IIPP Policy Brief (December 2018)

The Green New Deal: A bold mission-oriented approach

Professor Mariana Mazzucato
Director, UCL Institute for Innovation and Public Purpose

Martha McPherson
Head of Green Economy and Sustainable Growth, UCL Institute for Innovation and Public Purpose

With 12 years recognised as the window of opportunity to keep global temperatures within the 1.5 degree increase agreed in the Paris Accord, the clock is ticking to mitigate the worst outcomes of climate change (IPCC, 2018). But fear does not get us a transition. Only by turning climate change into positive opportunities for investment and innovation will a green transition come about, affecting production, distribution and consumption across the economy.

In the US, the green transition is taking the form of a proposed 'Green New Deal'—a term that is not new, but which is now picking up traction. It requires a re-direction plan for the entire economy, across different sectors and actors (public, private and civil society). It must give a new direction for infrastructure — sustainable public transport and new ways to think about the future of mobility. The Green New Deal must have aspirations far beyond just mitigating climate change, and must be focused on new opportunities for investment and innovation — it must include finding clarity and courage in the policy arena, unlocking hoarded investment in the business sector, and supporting workers to acquire new skills. Civil society must be the majority stakeholder in a green growth transition.

The green transition will take place in a complex global economy, but complexity has rarely been acknowledged in economic discussion about green shifts, and specifically when considering theories of climate change. The simple, static tools that have been deployed in the past — ideas of 'market failures', 'negative externalities', and 'public goods' are no longer sufficient for the purpose of capturing the dynamic characteristics of a green growth transition. The core characteristics of complex systems include the impact of feedback loops, path-dependency, non-linear dynamics, endogenous risks, fundamental uncertainty and absence of optimality — these must be considered more fully when we come to monitoring and evaluating the opportunities that will lead us to a sustainable growth trajectory (Kattel et al, 2018).

What is required is a mission-oriented approach which sets a clear direction for change, while at the same time using the full range of government instruments (from procurement to guaranteed loans, grants and prize schemes) to crowd in bottom-up investments and innovation across the entire economy. The change must occur at all levels — local, regional, national and international. It must be guided not by fear, but by a positive vision for change.

Green growth means economy-wide redirection

Public and private sector decision-makers who have engaged with climate change mitigation, and with green transition efforts, have often honed in on narrow protocols and policies, specifically targeted at low-hanging fruit, or individual economic sectors. Frequently, such efforts start with the query, 'how do we pay for this?'; an approach which sees greening activity as a cost centre, rather than

considering how outcomes can be planned to harness the potential of green growth (Kattel et al, 2018).

The green transition must go beyond independent initiatives and discrete approaches, and be characterised by a new lens for economy-wide growth. The climate crisis can be both a carrot and a stick to create a new direction for the global economy. Green growth is more than just a low carbon transition; climate change impacts are felt from the financial sector to the creative economy, and from conservation to healthcare. Change needs to be cross-sectoral, harnessing supply and demand, innovation and procurement, and public and private actors (Mazzucato, Semieniuk and Watson, 2015). We have an opportunity for inclusive, sustainable economic growth that brings everyone along with it, including traditionally overlooked groups. Those working in brown industries should not simply be displaced, but be fully skilled up for the transition. For this reason labour unions should be at the negotiating table — thinking in forward-looking ways to make sure the green economy is co-created and co-shaped rather than handed down from above.

Markets will not find the green direction on their own — there is not yet a ready-made route that will make multi-directional, experimental, green innovation profitable (Mazzucato and Perez, 2015). Only when there is a stable and consistent direction for investment will regulation and innovation converge along a green trajectory. Business does not invest unless it sees an opportunity for growth — so turning mitigation into opportunities for investment and innovation is key. This requires more than tax incentives — it requires bold investments like those witnessed in Roosevelt's New Deal in the wake of the Great Depression (Mazzucato et al, 2015).

Industrial strategies, increasingly developed by governments around the world, should be directing economies towards green growth through innovation and investment. Rather than ending up as a static list of sectors to support, industrial strategy must be about steering investment-led growth across different sectors, working with the 'willing' rather than the 'winners' — those companies ready to commit to green growth. Vital infrastructure systems: energy, transport, digital communications, water, and waste — which generate interdependent, long-term, high investment and high-employment projects, must be designed to direct economic activity towards green growth, and must be aligned with a cross-sectoral sustainable industrial strategy (Wall et al, 2014).

The urgency of wartime scenarios catalysed not only activity but also a common consensus of the end goal. But unlike war, we must see the battle for sustainable growth as a common pursuit for humanity — a win-win.

A mission-driven approach

Kennedy's moonshot speech—clear on the goal, clear on the expense required, clear on the risk and uncertainty—and clear on why it is 'worth it' is a good guide. Mission-oriented innovation policy defines an ambitious goal, and then uses this to create a long-term policy landscape, setting out concrete tasks that mobilise various actors for bottom-up experimentation across different sectors. In the same way that going to the Moon required investments in nutrition, textiles, electronics, and metals, green missions will require investments in energy, transport, nutrition, health, and areas that will allow manufacturing to reduce its material content.

Green growth is more complicated than the purely technological feat of getting to the Moon. It will require innovation, of course, but also regulatory changes, behavioural changes, and much more consensus across the economy.

Today's missions can be directed at the global challenges posed for us by the Sustainable Development Goals (SDGs), which express 17 inspirational goals, signed up to by 193 countries, and are an opportunity to move forward with mission-oriented thinking in a green, inclusive and sustainable directions. There are opportunities to break the ambitious goals down into a variety of achievable missions — for example, SDG 14: 'Conserve and sustainably use the oceans, seas and marine resources for sustainable development', could be broken down into various missions, including 'a plastic-free ocean' (Mazzucato, 2018a/b; Miedzinski et al, 2018).

The roadmap below shows an example of a mission for creating carbon neutral cities — cross-sector links and research and innovation projects which could get Europe to 100 carbon neutral cities by 2030.

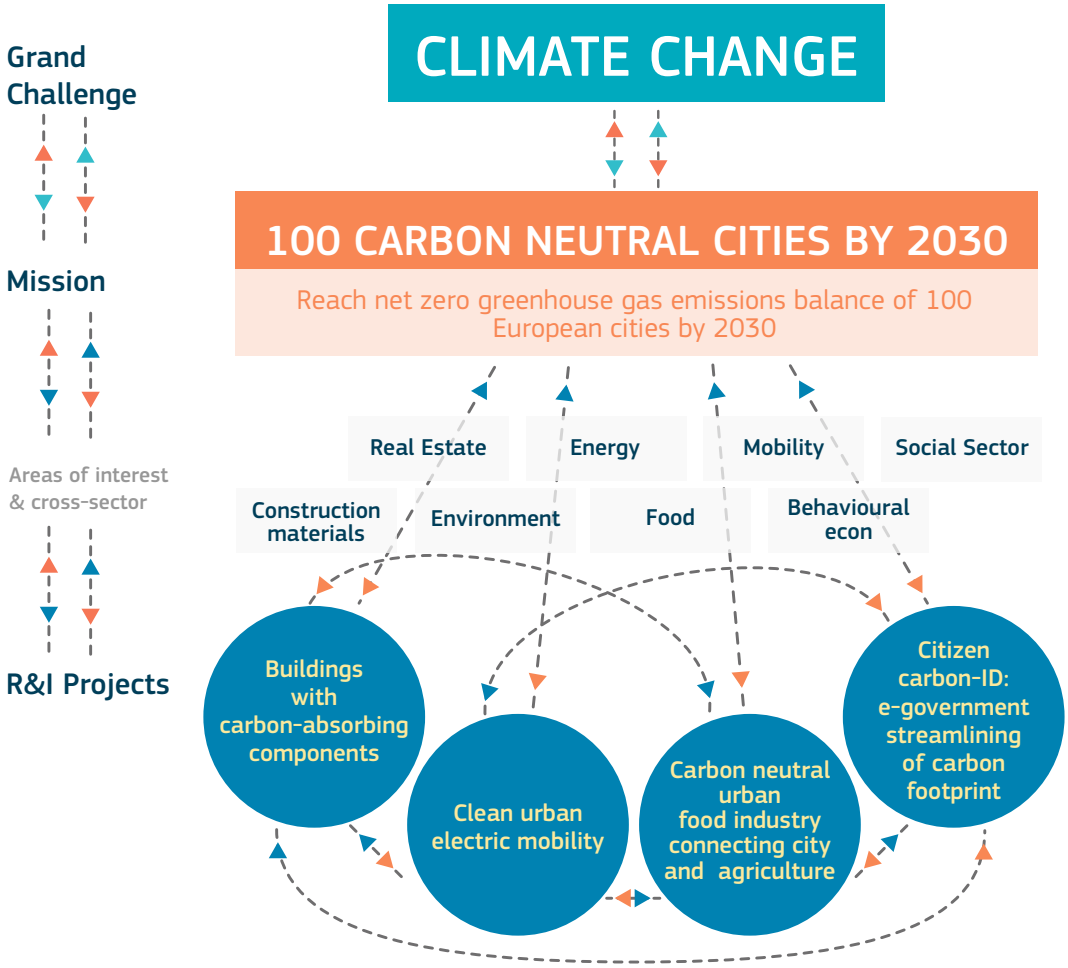

Fig 1. Mission roadmap for 100 Carbon Neutral Cities By 2030, designed for the European Commission report *Mission-oriented Research and Innovation in the European Union* (Mazzucato,2018a)

Levelling the playing field did not get us to the moon: Tilting towards a green direction

Economic discussions of climate change as a market failure have led governments and businesses to see themselves in opposition in a zero-sum game. Policymakers are not invited to take investment or policy risks, but rather to 'fix' the mistakes of the market, level the playing field, and then get out of the way. Instead of this market fixing approach, policy can actively co-create markets, tilting the playing field in a green direction. We have seen this levelling vs. tilting choice before — in the early stages of the IT, biotech and nanotech industries, there was little indication that the business sector alone would drive these sectors forward. Governments had to provide the early stage high risk investment, especially in areas with highest capital intensity. Only then did business see a path to follow (Mazzucato, 2013, 2015).

To avoid innovation continuing its route of lock-in to a high-carbon path, and to actively turn our backs on stagnant innovation landscapes, policy must ensure that investments into low-carbon innovation are rewarded (Mazzucato and Perez, 2015; Mazzucato 2017). This can be done by using the full array of government instruments, from procurement policy to prize schemes, to 'pick the willing' — those organisations willing to take on the difficult investment required for a green transition. Governments cannot micromanage this process as that would stifle innovation but they can set a clear direction, make the initial high-risk bold investments which crowd in private actors later on, and reward those who are willing to invest and innovate.

Crucial in the design of an innovation and growth strategy will be a radical and bold restructuring of the tax system. Tax structures must reward long-run investments, particularly in labour and R&D, rather than in quick trades that are geared at extracting value, and which lead to financial asset inflation (Mazzucato, 2018b). A green economy requires taxation away from salaries and on to energy and materials use, alongside measures to counteract widespread short-term, 'casino-type', financial activities (Mazzucato and Perez, 2015). In the real economy, tax incentives and disincentives can be designed to tackle high polluters, to decrease material content per product, and to encourage innovation around areas like waste and durability. Rather than removing taxes as 'impediments' to investment, we must instead re-tool tax policy to direct investment and innovation. Also vital in all of this is a careful consideration of the impacts of changes in taxation on the distribution of income of wealth — green taxes may

not always be socially just.

A holistic approach across the entire innovation chain, using supply and demand tools

Investments are required across the entire innovation chain, with a focus on both supply and demand (Mazzucato and Semieniuk, 2018b). Capital does exist in the significant amounts needed to get us to a sustainable, inclusive green economy; the problem is that the channels through which it might reasonably flow require unclogging, and in many cases, rerouting entirely. Perez points out that problems exist both on the side of green industries, as well those looking to finance them. There is a 'demand for finance problem' in innovation just as there is a 'supply of finance problem'; that is, that governments and companies have short-termist traits, and lack the courage to make long-term commitments, even to areas which will be highly profitable in the long run (Mazzucato and Perez, 2015).

It is not enough for policy to limit itself to particular parts of the innovation chain. Instead, companies and developers in green sectors must be able to grow with the confidence that their work will continue to be funded both upstream and downstream, from basic research to increase scientific and technological knowledge, through to applied research into real-world problems. The latter often require particular institutional structures, such as the Fraunhofers in Germany or the Catapults in the UK.

Regulation to direct the supply side must be supported with public procurement on the demand side, for example enacting low-carbon materials policy and deploying this in large-scale government-led construction or manufacturing projects. In the same way that mass-production required suburbanisation to be fully deployed, the ICT revolution could use green as a new direction for its full deployment (Perez, 2017).

Supply side initiatives should also include network development, information dissemination, and joint mission-planning. Being able to both jump-start, and to stabilise activity across the chain leads to a confident, successful, innovation landscape. Funding is not independent of organisational capacity — portfolio management, flexibility and adaptability are key lessons that DARPA (in the US Department of Defence) have taught the sister organisation ARPA-E (in the Department of Energy).

Public sector actors are already highly active along the innovation chain; 50% of renewable energy sector R&D spending originates in the public sector, according to Bloomberg New Energy Finance (BNEF) estimates. Actors as diverse as the US's 32 new Energy Frontier Research Centers (EFRCs), Germany's Fraunhofer Institutes, the Chinese State Council's Innovation Fund, and the world's 31

export credit agencies are supporting renewables development from financing first-of-a-kind demonstration technologies, through to insuring developers against export risk (Mazzucato and Semieniuk, 2017). But more is required. The budget of ARPA-E is only around 10% of that of DARPA, and it is often under attack with the accusation that it is 'crowding out' business — ignoring the history of how DARPA was able to crowd in business precisely because it was mission-oriented.

Patient long-term finance

A green transition requires patient, long-term strategic finance. Simply increasing the availability, and quantity of finance to green initiatives alone will not bring about the re-directed economy that we need. To re-orient growth towards green, what matters is not just the quantity of available finance, but the quality of finance (Mazzucato and Macfarlane, 2017/2018). This is because finance is not neutral; the characteristics of financial actors, vehicles and methods affects investments made, activities undertaken, and outcomes observed (Mazzucato and Semieniuk, 2017/2018a). The private financial sector often tends towards a short-termist and risk-averse approach that frequently results in latter-stage investment, taking on a narrower portfolio of low-risk items only once future returns are secure. In the past, this has led to a clamour of incentives to ameliorate risk-return ratios in climate-friendly assets, particularly visible in the energy and infrastructure space. The rationale is that this will make the 'floodgates of finance' open, and resolve the problem. However, finance galvanised through these methods does not always display improvements in quality or appropriateness to fund green innovation. Venture capital is structured to exit investments (through an IPO or buyout) in three to five years, making it a less appropriate finance type for long-term renewable generation installations. In the biotech sector this short-termism led to many product-less IPOs (PLIPOS) (Lazonick and Mazzucato, 2013). Betting only on short-term private finance risks derailing the transition (Semieniuk and Mazzucato 2018).

State investment banks, and development banks, with mandates addressing smart, sustainable and inclusive growth, are currently taking a highly visible role in clean technology development and diffusion (Mazzucato and Penna, 2014). In 2011, Germany's KfW bank announced it would make available €100 billion (US$120-130 billion) over the following five years to promote renewable energies and contribute to Germany's Energiewende plan ('Energy Turnaround'). By contrast, the 'impatient' finance characteristics identifiable in US and UK renewables incentives – including a deep sense of uncertainty around tax credits and subsidies (indirect government funding), have hampered innovation (Mazzucato, 2016). Innovation around different sources of patient finance—at local level as well—will be key to a green transition. For example, there are currently plans in New York City to develop a public bank which would provide patient finance, supporting long-term neighbourhood-led development (Public Bank NYC, 2018).

Re-thinking fiscal and monetary policy

When policy intervention is aimed at shifting multiple sectors in a new and more productive direction and crowding in private sector finance, the 'multiplier' will likely be higher (the effect of public investment on GDP growth). Mission-oriented fiscal policies lead to not only the largest 'supermultiplier' effects, but also accompanying accelerator effects on economic growth (Deleidi and Mazzucato 2018). This is because they create synergies across the economy, connections between sectors, and also connections between manufacturing and services. Denmark is a key supplier of high tech green services to China's green economy (a $1.7 trillion budget), a result of its dynamic policies around decarbonisation, industrial leadership in manufacturing, and how these require dynamic services.

Similarly, monetary policy, central banks and financial regulators are also required for re-orientation towards a green direction. With national mandates for maintaining financial stability, central banks were startled by Governor of the Bank of England Mark Carney's speech on 'The Tragedy of the Horizon' in 2015, which contrasted the misaligned timespans of short-term monetary and financial stability policies, with medium to long-term climate risks (Campiglio et al, 2018). Considering monetary policy (including Quantitative Easing and collateral frameworks), macro-prudential policy and credit allocation tools through the lens of a smooth and managed low carbon transition could both reduce financial stability risks and uncertainty and help provide sufficient finance to achieve sustainable economic growth. The danger is that central banks remain largely wedded to a 'market-fixing' approach to carbon-risk, relying on greater disclosure by the private financial sector of their own perceptions of risk via 'stress-tests' rather than fully adapting monetary policy and financial regulation to the economic and financial reality of a green transition. Lessons for advanced economies can perhaps be learned from the experiments in 'green credit guidance' policies that are happening in emerging market economies where central banks have a strong economic development mandate (Bezemer et al, 2018; Dikau and Ryan-Collins, 2017).

Movements and inclusive growth

Green growth must be bottom-up and inclusive. Movements which come from missions have the power to make markets, contesting and shaping the purpose of innovation (Leadbeater, 2018). The green transition is experiencing movements, built out of people who want to create millions of green jobs, and who have the grassroots drive and multi-level buy-in to make it happen. Innovations succeed especially when they make sense to businesses, workers, consumers, and activists. Only when innovations can be integrated into daily life will take-up be guaranteed. In the US, current demands for a Green New Deal came out of a movement — the Sunrise Movement, harnessed by congresswoman-elect Alexandria Ocasio-Cortez, who has campaigned extensively for ambitious, inclusive green growth. In Germany, the German Energiewende [Energy Transition] policy grew out of long-term environmentalist movements, and became a cross-sector transformation of the economy, notably in high-carbon industries such as steel. Labour unions should be closely involved in transition policy-making. Rather than a defensive lens, it is key that a 'just transition' be about proactive stakeholder governance of a green transition with labour unions, civil society organisations and communities at the table before, during and after.

The role of cities, states, regions and nations

Action needs to be taken at every level — local, state, regional, national level and international level. International actors are championing mission-oriented approaches, but they don't always have a framework. The UN Environment Programme 2018 Emissions Gap Report chose cross-sector innovation as its focus, and the Clean Energy Ministerial Mission Innovation (CEM-MI) brings together global energy ministers to discuss new initiatives, but a mission-oriented innovation policy roadmap is needed (Mazzucato and Semieniuk, 2018b).

States and cities are already emerging as green growth catalysts, and civil society support is booming. Post-Paris, with the role of the USA diminished by the Trump Administration, regional actors in the USA are engaging. 3,629 leaders including state governors, tribal leaders, faith and business leaders signed the 'We Are Still In' pledge to support climate action (We Are Still In, 2018).

In California, Governor Brown has signed international coalitions like Under2, and formed partnerships with environment ministers in Canada, Mexico and China. Local officials in Manchester, UK, which is aiming for carbon-neutrality by 2038 — one of the most rapid timelines in Europe, are developing a mission roadmap with a cross-sector model which delivers a citizen-centric bottom-up approach (UCL IIPP/MOIIS, 2018). Other cities like Medellin and Mexico City region are engaging to support their green industrial strategy missions in 2019 (UCL IIPP, 2018). Networks are beginning to come into place, but mission projects and cross-sector industrial and economic plans at local level need rapid development.

Conclusion

Setting, financing, and monitoring a green growth agenda requires courage from all actors involved to move away from traditional ways of thinking about climate change and innovation; to develop targeted, directed policies and protocols; and to start out quickly with aspirational, achievable and galvanising missions. To battle climate change, we can transform today's fears of uncertain outcomes into a mission to be accomplished, as bold and inspirational as the 1969 moonshot. This will require visionary leadership, patient strategic finance, a grassroots movement and bottom-up innovation. It must be economy wide, and occur at all levels — local, regional, national and international, federal and city level. Only by having a wide stakeholder governance of green transitions can we enable growth that is both sustainable and inclusive.

Contact

For further information, please contact:
Martha McPherson
m.mcpherson@ucl.ac.uk

About the UCL Institute for Innovation and Public Purpose (IIPP)

This policy brief focuses on recent work by the UCL Institute for Innovation and Public Purpose (IIPP) on the topic of green growth and sustainability. IIPP is a department within University College London (UCL) and part of The Bartlett faculty, known internationally for its radical thinking about space, design and sustainability. IIPP's mission is to change how public value is imagined, practiced and evaluated to tackle societal challenges and achieve economic growth that is more innovation-led, sustainable and inclusive. Our research and teaching programmes aim to shape a dynamic and bold public sector driven by public purpose. Markets can be shaped by purposeful policy making and by new collaborations between the state, business and civil society. Markets can be designed to deliver public value.

Based in IIPP, the Commission for Mission-Oriented Innovation and Industrial Strategy (MOIIS) advises the UK government on ways to direct industrial strategies so that different sectors invest and innovate towards solving societal goals. In particular, missions that make economies more sustainable and inclusive. Key to this process is how to design into the system an ability for bottom up experimentation. IIPP is also working closely with the European Commission and the United Nations on the use of mission-oriented innovation to achieve growth that is more inclusive and sustainable.

More information here: www.ucl.ac.uk/iipp.

References

Bezemer, D, Ryan-Collins, J, van Lerven, F, Zhan, E, (2018) 'Credit where it's due: A historical, theoretical and empirical review of credit guidance policies in the 20th century', IIPP WP 2018-11, UCL

Campiglio, E, Dafermos, Y, Monnin, P, Ryan-Collins, J, Schotten, G, Tanaka, M, (2018) 'Finance and climate change: what role for central banks and financial regulators?', Bank Underground

Deleidi, M, Mazzucato, M, (2018) 'Putting Austerity to Bed: Technical progress, aggregate demand and the supermultiplier', IIPP WP 2018-01, UCL

Dikau, S, Ryan-Collins, J, (2017), 'Green Central Banking in Emerging Market and Developing Country Economies', The New Economics Foundation

IPCC, (2018) Global Warming of 1.5°C, IPCC, Geneva

Kattel, R, Mazzucato, M, Ryan-Collins, J, Sharpe, S, (2018) 'The economics of change: Policy and appraisal for missions, market sharping and public purpose', IIPP WP 2018-06, UCL

Lazonick, W, Mazzucato, M, (2013) 'The risk-reward nexus in the innovation-inequality relationship: who takes the risks? Who gets the rewards?', Industrial and Corporate Change, Volume 22, Number 4, pp. 1093–1128

Miedzinski, M, Mazzucato, M, Ekins, P, (2018) 'A framework for mission-driven innovation policy roadmapping for the SDGs', forthcoming

Mazzucato, M, (2013) The Entrepreneurial State, Anthem (Penguin 2015) London

Mazzucato, M, (2016) 'The Green Entrepreneurial State', SPRU, University of Sussex

Mazzucato, M, (2018a) 'Mission-Oriented Research & Innovation in the European Union', European Commission, Brussels

Mazzucato, M, (2018b) 'Mission-led Research and Innovation in Support of the Sustainable Development Goals', UN Sustainable Development Solutions Network

Mazzucato, M, Macfarlane, L, (2017) 'Patient strategic finance: opportunities for state investment banks in the UK', IIPP WP 2017-05, UCL

Mazzucato, M, Macfarlane, L, (2018) 'Patient Finance for Innovation-Driven Growth', IIPP Policy Brief, UCL

Mazzucato, M, Penna, C, (2014) 'The Market Creating and Shaping Role of State Investment Banks', SPRU Working Paper 2014-21

Mazzucato, M. and Perez, C. (2015), '"Innovation as Growth Policy," in The Triple Challenge: Europe in a New Age'. J. Fagerberg, S. Laestadius, and B. Martin (eds.) Oxford University Press: Oxford

Mazzucato, M, Semieniuk, G, (2017) 'Public financing of innovation: new questions', Oxford Review of Economic Policy, Volume 33, Number 1, pp 24–48

Mazzucato, M, Semieniuk, G, (2018a) 'Financing renewable energy: Who is financing what and why it matters', Technological Forecasting and Social Change, 127, pp 8-22

Mazzucato, M, Semieniuk, G, (2018b) 'Bridging the gap: The role of innovation policy and market creation', Emissions Gap Report 2018, UNEP

Mazzucato, M, Semieniuk, G, Watson, J, (2015) 'What will it take to get us to a Green Revolution?', SPRU, University of Sussex https://www.sussex.ac.uk/webteam/gateway/file.php?name=what-will-it-take-to-get-us-a-green-revolution.pdf&site=264

Perez, C, (2017) 'Is Smart Green Growth the Solution? Lessons from History', BTTR WP2017-01

Public Bank NYC, (2018) https://www.publicbanknyc.org/about

Semieniuk, G, Mazzucato, M, (2018) 'Financing green growth', IIPP WP 2018-04, London, UCL

UCL IIPP, (2018) 'IIPP's missions part of Mexico's pathbreaking £7.8m sustainable energy programme', https://www.ucl.ac.uk/bartlett/public-purpose/news/2018/nov/iipps-missions-part-mexicos-pathbreaking-ps78m-sustainable-energy-programme

UCL IIPP/ MOIIS, Greater Manchester Independent Prosperity Review, (2018) 'A mission-oriented approach to GM's clean growth challenge', forthcoming.

Wall, J, Henriques, J, Hickford, A, Nicholls, R, Baruah, P, Birkin, M, Chaudry, M, Curtis, T, Eyre, N, Jones, C, Kilsby, C, Leathard, A, Lorenz, A, Malleson, N, McLeod, F, Powrie, W, Preston, J, Ria, N, Street, R, Stringfellow, A, Thoung, C, Tyler, P, Velykiene, R, Watson, G, Watson, J, (2014) 'Assessing the Long-Term Performance of Cross-Sectoral Strategies for National Infrastructure', American Society of Civil Engineers, Journal of Infrastructure Systems, 20:3

We Are Still In, (2018) https://www.wearestillin.com/

ucl.ac.uk/iipp
@IIPP_UCL

Institute for Innovation and Public Purpose

UCL