

Is renewable energy still a green issue?
Renewable energy visions in an ecological modernisation
age in Australia

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ABSTRACT Greens have long cherished a renewable energy future. Addressing climate change was a key motivation. But for many Greens, the renewables' vision was also about more than this. It was driven by a set of values and goals that motivated them as much as climate mitigation. These included visions of decentralisation, stronger communities, anti-hierarchical arrangements and enhanced autonomy. But, over the ensuing decades, the effort to expand the appeal of a renewable energy future beyond a small green cohort, saw – especially in the context of an emergent neo-liberalism – the adoption of an ecological modernisation frame by many greens, even if reluctantly at times. While this proved successful, it risked compromising the scope and character of the renewables' vision. Today, renewable energy is championed as much by business as it is by environmentalists, and has become a pragmatic and commercial option attractive to a much broader range of actors. This includes large scale, highly centralised and corporatised renewable energy projects, often funded by large energy corporations, and mirroring the commercial character of their fossil fuel counterparts. These forms are increasingly driving the contemporary renewables' enterprise. But this paper contends that there is also considerable grassroots activity - often overshadowed by these larger enterprises - in the form of smaller scale projects generated by environmental and community actors driven by different sets of values. At a broad public level, renewable energy is usually viewed as a homogenous project with shared objectives – particularly climate change mitigation. However, the range of projects and actors emerging in this new energy space suggests otherwise. This paper seeks to shed light on what is in reality a diverse and multifaceted renewable energy terrain that conceptualises the 'green' character of renewable energy very differently. It does so by first examining how mainstream ecological modernisation has (re)shaped the renewable energy project today, and the kinds of renewables' enterprises that have emerged in its wake. Second, it considers the efforts by grassroots actors to create projects that incorporate goals and values beyond a narrower ecological modernisation remit.

INTRODUCTION

Renewable energy (RE) illustrates well the logic of ecological modernisation (EM). In particular it illustrates the successful operation of EM's co-benefits paradigm: that technological innovation and market based prompts will help resolve environmental issues in ways that benefit both the economy and the environment. Propelled by this logic, RE has successfully moved from a fringe idea owned by largely environmental actors to a mainstream one embraced by a much broader constituency. While small, decentralised renewable energy schemes have long dotted the landscapes of countries such as Denmark and Germany, and to a lesser

extent Australia, the widespread surge of renewable energy systems today represents another historical stage altogether.

This recent mainstream embrace inevitably (re)shapes the renewables enterprise. RE is now supported for a range of reasons beyond the largely environmental ones that may have originally animated environmentalists. New supporters today are not necessarily stirred by the same values and visions as these greens. For many of the latter renewables went beyond specific issues such as climate change to be underpinned by a broader set of values and social ambitions. These included goals of decentralisation, stronger communities, anti-hierarchical arrangements, social and energy justice and enhanced autonomy. But not everyone who takes up RE today does so because of the perceived climate or other social and environmental benefits that it may produce. In the context of rapidly increasing electricity prices, an overriding consideration can be that of cost. Businesses too, from the small to medium sized right through to large and utility size corporate projects, can be driven by a different set of ambitions, particularly the perceived financial benefits of investing in innovation and sunrise industries. Increasingly, large corporate actors, including large energy corporations, are moving into the field with projects that can mirror the commercial and operational character of their fossil fuel counterparts. For many of these individual and business actors, addressing the climate problem may be perceived as a desirable coincidental benefit, but not necessarily a core driver.

The 'green' character of the RE enterprise is hence changing. Championed as much by business as it is by environmentalists, RE has become a pragmatic and commercial option attractive to a much broader range of actors. While often treated homogeneously at the level of general news media, RE is in reality a diverse enterprise which envisions very different economic, political and socio-technological futures. And the environmental character of these different energy futures also diverges significantly. In this paper we conceptualise this divergence as a tension at the heart of the renewable energy enterprise between those who

seek to keep the vision ‘green’ and those primarily focused on its economic prospects. In this paper we understand the term ‘green’ as one that views environmental problems, including climate change, as linked to the socio-economic and political structures from which they arise and are embedded. Addressing climate change thus requires socio-economic and political change as much as technological transformation. The two perspectives of course are not necessarily zero-sum – economic drivers can and do produce environmental gains, as mainstream EM correctly attests – but the character of the economic drivers can significantly impact the quality of these environmental gains.

Conceptually, the empirical divisions within the renewable energy domain mirror well the theoretical tensions at the heart of the discourse of EM, hence providing a useful theoretical lens for examining today’s renewables enterprise. The paper thus proceeds in two interrelated steps: first, empirically – through an exploration of the main ventures, drivers and actors in the contemporary RE space in Australia today; and second, theoretically – through a consideration of these empirical developments via the lens of EM. EM has been a key discursive driver of the turn to RE, but it also conceptualises and envisions the future shape of the RE enterprise – and the environmentalist project more broadly – in different ways.

The paper is divided into several sections. It first discusses the growing RE enterprise through the prism of ecological modernisation. It next presents a simplified typology that describes the diversity of RE activities, illustrating this diversity through several case study snapshots of the values and goals that drive them. The Discussion in Section Four theorises these differences more directly through the lens of EM, before drawing broader conclusions. It is important to reveal the diversity of these RE ambitions since transformations in the energy domain will shape social futures in significant ways. Energy transitions are, after all, not only ‘economic and technological but also social and political transformations’ (Kalkbrennar and Roosen 2016, 67).

ECOLOGICAL MODERNISATION AND RENEWABLE ENERGY

The notion of alternative or ‘appropriate’ energy, even before the advent of climate change awareness, was long a key goal among early environment movement actors. This reflected in part a strong anti-nuclear position within the movement. These alternative energy views were particularly strong among the movement’s radical ecology actors. For these actors, alternative or appropriate energy, as it was termed in its early days, was as much a means to an end as an end itself. This is because, as Feenberg (in Smith, 2005, 108) observes, the ‘interests and worldview of the actors are expressed in the technologies they participate in designing’. Alternative energy was not only considered environmentally benign and less toxic, but was often understood as the conduit through which other ecological values could be realised. These included values of decentralisation, community, autonomy, collectivism, localism and connectedness to nature and place.

The rise of ecological modernisation in 1980s in Europe offered a promising conduit – both practically and theoretically – for realising the alternative energy dream. EM’s overarching claim that environmental goals could be won without radical transformation of existing social and economic systems was enticing. Moreover, it promised business – a frequent target of green angst – that environmental protection would not only be good for the environment, but also for their bottom line. In short, ‘environment protection would pay’: it would be good for the economy and good for the environment (Hajer, 1995). Importantly, this logic meant that such an ecologically modernised approach to environmental issues could be readily accommodated into the emergent paradigm of neo-liberalism. EM’s underpinning co-benefits paradigm hence appealed to a wide audience – environmentalists, governments and business alike.

EM was as much a program for tempering radical environmentalism as it was a new idea, offering a compromise between the demands for radical environmental change and a

‘greened’ business as usual (Buttel 2000). The early green movement’s ideological combat for the heart of environmentalism was hence seemingly conceded to its mainstream reformers, who had long argued that bringing business to the negotiating table was key to environmental protection. EM, after all, starts from the premise that there are serious environmental problems that require urgent redress. But it also believes that the industrial capitalism that may have created many of these problems also offers the tools for their resolution (see Mol 1996; Janicke 2008). Markets based tools, mediated by supportive policy frameworks, are singled out as particularly suited to the task, especially in their capacity to tap the innovation and entrepreneurialism that drives industrial capitalism (see Mol and Spaargaren 2003). Technology is considered central here.

Understood this way, renewable energy technology is seemingly perfectly fit for purpose – an exemplary illustration of the logic of (mainstream) ecological modernisation. There have already been significant wins here. Global investment in renewables has increased significantly from approximately \$US50 billion in 2004 to a record \$US 348 billion in 2015, with one in five units of energy delivered by renewable resources today (IRENA, 2017). An uncertain policy environment in Australia, driven by successive governments’ active support for the fossil fuel sector vis-a-vis renewables, has seen the pace of renewables investment stall over the past few years, especially under the steerage of recent conservative governments. Nonetheless, despite only accounting for 14.6 per cent of Australia’s electricity generation in 2015, and despite the persistent political roadblocks, the expectation is that renewables sector is at the threshold of a significant surge. In early 2017, a number of large corporate business lobbies have publicly urged governments to modernise the policy landscape to better accommodate the burgeoning renewable industries.

These renewable wins are widely applauded, and rightly so. Short of significantly reducing societal demand for energy, the capacity of RE technologies to reduce carbon emissions in the electricity sector is without peer. The transition to a ‘clean

energy future' is clearly underway, driven by effective partnerships between government, business and various civil society actors in a host of countries across the globe. Certainly, the focus on reducing carbon pollution has shifted to technological solutions, with increasing investment in these sunrise industries. This renewables push has been enabled by three key factors: governments prepared to establish the critical policy infrastructure; businesses in embracing the innovation and investment challenge; and civil society in their preparedness to work with both.

But what kind of RE future is it that is being envisaged? Is it a one size fits all? And how 'green' are its credentials? As we saw, at a broad public level, renewable energy is viewed as a homogenous project with shared objectives – particularly climate change mitigation. However, the range of projects and actors emerging in this new energy space suggests otherwise. This diversity is in turn reflected in EM, which can also speak in different voices. Theoretically, EM aligns along a spectrum that positions a mainstream and reformist version at one end, extending to a more radical, 'stronger' version at the other. The dominant mainstream version places considerable faith in the institutions of modernity – particularly technology and the market – to resolve environmental problems, even as some reform of these institutions is necessary to render them more environmentally responsive (Hajer 1995). While more radical ecological modernisers are by no means technology-averse, they understand the causes and consequences of environmental degradation more broadly, emphasising the centrality of their political, social and justice components as much as their techno-economic ones (see Christoff 1995; Buttel 2000, Curran 2009). The latter may hence embrace the technology's potential while seeking to steer it towards addressing a broader set of values and goals. As Hatzl et al puts it '[w]hile in technological innovations, the technology itself provides the entry point for niche and transition analysis, in social innovations the focus is on the development of new social arrangements' (2016, 60). We find elements of these different views reflected in today's RE space.

LEVELS OF RENEWABLE ENERGY PENETRATION

Even against a difficult political climate, the renewables potential is establishing itself as firmly in Australia as it is across the globe. In this section we provide a snapshot of this activity through the use of a simplified typology that categorises renewables activities into three broad areas: individual, community and commercial. The individual level involves renewable energy activities and actors at the household sector, usually rooftop solar with or without battery storage. The community level incorporates a range of small to medium sized projects and business models, and is more likely to be populated by civil society actors motivated to varying degrees by social change goals, including environmental change. The commercial sector involves large and utility size scale projects, including large energy corporations who are often key actors in the fossil fuel industry but who are gradually increasing their investment footprint in renewables.

These categories are not always mutually exclusive, and there can be considerable overlap. For example, individuals' domestic solar relies on various levels of business activity to supply it and there is an increasing spectrum of business models employed at the community renewable energy scale, some of which involve partnerships with large corporate actors. We nonetheless reserve the commercial category for the larger scale, in some cases utility sized, projects managed by bigger businesses and/or the corporate sector. What particularly interests us across all levels is how these different enterprises are distinguished in terms of their aims, values and motivations – and in their renewable energy visions. In what follows, we provide a brief overview of the key values and goals that motivate a variety of RE activities, focusing more directly on the commercial and community categories, the latter often including individual actors from our first category. We use six brief case study snapshots drawn from these categories, utilising publically available interviews with key actors and published information on the goals, drivers and normative positions that motivate these actors and

organisations.

Individual projects

Renewable energy, particularly in the form of rooftop solar panels, is now a widespread mainstream enterprise. Rapidly increasing electricity prices, and a rapid decrease in the cost of solar panels, has fuelled a significant surge in rooftop solar, particularly in sub-tropical Australian states such as Queensland which enjoys an abundance of sun. Indeed, this factor has propelled Australia to per capita world leader in household solar photovoltaic installations, with a nationwide 15 per cent penetration eclipsing that of countries such as Germany which has committed to a significant renewable energy target of 80 per cent by 2050 (Bruce and MacGill 2016). Australia's growth from 8000 to 1 million installations over five years between 2008 and 2013 (Sommerfeld et al 2016, 315), and an accompanying 58 per cent price drop over a similar time frame (Climate Council 2016) gives us a clear sense of the buoyancy of the Australian domestic solar enterprise. Australia's embrace of domestic solar is only expected to accelerate with the upcoming 'revolution' in availability and pricing of battery storage.

The economic logic of household solar drives its uptake, particularly in the context of Australia's high electricity prices. Originally propelled by generous subsidies such as feed in tariffs and subsidised systems, solar panels' rapidly falling prices has continued to drive the expansion, even against the significant reduction of these subsidies. Indeed, March 2017 saw the largest surge in domestic investment yet (Bainbridge 2017). It is clear that the price of electricity in Australia, and the impact of a recent South Australian state-wide electricity blackout on the perceived security of the networked electricity supply, has prompted consumers to opt for rational alternatives now readily available to them, and at affordable prices (Bainbridge 2017). In a recent study on domestic solar in Australia, several factors stood out. Aside from the advantages of a sunny climate and high electricity prices, there is also the character of Australian housing – which is often stand-alone and with capacious roof space – and Australia's high rates of home ownership which sees the

home owner directly responsible for costly power bills (Bruce and MacGill 2016).

Cost rather than climate change is thus a key consideration for the expansive uptake of rooftop solar in Australia. Emissions reduction may be a coincidental benefit but not always the main driver. This scenario is not necessarily zero-sum, however: both drivers can be simultaneously present, if to different degrees. Nonetheless, recent studies bear out the primacy of cost as a driving force towards domestic solar. A 2014 study found that ‘of the top 10 solar suburbs in each Australian state and territory, almost all households had a lower income than the state average’ (Vorrath 2014). In addition, higher rates of domestic solar can be found in lower socio-economic rural and regional areas (see also Hicks and Ison 2011). Indeed, of ‘the top 10 postcodes in each state (80 in total across 8 states and territories) 45 per cent were in rural and regional areas, 45 per cent in capital cities and the remaining 10 per cent in other major urban centres’ (Vorrath 2014). Sommerfeld et al’s 2017 Queensland study corroborates these findings. It found that households in lower socio-economic regions in Queensland are more likely to install solar systems. These households outnumber those in more affluent areas, locations more likely to be made up of the ‘post-material’ demographics generally deemed more sympathetic to environmental causes. Summing up these scenarios, Vorrath (2014) concludes that ‘the factors driving rooftop solar uptake in these demographics were most likely to be: level of home ownership; building suitability; relative importance of energy bills; and level of new home and renovation activity (Vorrath 2014). Mention of the climate problem is generally absent – although this does not negate its presence as a coincidental benefit. Nor does it negate the overall benefit – as mainstream EM might surmise – of economic drivers’ potential to impact positively on environment change. After all, rooftop solar –whatever the motivation – contributes to emissions reductions.

Commercial projects

Investment in large scale renewable energy utilities in Australia is still relatively small, hampered by an

unaccommodating policy environment. Many energy companies with the capacity to invest in such enterprises remain cautious due to the prevailing investment uncertainty. With the support of ARENA – a government funded renewable energy agency – large scale wind and solar PV projects were those most likely to be developed, particularly since these projects are attracting grid-parity pricing with fossil fuel generated electricity (White and Zhong 2016). Consistent with the market principles that drive this investment, least-cost technologies are privileged. Wind power is already the most cost competitive of the renewable technologies, with solar PV expected to catch up soon. With its strong commitment to renewables South Australia has invested significant sums in medium scale wind farms, with over 40 per cent penetration of renewables in 2016 (Clean Energy Council (2016, 7). More recently, SA has tendered for large scale solar and storage farms.

The Clean Energy Council (CEC) reports that between 30 and 50 large scale wind and solar projects will need to be developed over the next few years in order for the current RET's large scale targets are to be met (CEC 2016, 8). Eight such solar projects became operational in 2015, and three of the largest solar plants yet developed in 2016 (2016, 8, 44). Two of these three were developed by one of Australia's largest energy corporations – AGL, alongside its partner First Solar (2016, 5). The uncertain policy environment, along with these energy corporations other, largely, fossil fuel commitments, has ensured that only 'a small number of genuinely large-scale solar plants have been built in Australia'; nonetheless, 'the focus of these early projects [has been] on clearing the various hurdles that come from doing things for the first time, then sharing these lessons with the rest of the industry' (2016, 44).

Overall, corporate interest in the development of large scale and utility size renewables projects remains limited even as some of the largest Australian energy corporations, in anticipation of more favourable conditions and incentives, are beginning to scope their involvement. As the Clean Energy Council concludes:

The energy industry has been used to working with decades long investment horizons, where change happens at a glacial rate. But like the taxis and telecommunications industries, the energy sector has found itself blindsided by rapid change, and is now scrambling to get ahead of the curve (CEC 2016, 3).

As soon as the political and regulatory environment changes, both on a national and global level, we can expect a substantial upscaling of large scale renewable projects, with the corporate sector poised to take advantage of improving financial opportunities. In such preparation AGL established the Powering Australia Renewables Fund in early 2016 as an investment vehicle geared towards the development of large scale renewables projects. The Fund will seek to provide some investment certainty in a market riven by ‘tentative market conditions’, largely exacerbated by political and policy hiatus, even as ‘commentators have questioned whether 10 years is sufficient’ (White and Zhong 2016). Another large energy company – Origin Energy – also communicated their ambition to pursue a range of large scale projects, at both the generation and retail ends (White and Zhong 2016).

Moreover, the corporate sector in Australia appears to be losing patience with the current federal government’s energy policy stalemate. In March 2017, Australia’s largest corporate business lobby, the Business Council of Australia, along with a significant number of other peak business lobbies, urged the federal government to adopt an emissions intensity scheme in the electricity sector in order to encourage investment in an energy system requiring significant renovation to cope with a transforming energy landscape. More recently, Energy Networks Australia (ENA) – a major actor in the electricity transmission sector – has argued that clear and certain policy settings could save Australian electricity customers \$100 billion as well as encouraging the grid renovation that smooths out renewable energy spikes (see Murphy 2017). The ENA report signalled that up to 45 per cent of Australia’s electricity would be generated from millions of decentralised privately owned systems, noting that this will create ‘profound adaptation challenges for the system’s architecture,

stability and efficiency given it was originally designed for almost 100 per cent of generation at the transmission end of the system' (in Murphy 2017). A RE future would require the development of significant numbers of large-scale solar and wind farms over the next few years. As we saw, many large energy companies are poised to enter such ventures, as illustrated by the following overview of three large scale corporate projects.

AGL

AGL – the Australian Gas Light company – is one of Australia's leading integrated energy companies, operating in both the energy generation and retail markets. Its significant asset portfolio includes a number of gas and coal fired power stations, including the controversial mining of coal seam gas, as well as a number of renewable energy plants and farms. Together with Origin Energy and Energy Australia, AGL control over 70 per cent of Australia's retail energy market (Hewson 2015). Along with its fossil fuel assets, AGL is currently Australia's largest operator and developer of renewable energy generation. Over the past few years, AGL has invested over \$3 billion in renewable technologies. This includes a utility size wind farm commissioned in 2013.

In keeping with most large corporations' corporate social responsibility (CSR) profiles (Curran 2015), AGL's motivations invoke sustainability very directly. According to its website (AGL 2017), it claims to be 'taking action toward creating a sustainable energy future for our investors, communities and customers'. In addition, it highlights its commitment to an overarching set of environmental principles which include not sourcing fuel from native forests, and a pledge to addressing climate change, particularly through their investment in renewables.

While *AGL* is currently one of Australia's largest investors in renewable energy, it remains a significant investor in fossil fuels. According to some observers, at the same time as it was expanding its investment in renewables, 'it went on a buying spree of coal-fired power stations ... making it also Australia's biggest investor in coal power and Australia's biggest greenhouse gas emitter' (Slezak and

Farrer, 2016; see also Hewson 2015). It has, however, recently withdrawn its sizeable investments in another fossil fuel industry – coal seam gas (CSG). CSG developments have proved controversial in Australia – as they often are globally – on democratic and environmental grounds; and widespread community resistance has proved persistent and organised (Curran 2017). AGL's subsequent withdrawal from this industry was hence met with considerable community approval. Yet the stated reason for its withdrawal omits any reference to climate, community or other environmental considerations. Instead its CEO states that 'AGL has made a strategic decision to exit gas exploration and production entirely against a backdrop of volatile global commodity prices and long lead times' (in Chambers 2016).

Nonetheless, the rapidly changing investment landscape for renewables is impacting the company's decision making. Its CEO recently commented that the company needs to extract itself from the 'CO2 emissions business' in order to protect themselves from 'financial risk' in an inevitably transforming energy market. Pertinently, he further observes that this decision has 'nothing to do with the [climate] science – it's irrelevant what I believe. If markets believe it, if customers believe it, if investors believe it, if government is making policy, then what I have is a significant risk in my portfolio that I have to mitigate' (in Slezak and Farrell 2016). To this end *AGL* announced the closure of some coal-fired power plants by 2050 and a commitment to alternatives. Its critics remain circumspect, viewing the decision as 'merely window-dressing', particularly in light of AGL's intention to continue operating 'the most polluting power station until the middle of the century' (in Slezak and Farrell 2016).

New large scale projects such as AGL's Silverton windfarm will nonetheless soon open, clearly showcasing the company's growing profile in renewables. Yet the socio-political ambitions that drive many in the community energy sector are largely dormant in these larger corporate enterprises. This is no surprise of course given the legal and financial responsibilities large corporations have to their shareholders. But nor does this negate mainstream EM's co-

benefits claim. As we saw with domestic solar, regardless of motivating force, at the end whether driven by climate factors or investment opportunities, the end result is the same: emissions will fall and both business and the climate will benefit.

Origin Energy

As one of Australia's largest integrated energy companies, *Origin Energy* is involved in energy exploration, production, generation and retail. It now also claims a large and growing footprint in renewable energy, with the company avowing that 'growing our position in renewable energy is one of our major priorities' (Origin Energy 2017). To this end, it outlines a growing portfolio in wind, solar and hydroelectricity. More recently, it has committed to the purchase of wind from an array of wind farms in the state of South Australia. The main drivers for these commitments are to provide 'significant economic benefits to the local [South Australian] community, create ongoing jobs, provide rent for participating landowners and a community fund' (Origin 2017). Origin is also the largest solar panel installer in the country and is progressing investment in utility size solar projects. It has recently committed to a utility scale photovoltaic solar plant in the Darling Downs region in Queensland, and holds significant renewables investments in countries such as Chile.

In a series of webpages devoted to describing these projects, there is only passing mention of environmental ambitions such as mitigating climate change, including in the company's main Renewables page. Here the opening statement affirms that:

Since our company formed in 2000, we've made huge investments in wind, geothermal, hydropower and solar technologies, both in Australia and overseas. And while some of these technologies are yet to prove commercially viable, we're definitely not giving up. In fact, growing our position in renewable energy is one of our major priorities.

Specific reference to 'environmental goals' can be found in a vignette from one of their solar customers; and, in their solar

projects section, they highlight social benefits such as electricity cost savings, and the jobs that result from some of their renewable energy investments (Origin 2017). The socio-political objectives such as energy democratisation and energy justice are largely absent. While elements of ‘empowerment’ are identified – even if not directly articulated in these terms – it is a form of empowerment directed to control over electricity costs than to socio-political norms.

Origin’s environmental credentials lie predominantly in its GreenPower plan. This plan allows customers to choose – for an additional cost – the proportion of their electricity that is derived from renewable sources. Origin’s classification of gas is of particular note. Alongside its GreenPower plan, Origin offers a ‘Green Gas’ one which emphasises the environmental value of using gas by ‘doing your bit for the environment as well’ (Green Energy Blog 2016). The company’s promotion of ‘green gas’ downplays gas’ status as a fossil fuel, its contested emissions load and its equally contested profile as ‘green’ bridging fuel (see Hausfather 2015).

Origin is nonetheless committed to advancing the business of renewable energy in Australia. In early 2016, with the cost of large scale renewable energy projects falling, and investment in coal fired power generators stalling, Origin signalled its intention to upscale its renewables investment considerably, with its managing director claiming that ‘[w]e’re not mucking around here’ (in Robins 2016). Like its counterpart *AGL*, *Origin’s* values and commitments were directed towards exploiting the significant investment opportunities that the rapidly changing energy market presents for energy businesses such as theirs.

Solar Choice

We turn next to a smaller company which is both a solar project broker and provider of a solar comparison service. Its partnership with US solar giant Sun-Edison to develop the Bulli Creek solar farm in Southwest Queensland should see its renewables profile considerably expanded (see Robertson 2015). Bulli Creek is projected to generate more power than any of Queensland’s current coal-fired power stations, making

it Australia's, and potentially one of the world's, largest solar farm. Despite its siting on what *Solar Choice* stresses is grazing land, and its close proximity to grid transmission nodes, the Bulli creek farm continues to court controversy, with many in the surrounding agricultural community concerned it will intrude on 'prime agricultural land' (see Robertson 2015).

Siting controversies such as these are expected to intensify in the next few years in Australia with investment in large scale solar farms set to triple. These controversies are not confined to this particular company and will impact many forthcoming large scale and utility size renewables projects (see QFF 2017). *Solar Choice's* CEO remains undaunted, observing that 'you can't hold back the forces of economics forever'; indeed, with 'the economics of large scale solar ... on the right side of history ... [i]t's not a matter of if these projects will be built but when' (in Robertson 2015).

Solar Choice highlights the financial benefits of solar for both its individual customer base and its larger scale brokerage clients. Climate change is rarely mentioned – at least, on the mainstay of its webpage interface. But when asked directly whether the need to address climate change motivated the business, the CEO responded that:

No one's suggesting that we need to take a communist approach to this ... It's a free market and those who are able to be the first to innovate and embrace the change and to move with it should do well and they shouldn't be punished for doing so ... Obviously there's a great amount of opportunity out there but it does take a fair bit of boldness as well to be able to participate in this paradigm shift (in Robertson 2015).

Reference to other social and environmental goals is made in the 'Join or Start a Solar Community' section where the financial and environmental gains of investing in solar are presented as co-benefits. These include 'significant savings on power bills and plentiful power from a carbon emission-free energy source', gains which can 'increase multifold when a solar community is formed' (Solar Choice 2017).

Solar Choice's approach provides a useful contrast with community renewable energy organisers also providing solar purchasing discounts, and solar comparison services. For example, *Suncrowd* – a social enterprise that measures 'success by impact not profit' and that is committed to 'creating a people powered energy future', also stresses the economic benefits of solar bulk buys but also highlighting the social capital advantages of community building (Suncrowd 2017). *Suncrowd's* 'Community Benefit Share' ensures that a 'portion of every sale made during each bulk buy goes to the local Community Partners to directly invest in their innovative social or environmental projects - creating a loop of positive change' (Suncrowd 2017). Of course, how large this 'portion' is and the kinds of community projects that are supported as a result, are critical to determining the character of these social enterprise outcomes.

Community projects

The community renewable energy (CRE) sector is a diverse and enthusiastic participant in the renewables enterprise. Compared to their individual and commercial counterparts their motivations are also the most socially and environmentally focused. CRE projects have an extensive historical pedigree (Hatzl et al 2016; Toke 2011). Prior to the development of modern centralised grids for the distribution of mass-scale energy supplies, towns, villages and communities were reliant on decentralised small scale energy generation. The windmill is emblematic of this early generation. But CRE projects are now emerging in countries with limited prior experience of them, such as the UK, and even supported at the government level (see Walker and Devine-Wright 2008). In Australia, they have emerged in earnest only comparatively recently, but are growing steadily. A recent media piece reported that that investors were 'snapping up community energy projects, with some selling out in minutes' (Bainbridge 2017). This reflects the increased popularity of renewable energy and the preparedness of investors to finance community projects that were until relatively recently considered the province of niche, often green, actors.

While the precise meaning and character of CRE projects remains the subject of some debate (see Devine-Wright 2008), for the purposes of this paper we understand these projects as those that are instigated by and/or for the community in an effort to empower communities to take control of their energy needs, in the interests of energy affordability, social justice and climate change mitigation. The Coalition for Community Energy's (C4CE) National Strategy (2015) understands the CRE sector as

A vibrant community energy sector, where communities across and throughout Australia are hubs of sustainable innovation and collaborative action between residents, business, industry, and all tiers of government. Their shared vision of achieving 100 per cent renewable energy fits within their broader purpose of transitioning to an environmentally sustainable way of life, also encompassing food, housing, transport and more.

There is also some debate about whether CRE can be understood as a social movement in its own right. Certainly the core motivation of social movements – values change – also motivates many CRE actors, even as they too are attracted to the cost savings that CRE projects can provide. Mey and Hicks (2015) understand the CRE sector as part of the broader climate change movement, even as it occupies its own distinct identity. Nonetheless, the community sector's determination to contribute to social and values change marks it, according to Mey and Hicks (2015), as a social movement. In a 2015 C4CE survey of the key drivers and motivations for participation in CRE initiatives, commitment to addressing climate change and associated environmental issues was identified as the most important factor, followed by 'community self-sufficiency and resilience' and 'engagement and empowerment' (C4CE 2015).

There is a wide range of CRE models, however, and caution needs to be exercised in not over-generalising their motivations. Certainly different communities and actors take different approaches to structuring their organisation. This depends in large part on the values, goals and objectives that motivate them, the commerciality of the projects and the legal

and constitutional structure adopted. As Klein and Coffey (2016, 877) observe:

The community energy label can describe a wide variety of projects. In a grassroots model, local people are engaged in the organization and operation of a project and share in its benefits. However, market-based models, in which a firm develops a project and community members buy-in, can also be effective and provide economic and social benefits.

Ison and Hicks (2012) have summed up the drivers of community renewable energy projects in terms of their political, environmental, social, economic and technological benefits. Politically, CRE projects ‘create actors in a renewable powered future; build power and action; [and] win hearts and minds’. Environmentally, they contribute to ‘emissions reductions’; and encourage an ‘increase in environmental values and behaviours’. The social category is particularly extensive and overlaps the other categories. Here we find ‘local development and income diversification; [and] community asset’. The economic benefits are listed as ‘local jobs; shareholder income; [and] community income’. The final technological category boasts ‘renewable energy education and training; renewable energy industry development; [and] energy self-sufficiency’.

Overall, we can divide the CRE sector into three main categories. The first is the very small scale community category: the Parents and Citizens committee of a pre-school, for example, installing solar panels on their roof as a cost saving measure and as a showcase of sustainability to their school community. The second category consists of communities engaging in innovative business models and services to deliver renewable energy products to various communities – their own, or further afield; for example, *Suncrowd*, which organises community bulk buys of renewable energy products and provides information services for their installation, utilisation and quality control. There is considerable activity occurring in this area – with a significant number of innovative business models emerging to service this growing area. The third category involves medium size

community-owned RE projects; for example, the establishment of a small scale wind farm to service a small to medium community, such as Hepburn Wind. We now turn to three such examples of small scale community projects, including Hepburn Wind.

Hepburn Wind

Hepburn Wind, situated in a small town on the outskirts of Melbourne, is one of Australia's first community owned and operated windfarms, providing renewable energy to approximately 2000 households. Established in 2007, the community owned windfarm adopts a co-operative structure which ensures extensive community participation in decision making. It provides financial returns to its members and, through a designated community fund, ensures that additional funds are directed to other community projects decided on by the cooperative. Initial construction funds were made available from investment by community members, grants by the Victorian state government and Bendigo Bank Loans.

The establishment and ownership framework of the Windfarm is a considerable feat in Australia's renewable energy story. The cooperative claims that '[d]espite many challenges, overwhelming support from the community has made it happen – inspiring similar projects to explore the community enterprise model for renewable energy projects' (Hepburn Wind 2017). This includes the contribution of almost \$10 million by the community to advance the project. As we will observe in the other CRE projects discussed below, initiating and modelling a community based ownership process were important motivations for the windfarm.

Hepburn Wind's values are wide ranging. The overriding environmental goal is to mitigate climate change, but in a manner that not only allows local communities to make a significant contribution to this goal, but also one that can 'provide long-lasting economic and social benefits to the local community' (Hepburn Wind 2017). The organisation also stresses the underpinning norms of its cooperative structure: 'self-help, self-responsibility, democracy, equality, equity and solidarity'; this is in addition to the principles that drive

cooperatives:

... voluntary and open membership, democratic member control, member economic participation, autonomy and independence, education, training & information, co-operation among co-operatives and concern for the community (Hepburn Wind 2017).

The distinction between its cooperative structure and that of standard companies is important to the organisation. This is because:

Co-operatives are run democratically, whereby each member has a single vote, regardless of the number of shares they own. Technically, co-operatives are run primarily for the benefit of their members whereas companies are run to maximise the return on investors' capital. In Hepburn's case, while members expect to receive dividends from a profitable wind farm, they also want the benefit of producing emissions-free electricity as well ensuring benefits for the entire community (Wise in Hepburn Wind 2017).

The centrality of the community's role is stressed throughout Hepburn Wind's cooperative material. Indeed, its chairman states that 'I don't believe you can develop a community wind farm without first building the grassroots movement to support it' (in Wise in Hepburn Wind 2017).

Hepburn Wind thus summarises its project's benefits as community engagement, which is central to achieving the community's overriding sustainability goals; regional economic gains that generate local jobs; approaches that ensure that profits remain in, and are re-invested back into, the community; community empowerment which enhances commitment, encourages diversity, builds social capital and skills capacity; and the commitment to being a model for others in the interests of broader social change (in Wise in Hepburn Wind 2017). *Hepburn's* local investors are not averse to the importance of savvy investment, however. Instead such investment is characterised as 'a win-win for both the environment [and] the community' (in Slezak, 2017).

In a recent media piece, *Hepburn Wind* affirms that its inspirational roots are located in the forgotten tradition of decentralised community owned power, and more recently in countries such as Denmark where this model continues to thrive (Slezak 2017). Paradoxically, the idea for *Hepburn Wind* emerged in response to the strong opposition that a larger scale proposal by a corporate entity generated in the community. Using his experience of community energy projects in Denmark, the Danish founder surmised that a smaller scaled project that enabled community ownership and that supported broader sustainability goals was a better fit.

Enova Community Energy

While *Hepburn Wind* was Australia's first community owned windfarm, *Enova Community Energy* is Australia's first community owned energy retailer. The social enterprise is majority-owned by community shareholders. Drawing its inspiration from the inaugural community energy conference in 2014, it went on to win a grant from a consortium of non-government and government agencies enabling it to draw up a business plan for a regional electricity retailer in northern NSW. According to Chair and Board members, its rationale involves protecting the 'pristine Northern Rivers environment' and supporting a 'community that demonstrably is aware of the reality of climate change and wants to do something constructive about it' (Northern Rivers Business Magazine (NRBM) 2015, 17). Their overall commitment is hence to 'bringing about people's power, literally allowing people to be involved in producing and owning their own power and supporting their community' (NRBM 2015, 17).

As a social enterprise, *Enova* structures its retail and community energy goals through an arrangement that sees its retail arm, Enova Energy Pty Ltd, distributing half of its profits to its not-for-profit arm, Enova Community. In this way, *Enova Energy* fills a gap in the energy retail sector of the energy market. A message from Enova's founding team states that:

In the past, community-based renewable energy projects struggled to find a retailer who would purchase excess

energy – the large companies just haven't been interested. Enova will not only buy this power, we will also work with communities to help bring their renewable energy projects to life (in Enova Energy 2017).

Also like *Hepburn Wind*, *Enova* aspire to producing a model for how communities throughout Australia can establish their own community retail enterprises. In a leaflet advertising their share offer, *Enova* urges the local community to be 'part of a genuine change movement for Australia in renewable energy', one that allows communities to keep the profits made through their electricity spend in their communities, and offers the opportunity to take 'power' over one's economic, social and environmental future (Enova Leaflet 2016). Among economic benefits such as local employment and majority community ownership, it also highlights a constitution that 'secures company objectives of environment and community benefit' and ensures that profits are 'returned to the community through combination of dividends and social benefit projects' (Enova Leaflet 2016).

The enterprise also intends making up the policy shortfall in renewable subsidies by buying excess renewable energy from its customers at more attractive feed-in-tariff rates than those currently offered by government. On a socio-economic level, *Enova* also commits to the provision of social and energy justice outcomes, including coordination with other agencies in the support of vulnerable households, and through assisting the spread of renewable energy to the rental sector (Enova Energy 2017). Not unexpectedly their vision to 'build an energy conscious community' resonates broader environmental and socio-economic values, including to:

- Keep profits and jobs in the community
- Reduce our region's carbon footprint
- Create an energy supply model that benefits all socio-economic groups
- Establish an energy supply model that can be recreated by communities across the country

- In the longer term, produce enough renewable energy locally to meet all of our customers' energy needs (Enova Energy 2017).

This vision also extends politically, by showcasing an initiative with the potential to inspire 'political leaders ... to gain confidence and have the courage to change policies to favour renewable energy in our country' (Enova Energy 2017).

In an interview with regional media, *Enova's* Chair was asked about the enterprise's 'points of difference' with major energy retail companies that were also investing in green energy initiatives (such as *Origin* discussed above). The Chair emphasised the organisation's status as a social enterprise that privileged local economic and environmental benefits, supported local innovation and provided educative services in the areas of energy efficiency and renewable energy uptake. Moreover:

We are local, personal, and we care. We are not big, bureaucratic and one size fits all! We can tailor projects to work with the community on green initiatives. As people demonstrate in various ways that they want to adopt alternative energy solutions, we'll be there to provide advice and help make it happen (NRBM 2015, 16).

Solar Citizens

Solar Citizens advocate for the widespread take up of solar power in Australia. An independent community based organisation, *Solar Citizens* seeks to represent Australia's solar households and encourage many others to join them. A registered not-for-profit entity, the organisation relies on individual donations to fund campaigns that advance the take up of solar. In order to ensure that all Australians have ready access to clean, safe and affordable electricity, they work towards redirecting control of energy generation away from the large energy companies and into the hands of individuals and communities (Solar Citizens 2017). Their vision and belief is that

... when millions of solar owners and supporters stand

together, we can be powerful. We run campaigns that use people power to put pressure on decision makers and bring about the best outcomes for solar owners and people who want solar (Solar Citizens 2017).

Understood this way, their goals are directed to social change. They may applaud the economic sense of individual rooftop solar, but also seek to cohere the domestic solar sector into a more coherent normative grouping that aspires to broader social change. According to the organisation, a solar citizen is anyone who supports solar power, either through utilising it in their own homes and/or through promotion of solar throughout their communities. Solar citizens thus include not only ‘those millions of households with solar power but also those who aspire to it, and those who aspire to creating or investing in a community owned solar project in their own communities’ (Solar Citizens 2017). The organisation’s *State of Solar 2016* report is also one of the first to comprehensively map the state of rooftop solar in Australia, including an overview of both its economic and environmental benefits.

Their work supports many, usually smaller scale, solar businesses. As a not-for-profit entity, however, they also claim a broader normative objective of advancing renewable energy in the interests of serving social and environmental goals. In their *State of Solar 2016* report, they observe that while 60 per cent of solar owners installed domestic panels to reduce electricity costs, compared to 38 per cent who chose them for environmental benefits’, they nonetheless claim that ‘there are greater satisfaction levels relating to the environmental impact of their solar arrays for these same respondents ... over the financial return ...’ (Solar Citizens 2016, 15).

Solar Citizens is also a research based entity, partnering with a number of organisations to produce research reports and community power plans. A joint project between *Solar Citizens* and activist group *GetUp!* has produced *The Homegrown Power Plan*, a toolkit designed to accelerate the renewable energy ‘revolution’ in Australia:

Australia is at a crossroads. We can unleash the power of

the sun and wind to provide clean, safe, affordable and reliable energy for all. Or we can choose to keep burning fossil fuels that pollute our atmosphere and warm our planet, causing extreme weather and threatening our health, our economy and the places we love ... (Solar Citizens and GetUp! no date, 2).

Among its recommendations, community energy projects – ‘People’s Power-Up’ – are emphasised. According to the organisation, community energy projects would not only speed up ‘this people-powered energy revolution’ but could also be designed specifically for different communities’ and regions’ energy needs. For example, a ‘collaboratively-designed, well-funded national Indigenous Communities Clean Power Program could ensure that all Aboriginal and Torres Strait Island communities have access to clean, affordable, local renewable electricity’ (Solar Citizens and GetUp! no date, 11).

Solar Citizens consider that an energy revolution is underway in any case, representing a ‘seismic shift’ in one of the cornerstones of modern society: energy generation. This ‘revolution’ represents one of the ‘largest transfer[s] of power in history’ (Solar Citizens and GetUp! no date, 22). Extensive ownership of rooftop solar not only benefits individual consumers, but also helps raise political awareness of how power is used, and the impacts that its conventional generation and distribution creates. While the ‘energy giants who for so long have relied on passive consumers and guaranteed revenue are fighting back’ and have often ‘enlisted politicians to help protect their profits’, *Solar Citizens* believes that ‘the transition to 100 per cent clean, affordable, renewable power’, and the different sets of values it supports, is unstoppable.

DISCUSSION: GREENING THE RENEWABLES PROJECT

There is clearly considerable activity occurring in the renewable energy space. The environmentalist aspiration of a 100 per cent renewable energy future is no longer a ‘pipe dream’; rather it is a realistic future prospect that is welcomed by a diverse range of actors beyond environmentalists. But the

kind of renewable energy future that is heralded is not a one-size-fits all. Instead, competing visions, underpinned by diverse sets of goals and values, aspire to create very different renewable energy futures – futures in turn influenced by competing ecological modernisation imaginings.

As we saw, contrary to often simplified or sweeping accounts in the mainstream media, renewable energy is in fact

a diverse enterprise that attracts a variety of actors who are motivated by a variety of values and goals. We theorised this diversity through the lens of the dominant approach to environmental management today: the discourse and practice of ecological modernisation. However, like the renewable enterprise itself, EM too is diversely conceptualised and practiced, which in turn influences the kinds of renewables projects that are conceived and enacted in its name. We thus discussed today's renewable energy enterprise today in terms of competing visions of renewable energy futures – visions that we will now more directly theorise as those that endorse a mainstream EM and those that advocate a more radical version. The former, as we saw, is largely reformist, technocentric and economically and market oriented in its approach, while a more radical version embraces technology, innovation and (some) market tools but directs them to achieving broader social, political and environmental change than its mainstream counterpart.

As we saw, the CRE sector goes some way towards embracing a broader set of social values and goals than its corporate counterpart, using renewable energy futures as conduits through which to achieve broader environmental and political change. These values include those of community empowerment, democratisation, autonomy, decentralisation, and social and energy justice. This in part reflects the origins of many of the community actors themselves. As we saw, many CRE actors have roots, either formally or informally, in the green movement, and form part of what is often conceived of as 'grassroots innovation' (see Seyfang, & Smith, 2013; Seyfang & Haxeltine, 2012). Hatzl et al point out that '[i]n contrast to the greening of mainstream business, grassroots initiatives operate in civil society arenas and involve

committed activists experimenting with social innovations ... [and] greener technologies'; to this degree, there is an important distinction 'between (a) grassroots social innovations and (b) market- based technological' innovation (2016, 58).

Seyfang and Smith (2007) proposed five key criteria for distinguishing grassroots CRE projects from market based ones: context, drivers, niche design, organisational structure and resource base. These are all important and have emerged in different ways in our discussion of the different CRE forms, and the distinction we draw between the different forms of EM. However, this distinction is increasingly blurring in today's rapidly innovating RE space. For example, as Hatzl et al point out, with solar 'pv technology itself ... already technically mature and well-established on the market ... the innovation [thus] lies in the new social arrangement' of CRE actors engaging in 'a new form of business activity' (2016, 60). There can also be competition, for example, between more market oriented and community oriented actors for the excess electricity that is generated by individual domestic solar – as occurs with one of our CRE snapshots. Moreover, even cooperatives and social enterprises need to remain financially viable in order to continue providing community services and achieve sustainability goals. But, as Bauwens observes, '[w]hen the community logic prevails members are more norm-driven, whereas when a market relationship is established between the organisation and its members these are more motivated by material incentives' (2016, 287).

Caution is nonetheless required to avoid reductionist conclusions in the face of a highly complex renewables landscape, and the positions that various actors of all persuasions take given the reality of their embeddedness in market democracies. Indeed, there is significant business model innovation in the CRE sector, innovation that in turn relies on market instruments such as carbon pricing and emissions trading schemes. The call for carbon pricing as a critical tool for addressing climate change is arguably loudest in the CRE sector. EM too, whether mainstream or otherwise, is an environmental management approach for largely modern

market societies. As Christoff points out, ‘weak and strong features of EM’ are not ‘simply mutually exclusive binary opposites’ since an ‘enduring ecologically sustainable outcome ... does not abandon technological change, economic instruments or instrumental reason’ (1996: 491). Rather the claim is that the ‘weakness’ of mainstream EM can be addressed through a stronger focus on broader-based social

and political change – as some CRE actors seek. This is consistent with the view that environmental problems arise from the institutional structures and power relations that underpin contemporary market economies. For some radical greens, of course, the fact that environmental ‘solutions’ emerge from the very economic logics that created them in the first place, means that they remain deeply sceptical of EM’s redemptive capacity, whatever its form (see Bluhdorn 2007).

Both the possibilities and shortcomings of EM are hence mirrored in these RE developments. With regard to the former, EM’s logic has undoubtedly helped propel an important industry that offers significant hope for reducing the emissions that help drive climate change. In addition, the benefits of mainstream EM are not confined to its technological capacities alone. Its temperate, reformist and incremental approach means that it appeals to a much broader audience than its more radical counterparts could. Its ability to attract business ventures across a broad spectrum of actors proves one of its most significant benefits. Politically, it has also helped generate considerable institutional reform directed towards stronger environmental management. And socially, it has reassured the public that environmental problems are being addressed. These features help explain why even those environmentalists critical of mainstream EM’s limitations utilise its ‘win-win’ rationale in making their own cases. It has, after all, proved peerless in mainstreaming – and ‘de-radicalising’ – the important environmental protection message.

EM’s shortcomings are nonetheless compelling. There is, first, the underpinning notion of ‘decoupling’ – the claim that economic growth can be successfully decoupled from environmental harms. But, as Ward et al (2016) point out,

‘[e]ven supposedly “green” technologies such as renewable energy require materials, land and solar exposure, and cannot grow indefinitely on this (or any) planet’. The health and environmental impacts of mining for the rare earth minerals renewable technologies require is a case in point (see Stegan 2015; Ali 2014). And the ‘clean energy race’ that is emerging in the wake to of the renewables revolution has significant

power relations implications, particularly since energy transitions necessarily create new accumulation strategies that shape geo-politics and ‘green global divisions of labour’ in significant ways (Lachapelle et al 2016).

The decoupling issue is in turn linked to that of consumption – an element largely missing in the renewable energy conversation today. The focus remains on the sustainable production of energy, rather than what this energy is directed to producing. Producing goods with renewable electricity reduces emissions but not necessarily waste – the latter a significant environmental problem. This reflects mainstream EM’s focus on the production side of the environmental equation more so than it demand side (York and Rosa 2003). While there may be more focus on issues such as sustainable food production and recycling in the CRE domain, even here consumption, and decoupling, can be treated cursorily.

Second, successful EM relies on wide-ranging political modernisation. The picture here is not always propitious, especially in resource rich economies such as Australia (see Curran 2015) and the United States. Australia’s potential ‘modernisation losers’ – in this instance the fossil fuel sector – have mounted, and continue to mount, stiff resistance, often with the support of government. This factor helps explain why, in a country that is simultaneously rich in renewables and fossil fuels, there is still relatively modest penetration of RE, even as momentum is building. These dynamics are set to be repeated on an even grander scale with the climate-sceptical Trump presidency in the United States.

Actors in the CRE sector go some way towards seeking the broader socio-political modernisation required of a sustainable society. The projects they propose also go some

way towards prefiguring what this socio-technological change could look like. Their aspiration for ‘energy autonomy’ and ‘energy justice’ references the uneven power relations that underpin the energy landscape, and the ecology-society relationship more broadly. Their desire for forms of decentralisation, democratisation and community building speak to a shift away from the hierarchical power relations

that are embodied even in democratic polities, and in the corporate structures that underpin modern industrial societies. While many of the business models adopted by the CRE sector must also be financially viable, the cooperative or social enterprise structures that many adopt are directed to meeting other goals such as community building, social equity and energy democratisation.

CONCLUSION

EM’s logic underpins the renewable energy surge. Innovations in renewable technologies provide important opportunities for addressing the climate problem, opportunities that have been enthusiastically embraced by both business and civil society. No longer a fringe technology promoted by an equally fringe group of greens, today the renewable potential has been embraced by a wide range of actors motivated by a diverse range of norms and ambitions. Recent global policy developments – in particular the Paris climate agreement and the EU’s subsequent plan to quit investment in new coal fired power plants from 2020 – are combining to accelerate the renewables surge. Yet, despite this activity, whether changes to the energy mix can occur quickly enough to avert dangerous climate change remains a moot point. Nonetheless, driven by a compelling co-benefits paradigm, EM has succeeded in expanding the domestic, community and community reach of renewable energy, generating a significant suite of innovation directed towards environmental gain. But, as we saw, a renewable energy future is not a one-size-fits all. The renewable model that eventually prevails will shape this future in significant ways.

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