Institutional Framework for Low-Carbon Urban Infrastructure Investment: Some Evidence and Lessons from DKI Jakarta, Indonesia

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Institutional Framework for Low-Carbon Urban Infrastructure Investment: Some Evidence and Lessons from DKI Jakarta, Indonesia

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Abstract

This paper proffers an extension of an institutional framework for guiding low-carbon urban infrastructure investment. It reads the “low-carbon societies” discourse as an expression of Ecological Modernization Theory (EMT), and assesses it using Daerah Khusus Ibukota (DKI) Jakarta as a case study, along with a complementary survey of macro analyses of the effectiveness of ecological modernization strategies. The paper finds that DKI Jakarta, as expected of the low-carbon societies discourse emergent from EMT, has a well-developed plan and institutional framework for pursuing improvements in the intensity of greenhouse gas (GHG) emissions. However, despite ensuing mitigation targets and organizational changes, projections of overall carbon emissions for DKI Jakarta by 2030 are likely to exceed levels deemed to be sustainable and equitable. In response this paper suggests that the institutional framework for guiding low-carbon urban infrastructure investment must complement its prioritization of efficiency strategies with an engagement with the idea of sufficiency and its eventual enactment. This is a challenging proposal given the dominance of industrial capitalism and the related trend that David Harvey termed

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“entrepreneurialism” in urban governance. This realization calls for theoretical and practical innovations in climate governance. An economic development framework responding to these demands is discussed and suggestions for an institutional framework to guide low-carbon urban infrastructure investment are considered.

**Keywords:** Low-carbon societies; sustainable cities; post-2105 development agenda; climate policy; capability approach; well-being within planetary boundaries

1. **Overview of GHG Mitigation: Context and Scale**

The demands on climate governance are apparent in projections reported in the series of International Panel on Climate Change (IPCC) Assessment Reports that has now reached its fifth update. Already, in the Fourth Assessment Report, the best-case scenario available\(^1\) appeared to be a 2.4–2.8°C increase above pre-industrial levels in the “Global Mean Temperature at Equilibrium”. Even this level requires a 30–60 per cent reduction of global CO\(_2\) emissions from the 2000 levels by 2050. The corresponding atmospheric concentration stabilization range is 490–535 ppm CO\(_2\)-eq (or 400–440 ppm of CO\(_2\)) (Barker et al., 2007, p. 39, refer to Table TS.2 for details on this and other mitigation scenarios). The “peaking year” for CO\(_2\) emissions in this scenario lies between 2000 and 2020.

However, studies continue to focus on staying within the 2°C target. Focusing on the required decarbonization rates (improvements in carbon and intensity) needed to meet this greenhouse gas (GHG) mitigation target, PricewaterhouseCoopers (PwC, 2013) presents calculations based on the overall availability of atmospheric space from 2000 until 2100. They report data and estimates of required, achieved and revised trends for decarbonization rates in this period. Their results indicate that a low-carbon pathway (i.e. for a higher probability of staying under 2°C average temperature rise) for the twenty-first century requires an average global decarbonization rate of 6 per cent per year, every year until 2100 (PwC, 2013). In comparison, the achievement between 2007 and 2012

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\(^{1}\) The facts of atmospheric GHG concentrations and the IPCC’s review of atmospheric temperature models, summarized in Barker et al. (2007), suggests that human society is “too late for two degrees” (see PwC, 2012).
was 0.7 per cent. At this rate, the global economy is on course to exhaust the atmospheric carbon budget for the entire twenty-first century by 2034. Achieving the 6 per cent decarbonization rate is comparable to a 50 per cent reduction in global carbon intensity in the next ten years and a 90 per cent reduction by 2050 (PwC, 2013).

Such projections are in line with studies that indicate the importance of the focus in environmental governance on reductions in energy and carbon intensity, but also highlight the inadequacy of only focusing on these (e.g. Hoffman, 2011; also see Jackson, 2009, especially Chapter 5). This general trend — reductions in carbon intensity unable to keep up with GHG mitigation requirements — is also apparent in the case of DKI Jakarta, as discussed below. An institutional framework for low-carbon urban infrastructure investment must no doubt pursue carbon intensity improvements, but must also appreciate and eventually enact sufficiency in material and energy throughput. How to do so is an urgent question facing the low-carbon societies discourse and this paper proposes an approach for doing so.

2. Transitioning to a Low-Carbon Society in DKI Jakarta: An Ecological Modernization Discourse

The breaching of the 400 ppm atmospheric GHG concentration milestone in 2013 was long preceded by recognition of the upward trend in CO₂ concentrations, and worldwide efforts to develop and implement policy responses. In the light of a key climate governance principle adopted during this process — “common but differentiated responsibilities” — developed countries agreed to decrease emissions, in CO₂-eq terms, by 25–40 per cent below 1990 levels by 2020, while developing countries must achieve “substantial deviation from the baseline” trend (IPCC Fourth Assessment Report, quoted in Sharma & Desgain, 2013, p. 10).

A key strategy that emerged for doing so is that of transitioning to “low-carbon societies” (Skea & Nishioka, 2008). This approach prioritizes

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2 The idea of sufficiency, as a normative contribution to environmental governance, has a long history, but is yet to be integrated into the climate policy process. Early expressions of the idea, in the context of colonialism, include the quote, often attributed to Mahatma Gandhi: “the earth provides enough to satisfy everyone’s need, but not everyone’s greed”. More recently in the context of the environmental crisis, the discussion of “sufficiency” by Wolfgang Sachs (1999) is insightful. In recent years the idea has again found resonance in policy-oriented processes such as “sustainable consumption and production” and deliberations underway on “well-being within planetary boundaries” in the context of the post-2015 development agenda.
interventions to reduce energy and carbon intensity in various sectors of the economy, and believes doing so will adequately mitigate the overall carbon burden. Skea and Nishioka (2008, p. S6) identify low-carbon societies as those that:

- Take actions that are compatible with the principles of sustainable development, ensuring that the development needs of all groups within society are met.
- Make an equitable contribution towards the global effort to stabilize the atmospheric concentration of CO$_2$ and other greenhouse gases at a level that will avoid dangerous climate change, through deep cuts in global emissions.
- Demonstrate a high level of energy efficiency and use low-carbon energy sources and production technologies.
- Adopt patterns of consumption and behaviour that are consistent with low levels of greenhouse gas emissions.

Distinguishing between “developed” and “developing” countries, they note that the former have to emphasize “low-carbon technologies and changes to lifestyles and institutions”, while in the latter, pursuit of low-carbon societies must go “hand-in-hand with the achievement of wider development goals” so as to achieve an “advanced state of development” with CO$_2$ intensity “commensurate with that achieved by low-carbon societies in developed countries”.

Some essential attributes of the Ecological Modernization Theory (EMT) (e.g. see Buttel, 2000; Mol & Spargaaren, 2000) are evident in this characterization of low-carbon societies. First, EMT asserts that the development project will adequately mitigate its carbon emissions through a self-referential process of continued modernization of its institutions and deepening of its commitment to advances in science and technology and industrial capitalism. As we shall see here, in the case of DKI Jakarta, the low-carbon society discourse considers these historical processes as logically compatible with achieving adequate mitigation in carbon emissions.

An important reason for this uncontested status of the development project is the socio-political processes accompanying industrial modernization (e.g. civil society mobilization; evolution of state institutions, engagement from corporate managers, international engagement and pursuit of new investment opportunities such as green infrastructure, efficiency strategies and financialization of ecosystem services, among others) that reflect
the institutionalization of environmental concerns. The emergence of the “nationally appropriate mitigation actions” (NAMAs) at the international level and their implementation in cases such as DKI Jakarta are seen to illustrate the EMT’s self-reflexive modernizing state that evolves in response to climate change. Consequently, critically scrutinizing modern society’s faith in historical processes like industrial and now finance capitalism and their structures appears unnecessary.

Lastly, in terms of implementation, the low-carbon society discourse echoes the environmental management essence of the EMT through a reliance on “high level of energy efficiency … production technologies”. This will be evident in the mitigation measures selected by DKI Jakarta.

2.1 Compatibility with Development Targets

The 13th Conference of Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) in 2007 at Bali, Indonesia, is credited with the agreement that developing country parties will undertake “nationally appropriate mitigation actions” (NAMAs) while developed country parties will undertake “nationally appropriate mitigation commitments or actions” (Sharma & Desgain, 2013, p. 8). This recognition of “appropriateness” to national circumstances is significant and culminated in the notion of mitigation by developing country parties prevailing for the first time during the UNFCCC climate negotiations. NAMAs require parties to volunteer nationally appropriate “significant deviation” from business as usual (BAU). While quantitative targets were not specified in the negotiation’s outcome, developing country parties have volunteered mitigation targets of varying scope under this NAMAs framework.3

In September 2011, the Government of Indonesia (GOI), the host of the UNFCCC COP13, enacted the Presidential Regulation of the Republic of Indonesia, Number 61, Year 2011 on the National Action Plan for Greenhouse Gas Emission Reduction (Presidential Regulation No. 61, 2011). This presidential regulation volunteers a BAU Deviation Target of –26 per cent by 2020 (up to –41 per cent contingent on receipt of international aid)4 and also provides the framework for developing the National Action

3 See Sharma and Desgain (2013, especially p. 13) for details of the range and scope of the volunteered mitigation targets.
4 Article 2 in Presidential Regulation No. 61 identifies “core” and “supporting” activities as part of the National Action Plan for Greenhouse Gas Emission Reduction. These activities are cate-
Plan for Greenhouse Gas Emission Reduction (RAN-GRK) and the Regional Action Plan for Greenhouse Gas Emission Reduction (RAD-GRK) at the province level. The RAN-GRK and RAD-GRK are “work plan document(s) for the implementation of various activities both directly and indirectly to reduce greenhouse gas emissions in accordance with” the “national” and “regional”, respectively, “development targets” (Article 1, Sections 1 and 2, Presidential Regulation No. 61, 2011). This centrality of economic development in determining national appropriateness is critical to note. Equally important to recognize is the fact that the definition of development targets is exogenous to the process of climate governance and illustrates the self-referential formulation of the EMT.

2.2 Institutionalizing Carbon Mitigation in DKI Jakarta

The city of Jakarta as the Special Capital Region (Daerah Khusus Ibukota, or DKI) has provincial status in Indonesia and has developed its own RAD-GRK. In response to the Presidential Regulation No. 61, a former governor of DKI Jakarta, Mr. Fauzi Bowo, committed Jakarta to reduce GHG emissions by 30 per cent relative to BAU as the base line in 2030, equivalent to 35.24 Mt CO2-eq. This overall mitigation target was then allocated, sector-wise, into the RAD-GRK, with specific mitigation activities and an annual road map for these activities. A survey of the mitigation activities and organizational mechanisms that have been devised reflects the reliance on a “high level of energy efficiency and use of low-carbon energy sources and production technologies”. Such gains are as we expect from the EMT. The development project, and the larger historical process of modernization, is capable of recognizing its externalities and instituting responses drawn from its vast repository of institutional and technical capabilities.
Based on communications with *Badan Perencana Pembangunan Daerah* (BAPPEDA), the Regional Development Planning Agency, and other stakeholders in Jakarta in March 2013, as well as review of the related policy documents, we identified the following processes for formulating and implementing the RAD-GRK. For example, Table 1 is the roadmap for implementing mitigation actions in government buildings. Similar roadmaps were prepared for other sectors of the local economy.

Guided by these roadmaps, the implementation of mitigation activities is envisaged through the organizational infrastructure in place to execute and fund activities identified in the RAD-GRK. The organizational structure for implementing mitigation activities is shown in Table 2, while Table 3 maps the funding mechanisms instituted for the purpose of investing in low-carbon urban infrastructure.

The legal basis for the RAN-GRK development is available in the *Guideline for Developing a Local Action Plan for Green House Gas Emission Reduction* (Government of Indonesia, 2011, p. 2). Further, development of the RAD-GRK is supported by the provincial regulation No. 10/2008 on the distribution of authorities among agencies, offices, technical and non-technical institutions in the province. Additionally, in supporting the implementation of the RAD-GRK, a number of regulations are required and under development. A full list of these regulations pertaining to different sectors is available in *Rencana Aksi Daerah penurunan Gas Rumah Kaca* (RAD-GRK DKI Jakarta, 2012, pp. 119–120).

### 2.3 Guidelines and Principles for Formulating RAD-GRK

A key guiding principle for formulating the RAD-GRK is integration with development plans and targets. The relevant guidelines recommend that the plan “be reviewed according to national and local needs and current developments”, that it be seen as an “integrated part of Local Development Strategy and based on policies and local strategic plans”\(^5\) and further as a “local development plan with new approaches that focus more on GHG

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5 The established development planning institutions include the Local Long-Term Development Plan (RPJPD) and the Provincial/District-City Regional Spatial Management Plan (RTRWP/K). In turn, these documents are the main inputs for local planning documents including the District Government Work Unit Plan (Renja SKPD), the Strategic Plan of District Government Work Unit (Renstra SKPD), Local Mid-Term Development Plan (RPJMD), Local Development Work Plan (RKPD) and, importantly, the Local Budget (APBD).
Table 1 Translation of Mitigation Actions into Roadmaps (e.g. of Green Buildings)

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<td>Emission reduction</td>
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<td>19,933</td>
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Sector: Energy
Sub-sector: Sinks from commercial sectors (green buildings, i.e. Governor’s and Parliament buildings)
Responsible office: Division of Government Buildings, Settlement Office
Estimation of carbon sinks under BAU scenario in 2020 and 2030 are respectively 25,265 CO₂e and 25,330 CO₂e
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<td>Total electricity consumption after energy saving programme (MWh)</td>
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<td>Waste</td>
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<td>Liquid waste</td>
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Table 3 Funding Mechanism for the Implementation of RAD-GRK

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<th>Mitigation action plans in:</th>
<th>Public funds</th>
<th>Private funds</th>
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<td>Domestics</td>
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<td>Transportation</td>
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(Continued)
### Table 3 Continued

**Key to Table 3:**

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<td><strong>Government budget</strong></td>
<td><strong>Domestics</strong></td>
</tr>
<tr>
<td>1 National budget</td>
<td>1 Bank</td>
</tr>
<tr>
<td>2 Provincial budget</td>
<td>2 Private equity investors</td>
</tr>
<tr>
<td>3 PIP — Pusat Investasi Pemerintah (Centre for Government Investment)</td>
<td>3 Pension funds and insurance companies</td>
</tr>
<tr>
<td>4 Business entities (state)</td>
<td>4 Public capital market</td>
</tr>
<tr>
<td>5 Business entities (provincial)</td>
<td>5 CSR — corporate social responsibility</td>
</tr>
<tr>
<td><strong>BM: Bilateral/multilateral</strong></td>
<td><strong>Foreign</strong></td>
</tr>
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<td>6 World Bank, etc.</td>
<td>6 Bank</td>
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<tr>
<td><strong>Climate change</strong></td>
<td><strong>Private funds</strong></td>
</tr>
<tr>
<td>7 ICCTF — Indonesia climate change trust funds</td>
<td>7 Private equity investors</td>
</tr>
<tr>
<td>8 Special trust funds</td>
<td>8 Pension funds and insurance companies</td>
</tr>
<tr>
<td><strong>Civil organizations</strong></td>
<td><strong>Market based</strong></td>
</tr>
<tr>
<td>9 Domestics</td>
<td>9 Public capital market</td>
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<td>10 Foreign</td>
<td>10 Carbon trade</td>
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emission reduction efforts”. Indeed, the RAD-GRK is seen as the “local contribution (province/district/city) to Indonesian commitment to GHG emission reduction”, “involving local developmental actors from various elements of the society to enrich the substance of the RAD-GRK, improve ownership, and improve engagement in the action plan’s implementation within the set timeline”. The understanding of development embedded in this context is clarified by the requirement that the plan “does not hamper economic growth and poverty reduction initiatives, as well as keeps on prioritizing people’s welfare” (all quotes from Government of Indonesia, 2011, p. 7, italics added).

The central characterization of the RAD-GRK as a climate change mitigation extension of the local development planning process helps link climate governance with the process of democratic decentralization in development planning that began a decade ago in Indonesia. After decades of centralized planning, these changes sought to devolve power over development planning and implementation to local governments. Reflecting this commitment of the post-Suharto era, the “structure of authority” for implementing various mitigation actions is organized under “high”, “medium” and “low” authority. “High” authority, reflective of the importance of political decentralization, refers to the local government, while “medium” refers to the provincial and “low” to the national. Table 4 presents illustrative mitigation actions in DKI Jakarta allocated under the different types of authority.

A participant of the DKI Jakarta RAD-GRK development process (interviewed in March 2013) described the process as follows: The Local Environmental Management Agency (BPLHD), as the co-ordinator of this process, created a task force of several experts belonging to sectors such as energy, forestry, waste water treatment, solid waste management, universities, NGOs and government. This task force conducted Focus Group Discussions to first come to a shared perception of the issues, to increase capacity and also to get input from the “bottom” with regard to possible mitigation actions. After the GHG mitigation actions in alignment with development targets were identified in this manner, the calculation of

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6 The “substance” of the RAD-GRK refers to (a) sources and potential of GHG emission reduction, (b) baseline BAU of GHG emission, (c) proposed GHG Emission Reduction Action Plan (mitigation), in the forms of both key activities and supporting activities, (d) proposed priorities/priority scale of selected mitigation action proposals, and (e) implementing agencies and funding of identified actions, measurement and monitoring of the RAD-GRK programme/activities in the regions.
emissions baselines for activities in each sector and their mitigation potentials were assigned to experts who then presented the results and the investments needed for these activities.

The approach to climate governance in DKI Jakarta discussed above reflects the key attributes of the EMT. The institutional evolution seen in the prioritization of GHG mitigation and its institutionalization in Indonesia and the resulting organizational structure, funding and executing mechanisms are as expected from the EMT. Also critical is an appreciation in DKI Jakarta of the challenge at hand as being sectoral engineering problems. It segregates the carbon problem into specific economic sectors, identifies mitigation options for each economic sector in a co-ordinated manner, develops a target and action plan for each mitigation option in each sector, secures funding from a variety of options, and executes projects and measures and monitors their implementation. These are important achievements and available mitigation projections attest their value.

Similarly, the devolution in development planning is an important advance of democratic practice in Indonesia. However, the consideration in this process of goals such as fair, equitable and ecologically sustainable development and their differences, efficiency gains notwithstanding, from
mainstream development discourse remains in need of attention. Actually, in keeping with the EMT, these differences, discussed in more detail below, were not perceived as concerns.

3. EMT-Based Transition Strategies and Their Effectiveness in Managing GHG Trends in DKI, Jakarta

In 2010, Indonesia had a per capita emission of 1.8 tons of CO$_2$ per year (World Bank, 2013). This was within the 2.6 to 3.3 tons CO$_2$-eq per capita per year “equity- and sustainability-based” allocation of GHG emissions calculated by Byrne, Wang, Lee, and Kim (1998). Other scholars arguing that such estimates overlook historical responsibility have taken countries’ cumulative emissions from 1850 to 2050 as the basis for calculating fair and sustainable allocation of atmospheric space. Kanitkar et al. (2010) used this approach to calculate each country’s fair share or “entitlement” to the finite atmospheric space.

Applying this approach reveals that Indonesia, on the basis of its 2009 population, is entitled to a fair share of 3.34 per cent or 21.12 Gt of carbon (GtC). Of this entitlement, the country has used 2.1 GtC between 1850 and 2009, leaving it with an entitlement to emit 19.02 GtC, or 69.75 GtCO$_2$ between 2009 and 2050. This carbon budget translates into an average flow of 5.9 tons of CO$_2$ (i.e. 1.61 tons C) per capita per year between 2010 and 2050. In 2005, DKI Jakarta had an overall GHG emission of over 34 MtCO$_2$-eq (i.e. 9.271 MtC), which amounted to a per capita rate of over 3.7 tCO$_2$-eq (i.e. 1.01 tC) per year (RAD-GRK DKI Jakarta, 2012). This level is higher than the range identified by Byrne et al. (1998). Assuming that the RAD-GRK successfully realizes the 30 per cent reduction from BAU by 2030, the overall emissions will be around 82.21 MtCO$_2$-eq (i.e. 22.42 MtC) or a per capita emission of 6.9 tCO$_2$-eq (i.e. 1.88 tC) per year (assuming a 2030 population for Jakarta of 11.95 million).

Note that this level of per capita emissions is higher than the average annual per capita allocation target of 5.9 tons of CO$_2$ (i.e. 1.61 tC) between 2010 and 2050 for Indonesia, as estimated by Kanitkar et al. (2010), based

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7 Based on the authors’ calculation, assuming a 1 per cent population growth rate (average rate for 2010–12 was 1.3 per cent) for 2012–50, and using the median population (295 million) of the resulting spread.
on the historically equitable, sustainable and entitlement-based approach to allocating atmospheric space. Notwithstanding the 30 per cent efficiency improvement committed to by DKI Jakarta, its emissions are likely to overshoot the equitable and sustainable level of about 6 tons of CO₂ per capita. It may be that other less urbanized or less industrialized provinces in Indonesia might perform better and the country as a whole might stay within its carbon budget. But this is speculation on our part. What appears likely based on present data is that strategies to improve carbon intensity, while valuable, are also insufficient to bring DKI Jakarta within its fair and sustainable carbon budget.

Stakeholders in Jakarta recognize the gap between expected emission levels and an equitable and sustainable level. However, they assert that such contradictions are an inevitable cost of development, and despite the evidence, overlook the persistence of these contradictions in the face of important environmental policy gains. They observed that “because we [Indonesia] are a developing country … we still need energy to increase the development … so the overall emission will increase, even though there will be a 30 per cent improvement in efficiency” (personal communication, March 2013, Jakarta). This view was repeated by another stakeholder, while noting that Indonesia is a developing country with a presently low per capita carbon footprint that needs to increase in order for it to progress and realize its development goals. Such rationalization recognizes the contradiction, but considers it to be the purported cost of development and therefore inevitable and, in keeping with the EMT discourse, as something that will be resolved when the economy becomes wealthier and more technologically sophisticated. This is hardly unique to DKI Jakarta.

Before examining the lessons here, we echo an important caveat to such discussions. While Indonesia and other developing countries are presently within their equitable and sustainable allocation of atmospheric space, countries of the G8 and other Annex-1 countries have surpassed their fair allocation of atmospheric space. They are recognized here as ecological debtors unfairly occupying the atmospheric space of other countries. And echoing Kanitkar et al. (2010, p. 15), we note that “no negotiating position based on the considerations of this paper can bypass the requirement of sharp and immediate cuts by the developed countries as a primary condition for further action”.

The discussion of DKI Jakarta and the evidence it furnishes on the performance of the EMT discourse applied to low-carbon societies is that
a strategy of climate governance prioritizing improvements in carbon intensity is valuable, but is also limited. Therefore, future climate governance needs discursive formations, accompanying mechanisms and institutions that acknowledge this paradox and respond to it. Before introducing our proposal for this purpose, we recount illustrative macro analyses of the effectiveness of EMT strategies seeking to mitigate impacts of energy and material throughput which underline again that trends seen in DKI Jakarta are neither unique nor unexpected.

4. A General Problematization of EMT in Environmental Governance

It is evident that countries at an “advanced state of development” are yet to succeed in extending their success in ecological modernization (e.g. sophisticated environmental bureaucracies, complex socio-political formations, and improvements in energy and materials intensity) to achieving “absolute decoupling” between their economic development path and its ecological impact. It is generally the case that these countries tend to be more efficient in energy and material use and less polluted with regard to some pollutants domestically. But despite improved ratios, G8 economies, as illustrative of advanced developed economies, remain ecological debtors at the macro level. This failure is true with respect to carbon emissions as well (e.g. Davis & Caldeira, 2010; Helm, 2012; Helm, Smale, & Phillips, 2007).

In addition, important environmental gains in these countries also come, in a not insignificant measure, through outsourcing environmental burdens of domestic consumption and GDP growth. Thus, decreasing domestic material consumption (DMC) together with GDP growth persists, along with overall growth in material footprint (MF) (Wiedmann et al., 2013). This divergence is facilitated by an ecological modernization discourse that not only achieves better enforcement and intensity improvements domestically, but normalizes a process of impact externalization via international trade, where significant energy and material throughput occurs elsewhere (the erstwhile “periphery”) and only the final commodity is imported into the advanced economy (e.g. Lenzen et al., 2012).

Overall, despite efforts to manage the environment through efficiency strategies, the overarching outcome of environmental governance, measured in terms of a jurisdiction’s ecological footprint, has not moved towards greater sustainability (Wiedmann et al., 2013; York & Rosa,
This general trend, of which climate governance in DKI Jakarta is one more illustration, undermines the EMT discourse that privileges an environmentalism of affluence and efficiency.8

It is critical to ask why, as societies become institutionally sophisticated, affluent and technically more innovative and efficient — in short, ecologically modern — they continue to consume so much more that, despite productivity gains domestically and externalization of impacts, they still fall short of realizing ecological footprints that are equitable and sustainable.

One explanation to consider is that environmental governance remains cloistered in the technological and economic realm, while ignoring discursive and structural aspects of the social milieu in which it is situated. The low-carbon society approach discussed by Skea and Nishioka (2008) is illustrative. The main guidelines offered for policy formulation are strengthening carbon pricing for more efficient carbon markets; the transfer of low-carbon technologies to developing countries, investment in energy efficiency; carbon capture and storage. Such techno-economic fixes, or broadly “efficiency strategies”, while important, cannot help scrutinize discursive drivers of economic development and, in turn, energy use and climate change.

That social milieu within which the above efficiency strategies are located is perhaps best characterized by the words of J. K. Galbraith as “preoccupied with productivity and production” in pursuit of “more elegant cars, more exotic food, more erotic clothing and more elaborate entertainment” (Galbraith, quoted in Guha, 2006, p. 220). While coined as a description of the United States in the 1950s, such a milieu is now increasingly globalized. For its part, the United States’ economy, despite advances in productivity and efficiency enabled by wealth and technology, has remained amongst the largest ecological debtors. The observation from DKI Jakarta, reported here, is an incipient reflection of this tendency that is projected to repeat itself if Indonesia modernizes in the footsteps of already industrialized countries.

In addition to low-carbon technologies, Skea and Nishioka (2008, p. S6) highlight “patterns of consumption and behaviour that are consistent with low levels of greenhouse gas emissions” and ensuring “that the

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8 This evidence undercuts the confidence of the dominant environmental governance recommendation that was memorably presented by Tierney (2009) as “use energy, get rich and save the planet”.
development needs of all groups within society are met”, as integral to their understanding of a low-carbon society. Such goals are consistent with a self-referential EMT discourse and are increasingly apparent. For instance, discussion of the “socio-economy of low-carbon green intervention” (ADBI, 2013), assessment of capacity building and policy needs for sustainable consumption and production in Asia (CSIRO, 2012), and US President Bill Clinton’s 1994 Executive Order on Environmental Justice that acknowledged environmental racism and injustice and mandated the federal government to institute remedial measures.

Notwithstanding institutional acknowledgement, the actual achievement of environmental justice, and ecological justice more broadly, much like absolute decoupling, remains farfetched. It is fair to ask if these matters can be resolved without the EMT stepping outside its self-referential approach to environmental governance and revisiting the discursive and structural underpinnings of the dominant development model such as the “politics of productivity” (a “preoccupation with productivity and production” as a necessary basis for sidestepping political conflicts that arise across divides of ideology and social class) for building a desirable, stable society (Maier, 1977) and the accompanying normative consensus (i.e. the “pursuit of more …”).

The transition to low-carbon societies narrative does not preview an alternative to such a politics. The prevalent instrumentalism of climate governance does not seem to engage politics at all. Indeed, given the close, even foundational association of the notion of productivity with liberal democracies (Byrne & Yun, 1999), building toward an alternative politics is an eminently knotty problem that is easily overlooked by environmental governance. Difficult it may be, but without querying the “politics of productivity”, can the prioritization of technological, economic and organizational expertise in pursuit of efficiency alone take us far enough? This is unlikely. Its effectiveness is limited at the macro level, and nor is it adequate to the challenge at the local level, as above, in the case of DKI Jakarta.

The question then, when considering an institutional framework for low-carbon urban infrastructure investment, as cities increasingly focus and even compete in fostering entrepreneurial opportunities (Harvey,

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9 Among a long list of examples, see Hoffmann (2011, p. 1), who calls this the “Green Growth Illusion”; or Wilhite and Norgard (2004), who consider that equating efficiency with reduction is a self-deception in energy policy; or York and Rosa (2003, p. 282), who conclude that considered in cumulative terms and not relative to GDP, “modernisation leads to supermaterialisation and not dematerialisation” (also see Bunker, 1996).
is how to negotiate the freedom and logic of capital to pursue the highest returns and the freedom of individuals to pursue high-consumption lifestyles or open-ended consumption (Satterthwaite & Dodman, 2013) when the ecological and social consequences of these freedoms are no longer tolerable.

5. **Framing Our Approach: Engaging Well-being within Planetary (Carbon) Boundaries**

Engaging entrepreneurial urban governance in response to planetary boundaries using democratic means is a challenge confronting climate governance and environmental governance more broadly. In Jakarta, as elsewhere, in addition to energy and carbon intensity related policies, institutional frameworks for climate governance need to evaluate assumptions about human well-being that inform economic development and, ultimately, the normalized commitment to open-ended economic growth. The existing institutional framework in DKI Jakarta, described in section 2, is yet to visualize such a need and make space for such a purpose.

Mainstream (i.e. neoclassical) economic analysis and policy prescription are constrained by its assumption of humans as rational utility-maximizing individual agents. This is coupled with an understanding of utility as a mental state incapable of objective measurement and hence, not amenable to interpersonal comparison. This renders welfare assessments hostage to the methodological approach of individualism and the resulting focus on open-ended economic growth in per capita income as a moral and social necessity (Farley, 2014). Given that economists have no idea of what human welfare is about, or what people value, it is assumed that what can be measured, i.e. consumption, is an accurate measure of utility. Hence, more consumption and production, i.e. more economic growth, is on balance always better — a social and moral imperative. This methodological pitfall befuddles environmental governance.

Open-ended economic growth is further entrenched in the organization of competitive entrepreneurialism, which powerfully patronizes prioritization of capital investment, focusing on advanced, more efficient technologies, as the default policy response to urban infrastructure needs. Often this is done in lieu of enriching and enlivening citizen’s engagement through creating opportunities for building community, understanding and articulating well-being, and creatively imagining and re-imagining
urban purpose, form and experience in more equitable and sustainable ways. This skewed prioritization is also seen in the institutional structures created in the case of DKI Jakarta.

While countries such as Indonesia have as yet made minor contributions to the climate crisis, unlike already industrialized countries, they too need to consider these problems urgently\textsuperscript{10} and integrate insights into the design of institutional frameworks for guiding infrastructure investments. As is widely recognized (e.g. ADBI, 2013), the ongoing expansion of infrastructure investments are quickly locking in a particular pattern of climate impacts for the long term. To avoid this, an institutional framework to oversee investments in low-carbon urban infrastructure must concern itself not only with efficiency strategies, as the RAD-GRK does, but also create processes and mechanisms to query assumptions of human well-being, as the RAD-GRK potentially could. As noted above in section 2, the RAD-GRK is already conceived as a participatory plan document with a focus on local development priorities. That space can be expanded to bring scrutiny and deliberation on the purpose of economic development and content of human well-being in the twenty-first century within its remit.

The guiding principles for the formulation of RAD-GRK mentioned above note that the plan “does not hamper economic growth and poverty reduction initiatives, as well as keeps on prioritizing people’s welfare”. The assumption here is that economic growth is co-terminus with poverty reduction and people’s welfare. Indeed, there are strong associations between the two, especially in the context of a developing country. But there are also important divergences. Probing them, as we do below, allows more flexibility for policy analysis to ask, in less constrained circumstances, about the appropriate scope of economic growth that should inform local long-term development plans.

Ignoring this question and instead only prioritizing institutional modifications and efficiency strategies, as is inherent to the EMT, leaves assumptions about the freedom of capital and behavioural models deifying the freedom of individuals to pursue high-consumption lifestyles (Satterthwaite & Dodman, 2013), out of focus in urban climate governance. If these attributes of human behaviour and social structure are left outside the remit of climate governance deliberations, entrepreneurial energy risks confusing means such as industrial progress, commodity ownership and economic growth targets as objectives of human development, in lieu of complex

\textsuperscript{10} Also see qualification regarding historic responsibility offered above in section 3.
multi-dimensional, substantive human ends. This is evident in the deification of economic growth, generally, as well as in environmental governance and sustainable development policy.

Probing the presumed freedom of individuals to pursue high-consumption lifestyles could help appropriately locate the relevance of economic growth in climate governance discussions. We do so by briefly recounting discussions of social choice theory applied to welfare economics (see Sen, 1998, for an overview of the “possibility of social choice”). The motivating question in the study of social choice is about “relating social judgements and group decisions to the views and interests of the individuals who make up the society or the group” (Sen, 1998, p. 178). A key motivating concern of welfare economics, from the vantage of utilitarianism, is realizing the greatest happiness for the greatest number of people. The difficulty in operationalizing this simple idea is that utility — happiness or the satisfaction of desires or fulfilment of preferences — the “thing” to be maximized in society, is not easily quantified and amenable to comparison between individuals.

Confronted with this apparent inability to quantify utility and provide a metric of welfare comparable between individuals, the possibility of social choice was faced with an “impossibility”: how to choose among social policies or priorities under these circumstances? One response has been to focus on surrogates of utility that can be measured, so that “mainstream economics redefined utility and welfare as the satisfaction of individual preferences or tastes as revealed by willingness to pay” (Farley, 2014, p. 3). A rational, utility-maximizing individual would be “willing to pay” for something at a level commensurate to its effect on the utility to that individual. Having thus monetized a mental state, maximizing the monetary value of the economy, and ultimately economic growth assumed equivalence with maximizing utility and social welfare (Farley, 2014). The freedom of individuals to pursue open-ended consumption or high-consumption lifestyles is a logical extension, indeed necessity, of this alleged impossibility for human beings to communicate, understand, compare and evaluate individual assessments of welfare and to choose among possible social states other than through “free markets”.

It stands to reason that if this impossibility to comprehend and communicate was actually not so impossible after all, we might gain valuable degrees of freedom for environmental governance. This is a possibility worth further exploration. Indeed, it has long been argued by social choice theorists (see Sen, 1998) that the alleged impossibility of social
choice is a function of the information content utilized for welfare assessments. While interpersonal comparisons of well-being based on mental states may be onerous, there is no reason that such comparisons must rely only on something as nebulous as mental states. It is indeed possible to expand the informational content of such comparisons and consider more well-articulated and substantive markers of individual well-being (Sen, 1998).

A number of advances have expanded such markers of individual well-being. They include the idea of “primary goods” offered by John Rawls, the focus on “basic needs” initially offered by the International Labour Organization, the idea of “human-scale development” and satisfiers by Manfred Max-Neef, the capability approach offered by Amartya Sen and Martha Nussbaum, and, more recently, the latter’s articulation as multi-dimensional well-being (Alkire, 2002; Comim, Qizilbash, & Alkire, 2008) and further efforts presently underway to build a multi-dimensional poverty index. These ideas have probed the nature of the individual human actor and recognized the standard rational utility-maximizer model as deficient (e.g. Sen, 1977; see also Farley, 2014, for a critical review of behavioural assumptions of neoclassical economics incorporating recent empirical developments applied to the environmental governance context).

Expanding the informational basis for individual well-being assessment and interpersonal comparisons helps environmental governance engage the development discourse with more nuance, and move beyond the deification of GDP growth. Among the above illustrations, the capability approach offers a framing of welfare assessment in the vocabulary of freedoms “to do” and “to be” what an individual values as the achievement of their agency and/or its well-being (Sen, 1992, 1999). This is an expansive framing in terms of what it can encompass and makes requirements on the deliberative resources available for environmental governance. It relies on values, a more substantive phenomenon than mental states, as the basis for democratic discussion and deliberation. In this perspective, individual freedom for open-ended consumption or high-consumption lifestyles need no longer be absolute default priorities, as entrepreneurial urban governance currently appears to assume. Instead the relevance of consumption is now contingent upon its contribution to human scale development — i.e. the actual possibilities and achievements in being and doing as individuals value.

The advantage of such a human development framework in environmental governance is that it could help release environmental policy from
the Gordian knot of open-ended economic growth (Mathai, 2004) with far-reaching possibilities for development and environmental policy within planetary boundaries (Jackson, 2009). However, realizing such a potential requires an additional step of moving from articulations of valuable individual freedoms to collective ones that economic development and environmental policy ought to prioritize. It is possible for individuals to value capabilities which, if collectively practised (e.g. the capability for and functioning of engaging in consumerism11), are not conducive to sustainability. The question is how to socialize individual values and freedoms such that their valuation and selection evolve reflexively with contemporary social and ecological realities, like for example, environmental degradation, ecological injustice and breached planetary boundaries. An effort to address these issues at some length is offered in Mathai (2012) in response to the question of energy technology choice constrained by the need for greater fairness within planetary boundaries.

Applying the model suggested in Mathai (2012) to inform an institutional framework for low-carbon infrastructure investments needs to consider at least two requirements. The critical need is to bridge individual valuations and prioritization of valuable freedoms to collective ones. The need to do so has long been recognized in discussions on applying the capability approach (e.g. Sen, 1999). In these discussions it is regarded as relying on devolved, democratic governance proceeding via discussion and deliberation over valuations of social arrangements, ordering of priorities and ultimately selection. It requires climate governance to reach beyond the preserve of experts, even if from local government departments, to foster public reasoning on pertinent issues.

Second, the process must take cognizance of ecological finitude and deep-seated social inequalities. That is to say, the meanings of “development” or “advanced state of development” or “well-being” — i.e. valuable freedoms ascribed to these states, their evaluation, selection and prioritization — must proceed discursively with a understanding of ecological and social factors. The prioritization of freedoms via these two processes could then form the basis for arriving at sectoral mitigation targets, choices of technology and investments for reducing carbon intensity, such as that presented in the RAD-GRK discussed above.

11 Understood as the “unending addictive quest for fulfilment — or at least novelty and distraction through commodities” (Gasper, 2002, p. 450).
We have proposed above that a democratic, deliberative and reflexive engagement with valuable freedoms can help dilute the force of “behavioural models deifying freedom of individuals to pursue high-consumption lifestyles”. However, dealing with the structurally enshrined “freedom of capital” still remains a question for our proposal.

The response we propose here does not move in the vein of a revolutionary overthrow of capitalism of the “capitalism or socialism” variety. Instead, our proposal derives from the multiple discursive possibilities and material arrangements opened up when governance and agency is devolved, democratized and made inclusive. It turns on an understanding, unlike that of the total revolution variety, “that no social identity can be applied in a totalized way; there always remain elements of dissonance and spaces for antagonism within a given subject” (Ruggero, 2010, p. 31). The procedural importance accorded to devolution of economic development planning and its reliance on democratic deliberation in our proposal to dilute models of human behaviour that deify “the freedom of individuals to pursue high-consumption lifestyles” is also critical for this second objective.

Devolved and democratic deliberation creates opportunities for the acts of articulating alternative logics for everyday lived realities that are not necessarily bound to the logic of capitalist social relations. Instead, a focus on human-centred objectives such as the reflexive evaluation and selection of valuable human freedoms has the “potential to create entirely new social arrays, altering the expectations, values and belief systems of individuals by linking counter-hegemonic social conventions with foundational, everyday material practices” (Ruggero, 2010, p. 38, emphasis added). It is to these immediately available spaces of sustained, creative engagement with “everyday material practices” that we turn.

6. Linking our Proposal with Practice

The province of DKI Jakarta already has in place an institutional framework to guide low carbon urban infrastructure investment. We suggest in this paper that this institutional foundation can and should be extended. To do so, greater devolution of development and environmental governance that Indonesia has already adopted is necessary. The existing institutional framework no doubt seeks inputs from the bottom up, but it is limited to acknowledged experts from government ministries, NGOs and universities who
identify sector-wise mitigation activities, mitigation potential and budgetary requirements. This valuable institutional mechanism could be foregrounded with processes of democratic and deliberative politics articulating the meaning of human well-being, its ends and priorities.

We envision this as an exercise in public reasoning entailing public workshops, focus group discussions and various other participatory processes to identify, deliberate, select and prioritize valuable capabilities for being and doing. As part of this larger process of outreach and engagement, already existing participatory budgeting exercises like the Musrenbang or Kecamatan Development Project (see Blair, 2012) may be extended in order to discern the capabilities that citizens of Jakarta identify and articulate as their development objectives. And applying a global–local perspective, facilitators of this process must reflexively explore these objectives from the vantage of a historically fair entitlement-based per capita allocation (see above) of the biosphere’s carbon sink space. This is likely to be an iterative process until agreement is reached on development goals and priorities from the ground up. The outcome of this process of defining development goals and priorities can then feed into existing processes for identifying mitigation activities documented in section 2. Doing so introduces more options, as compared to the EMT’s strategy of developing and implementing mitigation activities under the yoke of a purportedly exogenous, non-negotiable prioritization of open-ended economic growth.

Why is introspection about economic development and human well-being and integration with climate governance immediately relevant to developing countries? As some might ask: Is it not too early? It is not, because investment decisions and institution building with long-term impacts are already underway in these countries. While developing countries stand to significantly benefit from more economic growth, unlike developed countries, two considerations must be borne in mind. First, irrespective of climate governance questions, for the greater effectiveness of economic growth it pays to understand and focus that growth to enable human development ends that citizens actually value. The uncritical policy emphasis on surrogates of utility, even in developing countries, is unhelpful for economic development. Second, it puts in place institutional mechanisms and associated social learning that will be needed once developing countries acquire higher income levels and begin to consider the need to stabilize economic growth.

The long-term consequences of not doing so are apparent in today’s industrialized economies that appear incapable of vacating ecological
spaces they have occupied in excess of their fair share, despite reaching levels of per capita income growth with considerably diminished returns in human well-being. We reiterate that our call for moving toward sufficiency in fossil fuel demand applies with immediate force and far more urgency to the so-called developed countries that are already steeped in ecological debt. A call for clarity of development objectives, beyond economic and geopolitical aggrandizement, applies to such economies with greater force. In short, the moral force for substantive responses to climate injustice from developed economies must be recognized and reflected in policy and mitigation achievements. Developing countries are unlikely to question their development model while economies that are and have long been ecological debtors proceed without doing so.

7. Conclusion

This paper has sought to extend the institutional framework guiding low-carbon infrastructure investment in Jakarta, Indonesia. It situated the existing framework within an assessment and critique of the EMT-inspired transition to “low-carbon societies” narrative that has come to prominence in climate governance. As expected from the ecological modernization approach, the paper finds that DKI Jakarta has a well-developed institutional framework for pursuing improvements in emissions intensity in the form of the RAD-GRK and other organizational innovations in recent years. These gains were found wanting by the evidence that despite carbon intensity gains, overall emissions are projected to surpass levels of per capita emissions derived from the entitlements-based approach for allocating carbon sink space. The finding for DKI Jakarta corresponds to similar global trends where efficiencies have improved simultaneously with overall growth of carbon and ecological footprints to unsustainable and unequal levels. This evidence suggests that efficiency strategies are necessary but insufficient when confronted with attaining more fairness in well-being on a finite planet, and in the specific instance of also investing in low-carbon urban infrastructure.

The response proposed here is a framework to pursue emissions intensity improvements simultaneously with an engagement with and eventual enactment of sufficiency in fossil fuel demand through a richer and more reflexive understanding of human well-being and the role of economic growth. To do so the paper highlighted the need to distinguish between
ends and means of development. We pointed out the capability approach as a valuable human development framework that fleshes out this distinction in a nuanced way. To build on what the capability approach offers, a suitable institutional framework must expand the space for devolved, deliberative democracy, where the ends of economic development — freedom to realize valuable doings and beings — can be identified, deliberated and prioritized in the light of important social and ecological trends. This makes significant demands on the democratic resources of any society. Indonesia can seize opportunities to move further in this direction given its initiatives with regard to climate change and its recent history of fostering devolution and decentralization in development planning and implementation.

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