

LOW CARBON DEVELOPMENT PLANNING IN ISKANDAR MALAYSIA: ASSESSING THE ROLE OF EPISTEMIC COMMUNITIES

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Introduction

At the United Nations Framework Convention on Climate Change (UNFCCC) meeting in Copenhagen in 2009, the Prime Minister of Malaysia, Najib Razak, announced that by 2020, the country would achieve up to a 40 percent voluntary reduction in carbon emission intensity compared to 2005 levels, with technology transfer and financing from the developed world. While that financing and technology never arrived, Malaysia has reduced its emissions intensity by 33 percent, and is likely to meet its goal (Prime Minister Najib Razak 2014), although a roadmap was only produced in 2014 (Government of Malaysia 2016).

This strong result comes from a seemingly unlikely quarter, given that energy is a key driver of the Malaysian economy, and given that the nation now has the second highest demand of energy per capita in the region (Gouldson et al. 2014).

In fact, Malaysia fits into a bigger trend, as there has been increasing political attention to the need to alter development patterns away from reliance on fossil fuels, as the evidence supporting the negative impacts of climate change mounts. This has led to the proliferation of carbon reduction measures and low-carbon policies around the world (Lambright, Chjangnon, and Harvey 1996; Higgins 2013; Khanna, Fridley, and Hong 2014). While there are various definitions of “low-carbon development,” the key concept is that economic growth can be decoupled from carbon emissions, pollution, and resource use (ADB 2013).

While national governments have made commitments to respond to international objectives, strategies have to be downscaled to the local level to enable implementation (Schreurs 2008). While the prevailing view is that national governments have to lead this process, Malaysia has followed a different pattern. Iskandar Malaysia, a rapidly growing economic region, created a Low Carbon Society Blueprint in 2012 (Universiti Teknologi Malaysia et al. 2012). This was the first low-carbon development plan for Malaysia at any scale, and was also the first of its

kind in the ASEAN region. It is now being touted as a model by a range of national and international organizations, and is being replicated in other parts of the country and region (Fong 2013; Hammim 2014).

This paper asks how a rapidly growing region with high growth targets has become the first region in ASEAN to develop a low-carbon plan. I argue that Iskandar's low-carbon policymaking has been a bottom-up process led by an epistemic community—that is, academics with a shared way of thinking—of Malaysian and Japanese researchers (following Haas, 1989). The success of the overall effort can be traced to the influence of this epistemic community, the members of which worked to build support, transform research into proposed policy changes, and take advantage of a national policy window to leverage financing and public-private partnerships. Implementation, however, has been hindered, because the epistemic community is mostly an apolitical group. While like-minded thinkers in the university and foundation contexts can suggest and support the emergence of new ideas, they are not in a position—unless they draw political support from others—to overcome financial and institutional obstacles and opposition from government agencies.

The paper is structured as follows. First, I will provide additional background about Iskandar Malaysia. Then I will review published work in several fields that sheds light on the emergence of low-carbon development strategies. Section four presents an overview of the low-carbon policy adopted in the past few years in Iskandar Malaysia. Section five uses the tool of “process tracing” to show how the commitment to low-carbon society emerged in Malaysia, and the key roles played by certain actors. The last two sections analyze what I see as the reasons for policy success and the constraints that are likely to impede implementation.

Background

Iskandar Malaysia is located at the southern tip of Peninsular Malaysia across the strait from Singapore. In 2006, the federal government established Iskandar as its second economic corridor and the largest economic corridor in Southeast Asia (IRDA 2013). It covers 2,216.3 square kilometers and includes five flagship zones (see map below), each with an urban center, including Johor Bahru, the second largest city in the country. The goal is to turn Iskandar into the Singaporean Shenzhen, making it the next mega urban transnational region (Rizzo and Glasson 2012).¹



Figure 1. Map of Iskandar Malaysia with flagship development zonesⁱⁱ

The region's prime location next to Singapore, along with supportive policies and incentives, have led to an influx of public and private investment. The region attracted \$47 billion in committed investments from 2006 to September 2015, with \$6 billion in the first half of 2015 alone (Bernama 2015). This investment is expected to drive the development of the country as a whole. Iskandar is viewed as an essential component of Malaysia's effort to transform itself from a developing to a developed country by 2020 (Ho et al. 2013). The population in the urban region is expected to more than double from 1.35 million in 2005 to more than 3 million by 2025, while the GDP is projected to almost quadruple—from \$9.9 billion to \$39.3 billion—over the same period (Khazanah Nasional 2006). More than half of the urban economy that will be required in 2025 has yet to be built in Johor and Pasir Gudang (Gouldson et al. 2014). Without concerted policy interventions, such economic growth would lead to an 80 percent increase in energy use in the next decade and almost an 85 percent increase in carbon emissions (Gouldson et al. 2014), underscoring the urgent need for a low-carbon strategy for the region.

In an effort to learn more about Iskandar's low-carbon commitment, I conducted 13 semi-structured interviews with regional officials and academics involved in the development and implementation of the Low Carbon Society Blueprint (Universiti Teknologi Malaysia et al. 2014). Two informants were interviewed twice. Data were collected from numerous sources, including public presentations, informal group conversations, participant observation, and site visits to areas where policies have begun to be implemented. Most of my data were collected during a field study in Malaysia as part of the UTM-MIT Malaysia Sustainable Cities Program

(MIT-UTM 2015).ⁱⁱⁱ Local and national environmental and development policies were reviewed, as were relevant conference presentations given by the key actors at internal research group meetings, national planning and climate conferences, and international conferences such as the UNFCCC Conference of Parties since 2009. National and international newspapers were also reviewed for information on the policy-making process. Interviews were transcribed and coded using a grounded theory approach (Strauss and Corbin 1997).

Climate policy and epistemic communities

With the increase in subnational efforts to combat climate change, there has been a concurrent growth of the published literature on urban climate governance (eg. Bulkeley and Betsill 2013; Biel and Lundqvist 2013; While and Whitehead 2013; Rice 2010; Rutland and Aylett 2008). This scholarly work identifies the urban realm as central to climate mitigation, and questions key assumptions at the heart of the international environmental governance scholarship—particularly the idea that that international regimes are the main players, while subnational governments act merely as passive acceptors of international norms. In this alternative literature, cities are viewed as key sites for innovation and experimentation, with elected and appointed leaders shaping the formulation and implementation of climate policy responses (Bulkeley and Betsill 2005).

While cities may now be leading the way in many countries, the process by which municipal governments have assumed a leadership role in fashioning and implementing efforts to reduce CO₂ emissions is still underexplored, especially in the Global South. The literature on policy change suggests several mechanisms by which low carbon development plans can take shape. It focuses heavily on the role of *ideas* in politics, on the assumption that governments are sites of political struggle and arenas for the development of ideas (Hall 1993). Most of the theories point to key actors, who are presumed to drive policy change. According to Hecló (1974), public policy reform (not necessarily in the climate-change area) is led by elected officials and political parties. For North (1990), this dynamic is supported by history. These are state-centered ideas about policy change, which some believe may be especially appropriate for Malaysia's "illiberal democracy" (Khoo 2012). In Malaysia, though, other actors, particularly non-governmental actors, appear to play important roles in policy development in Malaysia. In the Malaysian context, it may be that policy change is driven by what Sabatier and Jenkins-Smith call "advocacy coalitions"—i.e., social players who know how to use the media and educational campaigns to transfer their ideological convictions into the policy arena) (1994). Still others have pointed to supra-national institutions, such as the UNFCCC or multilateral aid organizations, as key

drivers of change (Rose 1993), given that they provide funding for highly visible projects and in the process transmit international norms. Examples are evident in environmental policymaking in Malaysia, particularly around forest protection (Hezri and Nordin Hasan 2006).

Peter Haas has theorized that holders of expert knowledge form epistemic communities are in a unique position to drive policy change. According to Haas (1989), epistemic communities have “recognized expertise and competence in a particular domain and an authoritative claim to policy-relevant knowledge within [that] domain or issue-area,” which enable them to influence policymakers. Epistemic communities are united by a shared set of principled and normative beliefs, shared causal beliefs involving multiple linkages between possible policy actions and desired outcomes, shared notions of validity, and a common policy enterprise (Haas 1992). Epistemic communities have been shown to have an effect on agenda setting, influencing negotiations, and bringing about preferred outcomes (Haas 1992; Cross 2013). Haas has theorized that “how states identify their interests and recognize the latitude of actions deemed appropriate in specific issue-areas of policymaking are functions of the manner in which the problems are understood by the policymakers or are represented by those to whom they turn for advice under conditions of uncertainty” (1992). This relationship puts epistemic communities in a powerful position: they can use their specialized knowledge to frame policy problems, and also to propose solutions to those problems. Given the important role that epistemic communities can play—at least in theory—it seems important to examine their role at the various stages in the policy-making process in a particular place and time.

Others have been more skeptical of the power, or even the existence, of epistemic communities. Critiques have focused on the absence of domestic politics within Haas international framework and degree of political autonomy that an epistemic community holds (Risse-Kappen 1994; Miller and Edwards 2001). In environmental negotiations, Susskind and Ali (2015) reject the idea that epistemic communities can alter the primary balance of power between coalitions and veto blocks. Ultimately, they argue, epistemic communities can use their “resources—knowledge, skill, and money—to raise consciousness,” but need the cooperation of political leaders who are accountable to their constituents in order to have any real impact on treaty negotiations. Others believe Haas’s approach overstates the level of influence and the ability to shape decision-maker interests (Dunlop 2009; Toke 1999). Toke (1999) points out that the epistemic community paradigm leaves out the role of other non-state actors—certainly a relevant critique as the diversity of actors involved in policymaking increases.

Efforts to explain the impact of epistemic communities is also supported by parallel thinking about other forms of policy networks that

have been shown to impact decision-making by facilitating knowledge sharing, mobilizing and allocating resources effectively, and attracting new forms of information and resources into a system (Börzel 1998; Berardo 2009). Academic institutions in Malaysia have played a key role in the development of climate and development policies by drafting policy proposals and providing relevant data. The development of the National Climate Change Policy, for example, was led by researchers at the National University of Malaysia (Tan, Pereira, and Koh 2009). A similar approach was used to develop the Low Carbon Society Blueprint, although with some key differences discussed below.

In the last three decades, much has been done to document the social dimensions of science and technology (see Jasanoff 1995 for review). This scholarly work has established that science is socially constructed within an historical context (Latour and Woolgar 1979; Latour 1987; Pickering 1992). This, in turn, has led to the emergence of a robust theory of co-production, as science and society are embedded systems, which form and inform each other (Jasanoff 2004). Therefore, what makes some scientific knowledge on climate change more relevant than other ideas depends not so much on the content as it does on the *process* by which it is developed and validated by the agents involved (Jasanoff and Wynne 1998). This perspective highlights the importance of the key actors and types of information involved in policy-making processes—particularly important in the development of the Low Carbon Society Blueprint.

Low Carbon Society Blueprint

The Low Carbon Society Blueprint (LCS Blueprint) comprises a proposed group of carbon emission reduction actions and measures to guide the development of Iskandar Malaysia. It defines a low-carbon society as one which “aims to minimize carbon emissions in all sectors, shift to a simpler and quality life and coexistence with nature” (Universiti Teknologi Malaysia et al. 2012). The objective of the plan is twofold: (1) to draw up key strategies to guide the development of Iskandar Malaysia in mitigating carbon emission, and (2) to respond to the nation’s aspiration to ensure climate-resilient development for sustainability (Universiti Teknologi Malaysia et al. 2012).

The blueprint includes policies, measures, and programs to achieve a reduction in carbon emission intensity, as well as total emissions, along with scenario-based modeling and projection of carbon emission reductions. The total Malaysia greenhouse gas emissions in 2005 are estimated to be 10.5 MtCO₂eq. This is forecasted to increase to 30.2 MtCO₂eq in 2025. With the implementation of the measures in the policy, however, the emissions could decrease to 18.3MtCO₂eq by 2025. According to these calculations, that would be a 56 percent reduction of greenhouse gas emission intensity and a 40 percent emission reduction

from the business-as-usual scenario. This 56 percent target was subsequently reduced to 50 percent in the final policy to provide a buffer.^{iv} See Figure 2 for a graph of the predicted changes in emissions by sector.

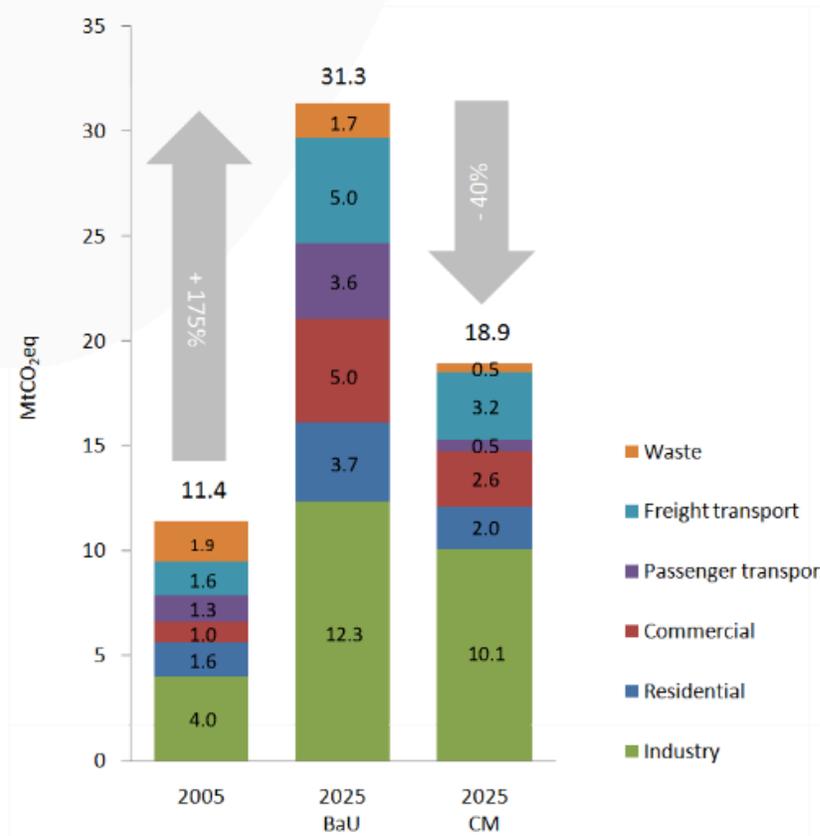


Figure 2. Predicted changes in emissions by sector

The policy is focused on three areas: Green Economy, Green Community, and Green Environment. It outlines twelve actions aimed at achieving this target under 52 sub-actions, 97 measures, and 281 programs. IRDA and UTM are currently developing a detailed roadmap, which will outline the local, state, and federal authorities who will be the implementation agencies for the actions. As of January 2015, there were ongoing discussions about who—other than the regional development authority (IRDA)—would be the implementing agencies for each action, and on what timeline.^v The Low Carbon Asia Research Center released a brochure on the roadmap in 2013, but did not provide further enumeration of costs or the exact role of each agency (Low Carbon Asia Research Center 2013). Thus far, there has been no indication of who would cover the costs of the implementation of the blueprint.^{vi}

Low-carbon actions

Table 3: Contribution of 3 main themes and 12 actions

Actions	Contribution * (ktCO ₂ e)	Share
Green Economy	6,937	54%
Action 1 Integrated Green Transportation	1,916	15%
Action 2 Green Industry	1,094	9%
Action 3 Low Carbon Urban Governance **	-	-
Action 4 Green Building and Construction	1,203	9%
Action 5 Green Energy System and Renewable Energy	2,725	21%
Green Community	2,727	21%
Action 6 Low Carbon Lifestyle	2,727	21%
Action 7 Community Engagement and Consensus Building**	-	-
Green Environment	3,094	25%
Action 8 Walkable, Safe and Livable City Design	263	2%
Action 9 Smart Urban Growth	1,214	10%
Action 10 Green and Blue Infrastructure and Rural Resources	392	3%
Action 11 Sustainable Waste Management	1,224	10%
Action 12 Clean Air Environment**	-	-
Total	12,758	100%

*Contribution to GHG emission reduction from 2025BaU to 2025CM ** Action 3, 7 and 12 does not have direct emission reduction, but their effect is included in other Actions. *** Since contribution of Action 10 includes carbon sink by forest conservation and urban tree planting, the total of contribution of the 12 Actions is greater than difference of the GHG emissions between 2025BaU and 2025CM in Figure 2 and Table2.

Figure 3. Greenhouse gas emissions by sector

Source: (Universiti Teknologi Malaysia et al. 2014)

Low Carbon Society Blueprint Development Process

The origin story

How did the LCS Blueprint arise? Professor Yuzuru Matsuoka of Kyoto University was looking for a research partner in Malaysia. Matsuoka is an engineer with a focus on atmospheric and thermal environmental engineering. He has more than thirty years of experience developing integrated climate models, and had recently developed the Asia-Pacific Integrated Model (AIM)—a package of tools used to determine national carbon emissions—and wanted to test it. A previous collaboration with another university had failed because of lack of commitment, but the Japanese team was still interested in working in Malaysia.^{vii}

Matsuoka was introduced to the lead member of the Malaysia research team at the Universiti Teknologi Malaysia (UTM), Professor Ho Chin Siong, in 2008.^{viii} Ho had completed his Ph.D. in engineering at the Toyohashi University of Technology in Japan. According to one of the other members of the UTM team, Ho “understood the research culture and even the general culture [of Japan] and has a good relationship with important professors in Japan,” which led to the initial introduction and ultimately the success of the partnership.^{ix} Greenhalgh (2008) has demonstrated the ways in which research team backgrounds influence their scientific program and ability to collaborate. It was also this background that supported the shared values that emerged between the two teams—an essential contributor to the formation of an epistemic community (Haas 1992).

The original team included seven researchers from Japanese universities and four from UTM brought together by Matsuoka and Ho. Five were from Kyoto University, one from Okayama University, and one from Ritsumeikan University. They were primarily environmental engineers, complemented by an economist and an environmental policy expert. The Malaysian researchers consisted of four faculty members from the UTM's Faculty of Built Environment. Three were trained as engineers, and one as an urban planner. The decision was made to collaborate on an initial project.

Ho approached the national government about using national data in the model. They were receptive, but slow to move forward.^x The researchers then decided to take a different approach: to test the model at a subnational level, in the Iskandar region, rather than nationally. This is the region where the UTM researchers are based, providing easier access to data to develop a baseline study on carbon emissions. It also has an industrial sector, making it a more representative choice.^{xi}

The research from this group applying the AIM model led to a published report in 2009, which was the first output from the collaboration. This report inventoried the then-current emissions in Iskandar, and quantified the socio-economic activity based on Iskandar's Comprehensive Development Plan for 2025. The report was shared with the regional development authority. In the words of one of the primary policymakers involved:

^{xii}"In 2010, I got this brochure. My boss at the time said, "Have a look at this and see what you think." It was prepared by [Ho] and several other people. [It was] very fresh to me. I was looking for something like that as a strategic document, and I've heard about all these things—carbon, climate change—and I read UN papers. But it came on my desk. And it was very good. *Very possible.*"^{xiii}

In order to continue the modeling work, the researchers needed to secure funding. Ho suggested that IRDA join the research program and apply for a joint grant to conduct the policy research and produce the blueprint. Ho convinced the Director General from the Johor State Department of Town and Country Planning and one of the IRDA Directors to travel to Japan to present the proposal and demonstrate the high level of policy commitment to the project (Interview January 2015).

The proposal was accepted, and the resulting grant—entitled the "Development of Low Carbon Society Scenarios for Asian Regions"—was funded under a joint program between the Japan Science and Technology Agency and Japan International Cooperation Agency, under an initiative called Science and Technology Research Partnership for Sustainable Development, or SATREPS (Low Carbon Asia Research Center 2015). This program supports international joint research projects through a combination of research funds and development assistance (Japan

Science and Technology Agency 2014). Within six months, the group received a 4 million USD grant allocated to the Malaysian research team. The term of the project is July 2011 to June 2016 in order “to define Low Carbon Society visions and craft a road map towards a Low Carbon Society” for Iskandar (Low Carbon Asia Research Center 2015).

The grant supported the creation of a transnational epistemic community uniting researchers from Universiti Teknologi Malaysia (UTM), Kyoto University, the National Institute for Environmental Studies, and Okayama University, with Professors Matsuoka and Ho as lead researchers. The research group has expanded, and now totals around 100 people including 30 primary researchers. With guidance and data from IRDA, this group has led the entire policy development process. The researchers—primarily Japanese and Malaysian—represent a wide range of fields, including urban planning, environmental engineering, chemical engineering, architecture, and environmental science, the theory being that this will provide the interdisciplinary perspective needed to produce a development plan (Low Carbon Asia Research Center 2015). The vast majority of the research team, however, are engineers, providing a foundation of similar training and disciplinary perspective. According to one of the researchers, the network has allowed for the sharing of ideas and information, and its development was one of the primary motivations for the whole project (presentation January 2015).

Policy development process

The researchers divided themselves into six cross-disciplinary teams, and then conducted research on potential measures for the blueprint. This research served as the basis for all the actions in the blueprint. The groups were (1) Scenario Integration and Land Use Planning, (2) Consensus Building and Education, (3) Energy, (4) Solid Waste Management, (5) Air Quality, and (6) Transportation. IRDA had its own parallel group, which allowed the researchers to engage with policymakers throughout the entire research process and enabled access to data. The Scenario Integration group was tasked with assessing which interventions overlapped across groups, to ensure—for example—that there was no double-counting of carbon reductions.^{xiv}

The process began with all groups making a list of possible actions. Many of the potential measures were initially based on Japan’s experience in developing a low-carbon plan for Kyoto and Tokyo. Japan International Cooperation Agency (JICA) also provided suggestions from their previous experiences in this area. The Malaysian researchers toured ten agencies—including non-profits, research institutes, local and federal government in Kyoto and Tokyo—to understand of the lessons of the Japanese experience. According to one key Malaysian researcher,

“We did not start from scratch. We looked at other examples. Japan has been doing this for some time. So we tried to understand how they did it, and the policies they had, and so on. Some we thought were possible for direct application, some might need adaptation, and some they didn’t have, but we thought we needed them, so we added new ones to reflect specific contextual needs.”^{xv}

A simple example of the differences is that Kyoto has four seasons and Malaysia does not, so many of the innovations that focused on energy-efficient heating were deemed unnecessary.^{xvi}

The six groups dug into issues in their separate realms. The Energy team, for example, focused on reviewing the literature on the impact of technologies on carbon emissions, rather than on the experience of other cities.^{xvii} The technologies that were recognized by other experts were adopted. Other measures that were added were in IRDA’s previous blueprints—such as the Integrated Land Use Blueprint—to maintain cohesion across policies, and facilitate the adoption of the low-carbon plan into the larger development planning process.

The teams met approximately a half-dozen times between July 2011 and March 2012 to develop the blueprint. Many of the meetings focused on access to data, and on reporting the results of meetings with IRDA and federal offices to attain the data needed for the quantification. There was some disagreement between the Malaysian and Japanese researchers about which technologies could be used in Malaysia, because some technologies that are common in Japan—such as incinerators to turn waste into energy—do not exist yet in Malaysia.^{xviii}

After determining the potential set of policy actions, measures, and programs, the data were entered into the Asia-Pacific Integrated Model to calculate the likely carbon reduction. As one research member described it, “It was an iterative process. Cycles and cycles of trial and error, refinement...”^{xix} While the Malaysian researchers discussed potential measures, all of the carbon calculation was completed in Japan, as they had developed the model and had the technical skills to run it.

The model is complex. (See Figure 5.) It requires developing and quantifying a possible future—with urban and energy demands and socioeconomic characteristics—and then working backward, using an extended snapshot tool to determine the impact of carbon reduction measures on achieving this vision of the future (Universiti Teknologi Malaysia et al. 2009; Interview January 2015). The model was used to estimate energy demand and CO₂ emissions from industry, residential, commercial, passenger and freight transport, and power generation (Ho et al. 2014). The modeling was done repeatedly to determine the exact impact of various measures in combination, and to decide during what timeframe actions would need to be implemented in order to reach the 2025 goal.

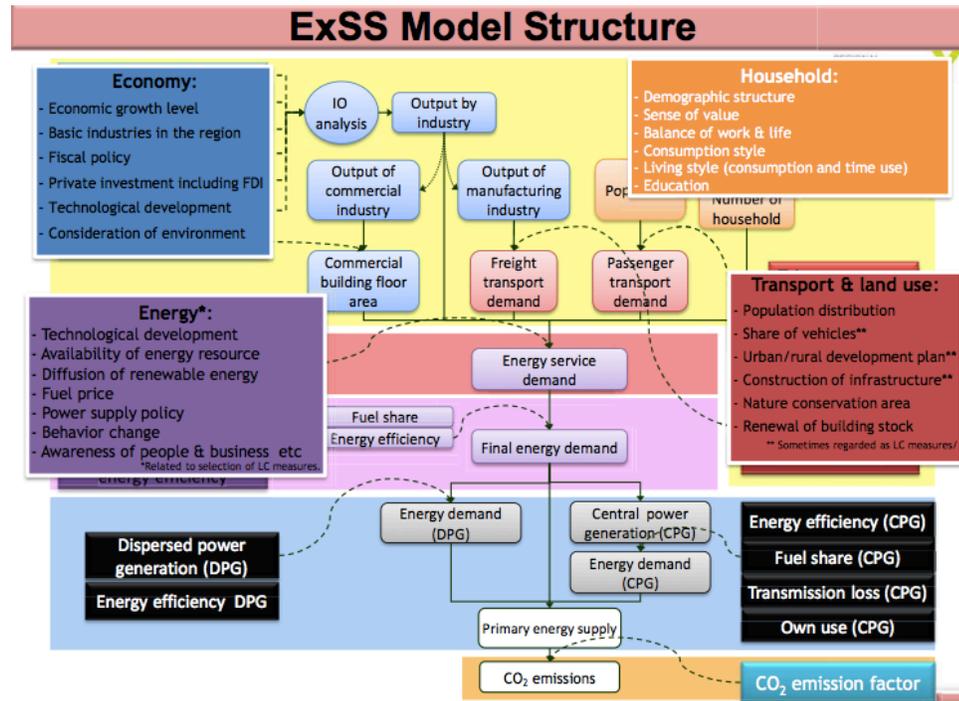


Figure 5. ExSS model structure^{xx}

The Malaysia and Japanese research teams were in contact remotely and met several times a year in person to present the findings, discuss which measures were appropriate for Malaysia, and demonstrate and adjust the models (Interview January 2015). In December 2011, the Scenario Integration and Land Use Planning group went to Kyoto to produce a refined list of the measures. The actions and measures were rated in terms of priority for implementation, ability to be quantified, feasibility, and relationship to existing Blueprint actions. After this meeting, the Japanese team was slated to work on quantification of measures, while the Malaysia team focused on developing more detailed measures.

After a draft version of the Blueprint had been completed, six focus group meetings were held to get feedback on the proposed policies and programs. According to the lead Malaysian researchers, the decision to apply this participatory process was inspired by work on consensus building approaches conducted by Professor Lawrence Susskind from the Massachusetts Institute of Technology.^{xxi} The meetings began in June 2011 with a range of stakeholders, including government officials; representatives from a federation of Malaysian manufacturers; Chinese, Indian and Malay chamber of commerce officials; and environmental NGOs such as the Malaysia Nature Society and Green Earth Movement (Ho 2014; Interview January 2015). The first meeting included 25

stakeholders from IRDA and local municipal authorities from the region. The second round included eight people from state and federal agencies, such as the State Economic Planning Unit and Department of Environment. Both these meetings were held at IRDA's offices. Another round was organized for teachers to provide feedback on the proposed actions focused on green education. The next rounds included civil society groups, industry, and other business groups.^{xxii} Local communities representatives and residential associations were also included, but broad community engagement was deemed beyond the scope of the process.

The meetings were organized so that stakeholders would have a chance to participate. All the measures relevant to that group were listed on the wall. Then, according to one participant, "we would go through one by one and [allow] comments [on the measures] and also give [stakeholders] colorful stickers to represent if people agree or disagree [by placing their stickers on each action]." For example, some people thought that promoting cycling was not appropriate, given the hot humid weather in the city, safety concerns, and the lack of facilities to support cycling.^{xxiii}

The meetings were facilitated by professors from UTM, who encouraged participants to focus on co-benefits in order to limit disagreement among members.^{xxiv} The meetings did not attempt to reach agreement among the parties, in part because so many people were new to the topic.^{xxv} The process was also not designed to produce a final list of agreed-upon measures; rather, measures were put back into the model to calculate the associated emission reduction.^{xxvi} In the end, the decision as to whether measures were included or not was based solely on their respective impacts on carbon reduction—i.e., measures with the largest reductions were included in the final plan.

Together with IRDA, the group at UTM produced the finalized blueprint based on these calculations. It was then approved by IRDA through an internal committee—the Approvals and Implementation Committee—which provides the governance framework for the authority.^{xxvii} The blueprint was officially launched with much fanfare at the UNFCCC COP 18 in Doha, and was presented as evidence that Malaysia will meet its international obligations. It was endorsed by the Prime Minister of Malaysia in Putrajaya, Malaysia on December 11, 2012, at the IRDA Members of Authority meeting in Kuala Lumpur.^{xxviii} In the document's foreword, the Prime Minister states that the plan "should serve as a working model for the development of similar efforts at national, state, or regional level" (Low Carbon Asia Research Center 2014). The plan has been revised two times with the updating of carbon calculations in July 2013 and November 2014. The latest version incorporated the *Iskandar Malaysia: Actions for A Low Carbon Future* booklet (IRDA 2013), which outlines ten actions to be implemented by the agency in the next year.

Keys to policy success

As noted, the success of the Low Carbon Society Blueprint is in large part attributable to the involvement of an epistemic community consisting of researchers from Malaysia and Japan who put the concept on the regional agenda, and then— working within a national policy window and leveraging partnerships and knowledge sharing—developed the needed measures.

Establishing buy-in and raising awareness

Throughout the whole policy process, the researchers promoted the plan. That promotion began with the development of the policy brochure, and continued through a process of convincing other national, local, and regional policymakers to support the blueprint, both as a partner in the research project and in the regional policy development. It was the work of these researchers that put low carbon on the agenda in the region. This was not an easy or fast process, as most of the regional development authority staff had never heard of low-carbon development before this project began.^{xxix}

Additionally, to get buy-in and promote the policy, the researchers embarked upon what amounted to a marketing tour. The lead researchers have presented the blueprint at UNFCCC COP every year since it was signed, and presented at 70 national and international conferences between 2011 and 2013 (UTM Low Carbon Research Center 2012; UTM Low Carbon Research Center 2013; Interview January 2015). They have also brought policymakers with them to present, so that they could see the support from other policymakers and practitioners firsthand. This effort to promote the plan has also brought positive attention to the region as a whole, and the region expects to receive investment following the blueprint (Ho 2015). Now that blueprint is complete, the UTM researchers have continued to spearhead this effort to win support from the local authorities in the region.

One evidence of the success of this promotional effort came with the mainstreaming of the policy into the Comprehensive Development Plan. In the previous Comprehensive Development Plan for the region, developed in 2006, there was no mention of reducing emissions or climate change as a factor in development planning (Khanzanah Nasional 2006). Now it is a centerpiece of the revised development plan, which includes the blueprint actions scattered throughout.^{xxx} It has also led the national government to request the same team to develop a national low-carbon blueprint after viewing their presentation at a conference in Japan.^{xxxi} The researchers have also been approached by the Kuala Lumpur and Putrajaya government, which both want to develop a low carbon policy.^{xxxii}

Evidence-based policymaking and connection to IRDA

The epistemic community brought objectivity and expertise to the policy process by gathering the appropriate experts, developing a sound research process, and using the carbon calculation as the ultimate determinant of the asserted measures. Haas argues that “epistemic communities have internal beliefs that make them more likely to provide information that is politically untainted and therefore more likely to ‘work’ in the political sense that this information will be embraced and followed by political authorities concerned about the need to be impartial” (2015).

This appears to be true in this case at the policy-development stage. The modeling process—which translated actions such as increasing walkability into quantitative values—gave policymakers the confidence to use their data as the basis for policymaking. From the start, the process was purposefully presented as a technical exercise. The researchers involved were told to focus on co-benefits, and *not* to address the social, political or economic implications of the measures included. For some of the engineers involved, this made the process difficult, since the planning process did not require them to think about how these measures would happen in practice, which is a normal custom in their field.

The purpose, however, was to produce sound quantitative data to support evidence-based policymaking. In a presentation in 2011, a policymaker from IRDA showed a slide that stated, “The ExSS & Backcasting Model [two models used in the policy] play an important role in getting the numbers (Facts and Figures) to support in the decision-making process when the Local Authorities and Iskandar Regional Development Authority (IRDA) design the Policies & Guidelines towards a Low Carbon Scenario” (Joeman 2011). The data was presented as essential to produce a regional policy decision.^{xxxiii}

It was also useful that the primary policy actor was a member of the research team, which enabled the members of that team to feel as if the policy was co-produced. The researchers engendered substantial trust throughout the process, and in particular, there was confidence in the scientific procedure used in the modeling. One of the policymakers said the main Japanese scientist has “a computer mind,” and described an episode when that scientist quickly spotted an error in a long string of complex code. He explained the modeling process: “You have thick layers of data. If you change one part here, it changes the whole thing along the line. It’s all connected. I don’t know how it does it. But at the end, it gives you a figure of change. If you change 3 elements, [you see] how much will it change at the end. It’s like magic, really.”^{xxxiv} In other words, the researchers had managed to take something complicated and turn it into something useable for policy development.

The researchers also conducted two modeling training workshops on the Extended Snapshot Tool to pass on knowledge to local, state, and federal government officials, and thereby to bridge the gap between

research and policy. The workshops—conducted by Professor Kei Gomi—were held in July and November 2011, and included 60-70 people (UTM Low Carbon Research Center 2012). IRDA now wants to bring this knowledge into the agency, and is planning to send one to three people to learn the modeling process from the Japanese researchers.^{xxxv} The collaboration has been so successful that IRDA has asked the research team to stay involved in the next phase of the project implementation. In that spirit, a Japanese technology company recently made a presentation to IRDA, and IRDA invited the research team to listen and provide technical guidance.^{xxxvi}

National policy context

Cross points out that contextual factors may increase the influence of epistemic communities (2013). Since the Prime Minister's speech at COP in 2009, climate change has become an increasingly important national policy issue. At the national scale, Malaysia has created a Climate Change Policy, a Green Technology Policy, a Renewable Energy Policy and Action Plan, and a Green Neighborhood Planning Guideline—all focused on transitioning to a low-carbon economy. According to Malaysia's National Climate Change policy, a strategic thrust is to "institute measures to make development climate-resilient through low carbon economy to enhance global competitiveness and attain environmentally sustainable socio-economic growth" (Ministry of Natural Resources and Environment Malaysia 2010). This supportive suite of national policies has made the local regional development authority more open to supporting the development of a local strategy. Both IRDA and the researchers have seen their work as part of meeting the national carbon reduction goal presented at COP, which was also listed as specific objective of the policy.

Leveraging partnerships and financing

The strong epistemic community was also successful due to its ability to leverage financing and expertise. The researchers' connection to Japanese financing provided a way to support the policy research and several of the initial implementation programs. JICA has also provided other support to the program through connecting the researchers with other scholars, supporting the COP side events, and providing ideas for possible implementation measures.^{xxxvii} Additionally, the researchers were able to secure expertise that did not exist in Malaysia in order to do the modeling necessary for the policy development. That said, it is also important to note that the combination of the two research teams—which built upon each other's knowledge and connections to academics and government within their respective countries—that helped ensure success. Those connections have since taken new and productive forms. Since the

blueprint was finished, for example, several Japanese companies have approached IRDA because they have energy-efficient technologies, which they would like to sell to existing industries in the region, thereby continuing the linkages between the two countries.^{xxxviii}

Implementation

While the epistemic community was successful at producing a policy and ensuring its adoption by its policy partner, the *implementation* of that blueprint has been difficult, mainly due to the researchers' technocratic and apolitical focus. Zito has demonstrated the limitations of epistemic communities in Europe, but found their usefulness limited after the early stage of policymaking (2001)—i.e., much sooner than is apparent in this case. Here, the focus on the measures that reduced the most carbon, and therefore were most effective in dealing with the problem, did not take into account the political, economic, or social tradeoffs involved. Clearly, this has constrained policy implementation, along with other key obstacles: a weak policy partner, limited access to financing, and power struggles between levels of government.

Admittedly, there were different views of implementation among the research team and donor. The research team thought that implementation was producing a policy.^{xxxix} They wanted to link science to policy.^{xi} They did not think that they needed to concern themselves with on-the-ground implementation, which they thought of as being beyond the scope of their assignment. In fact, as one of the researchers stated, "The blueprint was not created to be implemented. It was created as a proposal."^{xii} This outlook gave the researchers a large scope for developing potential actions, but did not place any realistic constraints on their final recommendations. However, once the blueprint was created, JICA did an audit and had expected that implementation meant action (Interview March 2015). This pushed the research team and IRDA to begin addressing the hurdles of implementation.

One challenge was the choice of the policy partner. IRDA was listed as the implementing agency on the grant, and before the research began, the team thought they were the appropriate agency for the role.^{xlii} IRDA was a useful partner in the policy development process because they are not beholden to constituents, and do not need to follow a legislative process for policy endorsement. This has welcome practical implications: for example, they are able to produce blueprints relatively quickly. Additionally, they have professional planning skills that proved useful for developing the actions.

The organization, however, is limited in its ability to implement its policy priorities. IRDA has no regulatory authority, and is unable to offer financial incentives or direct financing for projects. The organization can facilitate, but has no real power to act. For example, one of the actions in

the blueprint involves planting trees. While this would seem simple enough, IRDA requires approval from the local municipal governments to plant trees.^{xliii} This plan has now moved forward as it has been joined with a federal program called 1 Malaysia 1 Tree,” whereby the government plans to plant one tree for each person (IRDA 2013).^{xliv} This kind of limitation holds true for most of the actions proposed in the blueprint. In addition, because none of the local authorities were required to sign on during the blueprint policy process, this will require another round of engagement at the municipal level.

Meanwhile, even though IRDA considers itself the implementer for the majority of the blueprint, it is depending on private sector and NGO partners to help make these proposed actions a reality—which again will require more time and energy.

To summarize: while the government cannot make these transitions alone, the incentives or legal structures for other actors to take these steps have not been put in place in the region. Again, this demonstrates the limitations of not considering the economic and political constraints during the policymaking phase.

The actions that IRDA is currently implementing are primarily (1) consciousness-raising, and (2) soft measures—such as building websites and making awards—which do not require investment beyond existing programs. For example, the Green Accord Initiative Award (GAIA) is one of ten actions from IRDA this year; it will recognize developers who have adopted green building practices and who meet local and international codes (IRDA 2013).^{xlv} This award is a non-monetary incentive and is combined with a national rating tool, Green Building Initiative (GBI), which is similar to LEED.

Another of the ten actions IRDA intends to take this year is the creation of a mobility management system. This system is basically a website that “coordinates information, services and activities to optimize the effectiveness of urban transportation” (IRDA 2013), by providing information about routes, schedules, and fares. Additionally, IRDA has leased two electric vehicles for its use over the next three years (Kili 2015) in order to spur the promotion of low-carbon vehicles. IRDA sees this an opportunity “to have something visible...We want people talking about low carbon society. [So we need to] show people something on the ground.”^{xlvi}

Another program in the blueprint, the Eco-life Challenge, underscores the challenge of finding ways to support worthy programs financially. This is a program that was created in Kyoto, Japan, and which has been replicated in Iskandar public schools. The Challenge was implemented by IRDA, and has rapidly expanded from 22 to 198 schools over the last three years (IRDA 2013). The students in the program track their household water, electricity, and gas use (Utaka et al. 2009), and compete with each other to see which class can reduce their usage the

most. The concept is to build awareness among students in order to understand how their energy usage contributes to climate change.^{xlvii} This program is currently funded by the JICA grant, but—because that money will run out next year—IRDA is planning to partner with social entrepreneur I. M. Keiko to run the next phase, and also to include more parent volunteers, in hopes of making the project self-sufficient.^{xlviii} Another public awareness-raising program, aimed at sharing basic tips to reduce energy use, will likely be supported by the Green Earth Society, a local environmental NGO.

Note that these projects are comparatively inexpensive; even so, they still lack reliable funding sources. Meanwhile, due to financial constraints, the most costly projects have not been implemented at all. For example: decarbonizing industries involves increasing energy efficiency through purchasing equipment, investing in energy-saving management systems, and providing the affected industries with tax incentives and low-interest “soft” loans. IRDA is certainly aware that an industry focus is important, and although some industrial companies were consulted in the planning process, IRDA has not yet begun to tackle the portion of the plan that involves directly engaging with industries. That said, even the stated intention to focus on industry has generated some changes within the organization itself. For example, IRDA has already begun to shift its investment focus and its definition of appropriate development. “If you are a foreign company and super-polluting,” one IRDA official commented, “we don’t want you to come. Years back, we just invited everyone.”^{xlix}

There are federal programs that could be used to support Iskandar’s industries through these expensive transitions, but this requires coordination between levels of government. The Green Technology Financing Scheme, for example, is implemented by GreenTech Malaysia, a non-profit organization under the Ministry of Energy, Green Technology, and Water Malaysia (KeTTHA). This program provides subsidies to buildings that are energy efficient, use green technology, meet minimum indoor environmental quality standards, have sustainable site planning and management, use recycled content, and are water efficient (Malaysia Green Technology Corporation 2014). There has not been significant effort, however, to ensure that industries in the region have access to these funds.

Another primary roadblock to policy implementation is the current governance system, which makes local policy implementation especially challenging. There are three national departments that have partial jurisdiction over aspects of low-carbon development planning, but there is no coordination among them. The Ministry of Environment and Natural Resources is mandated to develop climate change policy, KeTTHa is charged with developing low-carbon development policy, and the Ministry of Housing and Local Government is responsible for local development

planning. At the same time, the federal is not interested in local plans—being mainly concerned with national-level data—which makes getting federal input and cooperation a significant additional hurdle.¹

Despite its lack of focus on local planning, the federal government still maintains strong control over local government—which more or less ensures a lack of financing for implementing programs on the local level. For example: one of the measures included in the blueprint is building an incinerator in Iskandar to convert waste to energy (Universiti Teknologi Malaysia et al. 2012). Even after the UTM professors identified the appropriate technologies and persuaded the municipal government of the advantages of the program, the facility still could not go forward, because it required approval from both the Sultan of Johor and the federal agency in charge of waste management. These actors have different priorities than the local municipality, and were not interested in building the incinerator. Again: in many cases, cumbersome bureaucracy makes it difficult to implement even those actions that have won the support of local officials.

All told, these challenges have been daunting enough that the UTM professors have undertaken pilot implementations themselves, focusing on what might best be described as low-hanging fruit. For example, they started working in FELDA Taib Andak to transform it into a model Low Carbon Village, even though no carbon accounting has yet been done in the village yet. This pilot project is patterned on the model of a low carbon village in Japan, and was inspired by JICA staff (Interview January 2015). The village has focused on small actions that require minimal financing, such as sponsoring a bike ride and constructing a short sidewalk.

Conclusion

Iskandar Malaysia has led the country in local low-carbon planning through the initiative of an innovative epistemic community. The case of Iskandar's policy development supports Haas's argument (1992) that control over knowledge and information is an important dimension of power, and that the diffusion of new ideas and information can lead to new patterns of behavior. Information and knowledge were the primary means whereby the policy development took root and moved forward. While several of the factors identified may only be applicable to Malaysia, the case provides insight into the roles of epistemic communities at the local scale in the Global South.

The case also illuminates the strengths and weaknesses of epistemic communities in various stages of the policy process. The epistemic community was able to make climate change a priority within regional development, develop the research and models necessary to produce sound evidence for policy actions, build awareness within and outside the region, and enable the signing of the policy by the Prime

Minister on the international stage. This allowed for the region to develop a policy process much faster than the process occurring on the national level, and to demonstrate what was possible with adequate financing and access to information and technology.

The epistemic community-led effort, however, has constrained the ability of the authorities to implement across the region at this stage. Most notably, the effort has been unable to secure the national-level financing which will be required to bring about substantial economic changes.

The work in Iskandar Malaysia is not complete. The researchers are determined to see the effort through, and are beginning to engage with the municipal authorities to develop their plans in hopes of achieving implementation at that scale—and the epistemic community is working to overcome obstacles as the process continues to move forward.

References

- [1] ADB. 2013. "Economics of Climate Change in East Asia." Manilla: Asian Development Bank.
- [2] Berardo, Ramiro. 2009. "Processing Complexity in Networks: A Study of Informal Collaboration and Its Effect on Organizational Success." *Policy Studies Journal* 37 (3): 521–39. doi:10.1111/j.1541-0072.2009.00326.x.
- [3] Bernama. 2015. "Iskandar Malaysia Records RM172 Bln Cumulative Investments Since 2006." *Bernama*. September 7. <http://www.bernama.com/bernama/v8/bu/newsbusiness.php?id=1151608>.
- [4] Biel, Anders, and Lennart J. Lundqvist. 2013. *From Kyoto to the Town Hall: Making International and National Climate Policy Work at the Local Level*. Earthscan.
- [5] Börzel, Tanja A. 1998. "Organizing Babylon—On the Different Conceptions of Policy Networks." *Public Administration* 76 (2): 253–73.
- [6] Bulkeley, Harriet, and Michele M. Betsill. 2005. "Rethinking Sustainable Cities: Multilevel Governance and the 'Urban' Politics of Climate Change." *Environmental Politics* 14 (1): 42–63. doi:10.1080/0964401042000310178.
- [7] ———. 2013. "Revisiting the Urban Politics of Climate Change." *Environmental Politics* 22 (1): 136–54. doi:10.1080/09644016.2013.755797.
- [8] Cross, Mai'a K. Davis. 2013. "Rethinking Epistemic Communities Twenty Years Later." *Review of International Studies* 39 (1): 137–160. doi:10.1017/S0260210512000034.
- [9] Dunlop, Claire A. 2009. "Policy Transfer as Learning: Capturing Variation in What Decision-Makers Learn from Epistemic Communities." *Policy Studies* 30 (3): 289–311. doi:10.1080/01442870902863869.
- [10] Fong, Wee Kean. 2013. "Lessons Learned from Low-Carbon City Planning in Malaysia." *World Resources Institute*. April 29. <http://www.wri.org/blog/2013/04/lessons-learned-low-carbon-city-planning-malaysia>.
- [11] Gouldson, Andy, Sarah Colenbrander, Effie Papargyropoulou, and Andrew Sudmant. 2014. "The Economics of Low Carbon Cities: Johor Bahru and Pasir Gudang, Malaysia." *Climate Smart Cities*. Leeds: University of Leeds.
- [12] Government of Malaysia. 2016. "Intended Nationally Determined Contribution of the Government of Malaysia." <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Malaysia/1/INDC%20Malaysia%20Final%2027%20November%202015%20Revised%20Final%20UNFCCC.pdf>.

- [13] Greenhalgh, Susan. 2008. *Just One Child: Science and Policy in Deng's China*. Berkeley: University of California Press.
- [14] Haas, Peter M. 1989. "Do Regimes Matter? Epistemic Communities and Mediterranean Pollution Control." *International Organization* 43 (3): 377–403. doi:10.1017/S0020818300032975.
- [15] ———. 1992. "Introduction: Epistemic Communities and International Policy Coordination." *International Organization* 46 (1): 1–35.
- [16] Hall, Peter A. 1993. "Policy Paradigms, Social Learning, and the State: The Case of Economic Policymaking in Britain." *Comparative Politics* 25 (3): 275–96. doi:10.2307/422246.
- [17] Hecl, Hugh. 1974. *Modern Social Politics in Britain and Sweden: From Relief to Income Maintenance*. New Haven: Yale University Press.
- [18] Hezri, A. A., and Mohd. Nordin Hasan. 2006. "Towards Sustainable Development? The Evolution of Environmental Policy in Malaysia." *Natural Resources Forum* 30 (1): 37–50. doi:10.1111/j.1477-8947.2006.00156.x.
- [19] Higgins, Paul. 2013. "From Sustainable Development to Carbon Control: Urban Transformation in Hong Kong and London." *Journal of Cleaner Production*, Special Issue: Advancing sustainable urban transformation, 50 (July): 56–67. doi:10.1016/j.jclepro.2012.11.025.
- [20] Ho, Chin Siong. 2014. "Realization of Blueprint for LCS Development in Malaysia." presented at the UTM and NIES side event, UNFCCC COP 20 Lima, December 11.
- [21] Ho, Chin Siong, Yuzuru Matsuoka, Janice Simson, and Kei Gomi. 2013. "Low Carbon Urban Development Strategy in Malaysia—The Case of Iskandar Malaysia Development Corridor." *Habitat International*, Low-Carbon Cities and Institutional Response, 37 (January): 43–51. doi:10.1016/j.habitatint.2011.12.018.
- [22] IRDA. 2013. "Iskandar Malaysia: Actions for a Low Carbon Future." Johor Bahru: IRDA.
- [23] ———. 2014. "Our Development Plan - Iskandar Malaysia." *Iskandar Malaysia*. <http://www.iskandarmalaysia.com.my/our-development-plan>.
- [24] Japan Science and Technology Agency. 2014. "About SATREPS." <http://www.jst.go.jp/global/english/about.html>.
- [25] Jasanoff, Sheila. 1995. *Handbook of Science and Technology Studies*. SAGE.
- [26] ———. 2004. "Ordering Knowledge, Ordering Society." In *States of Knowledge: The Co-Production of Science and Social Order*, edited by Sheila Jasanoff, 13–45. London: Routledge.
- [27] Jasanoff, Sheila, and Brian Wynne. 1998. "Science and Decision-Making." In *Human Choice and Climate Change, Vol:1: The Societal*

- Framework*, edited by Steve Rayner and E.L. Malone. Columbus: Battelle Press.
- [28] Jenkins-Smith, Hank, and Paul A. Sabatier. 1994. "Evaluating the Advocacy Coalition Framework." *Journal of Public Policy* 14 (2): 175–203.
- [29] Joeman, Boyd Dionysius. 2011. "Low Carbon Cities and Climate Change Adaptation: The Iskandar Experience." presented at the MNRE National Symposium on Climate Change, Kuala Lumpur, November 18.
- [30] Khanna, Nina, David Fridley, and Lixuan Hong. 2014. "China's Pilot Low-Carbon City Initiative: A Comparative Assessment of National Goals and Local Plans." *Sustainable Cities and Society* 12 (July): 110–21. doi:10.1016/j.scs.2014.03.005.
- [31] Khanzanah Nasional. 2006. "Comprehensive Development Plan for South Johor Economic Region (2006-2025)." Kuala Lumpur.
- [32] Khoo, Boo Teik. 2012. *Policy Regimes and the Political Economy of Poverty Reduction in Malaysia*. Palgrave Macmillan.
- [33] Kili, Kathleen Ann. 2015. "Irda Embarks on Use of Electric Cars." *The Star Online*, January 23, sec. Community. <http://www.thestar.com.my/Metro/Community/2015/01/23/Irda-embarks-on-use-of-electric-cars/>.
- [34] Kuhn, Thomas. 1962. *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press.
- [35] Lambright, W. Henry, Stanley A. Chjangnon, and L. D. Danny Harvey. 1996. "Urban Reactions to the Global Warming Issue: Agenda Setting in Toronto and Chicago." *Climatic Change* 34 (3–4): 463–78. doi:10.1007/BF00139302.
- [36] Latour, Bruno. 1987. *Science in Action: How to Follow Scientists and Engineers through Society*. Harvard University Press.
- [37] Latour, Bruno, and Steve Woolgar. 1979. *Laboratory Life: The Construction of Scientific Facts*. Sage Publications.
- [38] Low Carbon Asia Research Center. 2015. "SATREPS-Low Carbon Society." *SATREPS-Low Carbon Society*. <http://www.utm.my/partners/satreps-lcs/about/>.
- [39] Malaysia Green Technology Corporation. 2014. "Criteria for Building and Township Sector." *Green Technology Financing Scheme*. <https://www.gtfs.my/page/criteria-building-and-township-sector>.
- [40] Miller, Clark A., and Paul N. Edwards. 2001. *Changing the Atmosphere: Expert Knowledge and Environmental Governance*. MIT Press.
- [41] Ministry of Natural Resources and Environment Malaysia. 2010. "National Policy on Climate Change." Kuala Lumpur: Ministry of Natural Resources and Environment.

- [42] MIT-UTM. 2015. "MIT-UTM Malaysia Sustainable Cities Program." *MIT-UTM Malaysia Sustainable Cities*. <https://malaysiacities.mit.edu/>.
- [43] North, Douglass Cecil. 1990. *Institutions, Institutional Change, and Economic Performance*. Cambridge University Press.
- [44] Pickering, Andrew. 1992. *Science as Practice and Culture*. University of Chicago Press.
- [45] Prime Minister Najib Razak. 2014. "Speech by Prime Minister Najib Razak." presented at the UN Climate Summit, New York, November 23.
- [46] Rice, Jennifer L. 2010. "Climate, Carbon, and Territory: Greenhouse Gas Mitigation in Seattle, Washington." *Annals of the Association of American Geographers* 100 (4): 929–37. doi:10.1080/00045608.2010.502434.
- [47] Risse-Kappen, Thomas. 1994. "Ideas Do Not Float Freely: Transnational Coalitions, Domestic Structures, and the End of the Cold War." *International Organization* 48 (2): 185–214.
- [48] Rizzo, Agatino, and John Glasson. 2012. "Iskandar Malaysia." *Cities* 29 (6): 417–27. doi:10.1016/j.cities.2011.03.003.
- [49] Rose, Richard. 1993. *Lesson-Drawing in Public Policy: A Guide to Learning Across Time and Space*. Chatham House Publishers.
- [50] Rutland, Ted, and Alex Aylett. 2008. "The Work of Policy: Actor Networks, Governmentality, and Local Action on Climate Change in Portland, Oregon." *Environment and Planning D: Society and Space* 26 (4): 627 – 646. doi:10.1068/d6907.
- [51] Schreurs, Miranda A. 2008. "From the Bottom Up Local and Subnational Climate Change Politics." *The Journal of Environment & Development* 17 (4): 343–55. doi:10.1177/1070496508326432.
- [52] Strauss, Anselm, and Juliet M. Corbin. 1997. *Grounded Theory in Practice*. Thousand Oaks: SAGE.
- [53] Susskind, Lawrence E., and Saleem H. Ali. 2015. *Environmental Diplomacy: Negotiating More Effective Global Agreements*. New York: Oxford University Press.
- [54] Tan, Ching Tiong, Joy Pereira, and Fui Pin Koh. 2009. "Stakeholder Consultation in the Development of Climate Change Policy: Malaysia's Approach." In . Seoul, Korea.
- [55] Toke, Dave. 1999. "Epistemic Communities and Environmental Groups." *Politics* 19 (2): 97–102. doi:10.1111/1467-9256.00091.
- [56] Universiti Teknologi Malaysia, Iskandar Regional Development Authority, Kyoto University, Okayama University, and National Institute for Environmental Studies. 2012. "Low Carbon Society Blueprint for Iskandar Malaysia." Johor Bahru: Low Carbon Asia Research Center.

- [57] ———. 2014. “Low Carbon Society Blueprint for Iskandar Malaysia 2025.” Johor Bahru: Low Carbon Asia Research Center.
- [58] Universiti Teknologi Malaysia, Kyoto University, Okayama University, and Ritsumeikan University. 2009. “Low Carbon City 2025: Sustainable Iskandar Malaysia.” Johor Bahru: UTM.
- [59] UTM Low Carbon Research Center. 2012. “LCSBP Annual Report 2011/2012.” *Issuu*.
https://issuu.com/universititeknologimalaysia/docs/fy_2012-2013_lcs_annual_report.
- [60] ———. 2013. “LCSBP Annual Report 2012/2013.” *Issuu*.
https://issuu.com/universititeknologimalaysia/docs/fy_2012-2013_lcs_annual_report.
- [61] While, Aidan, and Mark Whitehead. 2013. “Cities, Urbanisation and Climate Change.” *Urban Studies* 50 (7): 1325–31.
doi:10.1177/0042098013480963.
- [62] Zito, Anthony R. 2001. “Epistemic Communities, Collective Entrepreneurship and European Integration.” *Journal of European Public Policy* 8 (4): 585–603. doi:10.1080/13501760110064401.

Notes

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- ⁱ Shenzhen is across the border from Hong Kong; together, the two cities
- ⁱⁱ Source: IRDA 2014
- ⁱⁱⁱ For more information on the program visit: <https://malaysiacities.mit.edu/>.
- ^{iv} Interview, January 2015
- ^v Interview January 2015
- ^{vi} Personal communication, May 2014
- ^{vii} Interview January 2015
- ^{viii} Interview January 2015
- ^{ix} Interview, January 2015
- ^x Interview January 2015
- ^{xi} Presentation January 2015
- ^{xii} Interview January 2015
- ^{xiii} Interview January 2015 (emphasis added)
- ^{xiv} Interview January 2015
- ^{xv} Interview January 2015
- ^{xvi} Interview January 2015
- ^{xvii} Interview May 2015
- ^{xviii} Interview May 2015
- ^{xix} Interview January 2015
- ^{xx} Source: Ho 2015
- ^{xxi} Interview January 2015
- ^{xxii} Interview January 2015
- ^{xxiii} Personal communication May 2015

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- xxiv Interview January 2015; personal communication May 2015
- xxv Personal communication May 2015
- xxvi Interview January 2015, personal communication May 2015
- xxvii According to IRDA, the role of the committee is to “monitor and coordinate activities of government entities and strategic proposals and investments related to the Iskandar Development Region.”
- xxviii With the Finance Minister, the Prime Minister is the co-chairman of IRDA.
- xxix Interview January 2015
- xxx Interview January 2015
- xxxi Interview January 2015
- xxxii Interview January 2015
- xxxiii Interview January 2015
- xxxiv Interview January 2015
- xxxv Interview January 2015
- xxxvi Interview May 2015
- xxxvii Interview January 2015
- xxxviii Interview, May 2015
- xxxix Interview March 2015
- xl Presentation January 2015
- xli Interview May 2015
- xlii Interview January 2015
- xliii Interview, March 2015
- xliv Indigenous tree species have been planted in urban parks, with the goal of planting 5 million trees by 2025.
- xlv The “year” referenced here is 2015.
- xlvi Interview January 2015
- xlvii Interview January 2015
- xlviii Interview January 2015
- xlix Interview January 2015
- ^l Interview March 2015