/~Wbarthur/papers/pdf_files/ADL_Intro.pdf (Last accessed on January 15, 2010)
- Blume, L.E & S.N. Durlauf (eds.) New Palgrave Dictionary of Economics, second edition, 2006
- Department of Climate change and Energy Efficiency(2010a), Make the most of opportunities
<http://www.climatechange.gov.au/government/en/business/opportunities.aspx..>(Last accessed on 17/3/2010)
- Department of Climate change and Energy Efficiency (2010b) Climate Change Adaptation programs <http://www.climatechange.gov.au/government/initiatives/climate-change-adaptation-prog..>(Last accessed on 17/3/2010)
- Green Gold Rush (2008),
http://www.actu.org.au/Images/Dynamic/attachments/6211/Green_Gold%20Rush_final
(Last accessed on March 25, 2010)
- Gale, F. & I. Lowe (1991) Changing Australia, 1991 Boyer Lectures, Sydney: Australian Broadcasting Corporation Press
- Gorman, J. & Sivaram Vemuri (2010 forthcoming)”Payment for Ecosystem Services as a Model for Integrated Natural Cultural Resource Management”, The International Journal of Environmental, Cultural, Economic & Social Sustainability”, April
- Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World, UNEP/ILO/IOE/ITUC, September 2008
- Heaton, Herbert (1936), Economic History of Europe, Harper and Brothers, NY and London.

Holland , J (1987) as cited in Arthur, W.B. , S. Durlauf and D. Lane (1997) The Economy as an Evolving Complex System II,
http://tuvalu.Santafe.edu/~Wbarthur/papers/pdf_files/ADL_Intro.pdf (Last accessed on January 15, 2010)

Kirk, R.L. (1986), Aboriginal Man Adapting, Melbourne: Oxford University Press

Lawrence, R. (1971), “Habitat and Economy”, D.J. Mulvaney & J. Golson (eds.), Aboriginal Man and Environment in Australia, Canberra: Australian National University Press

O’Connor Kevin, Robert J. Stimson and Scott Baum (2001), “The Regional Distribution of Growth” in John Nieuwenhuysen, Peter Lloyd and Margaret Mead (eds.), Reshaping Australia’s Economy: Growth with Equity and Sustainability, Cambridge: Cambridge University Press, Ch.3

Parry, M. & T. Carter (1998) Climate Impact and Adaptation Assessment, London: Earthscan

SRRATRC (1998) “Commercial utilization of Australian native wildlife”, Report of the Senate Rural and Regional Affairs and transport References Committee, parliament of the Commonwealth of Australia, Canberra

Wunder, S. (2005) Payment for environmental services: some nuts and bolts
<http://www.cifor.cgiar.org> (last accessed on 10.1.2010)