An X-Ray of Iskandar Malaysia Low Carbon Society Project in the Context of Earth System Governance

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Abstract

The Iskandar Malaysia Low Carbon Society is one of the most ambitious urban decarbonising projects in Southeast Asia. It is designed for Malaysia's emerging global sustainable metropolis - Iskandar Malaysia. The project blueprint covers three focal areas: Green Community, Green Economy and Green Environment which are fused into various application areas such as land use planning; consensus building and education; waste management; energy system, air quality and transport. The project runs on a dozen Actions, 53 Sub-Actions, 96 Measures and about 300 Programmes. The main challenge to achieving the objectives of the Iskandar Malaysia low carbon project include inter-agency duplication of responsibilities, bankability and omission of the informal sector of the society/economy. The project's blueprint bestrides statutory functions of federal, state and local governments and incorporates private sector, and the civil society. Most of the ideas of the Iskandar decarbonising project reflect the five A's of ESG-earth system governance (architecture, agency, adaptiveness, accountability, allocation and access) though not completely. This paper illustrates how the ESG's 5-A's can improve the Iskandar Malaysia low carbon project blueprint. We analysed the Iskandar Malaysia dozen action areas for their compatibility to the ESG framework. We found that Iskandar Malaysia is a well conceptualised project blueprint. Yet, it could be better off by adopting the ESG as a framework for resolving implementation gaps and challenges. The paper concludes that the integration of Iskandar Malaysia decarbonising project with the earth system governance concept could provide a good example of successful design and implementation of decarbonisation project in Asian cities.

Keywords: Sustainability, Low carbon society, Earth System Governance, Sustainability, Iskandar Malaysia

1. Introduction

The 21st century like its predecessor 20th century is characterised by carbon intensive lifestyles. This is substantially due to massive urbanisation and industrialisation that spread across the world resulting in depletion of the planetary systems and setting them off balance. The serious consequences of this development affect the survival of the ecosystems-humans inclusive. Addressing this challenge has been an uphill task for the scientific and policy communities who need to work together within spheres of interdisciplinary and participatory framework. This collaboration is important in order to translate into reality several measures that have been initiated for effective and sustainable solutions for the unfolding crises of sustainability. The speedy dominance of humans on the planetary systems otherwise called *Anthropocene* is induced by unprecedented urbanisation, industrialisation and process of globalisation (Barau and Ludin, 2012). The anthropocene age is particularly characterised by climate change risks, biodiversity loss and other disturbances in the planetary systems. These challenges are global in nature though they emanate from various global-local regions. For example, in an attempt to counter the challenge, there has been an overwhelming increase in research for building low carbon societies (LCS) in Asia as reported recently in Kainuma et al. (2012). Basically, this is a response to the staggering economic growth and development unfolding in Asia's many emerging economic regions. These Asian new global economic and industrial giants aim to implement their commitment to global carbon emission reduction and attain environmental sustainability. It is obvious that different methodologies are employed in designing low carbon society projects, and these methods are commonly tied to temporal targets (Shimada et al 2007; Nakata et al, 2011; Ashina et al 2012). While all the low carbon projects are welcome development, it is important to seek for ways to improve the projects in ways that the projects' objectives could be met satisfactorily within wider global governance contexts.

Malaysia like most Asian countries has shown commitment to carbon reduction through signing global treaties for emission reduction. This is demonstrated through integration of this commitment into the Malaysian 10th National Plan which stresses commitment to sustainability within global context. Malaysia has during the Copenhagen 2009 COP-15 pledged to voluntarily reduce its carbon intensity emission levels by 40% by 2025 (Siong and Joeman, 2011). One of the leading low carbon projects in Malaysia is the emerging metropolis of Iskandar Malaysia.

This low carbon project is designed for Malaysia's new metropolis which reflects the role of cities in the highly urbanised planet. What is unique about Iskandar Malaysia is that, it is a newly designed metropolis that was conceived with idea of sustainability and low carbon focus at its planning and development stage. This project is constrained in respect of its implementation despite commitment of the research community, public, private and civil society sectors. Most of the challenges relate to implementation of the ideas and programmes enshrined in the blueprint. In view of that, this paper examines how Iskandar Malaysia Low Carbon Project could benefit from an emerging multidisciplinary scientific enterprise called Earth System Governance (ESG) Project. The ESG project could significantly improve the standing of Iskandar Malaysia Low Carbon Society project in a number of ways. More importantly it could reduce implementation obstacles, it will also help the project to be in tune with and identify with latest global trends of sustainability through low carbon emission. This paper is divided into seven sections that span theoretical, comparative and analytical issues and recommendations for effective and sustainable low carbon projects.

2. Low Carbon Society and Sustainability

Defining low carbon society or low carbon towns as they are called in China (Li et al. 2012) is not rather simple. It depends on the level of preparedness, strategies, targets and commitment of a society to sustainability. It may also be based on who makes the definition- an individual, group-scientists or institutions. As a whole, emission reduction is a recurrent theme in any definition one comes across. For instance, the Japanese Ministry of Environment (2007) defines low carbon society and its scope as:

- "A society that emits GHG only in an amount which can be absorbed by nature."
- "To build a society where value is placed on family or community ties, health, interaction with mother nature and the spirit to improve the quality of life."
- "Harmony and coexistence with nature and promote "nature-friendly technologies," such as utilization of biomass."

The above three-tiered definition emphasises the quest for carbon emission reduction in all sectors, and that should include a simple and qualitative lifestyle, and coexistence with nature.

In another view, the Government of Scotland (2012) states that:

> "A low carbon society will use less energy and fewer resources: at home, at work, on the move and across the public sector. It is a society where more of the energy used comes from cleaner and renewable sources such as water, wind, wave and solar power."

It continues:

> "It is a society that is ready and able to realise the economic opportunities that come from producing fewer carbon emissions, from improved energy and resource efficiency, and from reducing the level of reliance on carbon-based fuel. It is a society which acts responsibly, is mindful of future generations, and whose actions lead by example across the world."

In general, low carbon has now become part of development literature vocabulary particularly in issues relating to climate change. Malugetta and Urban (2010) opine that low carbon *development* embraces poverty reduction, economic growth and wellbeing. Perhaps it is in line with this that the concept of low carbon *economy* emerges (Tongzhou, 2011). Presently, designing low carbon society projects in most countries props on what Schimdt et al (2012) call "technical solutions and quantitative scenarios, prepared by scientists". It is imperative that low carbon society projects leave model based status to real world and achievable scenarios. According to Shi and Lai (2012), green technologies, multidisciplinary and multi-perspectives underscore low carbon society projects as a whole. However, Pissarskoi (2012) argues that political decisions tend to respond to emission and energy issues that are often based on *foreknowledge* based ideas that scientists offer to governments. However, as Kainuma et al. (2012) noted, all low carbon society models aim to limit global warming temperatures. In what appears to be a major theoretical contribution to low carbon society theory, Pissarskoi (2012) contested the epistemic value of foreknowledge as a reliable tool for making decisions. The author outlines the types of foreknowledge as follows:

Deterministic foreknowledge:

– "X will be the case at t."
– Probabilistic foreknowledge:
– "X will be the case at t with probability p."

Possibilistic foreknowledge:

–" It is possible, that X will be the case at t."

Scientists use Kaya Identity for measuring human impacts on climate which is given as function of:

–CO_2 emissions from energy= Population x (GDP/capita) x (energy-use/GDP)x (CO2emissions/energy use)

Based on the above formula associated with the foreknowledge, the author argues that scientists explain variables given below and that is not all together a novel idea and at the same time constitute a source for uncertainties surrounding foreknowledge. The variables that may generate uncertainties include:

– Population: merely possibilistic;

– GDP: merely possibilistic;

– Energy demand: merely possibilistic;

– Technological development (efficiency): merely possibilistic

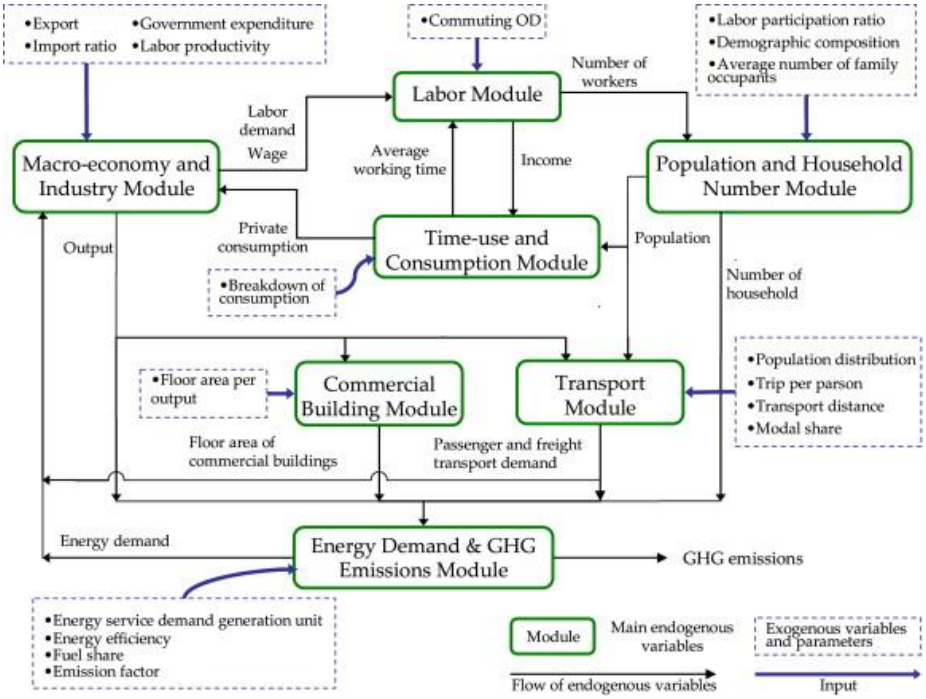

Figure 1 Extended Snapshot Tool (source: Ho et al. 2013)

Calculation of energy demand and emission in Iskandar Malaysia is made through ExSS - Extended Snapshot Tool (Ho et al., 2013) as shown in Figure 1. This could be considered as a

typical model for deterministic/possibilistic foreknowledge application in low carbon reduction project design.

Some researchers are of the opinion that building low carbon project should focus on individuals as consumers of energy. In this context, Heiskanen et al. (2010) stress that behavioural change is a key to achieving low carbon society. On the other hand, Carvalho et al (2011) suggest that small and large enterprises could also play a crucial role in achieving low carbon society by generating their own renewable energy through solar, wind, small hydro, waste etc.

In view of polarised opinions, it is important to explore ways for a better consensus building which could be open to participation and acceptance of the global public, sustainability and climate science communities. It is worth exploring the emerging Earth System Governance project particularly in view of its multidisciplinary and dynamic scope that according to Young (2010) play important role in solving multiple environmental problems and issues surrounding them.

3. Earth System Governance and Sustainability

Earth system governance (ESG) is one of the coordinated interdisciplinary projects that aims to introduce a global consensus based on multidisciplinary approach and multiple levels of policy and decision making. Biermann et al. (2009) define ESG as an:

> Interrelated and increasingly integrated system of formal and informal rules, rule-making systems, and actor-networks at all levels of human society (from local to global) that are set up to steer societies towards preventing, mitigating, and adapting to global and local environmental change and, in particular, earth system transformation, within the normative context of sustainable development. The notion of governance refers here to forms of steering that are less hierarchical than traditional governmental policy-making (even though most modern governance arrangements will also include some degree of hierarchy), rather decentralized, open to self-organization, and inclusive of non-state actors that range from industry and non-governmental organizations to scientists, indigenous communities, city governments and international organizations.

Earth System Governance is built around five core variables or analytical problems. These are briefly explained below:

a) *Architectures*- these involve emergence, design and effectiveness of governance systems and how they integrate with other global, regional, national and local governance systems
b) *Agents*- these are the drivers of earth system governance that influence, define stakes and responsibilities of actors- governments, businesses, non-governmental organizations etc
c) *Adaptiveness*- governance systems are not free from the inherent human-nature uncertainties. As a result, adapting to these uncertainties and finding solutions to them should be a leading feature of earth system governance
d) *Accountability and Legitimacy*- institutions to regulate governance systems at all levels must be legitimate, democratic, transparent and accountable in the discharge of their duties and responsibilities.
e) *Access and Allocation*- as the fifth pillar of earth system governance underscores the role of justice and fairness in resource sharing among members of the global and local societies.

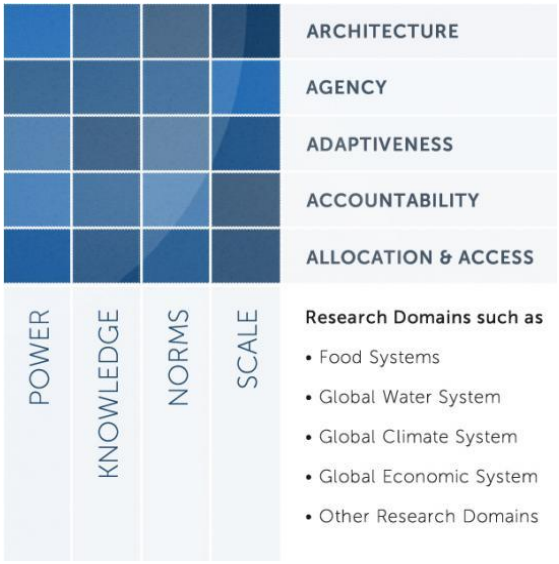

Figure 2: ESG concept dynamics

(Source: http://www.earthsystemgovernance.org/about/crosscutting-themes)

The 5-A's of ESG are embedded with crosscutting themes (see Figure 1) which entail the role of *Power*, *Knowledge*, *Norm*, and *Scale*. These four together with the 5-A's underlie the capacity of

the Earth System Governance to explain and analyse contemporary local and global environmental change particularly within prism of social sciences.

Earth system governance is based on grounded social theory that involves research and politics of natural resource management in broader dimensions (Biermann, 2007). Most of the countries committed to low carbon cities, towns and industries attempt to achieve global sustainability through reducing emission and meeting up global climate deals. On this point, Biermann and Gupta (2011) observe that globalisation is a driving force that necessitates strengthening global and regional institutions especially as there are over 900 international treaties that need implementation following their ratification. Global governance institutions on resource development and international trade could only be fair when they accommodate development interests and needs of developing countries (Spagnuolo, 2011). The concept of Earth System Governance is dynamic and its relevance to global sustainability has reached a tipping point (Young, 2010). Its relevance to other concepts such as planetary boundaries, anthropocene and international environmental sustainability treaties is increasingly recognised in research literature (Biermann et al 2010; Biermann, 2012, Biermann et al., 2012).

Modelling of low carbon society governance reflects numerous theories, Söderholm et al., (2011) identify such theories to include transition management (co-evolutionary economics and innovation theory), networked or negotiated governance, multi-stakeholder collaboration, and agenda-setting. Transition to low carbon economy seems to be a more dominant issue in the industrialised states whose age-long industrialisation has created landscapes of mass carbon emissions. However, from the work of Bridge et al. (2012), it appears that transition to low carbon society must take cognisance of location, landscape, territoriality, spatial differentiation, scaling, and spatial embeddedness of energy distribution.

Scientists and policymakers make decisions about the uncertain future. Hughes et al. (2013) identify three basic decision making types, namely: protective decision-making — by being aware of possible future external threats, and raise bulwark against them; secondly, Proactive decision making — is about possible future opportunities, for which actors seize opportunities to improve their future prospects through their own actions; thirdly, Consensus building — is about concerted actions by a numerous actors may lead to outcomes that can create societal consensus. In the context of the current drive for transition to reduced carbon emissions within Kyoto Pact,

decision are made on mid-term (2020-2030) or long term beyond 2050 (Hanaoka and Kainuma, 2012).

4. The Study Area: Iskandar Malaysia

Figure 3 Map of Iskandar Malaysia

Iskandar Malaysia represents a new form of urban economic development and governance strategy. This economic city region project was created by the Malaysian Federal Government in 2006 with a view to realizing Malaysia's aspirations to attaining a developed state status (Rizzo and Glasson, 2011). The administration of this region cuts across levels of governments and their affiliated institutions. Iskandar Regional Development Authority (IRDA) is shouldered with responsibility of actualizing the Iskandar Malaysia Comprehensive Development Plan (CDP). IRDA also works closely with the Johor State Government and five local councils within whose

jurisdiction the five Iskandar Malaysia five flagships areas (Table 1) in the implementation of the CDP.

Table 1: Iskandar Flagship zones with their activities

Flagships	Projects
A JOHOR BAHRU CITY CENTRE	• Central Business District projects • Danga Bay Integrated Waterfront City • Upgrading of Central Business District • Tebrau-Plentong Mixed Development • Customs, Immigration and Quarantine Complex (CIQ) • Johor-Singapore Causeway & Lido Boulevard • Conservation and Heritage Zones
B NUSAJAYA	• Kota Iskandar • Puteri Harbour • Medini • EduCity • Southern Industrial Logistic Clusters (SiLC) • Afiat Health Park • International Destination Resort • Housing and Residential Projects
C WESTERN GATE DEVELOPMENT	• Port of Tanjung Pelepas • Tanjung Bin Power Plant • Malaysia - Singapore Second Link • RAMSAR World Heritage • Tanjung Piai - Southernmost Tip of Mainland Asia • Free Trade Zone
D EASTERN GATE DEVELOPMENT	• Tanjung Langsat Industrial Complex • Tanjung Langsat Port • Johor Port • Pasir Gudang Industrial Park • APTEC (Lakehill Resort City)
E SENAI-SKUDAI	• Senai International Airport • Senai Cargo Hub • Senai High-Tech Park • Sedenak Industrial Park • MSC Cyberport City • Johor Technology Park • Johor Premium Outlets

Source: www.iskandarmalaysia.com.my/investing-in-iskandar-malaysia

In order to realise the Comprehensive Development Plan, IRDA created a number of blueprints designed based on principles of sustainable development which is enshrined in the vision and mission of the Iskandar Malaysia metropolis. The 32 blueprints are presented in Table 2 below.

Table 2: Iskandar Malaysia 32 Blueprints for Sustainability

Urban Planning	1. Planning and Design Guidelines for Neighbourhood Design	6. Planning and Design Guidelines for Housing
	2. Integrated Land Use Blueprint	7. Planning and Design Guidelines for Commercial
	3. Planning and Design Guidelines for Public Facilities	8. Planning and Design Guidelines for Industry
	✔ 4. Planning guidelines to Mixed Use Dev	✔ 9. Guidelines for Foreign Workers Housing
	✔ 5. Design Brief for Public Housing	10. Area Character Statement
Infra-structure	1. Transportation Master Plan	5. Integrated Solid Waste Management
	✔ 2. Integrated Transport Study	✔ 6. Design Standards for Road
	3. Master plan for Sewerage and Wastewater Treatment	7. Manual for Earthwork Plan
	4. Design Standards for Drainage and Storm Water Management	8. Improvements of Maintenance and Operational Plan
Environment	1. Environmental Planning	3. Master Plan for Renewable Energy
	2. Shoreline Management Plan	4. Master Plan for Green Design
Utilities	1. Electricity Blueprint	3. Master Plan for Gas Supply
	2. Master Plan for Water Supply	4. ICT and Telecommunication
Other Aspects	✔ 1. Safety and Security Blueprint	✔ 4. Strategic Investment and Marketing
	✔ 2. IM Human Capital Blueprint	5. IM Tourism Blueprint
	3. Iskandar Housing Management	✔ 6. Enterprise G.I.S. Blueprint For Iskandar Malaysia

✔ = Completed

Source: www.iskandarmalaysia.com.my

Iskandar Malaysia is located within an international Extended Metropolitan Region (EMR) comprising of Singapore-Johor-Riau in Singapore, Malaysia and Indonesia respectively (Macleod and McGee, 1996). Perhaps, against this backdrop, Murakami (2011) suggested the Comprehensive Assessment System for Built Environment Efficiency (CASBEE) as tool that

from Japan's multi-city carbon projects experience could facilitate development of low carbon society in Iskandar Malaysia. This is very important in view of the interdependency between Iskandar and other neighbouring urban areas. This is why the concept of Earth System Governance is another tool worthy of consideration when designing low carbon societies projects such as in the case of Iskandar Malaysia.

5. Peering the Iskandar Malaysia Low Carbon Society Blueprint and the Earth System Governance

Figure 4: three themes and dozen Action areas for Iskandar Malaysia Low carbon project

The three main themes of the Iskandar low carbon project and each of its 12 Action Areas (Figure 3) are supported by 53 Sub-Actions, 96 Measures and about 300 Programs designed to implement the low carbon project. According to Iskandar Malaysia Low Carbon Blueprint

published by Low Carbon Asia Research Centre (2012), the actions are mainly policy issues needed to achieve the goal of 50% reduction in carbon emission within Iskandar Malaysia. Whereas, the sub-actions entail the actions needed to achieve a particular Action over a period of time. On the other hand, the Measures entails the assemblage of strategies for implementation of Actions and Sub-actions, while the Programmes refer to a wide range of activities and deliverables such as budgets that implementing agencies identify. We tried to identify the areas where Iskandar Low Carbon Society Blueprint converges with some of the issues covered by the Earth System Governance Project (Table 3).

Table 3: Pairing ESG and Iskandar Malaysia Low Carbon Blueprint

	Earth System **G**overnance	Iskandar Malaysia LCS Blueprint	Remarks
	Variables	**Compliance**	
1	Integrated system	✔	32 blueprints
2	Formal rules	✔	
3	Informal rules	**X**	Not included
4	Actor networks	✔	
5	Prevention, of global environmental change	✔	
6	Local context	✔	
7	Mitigation, and adapting to global environmental change	✔	
8	Global context	✔	
9	Tight governmental hierarchy	✔	Formal institutions
10	Light governmental hierarchy	X	
11	Non state actors	✔	
12	Scientists	✔	
13	Indigenous communities	✔ and **X**	Not given tasks
14	City governments	✔	
15	International organisations	✔	
16	Multidimensional	✔	
17	Accounting for actions delivery/non delivery	**X**	Difficult to implement

Based on design of ESG (Biermann et al. 2009) and Iskandar Malaysia LCS Blueprint (2012)

6. Constraints to Implementation of Iskandar Malaysia Low Carbon Society and Prospects of Earth System Governance

The main constraints that would impede smooth Implantation of Iskandar Malaysia low carbon city would include issues bordering on the people's lifestyles, bankability of the outlined projects and overlaps between the various state actors- *mukims* (sub-local areas), local councils, state, federal agencies or even between some of these state-role players and the one-stop agency for implementation of Iskandar Malaysia Comprehensive Development Plan- Iskandar Regional Development Authority (IRDA). Another fundamental constraint would be the informal sector of the economy which is not clearly represented in the Iskandar Malaysia Low Carbon Blueprint. As is the case with many Asian newly industrialising economies (NIEs), living standards of Malaysian population are improving considerably relative to a few decades ago. Neverthesless, it is not easy to convince people to forgo some carbon-intensive lifestyles – such as ownership of cars, leisure travels, ownership of sundry non-taxable home-based appliances. This is true considering the argument that building low carbon societies must start with individuals' behavioural change (Heiskanen et al. (2010).

In the spirit of principles of sustainability, it is imperative to consider the role of the informal sector of the economy and society. There are a number of small informal businesses and livelihoods in and around Iskandar Malaysia. These include night markets, wet markets, road side stalls and sundry services that may in one way or the other contribute significantly in reducing or increasing emission through chain of their activities. Their role is particularly important considering the fact that the Malaysian government has made a voluntary commitment to reduce its emission level within mid-term period (Siong and Boyd, 2011). In connection to this is the missing role of the migrant labourers that increasingly make influx into Iskandar Malaysia. We may speculate that these migrants may not be fully aware of the Iskandar low carbon society housekeeping rules. As such they may constitute informal channels that could hold the project back. The role of knowledge and norms are identified within the concept of Earth System Governance (Biermann et al., 2009).

The issue of bankability is very important. Many developing countries including Malaysia are making great efforts to attract investors with strings of sustainability investment climate as obviously is the case of Iskandar Malaysia. It is a bit confusing as to who does what. The

investors are attracted to areas with readymade infrastructure-industrial zones, road networks, energy infrastructure etc. Then it is difficult for many investors to think of establishing clean energy sources for themselves as suggested by Carvalho et al (2011). Governments have other tasks to ensure other facets and faces of implementing sustainable development. Then perhaps focussing on individuals is very important in Iskandar Malaysia. In shorthand, the Iskandar Low Carbon Society Blueprint (2012) is built on the principles of possibilistic/deterministic foreknowledge (Pissarskoi, 2012). Considering the dynamics of the 5-A's as well as role of *knowledge, norm* and *scale* as crosscutting themes of the Earth System Governance, then it is pertinent to say that the concept of ESG could significantly facilitate designing additional programmes for filling the gaps identified in Iskandar Malaysia carbon project.

7. Conclusions

Iskandar Malaysia Low Carbon Blueprint is a comprehensive document that came six years after Iskandar Malaysia metropolis project has started and even reached a tipping point following the launching of the Blueprint during COP18 in Doha, Qatar. Nonetheless, it is not too late considering the snail pace of global low carbon agreement. Global sustainability policy architectures strongly influence state of local and regional sustainability paces. Generally, the Blueprint needs to be strictly and dynamically adhered to and followed by the public. Malaysia has made a voluntary commitment to emission intensity reduction and this is only possible if all the stakeholders make use of the provisions of the blueprint at least within the context of Iskandar Malaysia. Though the blueprint lacks crosscutting Actions, it could adapt the principles of ESG which is elastic and makes room for accommodating and updating a wide range of issues. It is also difficult for policy-makers and investors to know the definitions of green economy, green community or green environment. Policymakers need clarity on every theme before they can implement it. Completeness of the definition is therefore very important. As shown by the Government of Scotland (2012) the effort to build a low carbon economy takes a landscape system approach to define clearly where they come from and where they go as given below:

> "Natural resourcefulness is a defining Scottish trait - it's in our nature; in the disproportionate richness of our landscapes and habitats and in the way we reuse and recycle everyday commodities. It defines our environment through the winds and

> waters of our hills and glens and the wind, waves and tides of our islands and our coast. We have won the natural lottery. That is why Scotland is ideally placed to grasp the opportunities of a new industrial age."

This kind of interconnectedness also appears in the work of Bridge et al. (2012), who maintain that transition to low carbon society must take cognisance of location, landscape, territoriality, spatial differentiation, scaling, and spatial embeddedness of energy distribution. This connected is needed between the Iskandar Low Carbon Blue print, other 32 blueprints, the Comprehensive Development Plan and other issues not bracketed within them.

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