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Renewable energy drives sustainable development, but without the proper sociopolitical frameworks and social capacities sustainable development cannot occur. This case study is based upon two months of intensive ethnographic research on the island community of Samsø, Denmark. In 1997 it became one of a handful of communities worldwide which produces more energy than it consumes through the use of renewable energy technologies. Through the examination of this particular case, this study illustrates the need for public support and participation in the development process along with competent leadership. It also reveals that favorable social and political contexts were present which supported the utilization of community capacities in order to achieve a successful outcome.

DETERMINING THE NECESSARY AND SUFFICIENT CONDITIONS FOR SUSTAINABLE ENERGY DEVELOPMENT: A CASE STUDY OF SAMSØ DENMARK'S ENERGY ISLAND PROJECT

By

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DEDICATION PAGE

In memory of my parents who always believed in me and to my friends who still do. To anyone who believes in a better future.

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CHAPTER ONE: INTRODUCTION AND LITERATURE REVIEW

Introduction

In 1997, Danish Energy Minister Svend Auken encouraged the community leaders of five islands in Denmark to submit proposals for implementing a plan in which they would become completely free of fossil-fuels through the use of readily available renewable energy technology. The Minister of Energy chose islands as ideal sites for the implementation of such an energy project due to the ease with which the success or failure of the project could be measured. Their borders were well defined and their connections to the larger grid were limited, making measurements such as total energy use and production more precise and reliable. In essence, a real world experiment using a Danish island as a microcosm of Denmark could determine whether such an initiative could potentially succeed in the country as a whole, and possibly other parts of the world as well. The successful proposal came from Samsø Island, a Danish municipality of 4,100 people in the Kattegat Sea. Community members then held public meetings to determine how and when the project would be implemented, using funds from both the community and the European Union. During the course of these meetings, community members expressed strong support for the creation of a system for energy generation and distribution that was path-breaking, more sustainable than fossil fuels and environmentally friendly. The community tasked private contractors with the construction of eleven land based wind turbines, ten offshore wind turbines, three straw heat plants, and one combination solar thermal/wood chip heat plant.[1] The plan also included a strategy for changing out inefficient oil burners in homes which were unable to tie into the district heating systems.

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[1] Straw heat plants use straw as fuel for heating water which is then circulated to homes in village districts. The solar thermal/wood chip heat plant uses solar energy to preheat water which is then heated further by wood chips and circulated to homes in district villages. The wood chips come from the surrounding forests on the island.

New terminology is beginning to emerge in order to describe these regions because they produce enough energy to satisfy their own energy consumption. Known as 'energy regions', they are described by Matthias Müller, Adrian Stämpfli, Ursula Dold, and Thomas Hammer (2011) of the Inter-disciplinary Centre for General Ecology as "a situation in which a region does not import substantial amounts of energy resources from other regions, but rather relies on its own resources to satisfy its need for energy services" (p. 5802). Samsø, along with Güssing, Austria, are two of a few places globally which have become "energy regions" through the use of renewable energy (Kunze and Busch, 2011). The concept of an 'energy region' provides a useful framework for understanding the Energy Island Project, as it is currently the most accurate description of what Samsø has become because of the project. It is not exactly energy independent or self-sufficient because it is still connected to the regional grid via a single transmission line. The island, however, does produce more energy than it consumes so it adheres to the definition as described previously. "Energy regions" also may prove to be a useful framework for implementing sustainable regional development in general because access to energy drives development and for sustainable development to occur it must be driven by sustainable methods of energy production (Haas, Nakicenovic, Ajanovic et. al., 2008).

Though community leaders and island residents may not call the Energy Island Project a 'development project' or refer to it as sustainable, it shares many of the qualities of an ideal sustainable development project. It was meant to better the lives of island residents by eliminating their reliance on imported fossil fuel and by providing economic stimulation to the community in a way that can be sustained for the benefit of generations to come. What is especially interesting and worthy of further study in the case of Samsø are the implications for development strategies, energy implementation, and sustainability initiatives. What the Energy

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Island Project offers is a chance to understand how sustainable energy development happens successfully. Too often discussions of development and the underlying theories focus on how development has failed in the past (Kumar and Corbridge, 2002; Stiglitz, 2003; Lister, 2009; Chauvet, Collier, and Hoeffler, 2010). What this thesis hopes to accomplish is a study of one project as an affirmation of the possibilities for development and to illustrate how concepts once applied solely to communities in the Global South wishing to 'develop' can indeed be applied to development projects which attempt to improve the circumstances and livelihoods of individuals.

While this situation seems isolated and unique on the surface there may in fact be far reaching implications in what this community has accomplished. Energy is a driver for any type of sustainable development, whether it occurs in the Global North or South (Jansen, 2007) and easily accessible energy is also one of the keys in addressing some of the Millennium Development Goals. According to the United Nations Development Programme, "sustainable development and the eradication of poverty are not possible without a significant increase in affordable and accessible modern energy services in developing countries" (2004). The political context and social factors which allowed them to make the transition may exist in other areas or could be fostered in some way once they are better understood. There also may be some necessary preexisting conditions for similar projects to work elsewhere, and these communities could serve as renewable energy barometers to gauge their likelihood of success. They also are worth investigating because the citizens in this municipality have beliefs and opinions which shape the way it was organized, how it operates, and determines how it thrives (or declines). The undercurrents present in everyday life have a lasting effect on the community as a whole and will shape the ways in which it develops. The first step in doing this, however, is to understand what

sustainable development is, the role of renewable energy plays in achieving it, and the central role of community and capacity building in this equation.

Literature Review

Several important bodies of literature must be discussed in order to understand where the Energy Island Project fits in development practices. The first two bodies of literature, those pertaining to sustainable development and community development, orient this study within development theory and provide frameworks for discussing how development occurred on Samsø during the project. The third body of literature deals specifically with capacity building and serves two purposes. It acts as a bridge between sustainable development and community development because it is a concept common to both practices. It also helps identify success factors of the Energy Island Project by providing categories of capacities in development.

Renewable Energy as a Means of Achieving Sustainable Development

Energy is closely linked to development in most situations as it is the primary driver for development and increases in global energy use, along with population growth and urban development, have led to a need for development practices that are more sustainable (Roosa, 2010). The basic needs which people have do not change whether they live in developing or developed parts of the world; people still need food, water, and shelter, along with energy (Desai and Potter, 2008). Christine Wamsler and Nigel Lawson (2012) at the University of Manchester also point out that new factors such as climate change and globalization are beginning to enter the development discussion. These factors do not discriminate in how they affect the developed or developing worlds and development strategies will accordingly be very similar. The financial costs of these strategies may vary, but financing a project may actually be the simplest part of renewable energy development in these areas as there are already mechanisms in place which

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facilitate the access to funding (OECD/IEA, 2011). There is also a considerable amount of research being devoted to the economics and pricing of renewable energy technologies in developing countries (Weisser, 2004; Moner-Girona, 2009; Thiam, 2011). Therefore, it may actually be the more intangible, non-monetary elements of renewable and sustainable energy implementation which are the most difficult to achieve.

Beginning in the 1970s there was a growing realization that development strategies which were used to solve one social, economic, or environmental issue led to their own associated issues. Factors such as climate change and natural resource use required new ways of discussing development and new strategies to address these issues (Hook and Lebo, 2010). This gave rise to the idea of 'sustainable development' (Desai and Potter, 2008). International development studies and development theories prior to this focused primarily on growth and dealt with countries in what has been termed the Global South, encompassing areas primarily in South America, parts of Asia, Africa, the Caribbean, and the Middle East. It emerged as a formal discipline following the decolonization of these areas after World War II as a way to understand the social, political, cultural, and economic characteristics in these places and to help them become 'developed' in the same manner as countries in the Global North (Haynes, 2008). These theories used western values as a yardstick for development, and prominent theories such as modernization theory called for industrialization and the adoption of western political institutions (Pieterse, 2010). Other theories, dependency theory for instance, sought to explain why this industrialization was failing in many places when, according to the theory, it should succeed (Haynes, 2008). It is in response to the shortcomings of these theories that sustainable development theory emerged along with the associated theories of human development and social development.

There are those who contend that "sustainability" has no single meaning and resists being defined (Bell and Morse, 2008). The Bruntland Commission's report *Our Common Future* provides the most common and concise definition (Dernbach, 2009). This report, also known as the Bruntland Report, defined sustainability as that "which meets the needs of the present without compromising the ability of future generations to meet their own needs" (Barnaby, 1987). A broad definition to be sure, but it provides a base from which to begin. Murray Gell-Mann (2010), the Nobel Prize winning physicist, is much more specific with his definition saying that sustainability is not only environmental, demographic, or economic in nature but is also relates to politics, governance, and society. For the purposes of this study, the definition of sustainability includes energy use and energy development. The definition of sustainability could then be applied to energy use as 'energy use which fulfills the needs of present generations without compromising the needs of future generations'.

The practice of sustainable development has useful theories which are closely associated with it, some which are directly derived from it, such as human development and social development theories. Human development theory emerged as a response to the economically focused classical theories of development, such as the previously mentioned modernization and dependency theories. Human development theory places the individual, not economic growth, at the center of development (Griffin, 2000). It also stresses the idea of 'capacitation' and emphasizes investing in human resources, which can also be called human capital, i.e. the talents, skills, education, and leadership ability of any individual, among other things (Hayami, 2009). The Human Development Index was created by the United Nations as a way to measure human development and capture indicators, such as education and life expectancy, which were not measured by conventional economic indicators (Payne and Phillips, 2010). Social

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development theory, on the other hand, focuses on the "collective development of the whole entity, whatever that entity might be" (Pawar and Cox, 2010, p.14). Social development theory focuses on social capital, cooperative behavior which comes from shared expectations and leads to mutually beneficial results (Dillard et. al., 2009). Trust, social norms, and networks all have value according to the philosophy behind social capital, and connections among individuals affect the productivity within a community (Putnam, 2000).

Renewable energy projects are, at their core, development projects meant to improve whatever community in which they are being implemented. While they are often thought to primarily address environmental sustainability issues, they also address the social and economic challenges of sustainability quite well.[2] Using the community as the primary unit of analysis we can see the advantages of using renewables to address social sustainability issues. They can be used in a decentralized manner, as opposed to grid distributed energy from fossil fuels, and they can be used in an equitable fashion by meeting local needs more directly (Alazraque-Cherni, 2008). Because they lend themselves to decentralized applications they provide energy to areas where there simply is no grid access and can supply energy to those in otherwise inaccessible areas. Development projects involving small scale renewables have been successful in developing areas without grid access and can provide a more immediate, practical alternative than grid extension (Cherni, 2009).

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[2] Some of these advantages, such as decentralization, are especially significant to communities in the developing world where the energy needs for individuals are much more modest than those in the developed world (Nguyen, 2007). It has been shown that even relatively modest energy inputs can raise the standard of living for those in the poorest areas of the developing world (Chaurey, Ranganathan, and Mohanty, 2004). In fact, while there are significant gaps in the standards of living in the developed and developing worlds, there are some parallels which can be drawn between energy issues in both areas of the world. For example, energy poverty affects populations in both the developing and developed world alike. In 1998, there were approximately 24,000 winter deaths in the United Kingdom, 21,000 of which occurred among the elderly due to winter related illnesses caused by poor insulation in homes, energy inefficiency, fluctuating energy prices, and the level of household income (Wright, 2004; DEFRA/DTI, 2001). The rural poor in the developing world are susceptible to fuel poverty because, unlike those in more developed or more affluent areas, they use their fuel primarily for cooking and have no choice but to reduce energy used for subsistence when fuel prices rise (O'Keefe and Soussan, 1991).

Issues like fuel poverty also illustrate why communities such as Samsø are worth investigating because the conditions in this case can occur in any community regardless of whether they are in the developed or developing world. Renewable systems also allow flexible and multi-layered approaches to energy development. The decentralized nature of renewable energy systems permits a bottom–up approach which is sometimes necessary in certain development situations. They allow for the kinds of grass roots initiatives that larger organizations are simply not able to implement (Yadoo and Cruickshank, 2010). This is especially important when the success or failure of a project rests on whether or not it is a community-based effort, regardless of whether it is in the developed North or the developing South. They also allow projects to be initiated with top-down approaches and funded thorough regional and national institutions. As we will see this combination of bottom-up and top-down approaches is exactly what occurred in Samsø. The Danish national government initiated the Energy Island Project, local organizations and groups supported and guided the project, and the European Union provided much of the funding in the projects initial stages.

Renewable forms of energy provide a way to achieve sustainable development by addressing the three conditions which sustainability theorists hypothesize are necessary for sustainability to occur; economic sustainability, ecological sustainability, and social sustainability. These are typically referred to as the 'three pillars' of sustainability, with each area encompassing a different set of needs must be met to achieve sustainable development. (Moldan, Janouskova, and Hak, 2011). Jonathan Harris and Neva Goodwin (2001) of the Global Development and Environment Institute at Tufts University define social sustainability as a "system which must achieve fairness in distribution and opportunity, adequate provision of social services, including health and education, gender equity, and political accountability and

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participation" (p.xxix). Jesse Dillard, Veronica Dujon, and Mary King (2009) expand on this definition by saying it must also account for the social processes that achieve the other two areas of economic and environmental sustainability. In order to achieve fairness and equity, certain political practices must be in place for social sustainability to occur. Research on the politics of sustainability shows that democratic political practices are the ones most conducive to sustainable development, thought they do not necessarily need to be based on a federal system (Whitford and Wong, 2009).

Economic sustainability requires a new understanding of economics which departs from the traditional growth models of economics (Hardisty, 2010). In its simplest form, economic sustainability is the "maintenance of capital" and the resources that provide physical input in the production process (Khalili, 2011). It also means having a broader understanding of the end goal in sustainability, human development and well-being, and not growth alone (Dillard et. al. 2009). Environmental sustainability is meant to preserve the natural resources humans need for survival and entails living within the limitations of the biological and physical environment (Goodland and Daly, 1996). It is concerned with environmental systems and environmental sustainability can be seen as the foundation for social and economic sustainability because of the natural capital and raw materials the environment provides to civilization (Lafferty and Langhelle, 1999).

By providing a set of criteria, the three pillars of sustainability make it possible to begin describing the conditions for meaningful sustainable development to occur. Each pillar is associated with its own form of capital and determining which forms of capital are present in the case of the Energy Island Project can make a complex situation more manageable. This notion of 'capital' in development practices is also associated with the practice of capacity building

(Simmons, Reynolds, and Swinburn, 2011). While the definition of capacity building can vary somewhat on the circumstances in which it is applied, in the context of sustainable development capacity building is the leveraging of community assets to achieve a sustainable outcome (e.g. a renewable energy project of some form). These assets correspond to their respective pillars of sustainability and can be in the form of social capital, economic capital, or natural capital, all of which can be further subdivided into other forms of capital (Phillips and Pittman, 2009; Simmons et al., 2011).

As a review of the literature shows, the definitions for sustainable development can be ambiguous and hard to define. In order to proceed with this study and answer its questions it is necessary to settle on a definition which is the most suitable to this scenario. Defining sustainable development in any context means determining what is to be sustained and how long it is to be sustained (Kates, Parris, and Leiserowitz, 2005). On the surface when one looks at Samsø and the Energy Island Project, it is clean and reliable energy from renewable sources that is being sustained. However, if one looks deeper it is actually a way of life the residents of the island have grown accustomed to, but the dependence on fossil-fuels became too costly both economically and environmentally for many of the individuals who live there. For how this way of life is to be sustained is a bit harder to define, but for the purpose of this study it is assumed that it is for the life of the community in the foreseeable future.

Community must be defined as well since it is the scale of analysis for this study. It is perhaps the one concept that is the most difficult to define because he meaning changes depending on what it references and where the community being developed occurs. It could be a community of place, of interests, norms and habits, a series of networks, or perhaps even a combination of these different areas (Blackshaw, 2010). Looking at Samsø it is possible to

identify several communities based on these groupings. There is a community of place where everyone on the island is considered a resident within a greater community. Occupational communities exist which are defined by industry such as farmers and those that work in tourism. Communities of interest are also formed based on personal interests such as sports or politics. There is layering and overlap within and between communities. The definition may even change from culture to culture (Creed, 2006). Community has even gained meaning in terms of community renewable energy projects. According to Gordon Walker and Patrick Devine-Wright (2008), when speaking of community renewable energy projects there are two dimensions, "a process dimension, concerned with who a project is developed and run by, who is involved and has influence" and "an outcome dimension concerned with how the outcomes of a project are spatially and socially distributed" (p. 498). Rather than attempt to identify each community on the island, it may be best in this case to refer to the community as it relates to the Energy Island Project because that is the one commonality in this study. In other words, the community involved in the project is a larger collection of communities which chose to be involved in the project itself. This community is then developing itself through a renewable energy project which is meant to maintain a way of life the island residents have become accustomed to and wish to preserve.

Capacity Building and Conditions for Renewable Energy Development within Communities

Building capacities for development, or capacity building, as a means of achieving sustainable development first emerged in the 1970s as a development approach by the United Nations Development Programme (UNDP) to address inequality and poverty in community development processes (Yadama and Dauti, 2010). It has since been adopted by other development organizations, both governmental and nongovernmental, as a means of carrying out

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their development strategies (Eade, 1997; Laverack and Thangphet, 2009). Initially, it was meant to be a mechanism for stimulating economic growth by developing human and institutional resources within a community and enhancing its productivity (Gunnarsson, 2001). It has also focused solely on technical assistance, which eventually proved to be a poor way to achieve lasting and meaningful development. It came to light that unless there was commitment from political leaders at higher levels it was not likely to occur at more local levels (Maconick and Morgan, 1999) and recent research has shown that one of the key aspects in effective community capacity building is leadership, especially with respect to social capital (Emery, Fernandez, Gutierrez-Montes, et. al., 2007). Leadership can be viewed as the unifying force which brings together the other aspects of capacity building. This aspect may or may not be officially recognized or stated in a community's master plan for a particular project, but it should not be ignored. Desai and Potter (2008: 116) point to a direct relationship between effective leadership and community participation. Indeed, it seems that one of the primary challenges facing the successful implementation of renewable energy projects is finding community members who are willing and able to take on these leadership roles and see a project through to its completion. A study conducted in the rural UK community of Thirlmere showed that community members, while interested in the prospect of renewable energy installations, neither identified with the role of community leader nor had the desire to fill such a role (Rogers, Simmons, Convery, et. al., 2008: 4225).

Eventually capacity building approaches became more poor-centered in their methods, addressing the needs of those experiencing food scarcity for instance, because these populations were the least likely to benefit from development initiatives. Thus careful considerations were made to include them, but it was not always clear how that was to be done (Turay, 2001). More

recently the term has come to embody a more individual and community-centered approach. Currently, the UNDP defines capacity building as "the process through which individuals, organisations and societies obtain, strengthen and maintain their capabilities to set and achieve their own development objectives over time" (UNDP, 2011: p.3). It is also said, interestingly enough, to have sustainable development as its primary goal (Yadama and Marsela, 2010). But how and where capacity building occurs must be stated clearly to engage in a meaningful inquiry. Community capacity as described by Chaskin, Brown, and Venkatesh et. al., (2001) is "engaged through varying combinations of three levels of social agency: individuals, organizations, and networks of associations" (19). It is also locally driven, and a bottom-up story emerges just as it did with Samsø and the Energy Island Project. Thus, it is at these the intersection of these three locally-driven characteristics that community capacity, and indirectly sustainable development, occurs.

Although it began as a development tool of international development organizations, capacity building has since been adopted as a method in community development as well. Indeed there are some who contend that community development and capacity building are one in the same (Craig, 2007). Capacity building is a useful tool, but it is not without its drawbacks. For one, it is difficult to measure capacity even though attempts have been made to do so. The language of capacity building also has been criticized, described as a 'buzz word' in development rather than a valid approach for affecting change (Kenny, 2002; Cornwall, 2007). Capacity building can also have assumptions attached to it, for instance assumptions that capacity building is automatically good and that communities want to be developed. These assumptions also are easily committed if those working for development organizations begin to

impose the priorities of the organization, which may be dictated by donors, onto the communities they serve (Eade, 2007).

Allowing communities to build their own capacities through locally owned and operated organizations can help mitigate some of the potential dangers of mismanaged, top-down capacity building efforts. Understanding the roles that local organizations, individuals, and governments play in sustainably developing their own communities and utilizing their own capital as they see fit can provide insight into how sustainable development is achieved at the local level. Samsø's Energy Island Project provides at least one opportunity for studying how successful capacity building is achieved from within, and in turn provides clues as to the necessary and sufficient conditions for sustainable energy development to occur. This study hypothesizes that if community members are significantly involved in the development process then sustainable development can have its intended effect. It is also very likely that strong social networks were present on the island given the degree of collective action.

Research Design and Research Questions

Because this study is primarily about an energy transition which has already occurred and how it affected the people on the island, treating the transition as a case study allows an investigation of the historical context, community mindset, community dynamics, social networks, and political environment at work in the community. The case study research method is a good way of approaching any question that is asking 'how' and 'why' something occurred. These conditions apply to Samsø and the Energy Island Project and are part of the reason this approach was chosen to explain and understand the evolution and impact of the project. An additional reason was because one of the three types of case studies, the exploratory case study,

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is useful in examining new or innovative phenomena, such as practices and processes common in sustainable development (Voss, Tsikriktsis, and Frohlich, 2002; Yin, 2009).

This is the first case study on an energy region that looks at more than just the technological aspects of the Energy Island Project in the energy development process. It focuses specifically on the socio-political aspects of energy development and provides information which is otherwise unavailable without an in-depth ethnographic study. There is almost no scholarly material on the Energy Island Project, most of the available material consisting of journalistic writing and reporting. Müller et al. (2011) state that there is "an important gap in the literature [which] concerns the lack of comparative empirical research [on energy autarkies]. Further research should look at the success factors behind successful regions" (p. 5809). This is a common problem faced by sustainability researchers in "embryonic and rapidly emerging fields of study" (Franklin and Blyton 2011) and relatively few case studies have been done on sustainability and renewable energy in communities.

The data used in this case study are based on two months of intensive ethnographic research while on the island of Samsø and consists of two parts. The first part is a historical inquiry into the factors which led to action and the policies which were implemented to affect the changes leading to renewable energy based energy infrastructures. The data gathered in this part of the project came from documents such as the project's master plan, press releases regarding the project, and interviews with public figures involved in the implementation. This established a context for the second portion of the project, which is an evaluation of the project based on the perceptions of community members as to the projects efficacy and lasting effects.

This thesis project is ultimately concerned with the individuals and groups in this community, their social networks, and the values, ideas, and beliefs of everyone concerned. It is

a project about how development affects people, the necessity of their participation in these projects, and the knowledge they can impart about their own living environment. The methods employed in case study research naturally lend themselves to community development and sustainability research. Their usefulness lies in understanding the social factors surrounding development and sustainability issues and allows the researcher to see the problem from the perspective of the affected community or individuals. These methods also help the researcher maintain the proper objectivity by acknowledging the complexities inherent in social situations and allow them to see both sides of an issue to a degree.

Stakeholder feedback in sustainable development is one of the more useful tools in determining the successes and failures of a development initiative because they are the ones most able to gauge if their needs are being met (Sayer and Campbell, 2004). I interviewed twenty-four community members, including municipal and project leaders, business owners, farmers, retirees, and working class individuals; again, there was some overlap with these classifications which can be seen in Table 1. Snowball sampling was used to choose respondents, with each person interviewed recommending more people to contact. Respondents were also chosen through chance encounters via participant observation. My interviews began with very general, semi-structured questions about life on the island and would progress naturally to other topics about the Energy Island Project, the environment, and future projects.[3] From the first few interviews I developed an additional set of questions which pursued more specific topics I had not been aware of at first but added content to the study. I tape recorded every interview after receiving verbal permission from the participants.

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[3] There was not significant language barrier to speak of. Most people on the island spoke English well enough for the purposes of this study. There were several instances where clarification was necessary because either the participant or I was not familiar with a word or phrase but in every instance further explanation of what was meant solved the miscommunication.

Table 1: Occupations of Respondents

Occupation	# of Respondents
Archivist	1
Author	1
Business Owner	3
Contractor	1
Engineer	2
Farmer	6
Librarian	1
Maritime Worker	1
Pensioner	7
Photojournalist	1
Plumber	1
Politician	4
Realtor	1
Teacher	2
Unemployed	1

In addition to interviews I also participated in daily activities at the Energy Academy, the organization which hosted me during my field work, and other community events which occurred during my stay on the island. This was useful in that it provided content and context for the study and allowed for at least partial immersion in the culture of the island. These observations allowed me to see some of the social networks and social dynamics between individuals and groups in a real and practical way which helps to inform the field work as a whole. It also enabled me to ask a number of questions. For instance, did the individuals interviewed perceive the Energy Island Project in a positive or negative way, were community members involved in decision-making processes, and are there strong social networks which may have contributed to each development project?

Attempting to understand how a community achieves the transition to renewable energy raises several sets of questions, all of which will be used to guide the structure of this thesis.

They can be grouped into two broad categories which ask questions as to how the transition was made and what effects the transition has had on the community, such as:

- What are the necessary and sufficient conditions for achieving sustainable development and which conditions lead a community to becoming an energy region?
    - Why was the switch to renewable energy made and how was it achieved?
    - What opportunities and obstacles presented themselves for the transition?
    - How did supranational, national, and local government forces successfully work together to achieve the goal of a renewable energy island and who were the central stakeholders in the project?
    - What capacities are necessary for sustainable energy development to succeed?
- What are the implications for a community if it does develop sustainably or and if it becomes an energy region?
    - How did this transition affect people in the community and how did they react to/perceive the transition?

These questions will be answered using data gathered in the specific context of Samsø's Energy Island Project, an example of how a supranational organization such as the EU, the Danish national government, and a local community like Samsø can successfully cooperate to establish a sustainable energy model. It is possible that the ways in which this community and its residents responded to internal and external forces, prompting them to transition to renewable energy economies can inform sustainable development projects in other regions. It can also identify the necessary and sufficient conditions which need to be present for such a transition to occur. In order to identify these conditions, however, necessity and sufficiency must be clearly stated as it applies to sustainable energy development.

Ann Dale and Lenore Newman (2008) assert that, by definition, the necessary and sufficient conditions for sustainable development are in fact the three pillars of sustainability. Thus, the ecological, economic, and social requirements of sustainable development are individually necessary but must occur together to be sufficient and each of these pillars has its own associated necessary and sufficient conditions which must be met. However, it is not the purpose of this study to determine what the conditions are for each pillar, only for the socio-

political aspects specific to Samsø. It may then be better to reframe the question and ask "What are the necessary and sufficient conditions for social sustainability to occur"? This makes the inquiry more manageable and more appropriately oriented to the data which has been collected.

Summary

Sustainable development practices have become the desired way to achieve meaningful and lasting development, but for it to happen certain capacities must be built. This project adds some substance to the sustainability and capacity building debates by exploring the dynamics and drivers of this particular project. Studying a community which has made a successful transition, such as Samsø, to sustainable forms of energy can inform development practices in the future. However, a framework for determining the necessary and sufficient conditions for becoming an 'energy region' must be used, and capacity building provides some tools with which to do this. With this background research to support it, an earnest inquiry can be made and research questions may be developed to guide it.

The chapters that follow will be organized according to these questions and will analyze the structures and agencies which led to the realization of the Energy Island Project. Chapter Two, "Creating a Carbon-Neutral Samsø," will describe the existing conditions social and political structures which were in place when the project began. It will also discuss key drivers which provided the impetus to get the project off the ground. Chapter Three, "Community Development or Developing Community? Building Capacities for Sustainable Energy Development," will discuss the agencies responsible for building capacity as it relates to the Energy Island Project and illustrate local perceptions of the project now that it is complete. Chapter Four, "Summary and Conclusion" will summarize key points from each of these

chapters and discuss possible implications of the study's findings for similar projects in different

contexts.

CHAPTER TWO: CREATING A FOSSIL-FREE SAMSØ

Samsø is a 42 square mile island off the coast of the Jutland peninsula which is only accessible by diesel powered ferries. It has a history of agriculture and is known mostly for its new potatoes and strawberries. Vacationers travel to Samsø during the summer months to enjoy the island's beaches and stay in summer homes, a visible sign of a large tourist economy which is responsible for much of the island's income. What is intriguing is many of these tourists are not even aware that the Energy Island Project took place until they arrive on the island. For those that do know about it they say it is because of the single page the project received in the yearly travel magazine *Samsø Holiday Magazine.* The visibility of the eleven land based wind turbines and ten offshore turbines is just not very unusual in a country which produces almost twenty percent of its energy using wind power (Kaygusuz, 2009). The other evidence the project took place, the heat plants and the Energy Academy, blend into the background of the island. A map of the island can be found in Appendix A.

Describing the necessary and sufficient conditions for a renewable energy development project such as the Energy Island Project to occur requires the identification of the structures which supported the creation of the project, including the social and political environments as well as drivers. Any development project can be viewed as a complex system and identifying these elements aids in the explanation of what occurred, why it occurred, and how it occurred by naming the pieces that make up the system. The importance of context in renewable energy development has been illustrated in previous research (Christiansen, 2002; Greening, Boyd, and Roop, 2007; Owens and Driffill, 2008). This chapter describes the conditions of the Energy Island Project and is divided into three subject sections. The first section describes the political, social, and economic structures supporting the project. The second section deals with drivers

which necessitated the creation of the Energy Island Project and facilitated its realization. The third section discusses local, national, and supranational systems of governance which affected the project.

Background for Sustainable Energy Development in Denmark & Samsø

Any given development project or initiative will inevitably be affected by the politics and economic conditions of the region in which it occurs. Assessing the background conditions in which the Energy Island Project developed provides the information necessary to understand how they shaped the outcome of the project. Though Samsø is a unique case, an analysis of the broader formal and informal contexts can illustrate the magnitude of each of these forces in energy development and the degree of necessity in assessing political situations and the economies of regions in which a project is occurring. The policies of a central government, whether they are related to energy, development, or social welfare in general, will have implications for a project. More generally the type of government, whether it is democratic, authoritarian, socialist, or a combination of types, will change the ways in which development should be approached, thus making political context especially relevant for discussions on development. Economic conditions can indicate financial obstacles or opportunities in energy development. These areas form the structure which is relevant to renewable energy development, both generally in Denmark and Specifically in Samsø.

Political Context and Participatory Practices: Building the Energy Island Project

The way a community or state organizes and governs itself can be telling about how development projects might unfold. Lines of communication, seats of authority, and centers of influence can be identified making development initiatives more effective. The municipality of

Samsø is governed by a council which consists of an elected mayor, a vice-mayor, and nine additional council members. This is the basic makeup of local government in Denmark as a whole. Elections are held every four years and island residents vote in both municipal elections and regional elections. Up until 2007, citizens would have voted in county elections, but reforms by the Danish central government merged counties into six larger regions; the municipality of Samsø belongs to the Central Jutland region. These regions are governed by a council of 41 members and are primarily responsible for public health services, employment services, and mass transit (Local Government Denmark, 2009). For an organizational chart of the municipal government, see Appendix B.

More broadly, Denmark is known for having a history of public participation in democracy and democratic processes (Læssøe, 2007). It first transitioned to a democratic system of governance in 1848, and though there are still some issues in the system, it has been improving and ranks high even among other Scandinavian countries in terms of citizen involvement and participation (Christiansen and Togeby, 2006). Denmark, though a constitutional monarchy, has a parliament which is chosen through a system of proportional representation which results in a multi-party parliament (Wern, 2009: 10). What this essentially means is each party is assigned a proportional number of seats based on the number of votes received. There is a significant level of political trust and voter turnout is typically high. In Samsø's latest election, held in 2009, 79% of those eligible to vote turned out (KMD, 2012). Decisions made by authority figures are routinely challenged by citizens and this kind of practice is encouraged and tolerated. According to the Democracy Index, a report published by the Economist Intelligence Unit, as of 2010 Demark ranked 3rd out of 167 countries in democratic practices with only Norway and Iceland faring slightly better. The same report shows that, of

those surveyed in 2009, 91% were satisfied with democracy as a form of governance (Economist Intelligence Unit, 2010). Elections are open and transparent and parties often work together to compromise on issues. Participatory practices are typically viewed as one of the key elements in successful sustainable community development initiatives (Agger, 2010: 541) and the high levels of participation present in Danish politics are indicators of participatory democratic processes in the country as a whole. Direct participation is encouraged and viewed positively in many other areas of Danish society, such as the labor industry (Lund, 1994).

Within the country, organizational and union membership is high as well, with as much as eighty percent participation in unions and an average of three organizational memberships per person (Andersen, 2006). Participation in these types of organizations can create a political and social atmosphere where one is likely to feel comfortable collaborating with other citizens. Torpe (2003) has even shown that there is a direct correlation between involvement in associations and political engagement. This may help explain why Denmark, as a country, has been relatively successful in implementing renewable energy initiatives when compared to other democratic societies. High degrees of direct participation along with aforementioned political transparency have been shown to be possible determining factors in the widespread acceptance of wind energy initiatives (Mendonça, Lacey, and Hvelplund, 2009).

The social environment which supports this type of political participation also supports equitable practices in gender relations. According to the United Nations' *Human Development Report*, Denmark again ranked 3rd, this time marginally behind Sweden and the Netherlands (United Nations Development Programme, 2011). Equal pay for equal work between men and women is stressed in the policies of the Danish Ministry of Employment. The best example of this is the Consolidation Act on Equal Pay to Men and Women of 2006 which prohibits unequal

pay between men and women for the same work and specifically addresses the issue of gender-segregation in wages (Danish Ministry of Employment, 2006). Another indicator is equal participation of women in government. In all, as of 2002, 38% of the Danish Parliament was comprised of women, high numbers even among democratic nations (International IDEA, 2002).

These types of democratic processes which lead to equitable societal norms are, according to Dillard et al. (2009), essential for sustainable development and they refer to them as "the cornerstone to the achievement of human advancement" (33). Inclusive democratic processes will, ideally, also include meaningful public participation in the planning process. Inclusive processes and participation in community development are, according to Vincent II, essential parts of the values and beliefs which shape the development process (2009: 60). This idea of public participation will be discussed further in the discussion on local perspectives of the project because it seemed to be an important factor in the project's success according to many of the island's citizens.

Farming cooperatives may be partially responsible for the democratic processes which are present in the Danish political system. The origin of agricultural cooperatives in Denmark can be traced back to the first dairy cooperative formed in June 1882. During this time period there was a collapse in the grain market and, in order to survive, Danish farmers switched to dairy production (Jespersen, 2011). It was more profitable for these farmers to consolidate their products rather than to compete directly against one another. These types of cooperatives are still a part of the Danish culture, and because agriculture is an integral part of the culture on Samsø there were still many farmers participating in these types of cooperatives. They produced a sense of community by allowing full democratic participation by each farmer in the cooperative, regardless of the number of cattle owned (Østergård, 2004: 36). A farmer could own one head of

cattle or one hundred heads of cattle and they would still be allowed one vote. The framework of cooperative farmers' organizations has even been used in direct correlation with other renewable energy initiatives in Denmark, especially if a project involves biogas generation from manure. In this system, the manure from multiple farms goes to a single facility called a Joint Biogas Plant which is owned by multiple farmers in a cooperative. The resulting gas goes to heat and power plants and the used manure is redistributed among the farms of the owners (Meyer, 2004: 31). Farming cooperatives have also led to the formation of cooperatives in other areas such as banking, health insurance, and even electricity generation (Jespersen, 2011: 159).

This may be an example of one of the three types of community structure Morse identifies as collaboration, the other two being coalition building and partnerships (2004: 52). In collaboration, a community's assets, talents, and resources are used for a common purpose, but it can be the most difficult type of community structure to achieve. When planning projects as decentralized as renewable energy initiatives, the public comment and feedback phase of planning may not be sufficient on its own, that is, it may require a deeper involvement of the local citizenry to help realize a project. This requires a commitment on both sides of the project from those planning the project and those being asked to participate.

Island Demographics and Economies

As of the first of January 2012, the island had 3,889 residents, 3,715 of which were Danish citizens. Approximately one third of these individuals lived in the urbanized areas of the island; the remainder lived in rural parts of the island and most of the island is still considered rural. There were 2,009 households in 2011, with just less than half of the island's residents, 49 percent, own their own homes. Residents 17 to 64 years of age make up more than half of the island's population at 56.2%. Those over 65 comprise the next largest group at 27.1%. The

smallest groups are adolescents 7 to 16 years of age and children 0 to 6 years at 11.2% and 5.5% respectively (Municipality Facts, 2012a). Age distribution has remained relatively constant, thought there has been a decrease in total population, down from 4,010 in 2010. Information on racial and gender distribution was unavailable. It was not unusual for a person to have multiple forms of employment, and it was said that one had to have an entrepreneurial attitude to make it on the island. This was reflected in my interview sample, with many individuals having two occupations.

Samsø's primary economies have traditionally been agriculture and tourism (Samsø Commerce and Visitor Center, 2007). Its agricultural history especially influences the ways in which islanders interact with one another, most notably through the influence of agricultural cooperatives, as previously mentioned. The Energy Island Project created an energy economy, providing an additional source of income for the citizens and the municipality. Agriculture on the island consisted totally of crop farming now that the slaughterhouse and dairies were closed and moved to the mainland. This left the agricultural industry heavily dependent on the cultivation of new potatoes and strawberries. These two crops were especially sought after because of special qualities of the island soil, and the first batch of new potatoes would fetch high prices on the mainland. The strawberries also had a reputation in other parts of the country, and this type of branding was especially important to the islands economy because reputation counted for a lot. A bad batch could be damaging to farmers and business owners.

Tourism provides an income to the island in the summer months with thousands of visitors traveling to the island annually (Tagliabue, 2009), some renting summer homes for months at a time effectively increasing the islands population. Outdoor activities such as kayaking, swimming, and sailing are among the reasons visitors go to Samsø. The additional

income from tourism in the summer months, in addition to agricultural production, sustains the island thorough the winter months, when business close for extended periods. Some of the islands residents had mixed feelings about the tourists, appreciating their business but relieved when the season was done with.

Energy too, now, generates an income for the island, both for the residents who invested in the project, and for the municipality which owns five of the offshore windmills. The municipality must, however, reinvest any income from the offshore wind turbines back into similar projects according to Danish law. These funds are then used to finance additional projects by the Energy Academy. Tourism and energy overlap a great deal as well now, with energy tourism marketed as one of the added attractions along with the other, more traditional forms of recreation (Samsø Commerce and Visitor Center, 2012).

Events Leading to the Creation of the Energy Island Project

A discussion of the background conditions of the Energy Island Project must also be accompanied by the background events which led to its creation. The beginning event can be traced back to when he Danish Minister of Environment and Energy, Svend Auken, took the principles established in the Rio Summit held in 1992 and developed from them the idea for a competition among island communities in Denmark. With financial assistant from the Danish government, five islands produced plans which outlined methods, using existing renewable energy technologies, for transitioning completely to renewable sources of energy. Samsø was among them, the others being Læsø, Ærø, Møn and Thyholm. The Samsø municipal government contracted a company called PlanEnergi to assist with the composition of a master plan, which was selected as the most feasible and achievable master plan (Jørgensen et. al. 2007). Samsø became the place where the Energy Island Project would occur and the ten year transition began.

On Samsø, there were some key community members which took a special interest in the competition and saw it as an opportunity for their island home. They were individuals who were leaders in the community, whether in an official capacity or not. Some had personal connections to the mayor or Svend Auken himself, and these individuals eventually played a role in directing the project and formation what would eventually become the Samsø Energy Academy. According to the local narrative, there were two people in particular, a local plumber and a local politician, were particularly involved from the beginning. The local plumber was a respected individual on the island with an interest in renewable energy, and according to one informant "… he was involved in the first generation of windmills built twenty years ago, he was building, because he had a machine factory…in the beginning he was working a lot with the [Energy Island] Project" (Respondent 8, personal communication, 17 June 2011).[4]

This local politician had actually been in the Danish parliament, and had personal connections to Svend Auken as well as others who would become key players in the development of the project. In ideal development and planning scenarios, power dynamics, personal connections, and personal biases are absent. Flyvbjerg (1996) however, says that these circumstances are unavoidable in real world planning scenarios, and should be accounted for and acknowledged in any planning project. With this in mind, one cannot discount the possibility which personal connections played in the genesis of the project. The politician herself alluded to this type of connection with the Energy Minister:

> And we couldn't really get the date it would be decided, but because I knew Svend Auken, because I knew his sister and we were all there at their family parties and so on, so I could ask him, not use my knowledge to influence the outcome, only is it possible to get the date before the 16th of October because we have to leave at this time and it would be so good if I knew in advance. And then it was decided so that, think it was at the beginning of October, it was decided and

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[4] Respondents are identified by the order in which they were interviewed to ensure anonymity.

we knew that we had won the competition. (Respondent 21, personal communication, 6 July 2011)

This individual also had a personal connection to Søren Hermansen, the man who would spearhead the project and later became the director of the Energy Academy.

At that time, Søren was a teacher at the local folkehøjskole[5], but he was asked by the chairperson of the group spearheading the implementation of the master plan if he would like to fill a position in a newly created office where people could inquire about the project and renewable energy. His job would be to act as a consultant and present the proposal to groups around the island and to get their feedback. An engineer accompanied Søren in these meetings and presented the technical aspects of the project, which Søren would then explain in an accessible way. This is one of the first important steps which occurred in the process of gaining support because effective discourse and communication skills can help or hinder a project in its beginning phases (Wodak, Kwon, and Clarke, 2011: 612). Even though the technical aspects were important, explaining them in easily understandable terms was a necessary step for the project to move forward. A second reason Søren was sought out was because he spoke both dialects which exist on the island as a result of its unique geography, which separates it into distinct northern and southern parts.

Specific economic circumstances drove the project as well. One of the island's main industries is agriculture, and two of the largest employers on the island were a dairy and a slaughterhouse. As was characteristic for many island communities in Denmark, these places closed and moved to the mainland resulting in the loss of about eighty jobs on the island according to one respondent. The Energy Island Project was therefore seen as something which could provide much needed jobs to some on the island. The construction period especially,

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[5]A facility in the Danish education system for continuing education after primary school.

according to one of the local business owners provided "…many jobs and many thousands of hours of work…" (Respondent 19, personal communication, 5 July 2011). There was also the associated maintenance with the new heat plants and the need for individuals who understood renewable electrical systems. The needed infrastructure to support the new systems would provide some economic stimulus to the island.

The closing of the slaughterhouse and the dairy provide some insight into just how interconnected each aspect of daily life is on the island. The advantage of closeness and immediacy which allow people to forge connections and bonds with one another also has another side to it. According to four respondents, the closing of the slaughterhouse affected many of the families on the island, and was succinctly put by one respondent that:

> "…the reason why it went so well on Samsø is partly because something new has to start, because this community was sort of, well the slaughterhouse in Ballen was just closed some years before, all the dairies was closed… something new had to come to make this island live, and bring it back. Because it was sort of going down and nobody knew exactly what to do. (Respondent 16, personal communication, 30 June 2011)

On an island of approximately four thousand people, the loss of a large employer is especially significant. This was at a time when the unemployment rate for Denmark was around 8% (Trading Economics, 2012), making the effects of the closings especially salient. Officially the number of jobs lost is seventy (Jørgensen et. al., 2007) but even at this number if the majority of these families had school age children, school enrollment would be affected if the workers were forced off island to seek employment. This would in turn affect the number of teachers required and might result in further layoffs, and in a worst case scenario, the closing of a school. So, in many of the people's minds, the Energy Island Project was something which could help alleviate some of the ill effects of the slaughterhouse and dairy closing.

Some of the local farmers saw economic opportunity as well in the added income from either investing in the windmills themselves or selling straw which would normally be burned in open fields to the district heating plants. These farmers would later be significant investors of the Energy Island Project, with some individuals owning significant shares in the windmills and becoming members of the committee which oversees the operation of the offshore turbines.

Institutional Cooperation and Governance Frameworks for Sustainable Change

It is rare for an organization to act alone in development initiatives and there are usually multiple actors involved. This includes local, national, and sometimes supranational governmental bodies, nonprofit organizations, local stakeholders, and special interest groups at times. There were multiple organizations involved in the Energy Island Project at every level which worked together to create the necessary frameworks to support the project. This framework included collaboration between organizations, financial support, public involvement, public-private partnerships, and policies which allowed the project to develop in a successful manner. As Figure 1 shows, actors at the local level had the greatest influence on the implementation of the project due to proximity and investment in the project. The involvement of local governments, because they can shape policy related to renewable energy initiatives, is critical if renewable energy projects are to succeed (Hoppe and Coenen, 2011). This type of involvement was especially true of the Energy Island Project and the Samsø Kommune was involved with the Energy Island Project in a number of different ways. At times it was directly through the municipal council, and at others it was through one of the committees or offices.

Figure 1: Actors and Their Interactions
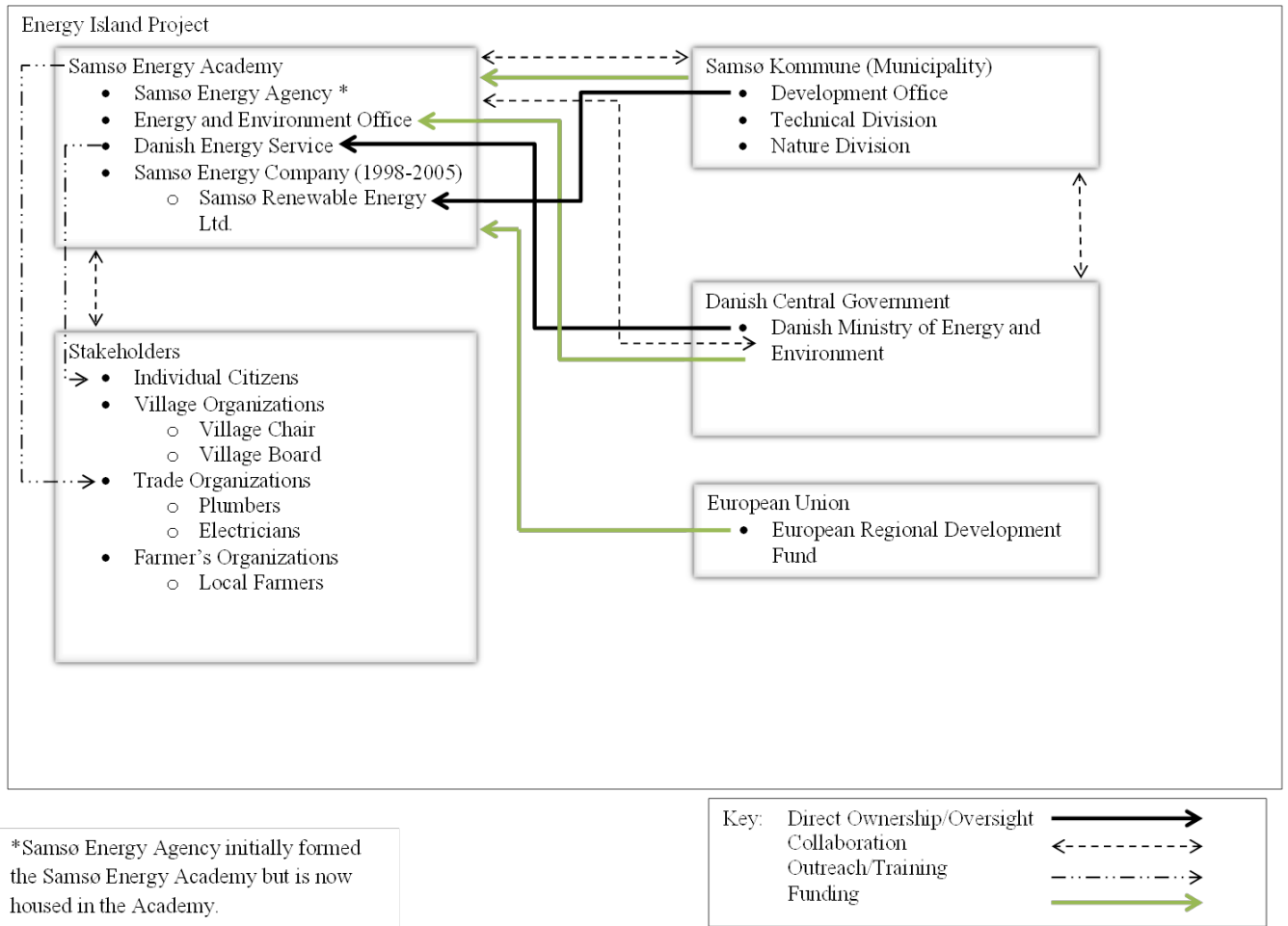
The Samsø Kommune facilitated the project in the beginning mostly through the advocacy of the mayor who, when the project began in 1997, worked with other individuals in the community such as Søren Hermansen as well as other government officials like Svend Auken. The Kommune also bought five of the ten offshore wind turbines, effectively making it a shareholder. The involvement of the Samsø municipal government was necessary in the beginning given that competition and the call for proposals came from the Danish Ministry of Energy. It also gave the project legitimacy in that it was officially supported. According to research conducted by Michalena and Angeon (2009), this type of governmental support at the

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local level is necessary for a number of reasons. First, effective communication between local government and central governmental authorities is necessary for the exchange of information. Second, governmental involvement is necessary at times for stimulating social support. And lastly they provide legislative frameworks for implementing renewable energy systems. In Samsø's case the municipality also provided investment capital for the offshore wind turbines.

Several organizations were formed to facilitate the coordination of all activities associated with the Energy Island Project (a timeline of the Energy Island Project and its associated organizations can be found in Appendix C). The Samsø Energy and Environmental Office was opened to give interested parties, such as the farmers, a place where they could gather more information. The office had a single employee to begin with, Søren Hermansen, who acted as an energy consultant and the first point of contact for people seeking to invest in the Energy Island Project. Initially, this office was funded by the Danish Energy Authority and the funding lasted until 2002, after which funding came from projects and consulting work (Samsø Energy Agency, 2012). The Kommune also created a council dedicated to matters relating to energy and the environment which also works closely with the Energy Academy called the Technical and Environmental Committee, which is comprised of five members of the municipal council.

Perhaps the municipal government's most significant contribution to the Energy Island Project was its role in the creation of the Samsø Energy Academy by approving plans for its construction as well as providing most of the funding, which came from the revenue generated by the municipally owned windmills (Samsø Kommune, 15 Feb 2005). The municipality also created a board to oversee the construction of the Energy Academy, the Samsø Energy Agency in 2005 with the purpose of coordinating local initiatives with international initiatives and to form what would become the Samsø Energy Academy. Legally, the Samsø Energy Agency is a

non-profit organization which was formed through the coordinated efforts of the Samsø municipality, the Aarhus county council, the Danish Enterprise and Construction Authority, and under the supervision of the Danish Ministry of Internal Affairs. Two years after the formation of the Samsø Energy Agency, the construction of the Samsø Energy Academy was completed and inaugurated by the mayor in 2007. Incidentally, 2007 also marked the time when the island completed its transition to a renewable energy economy.

Currently, the Samsø Energy Academy acts as a common space for the coordination of renewable energy efforts on the island of Samsø and as a meeting place for those interested in learning about the Energy Island Project. It acts as a facilitator and a custodian for projects currently under way, such as 'Samsø 2.0', an effort to transition the transportation sector away from fossil fuels to renewable forms of transportation such as electric cars and buses, and biodiesel powered ferries. What is interesting is that the Energy Academy is not a part of the municipal government and is what might be best described as a non-profit organization, begun and staffed by island residents.

A second private organization, the Samsø Energy Company, was formed to coordinate all of the individual projects associated with the larger Energy Island Project. The eleven land based wind turbines, the eleven offshore wind turbines, and the four district heating plants would in turn be financed and managed in a number of different ways. The eleven land based turbines would be owned by nine farmers, each owning one turbine, and the remaining two would be owned by multiple citizens through the formation of a guild, with each guild member owning a share. Five of the ten offshore wind turbines would be financed by the island municipal government and managed thorough the formation of Samsø Renewable Energy Ltd. The remaining five offshore turbines were financed through a combination of investments by local

farmers, island citizens, and two professional investors. Two of the five are owned by a farmer's organization, one is owned by a citizen's organization, and the remaining two are owned by two private investment companies (Samsø Energy Agency, 2012).

There also were less official forms of governance the local levels, even more localized than the municipal government. A total of twenty-four villages on the island of Samsø, some with their own village organizations and chairperson, were not official in the sense that they were not able to pass laws or levy taxes, but they were useful in reaching agreements and giving residents a forum for voicing their concerns. These organizations, depending on the level of organizational complexity, may have their own set of goals and bylaws. These goals were at times unique to the needs of the villages themselves but they also at times supported the goals and ideas of the island and of the Energy Academy. They might even be looked at as condensed versions of the island itself. One former village chair said the goals of his village organization included establishing its own wind turbine. Another former chair showed me a set of bylaws which included supporting renewable energy initiatives in the village and on the island. Indeed it was one of these village organizations, along with local village residents and business owners, which was responsible for the completion of one of the four heat plants ahead of schedule (Samsø Energy Agency, 2012).

These village organizations were an integral part of the Energy Island Project and a few villages became part of the initiative to install district heat plants in several locations on the island (Jørgensen et. al. 2007). In the beginning, when public meetings were held explaining the plan, these organizations were points of contact through which information could be shared. Working within this pre-established framework, a network was formed in which community members and leaders could make decisions and reach a consensus about the project.

National level actors and drivers which consisted of public figures and organizations in the Danish Government were influential in the development of the Energy Island Project as well. These actors initiated the competition between islands and provided some of the financial backing for certain phases of the project. The competition acted as a motivational force while the financial assistance acted as a support mechanism. National government involvement also gave the project legitimacy. National support, whether it is financial or political, is essential to any development project because it brings with it another set of capacities which can be added to local capacities (Plummer, 2002).

It should be noted here as well that the Danish government had guidelines and criteria which needed to be followed, but it did not direct how the Energy Island Project was to be implemented. Its involvement was very much like that of the local governments, in that it did not interfere directly in the project or exercise its authority over the municipality and its role has been rather hands off. This is due in part to Danish national renewable energy policy which encourages local ownership as a way of overcoming barriers such as visual pollution and the NIMBY (Not In My Back Yard) attitude of some residents. Research by Meyer (2004) at the Technical University of Denmark confirms this and with regards to Danish national energy policy says that "[t]he high acceptance of wind turbines in Denmark is due to a large extent to the fact that the majority of the Danish turbines are owned by private households based on neighbourhood co-operatives" (p.29). National energy policies elsewhere, such as in Italy, which do not have this quality often face local opposition when project are implemented unilaterally from the top-down (Farinelli, 2004).

During the implementation of the Energy Island Project, the Danish national government acted primarily through what was then the Danish Ministry of Energy and Environment. In 2007,

the organization was split into the Danish Ministry of Climate, Energy, and Building and the Danish Ministry of Environment, with the former as the primary ministry with which the municipality of Samsø and the Energy Academy would interact. When it was the Danish Ministry of Energy and Environment, Svend Auken was the primary intermediary between the national and local levels of involvement. Since it became the Danish Ministry of Climate, Energy, and Building, there have been three ministers in this role, among which was Lykke Friis, who was minister and visited the Energy Academy at the time of the fieldwork for this study. Svend Auken's and Lykke Friis' interactions with local officials and residents were often perceived as personal and positive, indicating strong collaboration between the local and national levels without national involvement being too intrusive.

The Danish national government also affected how renewable energy technologies were perceived in general through policies governing the use of municipal and personal renewable energy systems. The Samsø municipal government, for instance, must reinvest any revenue earned on the windmills it owns back into similar projects. These profits were then used to partially fund the construction of the Energy Academy (Samsø Energy Agency, 2012). Were it not for this particular directive, the funds might have been used for another purpose, making them unavailable for this particular use. Feed-in-tariff policies affected the individual use of renewable energy systems in individual homes by influencing the economic feasibility of such systems. These policies affected the price at which electricity could be sold back to the energy companies and subsequently determined how long it would take to pay off the investment made in a wind turbine or solar panel. If the time frame is too long, individuals are less likely to invest in such systems (Couture and Gagnon, 2010).

There also have been national financing programs which allow individual homeowners to apply for grants if they wish to increase the energy efficiency of their home. One such program provided partial funding if individuals wished to change out oil burning furnaces in their homes for more fuel efficient models which burned wood pellets. The Samsø Energy Academy took advantage of this program and incorporated it into its plans. It provided information to island residents and had a staff member available for free consultations if residents were interested in utilizing the funding (Jørgensen et. al. 2007).

The European Union was the sole actor of any significance involved at the supranational level. The European Union and its member states tend to have favorable political support with regard to renewable energy implementation, and its official goal is to meet 20% of its overall energy demand with renewable energy by 2020 (Johansson and Turkenburg, 2004). Its influence was felt most directly through facilitating and enabling the implementation of the Energy Island Project, mostly through financial assistance. One source of funding was through the European Regional Development Fund from 2000 to 2006 and contributed €400,000 (about $500,000) to the project over this period (European Commission, 2009).

This type of financial support can prove invaluable to development projects when done correctly, and in this particular case it seems to have had the intended effect. Though this type of funding is by no means guaranteed and is soft money, when added to other sources, such as national grant programs, it can have a lasting impact. The European Union also has more policy oriented approaches for promoting the transition to renewable energy among its member states, most notably with Directive 2009/28/EC which "sets a binding national target to be achieved by each Member State until 2020" and requires each member state to develop a National Renewable

Energy Action Plan (Fouquet, In Press). Denmark is currently on target for meeting its action plan, generating over 20% of its electricity with wind energy (Kaygusuz, 2009).

Summary

As complex systems, any development project requires multiple layers of renewable energy development projects are driven and shaped by local and national history, political systems of governance, social systems and interactions, and economic conditions. This was an overview of how these conditions shaped the development of the Energy Island Project and created a context for its implementation that was favorable in many ways. As Delmas and Montes-Sancho (2011) argue, since "natural, social, and political factors have been shown to facilitate the development of renewable policies and also of energy investments, it is important to take them into account in order to isolate the effect of a renewable policy" (p. 2277). Political practices were in place which fostered participation and an interest in local affairs. The island economies were supplemented by the new energy economy and allowed it to be integrated with the existing tourist industry. The right drivers were also in place which provided the necessity and opportunity for making the transition. Finally, the right institutional frameworks and governance mechanisms were in place to provide the necessary support. Each of these elements working together provided the structure necessary for sustainable development to happen.

Chapter Three is an exploration of the social agencies responsible for building capacities within the community. It is this capacity which requires the agency necessary for sustainable development. Local knowledge of the community as respondents understand it is used first to identify local capacities which existed within the community and facilitated the development of the project. The local perceptions of the Energy Island Project and its effects on the island community of Samsø will also be used to explain how the project was received in its initial

stages and how it is viewed today. Lastly, the general concerns of the respondents will be discussed insofar as they relate to opportunities and obstacles for sustainable energy development in the future.

CHAPTER THREE: COMMUNITY DEVELOPMENT OR DEVELOPING
COMMUNITY? BUILDING CAPACITIES FOR SUSTAINABLE ENERGY
DEVELOPMENT

The preceding chapter discussed the political and economic conditions which led to the development of the Energy Island Project, providing its structure. These conditions make up one layer of a complex, multilayered system in which the project began and developed. There were also drivers which gave the project the momentum to move forward. In this chapter, the interviews provide a voice for the community and show what community members believed contributed to the project's success, what the effects of the project were, and imparted what they thought to be important issues to those on the island. Obstacles and opportunities for future development projects also were identified through the course of the interviews. With the context of the Energy Island Project established a discussion of the existing capacities which contributed to the realization of the project can occur. The ways in which social, human, and institutional capacities contributed to the project will be discussed. Local perceptions are useful for identifying these capacities and Chapter Three will discuss these capacities as understood by the locals themselves. Chapter Three will also discuss the possible effects the Energy Island Project has had on the local population.

Local perceptions are considered a form of tacit knowledge, insofar as they are a part of a broader, more complex system of social and political interaction and can be used to inform development processes at least within the context of the island itself (Sayer and Campbell 2004: 30). The interviews conducted with respondents then become a way of exploring what they believe contributed to the success of the Energy Island Project and reveal some of its challenges. They also help identify some of the necessary conditions which must exist in order for a renewable energy development project to be successful. Eliciting these perceptions also provides

an opportunity for finding ways to improve on future development projects. Although this project was a success in that it reached its target of 100% renewable energy production in ten years, there could still be some goals which may not have been reached or ideas which may not have been realized. Seeking the advice or the opinions of the local population in this particular instance draws on the collective experiences of this unique group and could possibly help future development projects move forward and help avoid making the same mistakes twice, whether they occur on Samsø or elsewhere. Assessing these local responses may also contribute to building a rudimentary set of best practices or an operator's manual of sorts for sustainable development projects, especially when wind power is a factor. Identifying what the local perceptions are of success factors in the project is the most relevant place to begin in this case.

As previously mentioned in Chapter One, community capacity occurs on three levels; the individual, the organizational, and in networks of association (Chaskin, Brown, and Venkatesh et al., 2001). The individual level is comprised of leadership, human capital, and the associated skills and knowledge at this level (Thomas and Pawar, 2010). The organizational level consists of community-based groups, organizations, and institutions (Taylor, 2000). The network level consists of interpersonal relationships and informal groups (Luque, Tyson, Lee, et. al, 2010). In the case of the Energy Island Project, each of these levels had the associated forms of capacity necessary for effective overall community capacity building.

The Agency of Individuals in Building Capacity: Leadership and Personal Ownership

The agencies of individuals played a large role in the success of the Energy Island Project according to the respondents. The four agencies which came up repeatedly in the interviews were leadership, public involvement, the engagement of tradespeople, and the opportunity to own

shares in the wind turbines. These agencies are summarized in Table 2, and each will be discussed in the order of their frequency, beginning with leadership.

Table 2: Respondents' Reasons for the Energy Island Project's Success

Reason	# of Responses out of 24[6]
Competent Leadership	14 (58%)
Public Involvement	8 (33%)
Tradespeople Engagement	5 (21%)
Economic Need	4 (17%)

Project leadership in the case of the Energy Island Project was one of the primary themes which repeatedly came up in the course of the interview process. This emphasizes the necessity of leadership within community development as previously discussed and supports the theory. Many of the respondents mentioned the role of leadership in the project, either directly or indirectly, through the course of each personal interview. Respondents would often cite the role of Søren Hermansen as one of the key factors for the project's success and seven respondents (29%) directly linked the project's success with his involvement. Several specifically mentioned it was because he met with village associations, held public meetings, and conducted information sessions that the project was able to begin. Fourteen (58%) of the twenty-four respondents said that without an individual like Søren to sustain the vision of the project it would not have made it through to completion. As one respondent put it he was "the right guy to sell the right idea on the right way" (Respondent 5, 9 June 2011).

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[6] Some respondents gave more than one reason for the project's success. Therefore the total percentage will be greater than 100%.

As mentioned before, an important quality many of the respondents mentioned was that Søren Hermansen had the ability to communicate with a diverse audience and convey technical information about the project in such a way as to make it understandable. One respondent even described him as 'charming' and the fact that he had a sense of humor seemed important to many as well. Others said it was because he was able to relate to whichever audience he was addressing. Placing the success of an entire project on one man can be unfair or even incorrect, but the perception at least was that Søren Hermansen was an integral part of the project.

This ability to communicate effectively with local participants is one of the many aspects which contribute to successful community development, and several individuals cited Søren's ability to communicate effectively with speakers of both dialects on the island as a key point in the acceptance of the project. One respondent said from her experiences in the village meetings about his communication style:

> "…Søren, he knew both dialects, and when he came to public meetings…and people started saying what is all this about and will we ever make any money on that and isn't this a little too 'blowing in the wind'. Then Søren he just changed to the dialect which was, and that just depended on which part of the island we were, and talked to people in their own dialect and with his sense of humor…" (Respondent 19, personal communication, 6 July 2011).

De Vries, Bakker-Pieper, and Oostenveld (2010) have shown that communication styles are indicators of leadership, and Søren may have been exhibiting what they term 'Charismatic Leadership', a leadership style which is "characterized by an assured, supportive, argumentative, precise, and verbally non-aggressive communication style". Søren Hermansen's communication style was viewed favorably by all respondents who referenced his involvement with the Energy Island Project. This perception is pertinent as well, because convincing people of a project's merits early on and gaining acceptance for it in the beginning may help avoid resistance to it later or, or prevent it from failing even before it has begun.

Having the ability to speak both dialects prevented the alienation of individuals from either part of the island and allowed for a full range of participation. This type of inclusion is important in the beginning stages of any type of community development and serves to illustrate a point made by Quick and Feldman. They argue that the common use of the term 'inclusion' in planning usually means the involvement of socioeconomically diverse individuals. Their definition of inclusion, which may be more applicable in this case, is the building of connections between people over common issues in a given period of time (Quick and Feldman 2011: 274-75). Søren Hermansen was also born on the island and was thus considered a Samsinger. This gave him certain legitimacy with some on the island, and because he was from the island he was not viewed as an outside actor coming to shape events on the island. He also came from a family of farmers, which lent him credibility with the farming population on Samsø, an important demographic which controlled a large amount of capital on the island and held a certain amount of political power due to historical circumstances.

Many of the qualities Mr. Hermansen possessed are often cited as necessary skills for effective leadership in community development projects. His ability to communicate with those in his community, to distill and convey complex technical information, and showing respect for the thoughts and opinions of those in his audience are among those qualities necessary for innovative practices such as sustainable development to occur. Bossnik (2007) says that charismatic leadership is actually one of the four innovative leadership styles, the others being instrumental, strategic, and interactive, and each of these styles has their own strengths. Where he says that charismatic leadership is 'innovation personified', Instrumental leadership guides the innovation process by establishing standards, setting goals, and assigning responsibilities. Strategic leadership uses the power of hierarchical structures to achieve sustainable innovation,

and interactive leadership encourages and fosters leadership skills in those being led. While Bossnik examines these leadership styles separately in his study, it may be that each of these styles were present in some fashion in the Energy Island Project.

Other types of community leadership, though not as conventional but just as important, were mentioned as well. Five (21%) respondents said that a key factor was involving island tradespeople in the project from the beginning. Plumbers, electricians, and other tradespeople appeared to be key players in the promotion of renewable energy technologies during the course of the project because these were the individuals responsible for laying the necessary infrastructure vital to the project. In most instances they were also the first points of contact for consumers seeking to install renewable energy systems in their homes. Educating these individuals was seen by several as a necessary process. These tradespeople were also, in many cases, respected members of the community and leaders in an unofficial capacity, though some individuals interviewed were official leaders as well, as was previously mentioned with the multiple roles many island residents filled.

Capacities at a human level were also present. Those that lived on the island also expressed a close connection with the island, even those who moved to it only very recently prior to the field study. It may even be called a sense of ownership and responsibility. Quantifying the feelings of an individual is difficult, but there were clues in the language used in the interview which indicated string feelings about living and working on the island. Newcomers especially had similar ways of talking about the island and their reasons for moving to it. Six individuals said it was because they wanted a better life and that living on the island allowed them to live in an environment where they could afford a home, find work, or was good for raising children.

Two said they also simply wished to be closer to nature and the island provided good opportunities for outdoor activities.

Three of my informants told me that when they first moved to the island, they were contacted by some of the residents and welcomed to the island. This was done, in part at least, from actual good will but also because it was a way of assessing what the newcomer's skills and talents might be. If the newcomer had been a teacher then there would probably be a school on the island from which the newcomer might be solicited help. Or if they had been an engineer of some type then they might be a technical advisor for one of the local village councils. One of my informants confirmed this by telling me:

> "On this little island you talk with each other and you hear something about this person and this person, and I hope in a way it is still a bit like this, so we can welcome the new [people] who come to Samsø so we can phone them and welcome them, and say 'We need you because you can do something here'. We can use that [skill and knowledge]." (Respondent 6, personal communication, 15 June 2011)

This ability to recognize the value of a new addition to the community may be one of the strengths of the community which allowed it to be successful, at least when moving forward on the Energy Island Project. The social atmosphere of the island seemed to be that each member of the community was valuable in some way. In a sense, the community was building its own capacity, rather than having it built from the outside by an external actor.

Direct ownership mechanisms and the opportunity to invest in the project were also cited as one of the many reasons island residents supported the project. Four of those interviewed (17%) owned shares in at least one of the wind turbines and considered it a good investment, and indicated this as one of the reasons for their support. One respondent even referred to the shares as "the best retirement investment that I have ever done" (Respondent 10, 29 June 2011). The

opportunity to buy into the project and the fact that the turbines would be owned by the residents and municipality on the island generated positive attitudes towards the project as a whole.

Institutionalization of Capacity Building: Support Networks for Positive Change

Institutional interactions form their own complex networks and build networks which support the realization of projects such as the Energy Island Project. The municipal council's involvement was one factor which was necessary in bringing about the realization of the Energy Island Project. What is interesting is though the Samsø Energy Agency and Energy Academy were fostered in some way by the municipality, they are independent organizations. There are members of the municipal government on some boards associated with these organizations, but they are not officially under the municipality's control, nor does it seem as though they are expected to follow the municipality's direction. Members of the municipal council who were interviewed indicated that the Energy Academy was allowed to work autonomously and the organizations were seldom at odds with one another. As one respondent on the council put it:

> "The Energy Academy is really a more private institute, so our role as a local council hasn't really been that large, I mean of course we support it, but it's not part of our, it's not a department of the local administration, and actually if you look at our administration, our technical department, I think there are three people working [there], and there are ten people working here, so as a local administration we wouldn't have been able to implement the process, to implement the project…And I really haven't found any kinds of conflicts..." (Respondent 6, personal communication, 14 June 2011).

Not only was the Energy Academy allowed to operate without much interference from the municipal council, it was seen as an asset for achieving many of the goal mutually shared by the council and the Energy Academy because of staff experience and expertise. According to one council member the municipal council "very much rel[ies] on them because, for instance, we have to have a new [contract] with the buses on Samsø, and we would like it to be biogas or

electric buses if that was possible. But we haven't that much experience in the Kommune…so we are dependent on the Energy Academy" (Respondent 7, personal communication, 15 June 2011). Overall there was an amicable relationship between the municipal council and the Energy Academy, each providing services which the other lacked. The municipal council could set policy which facilitated renewable energy projects while the Energy Academy had the time and knowledge to devote to such projects.

The Energy Academy, as was previously mentioned, worked in tandem with the island's municipal government in what was essentially a public-private partnership to implement renewable energy projects in the community of Samsø. Dessi and Floris (2009) say that public-private partnerships such as this are a new model of governance, which they refer to as "Partnership Governance", that can prove to be especially effective in sustainable development initiatives because it manages the relationships between a large number of stakeholders. This type of governance also includes the opinions, skills, and resources of these stakeholders in the development process thus providing the institutional and civic support necessary to achieve initiatives such as the Energy Island Project.

Public-private partnership models in general have seen success elsewhere and prove to be a useful model in compensating for the shortcomings of one another. Many development organizations find this type of model useful and even necessary in some cases, such as The United Nations Development Programme, which promotes the use of public-private partnerships in energy development scenarios saying: "Public-private partnerships between government (through regulatory, legislative and pricing mechanisms) and private sector (through investments, technology and technical assistance) contribute to successful energy interventions

as the involvement of just one side is not sufficient to successfully undertake energy activities"
(UNDP, 2004).

The partnership between the Energy Academy and the Samsø Kommune is a perfect
example of a successful public-private partnership in that the Energy Academy is able to operate
much more quickly than the municipality, which must deal with bureaucratic constraints, and is
able to devote the time necessary to finding sources of funding. The municipality, on the other
hand, is able to create and shape policy in a way the Energy Academy is not. Those who worked
in each of these organizations were aware of the benefits of working together, as one of the
municipal council members described:

> "…you have to help each other to get some money out of different funds and
> different places like that. So if we worked apart we won't achieve the same thing.
> The Academy does not need our 'yes', but of course if we work together it helps a
> lot." (Respondent 12, personal communication 27 June 2011).

Another public-private partnership could be seen in the cooperation between the
municipality and village organizations. Some were more involved in the public discourse of the
project than others, but they were still involved in what amounts to a sophisticated network of
island leadership. As previously mentioned, these village organizations were comprised of an
elected chairperson and an elected board which deliberated on issues specific to their village
community. Some of these issues were unique only to the village while others might be of
interest to the island in general.

These organizations would meet with island political leaders at least on an annual basis
and present their concerns and attempt to reach resolutions of some kind. Many of the concerns
were not very different from what communities elsewhere might have; the conditions of
community roads, village economic conditions, or public transportation options to name a few.
Others were specific to the island; declining population, the status of the local hospital, and the

possibility of a bridge connection Samsø to the mainland, all of which will be discussed further later in this chapter.

The existence of the village organizations became a focal point where the different levels of leadership involved in the project could meet and discuss the project. They became a point of contact for Søren Hermansen who could work within the existing framework of these organizations when promoting the Energy Island Project. The village organizational board, local politician, interested members of the public, and Hermansen himself could meet and discuss the project. Sometimes the project was just one topic among many which were discussed at these meetings and came only at the very end of a normal agenda.

A respondent who had been a former village chair even gave an example of how these village organizations led to some parts of the project occurring ahead of schedule. The solar and wood chip heat plant in northern Samsø was planned to supply district heating to the villages of Nordby and Marup. The village organization along with potential investors took the initiative and worked with the company NRGi to get the plant up and running without prompting from the municipality or the Samsø Energy Organization. Completed in 2002, this became one of the first parts of the project to come online.

The Role of Networks, Trust, and Community Involvement in Building Capacity on a Social Level

The social level of capacity building is perhaps the most amorphous of the three levels, and as the study progressed it became apparent that people of the island identified themselves and others in nuanced, but significant ways. These divisions were both spatial and temporal. There were those which were from and identified with the northern part of the island or the southern part of the island. In addition to this one was also either a newcomer or a Samsinger.

Samsingers were individuals who were born on the island and had family who had been there for a generation or more. Newcomers were individuals who moved to the island, whether they had been there for a month or ten years. Seven of those interviewed (29%) could be considered Samsinger while seventeen were newcomers. These differences did not divide people in the sense that they did not associate with one another, but rather they were simply nuanced ways of identifying oneself and others which did come up from time to time in the discourse of the Energy Island Project. These characteristics should not be over emphasized nor should they be dismissed. Sensitivity to these kinds of social identifications can be important to development projects, especially in beginning stages of public discourse, because initial perceptions and feelings about a project can shape the way it unfolds by feeding into later processes (Walker, Devine-Wright, Barnett, et. al., 2011: 8).

Whether one was considered a Samsinger, a newcomer, or lived in the north or the south there were some shared qualities among island residents. There were indicators of trust among residents, some were physical, but mostly it was experienced by those living on the island. During the course of the study five qualities emerged which may have been key factors in the success of the project: trust between community members, strong social networks, a sense of belonging, investment in island affairs, and entrepreneurial attitudes. Of the first quality, informants used the phrase "We don't lock our doors here" several times (Respondent 17, personal communication, 1 July 2011). Criminal activity on the island, it was also said, was so low that there was only a need for one police officer. People left keys in their vehicles, and when asked about this, my informants said that people simply knew one another on the island well enough that if someone were to steal it they would know who it was. Evidently this had happened once or twice and the perpetrator was stopped at the ferry, the only means on or off the

island. The farmers also employed a method of selling produce which indicated a high level of trust and honesty in the community. Produce would be left on stands or shelves for people to buy without supervision, and people were simply expected to pay for what they took.

The importance of strong social networks became apparent through the interview process and one informant said this was due in part to the nature of living on an island: "When you live on a little island you need to have a good relationship with your neighbor…and other people on the island." (Respondent 17, personal communication, 1 July 2011). It also became apparent that individuals not only knew the same people but at times had different roles on the island and participated in numerous organizations on the island. When this came up in one of the interviews, an example was given by one informant who was a Samsinger:

> "Sometimes you sit here in the kitchen drinking coffee because you are friends, the next time you meet you sit in a bank because you want to borrow money, and sometimes it's the same person." (Respondent 15, personal communication, 30 June 2011).

The reasons for such strong social networks may have been a necessary living strategy for islanders in a place which experienced its peak activity during the summer months, both economically and agriculturally. The winter months were said to be a period of down time when businesses closed early and tourism waned. These were the months when social activities picked up and gatherings occurred in people's homes. The social networks of the islanders may also have been strengthened and reinforced by the municipality itself. Every three months the municipal government holds a meeting welcoming new residents to the island and to give them a chance to meet one another. The mayor is present at these meetings to answer questions and the newly arrived residents engage in activities which encourage social exchange. As scholars such as Alison Gilchrist (2000) explain, these types of social networks are vital for any community development efforts to achieve any lasting and meaningful effects.

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Community involvement in the development process was an especially important success factor to many of the individuals interviewed. Having a say and the opportunity to become involved in the project through public meetings and partial or total turbine ownership was, for these individuals, what made the project successful and unique. Eight individuals said that, for them, meaningful public engagement was what allowed the project to keep moving forward. This involvement, according to the respondents, took several forms and each allowed for a different type of public engagement, from the planning process to mechanisms for direct ownership. Between February 2002 and December 2006, there were sixteen public meetings were held which included agenda items on the Energy Island Project (Samsø Kommune, 2012). There were meetings before this period, however the records were unavailable.

The importance of community involvement and the public outreach displayed by Søren Hermansen were typically mentioned together in interviews. This serves once more to illustrate the importance of competent leadership and its connection to meaningful public engagement. This public input, it seems, was not just about giving feedback on the proposed plan but also included involvement in the planning process itself. Determining sites for the land based turbines was part of this public engagement and agreements on turbine locations had to be reached before the project moved forward. According to one respondent who was on the municipal council, this process took the better part of an entire winter (Respondent 9, 17 June 2011). Public outreach also included notices and articles in the local newspaper, the *Samsø Posten*, and notices from the municipal council. Two respondents said they learned of the Energy Island Project or kept up with the developments in the process this way.

Effects of the Energy Island Project and the Energy Academy

Throughout the interviews with island residents, community leaders, and stakeholders several themes emerge with respect to the thoughts and feelings about the Energy Island Project. Some of these themes were discussed briefly in Chapter Two, such as the possible economic prospects of the project, but this will be a more thorough look at some of the more salient aspects of local perceptions. These perceptions add an additional layer to an already complex scenario, but they can also give clues to what exactly transpired over the course of the development of the Energy Island Project and how it affected island residents.

It is important to understand the local perceptions of development projects such as the Energy Island Project because this type of feedback can be informative as to how the project was received in the beginning, what changes might have occurred in local views on renewable energy technologies, and how these views might be related to local knowledge of renewable energy technologies and projects. Even though this is a particular instance of a successful renewable energy initiative, and these perceptions are being assessed after project completion, there may still be far reaching implications in that this case can provide us with a cross section, from beginning to end, of what a successful renewable energy development project looks like.

The impact of local perceptions on renewable energy projects has been illustrated by Improta and Pinheiro (2011) in their study on a wind energy project in the village of Zumbi, Brazil. In this study the authors surveyed the adults and children of the community in order to assess their viewpoints on wind energy. Both the adults and children positively viewed wind energy, especially with respect to the visual aspect of the wind farm and wind turbines. They concluded that positive public perception of the wind energy project contributed to its overall success (Improta and Pinheiro 2011: 225). West, Bailey, and Winter (2010) identify public

opposition to renewable energy projects as one of the primary obstacles in implementing renewable energy projects. They point to a need for more governmental policies, especially within Europe, which are aimed at increasing awareness and public support for renewable energy development. The salience of just how necessary positive public perception of renewable energy initiatives becomes apparent if we look further into the case of the Energy Island Project.

There were some mixed feelings about the Energy Academy in some of the responses given by participants as well. Some felt they were no longer being included in what was occurring in the Energy Academy, and as one respondent put it:

> "…it's very invisible and it's just a place down there, a very nice house and it seems very empty when you look at it and maybe there's a lot of things happening but we don't feel a part of it. It feels like a part of something else. Not quite us, in the start it was us, while things were being built…five years ago, but we can't see anything happening anymore" (Respondent 20, personal communication, 5 July 2011).

Four other respondents also felt that there was a disconnect between the Energy Academy and the rest of the island.

Judging by the local perceptions of the Energy Academy, there seemed to be both benefits and drawbacks from the existence of such an organization. In the minds of the local population, the Energy Academy may have increased to the use of residential renewable energy technologies and produced a greater awareness of such technologies. On the other hand, the Energy Academy's presence may have created a sense among the island's population that they had less of a responsibility to find renewable energy solutions themselves, as that responsibility now fell to the Energy Academy.

Most of the individuals interviewed generally had a positive view of renewable energy technologies and felt that the wind turbines were a positive asset to the community. Many of the responses indicated that the Energy Island Project may have even led to a direct increase in

renewable energy awareness and use in individual homes. Of the twenty four respondents, nine (38%) said they believed the Energy Academy and the Energy Island Project made island inhabitants more aware of renewable energy technology and they reported seeing an increase in home renewable energy use or have spoken to individuals planning to install renewable energy systems such as solar panels or home wind turbines. Three (13%) said that they personally have installed more individual renewable energy systems in their homes or systems which were more energy efficient. Two (8%) indicated they were interested in investing in personal renewable energy systems and had plans to do so and a village chairperson said their village organization was exploring the possibility of a village wind turbine. One individual said they and their spouse had invested in an individual geothermal heating system.

There are several possibilities for this increased awareness, one of which is the visibility of the Energy Academy itself and the publicity of the Energy Island. For some the Energy Island Project became a part of the island's identity which in turn affected some of the personal lifestyle choices of individuals because of their connection to the island. As one respondent put it:

> "…it's very important to us that we all think now that we are living on this Energy Island, that means a lot to us, and it's part of our image and that's also important to us to be a part of it, and that's fascinating to see how people living on this island have been welcoming the project and said 'Ok, that means also something to me in person, so I want to take these steps also to be a part of it'" (Respondent 6, personal communication, 15 July 2011).

Another reason for increased awareness and home use may have been that local plumbers and electricians were the first points of contact if residents were interested in installing renewable energy systems in their homes. These tradespeople were trained and educated in the technical aspects of home renewable energy systems and were able to provide information to residents wishing to install such systems. They could then go directly to the plumber or electrician in question to install solar water heating systems, photovoltaic solar panels, or any

other conventionally available systems. These tradespeople were also intermediaries between the Energy Academy and the consumers if the consumer wished to take advantage of subsidies or tax incentives meant to facilitate the installation of alternative energy systems. For example, the Danish government provided grants to help cover some of the costs for exchanging inefficient oil heating systems for wood pellet stoves. This is achieved partly through the Danish Energy Service which also operates out of the Energy Academy through a representative.

Views on Future Projects

Looking forward, a number of conclusions can be drawn about future energy initiatives based on the interviews. Samsø 2.0 is the Energy Academy's new ten year which will address some of the shortcomings in the original ten year plan. Island transportation, both the publicly run buses as well as privately owned vehicles, was meant to transition over to renewable forms of fuel along with other phases of the Energy Island Project. The ferries to the island, public buses, and municipal vehicles were initially going to run on biogas or battery power, but the implementation only got as far as a few batter powered cars which were unreliable.

Most of the respondents were aware of the new energy plan, and many felt that it was a good way to keep the island moving forward. They were optimistic about the plan, but realistic about the difficulties that would likely be encountered. While the Energy Island Project was seen mostly as a positive endeavor, it did not require lifestyle changes, even if one were to have an oil heater replaced with a wood pellet heater. Transportation, on the other hand, was viewed as a more significant and difficult transition because it would involve personal sacrifices and lifestyle changes on the part of vehicle owners. Expense was seen as another obstacle due to the relatively high prices of electric vehicles when compared to a similar gasoline powered car.

The ferries which connect the island to the mainland also posed a challenge in the minds of those interviewed. These ferried consume a large amount of fossil fuel energy in the form of diesel, and there are few alternatives to the fuel. Biodiesel is one possible alternative, but there are not only technological berries to overcome, there are policy barrier as we. The ferries operate under a contract with the municipality and changes can only be made when the contract expires and terms are renegotiated.

Possible Obstacles for Future Development Projects

While the questions in the interview focused primarily on the Energy Island Project and the Energy Academy, other topics continually emerged with little to no prompting. Because of the frequency with which these themes occurred they warrant a discussion as to how they might relate specifically to future projects on Samsø, and how they might be used to illustrate the effects of prevailing issues in other development scenarios. Recognizing such issues can aid project planners in identifying obstacles or opportunities for future community development projects. Some topics were viewed similarly by the respondents while others were not but all were alike in that they could potentially alter island development. The most common issues which arose were the island's declining population, the possibility of a bridge to the mainland, and access to healthcare. Each will be discussed in order of the frequency it occurred.

Samsø, like other rural communities, has been experiencing a population decline in the past few decades. In 2003 there were 4,197 people on the island, and as of the 2011 island census there were 3,885, a loss of 312 people in less than ten years (Municipality Facts, 2012b; Jørgensen et. al. 2007). For an island with such a small population, a loss of three hundred people is significant and palpable to the residents of Samsø. Thirteen (54%) of the respondents said they were concerned about the declining population and thought it was a pressing issue

which needed to be addressed. They saw three primary reasons for the decline: very few opportunities for employment, the lack of a direct ferry to Aarhus, the closest large city, and the need for children to move to the mainland if they wished to pursue an education past the tenth grade. Each of these reasons was connected in some way to the others in some way and did not act in isolation.

The necessity to make one's own way on the island and find creative, entrepreneurial methods of making a living may also be contributing to the decline of the island's population. Five (38%) of the thirteen respondents who talked about population decline attributed it in part to the lack of jobs on the island. One respondent was personally affected by the loss of a job, echoing what the others were saying:

> "I'll stay here for as long as I can but since I lost my job I can't stay, I need to find a new one… I must say that I don't think that I can get a job on Samsø which will sort of live up to my ideas of the type of job I would like." (Respondent 14, personal communication, 30 June 2011).

Some topics were seen as both an obstacle and an opportunity by respondents. There was talk about the possibility of a bridge which would connect Jutland with Zealand and this was seen as an opportunity by some and a threat to the island's way of life by others. Those who viewed the bridge favorably said it would increase island population, create opportunities for work by allowing people to work in cities such as Aarhus, the closest major city, allow families to stay together, and increase property value. Those who were opposed to it said it would diminish the quiet, natural atmosphere present on the island and ruin those qualities associated with living in a rural area such as intimacy with ones neighbors and low crime rates.

The decision to build the bridge, however, would be a decision left to the Danish national government, giving the islanders little say in what would happen. Still, the possibility of a bridge is one the minds of the people and could distract attention away from future possibilities. On the

other hand, there may be support for new biofuel ferries from those who oppose the bridge, especially if plans for new biofuel run ferries includes the possibility of a direct connection to Aarhus.

The island has experienced a reduction in local medical care in recent years, with major medical services moving to Aarhus. Any individual requiring major care or surgery is flown out by helicopter in emergency situations, and individuals requiring specialized health care must travel to the mainland. This has become a topic of discussion in many of the local village organizations, as there are a large number of retirees living on the island. If health care needs become severe enough individuals may find it necessary to move closer to an area with available health care such as Aarhus.

Summary

An assessment of the local capacities through participatory methods of evaluation which were present on Samsø illustrates the value of local perceptions and knowledge in sustainable energy development. Local capacities could be identified in this way much more easily than if outside actors were to make an attempt at doing so. Furthermore, these capacities were built from the inside out, and without the assistance of an outside organization save for some financial capacity assistance. In the case of the Energy Island Project, most of the capacities were present which scholars argue are necessary for successful development to occur. These capacities were supported by those conditions and frameworks presented in Chapter Two.

What seemed most interesting about the emergent themes in the interviews was the level of awareness and cognizance of the development processes involved with the Energy Island Project. Participants did not outright call the Energy Island Project a development project, nor did they call themselves a developing community. But they did express a high level of self-

reflection on what exactly had happened and how it happened, referring to many of the aspects deemed necessary by the development community as important and vital for successful development. Chapter Four will review these findings and assess whether the research questions posed in Chapter One have been answered satisfactorily.

CHAPTER FOUR: SUMMARY AND CONCLUSION

This project has illustrated that energy drives development, regardless of whether it happens at the local, regional, national, or international level, but it has also shown that there are necessary social factors which accompany it in development initiatives. Sustainable development, therefore, is driven by renewable and sustainable forms of energy but it is sustained by the social capacities of communities. This type of energy development, aside from being beneficial for the environment, can also benefit those in the poorest of countries by offering alternatives to centralized, fossil fuel based forms of energy which have proven to be both expensive and unreliable. Understanding the necessary and sufficient conditions for sustainable energy development in Samsø and the steps in the overall process of achieving successful outcomes are what this project has achieved in part.

Necessity and sufficiency depends a great deal on the desired outcomes of a sustainable development project. With the Energy Island Project, the goal was to meet the energy needs of the community through the use of renewable energy sources. There were at least three conditions which were necessary for making this happen. First, there needed to be enough energy from renewable sources to meet the needs of the local population. Second, there needed to be sufficient financial backing to pay for the technology which would supply the energy. And lastly, there needed to be the right combination of social capacities within the community to facilitate the process. The first two requirements are easily quantifiable. Ten land based wind turbines and three district heat plants were enough to meet the community's needs, supplemented with individual heaters for those not able to tie into the district systems and eleven offshore wind turbines to offset automotive carbon emissions. It is the last requirement, the social capacities necessary to make the project happen, that this study examined.

Several forces acting somewhat independently, but occurring simultaneously, came together in a manner which allowed the switch to sustainable energy systems to occur on Samsø. The loss of one of the islands largest employers together with the competition between islands provided the opportunity for initiating change. Had this stressor not been present, the necessary motivation may not have been present for the project to occur. However, the opportunity for investment is always a benefit for a community as long as the return on that investment has a high chance of success. In the case of Samsø, it was policy which made the investment worthwhile since the Danish government guaranteed a certain price for any energy sold back to the grid (Meyer, 2004). Enough individuals in the community saw this opportunity and took the lead in generating support for the Energy Island Project. Through a system which provided political and financial support, citizens were able to muster their own community capacities into action for meaningful change.

The historical and cultural context in Denmark and on the island fostered an environment of cooperation and collaboration, thus the residents of Samsø were already familiar with and comfortable with participating in such a project. That does not necessarily mean that for any sustainable energy project or any development project in general to be successful it must occur in a society similar to that of Denmark. What it does indicate is that assessing cultural and historical frameworks of the community where a project is to occur can reveal possibilities for capacity building within existing frameworks. An examination of the Energy Island Project revealed these community capacities as they relate to the project, and are summarized in Figure 2.

Figure 2: Necessary and Sufficient Social Capacities
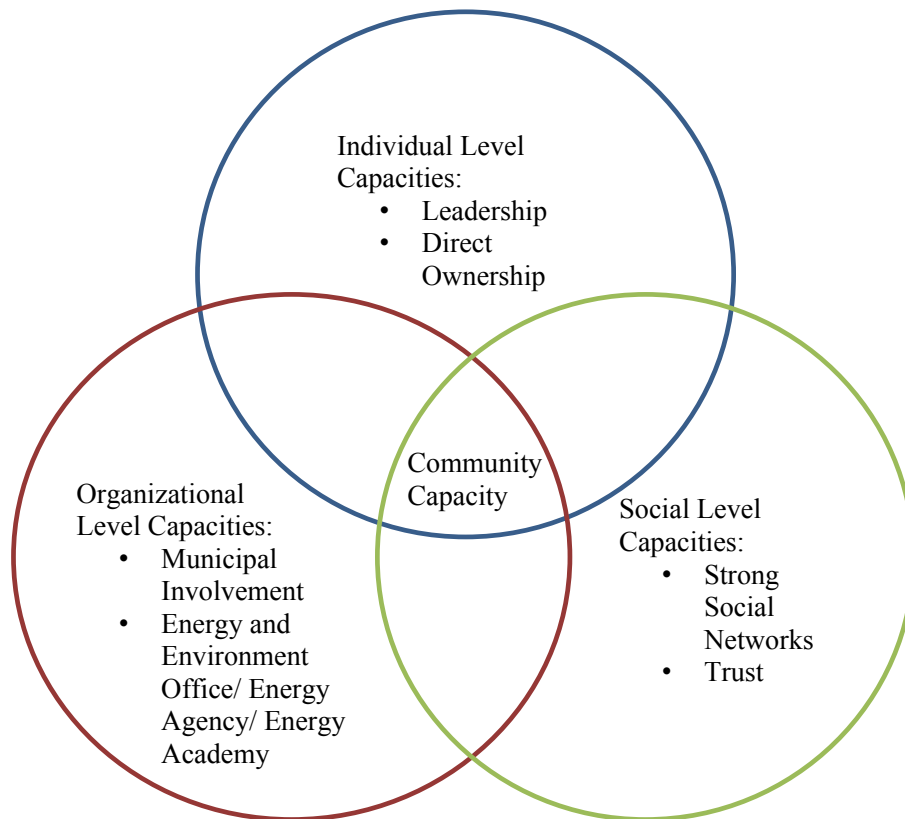
It may seem obvious that any development project will have an effective leader guiding it through its implementation. In practice, however, it can be difficult finding the right person for a given development initiative. Leadership styles vary and what works for one project may not work for another due to variations in preexisting conditions. As Robinson Jr. and Green (2011) point out, "[w]hat is often overlooked is the importance of multiple levels of social phenomena involved in leadership development, including the social, psychological and behavior characteristics of the individual" (p.142). In the case of the Energy Island Project, individuals interested in promoting the idea knew they had to find a leader who could connect with a community that was diverse despite its small size and well-connected citizenry. Søren

Hermansen, the Energy Academy director, had the right blend of personality characteristics that made him right for this particular task.

When identifying competent leaders, the context and environment in which the project occurs must also be taken into account because leadership styles interact differently from scenario. Each development project, because it can be thought of as a system has different constituent parts which make up the whole, and leadership can be seen a vital cog which may work effectively in one system, but not as well in another. Each system needs a leader which can act as "a champion, someone who is strategically placed within an organization to advocate effectively for the program" if it is to be truly sustainable (Scheirer, 2005: 340). These individuals act as intermediaries between organizations and individuals, promote the agendas of their community by involving multiple stakeholders, and negotiate the social and political networks of their community (Luke, 1998). In the absence of competent leadership, sustainability initiatives can falter and fail.

Leadership in less obvious forms contributed to the successful development of the Energy Island Project, such as the village chairs and respected local tradespeople. These were the individuals who were in many cases the first points of contact for local residents wishing to know more about the Energy Island Project and its purposes. The municipality and the Energy Academy would often coordinate with these individuals throughout the project as it developed in order to build support for it. The collaboration between these two types of leadership is an essential part of building communication and support networks for the project. This strengthened the community's 'civic connections', one of three parts which make up 'civic capacity' (Sun and Anderson, In Press). The other two parts of civic capacity, 'civic drive' and 'civic pragmatism', were strengthened as well by these community leaders in that they had the desire to be involved

and affect social change, a quality of 'civic drive', and they were able to translate social opportunities into physical reality, a quality of 'civic pragmatism'.

The institutional relationships, though not as apparent as the other factors in the beginning, were significant drivers especially in the beginning of the project and when the Energy Academy came into existence. To begin with, the Danish Ministry of Energy saw fit to hold the competition which would eventually name Samsø the Energy Island. This was the initiating force behind the project. The municipal council and other individuals on the island interested in the competition took the initiative to enter the competition. There may have also been other political forces at play with the interpersonal relationships between energy Minister Svend Auken and some individuals on the island.

Community involvement, both according to the literature consulted and the residents themselves, proved to be another key component without which the project would not have advanced. Public involvement has become one of the tenets in development and planning in recent years, and it is said to be a key feature of developing successful planning strategies (Kelly, 2010). It certainly was the case in the implementation of the Energy Island Project because many of the local citizens became investors in the project and provided much of the financial capital necessary to purchase the windmills. Encouraging public feedback also prevented repercussions later on in the project's life by allowing concerns to come forth early on and not in the midst of it, which could have held up development. Meaningful public involvement is one of the most effective ways to generate public support and interest for a project which might otherwise encounter significant resistance (Upham and Shackley, 2006) if for nothing else than local populations feeling that their territory is being encroached upon by outside actors. In other words, there needs to be a symbiotic relationship between a leader and those being led.

The existing social networks and individual capacities also proved to be instrumental in the implementation of the Energy Island Project. Key individuals in the community were known and their opinions were respected. Community outreach and involvement was facilitated by social frameworks which were already in place. Trust could be established easily and skills could be identified because it was already a part of the local knowledge. There was a type of self-consciousness in the community that created a suitable environment for sustainable development. As it was put by one respondent:

> "…what is special here is that everyone here has an opinion of what it means to be here, that it's an island. So this reflection, and if you are together with people here whether they have been here for a week or a lifetime, you now and then talk about what does it mean for Samsø that there are now 200 houses for sale. What does it mean that there is a crisis in this and that, how does it affect us here. I think that is one of the characteristics is this reflection" (Respondent 14, June 30, 2011).

There was a continuous evaluation of what it meant to be on the island which may cause a type of hyperawareness within the community. This type of collective identity and awareness is, according to Professor Roderick M. Kramer (2006) at the Stanford Business School, what allows social capital to be built (239). Without this social capital, it would not have been possible to follow through with the Energy Island Project.

There were two generally positive effects of the Energy Island Project aside from the goal of one hundred percent renewable energy use. The first relates to the economic sphere of sustainability in that it has become an economic base for the community by brining money into the community when it is sold back to the grid (Herzog, Lipman, and Edwards, 2001). The positive economic effects of the Energy Island Project could then be said to be twofold; job creation and income generation. This provided the financial incentive which made the project attractive to investors and community members.

Another positive effect was the increase in renewable energy awareness and individual use of renewable energy technologies. This is the type of lasting effect that sustainable projects hope to achieve and the fact that there was a noticeable increase in either use or awareness is promising. On the other hand, having an organization such as the Energy Academy may inadvertently shift the perceived responsibility of renewable energy use onto a single entity.

Implications for Energy Development Projects in Other Communities

A case study of the Energy Island Project has shown that a combination of factors worked together in unison to achieve the desired outcome of a sustainable energy system. Actors at the local, national, and supranational levels contributed their own capacities to create the necessary and sufficient conditions to make the project a success. Obstacles were avoided early in the project's life by encouraging active citizen participation and by having a concrete plan in place which was realistic. But most importantly, local organizations, leaders, and citizens came together in creating a framework which supported the project and built social capacity for the project, especially with respect to human and social capital. An examination of the Energy Island Project as it occurred on the island of Samsø reveals that a multiplicity of factors were present which led to its success. In short a combination of favorable historical and cultural context, economic drivers, energy policy, inter-organizational cooperation, and meaningful public involvement created a system which allowed the Energy Island Project to be successful. These factors make up the necessary and sufficient conditions, each with their own types of capital which contributed to increase the capacity of the community.

One might assume from this particular case study that a community might need to be wealthy and democratic to make a complete transition to sustainable energy systems. This is a

possibility which cannot be discounted altogether. However, there is research which points to the possibility for developing countries to make the transition as well in spite of this apparent hurdle. For instance, research by Geoffrey J. Stapleton of Global Sustainable Energy Solutions Ltd. (2009) states that capacity building is key for any renewable energy development to occur in developing countries and goes on to say, "Though there are many key factors required to ensure RE technologies are successfully implemented, one common key requirement is the need for effective consultation and communication with the respective stakeholders" (601). When looking at the elements which were present in the success of the Energy Island Project it becomes clear that they could potentially be found in other communities. The strong community ties which were present in the community did indeed foster effective communication. It may be possible too that not every element need be present for a project to be a success, only most of them. Indeed, the most important elements in the Energy Island Project were not financial but were instead individual, organizational, and associational.

Another fact which must be considered is that this renewable energy development project occurred in what is considered a rural region of Denmark. This bodes well for many nations of the developing world which still have a majority of their populations in rural areas themselves (Maiga, Chen, and Wang et. al., 2008). As was mentioned in the beginning of this study, renewable energy technology can be useful for supplying populations in rural areas with the electricity they require, and many projects have met with success in these areas (Guring, Ghimeray, and Hassan, 2012). The challenge remains now to achieve this type of transition on a national scale. This points the way for future studies of this nature and there are several possibilities which are open to further inquiry. It would be useful to conduct a case study on Samsø or another similar energy region and compare it to a case which was not successful. There

is also the opportunity to study the two remaining pillars of sustainability with respect to energy regions because this study examined one aspect of the necessary and sufficient conditions for sustainable energy development, the social aspect. Ecological and economic conditions necessary for sustainable energy development in energy regions have yet to be examined in a case study.

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APPENDIX A: Map of Samsø, Denmark with Renewable Energy Installations

APPENDIX B: Local Government Structure

Administrative Structure

```
                    ┌──────────────┐
                    │    Mayor     │
                    └──────┬───────┘
                           │
┌──────────────┐   ┌──────────────┐      ╭──────────────╮
│ Commerce and │───│  Municipal   │──────│   Internal   │
│   Tourism    │   │   Director   │      │   Services   │
└──────────────┘   └──────┬───────┘      ╰──────────────╯
                          │
                   ┌──────────────┐
                   │  Manager of  │
                   │  Operations  │
                   └──────┬───────┘
                          │
   ┌──────────────┐       │       ┌───────────────────────────┐
   │   Daycare    │───────┤       │ Health and Family Division/│
   └──────────────┘       │       │ Health Care/ Children and  │
   ┌──────────────┐       │       │ Families                   │
   │  Municipal   │───────┤       └───────────────────────────┘
   │Nursery/Kind. │       │
   └──────────────┘       │       ┌──────────────┐
   ┌──────────────┐       │       │   Library    │
   │   Private    │───────┤       └──────────────┘
   │ Kindergarten │       │
   └──────────────┘       │       ┌──────────────┐
   ┌──────────────┐       │       │Nature Division│
   │  School and  │───────┤       └──────────────┘
   │Afterschool C.│       │
   └──────────────┘       │       ┌──────────────┐
   ┌──────────────┐       │       │  Technical   │
   │  Job Center  │───────┤       │  Department  │
   └──────────────┘       │       └──────────────┘
   ┌──────────────┐       │       ┌──────────────┐
   │ Home Level   │───────┘       │Ports and Roads│
   │Social Psych. │               └──────────────┘
   └──────────────┘
```
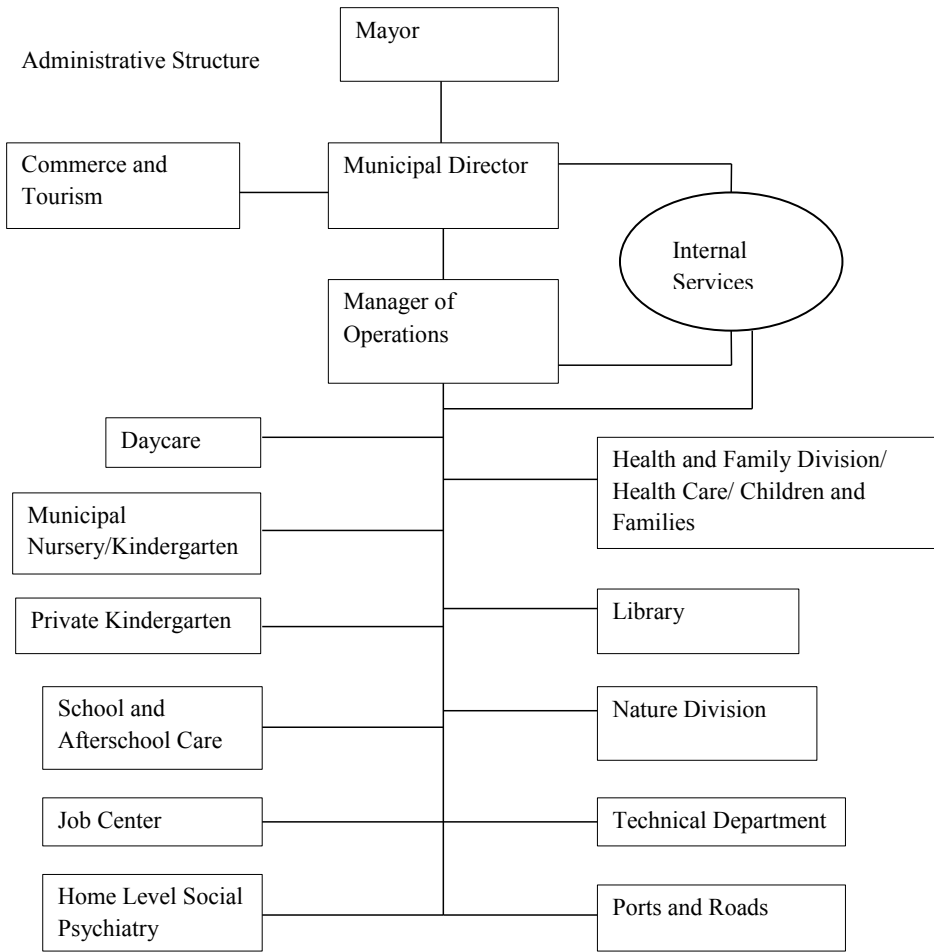
Adapted from Samsø Kommune, 2012

Political Structure

```
        ┌──────────┐   ┌──────────┐
        │  Mayor   │───│ Council  │
        └────┬─────┘   └──────────┘
             │
   ┌─────────┼─────────────┐
┌────────┐ ┌────────┐ ┌────────┐
│Social &│ │Technical│ │Economic│
│Cultural│ │and Env. │ │ Office │
│ Office │ │ Office  │ │        │
└────────┘ └────────┘ └────────┘
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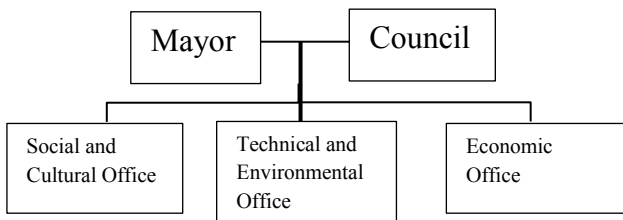
Adapted from Samsø Kommune, 2012

APPENDIX C: Energy Island Project Timeline

June: Samsø wins competition between five islands

July: Samsø **Energy and Environmental Office** opened

Funding from the Danish Energy Authority

11 land based wind turbines begin operating

EU funding: €400,000

- Onsbjerg district straw heating plant begins operating

- 10 offshore wind turbines begin operating

Nordby-Maarup district solar/wood chip heating plant begin operating ahead of schedule

- Ballen-Brundby district heating plant begins operating

- **Samsø Energy Agency** formed and tasked with building the Samsø

Samsø Energy Academy opens to the public

Municipal funding from turbine revenue for the construction of the Energy Academy

13% | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 100%

APPENDIX D: Interview Questions

1) How long have you lived in Samsø?
    a. Why did you move to / stay in Samsø?
2) What do you like most about living in Samsø?
    a. How do people interact socially here?
    b. What seems to be important to people in Samsø / What do they tell you is important to them?
    c. What makes Samsø special or unique?
3) Do you participate in community activities?
4) When did you first hear about the Energy Island Project?
    a. Do you remember what you thought and felt about the project when you first heard of it?
    b. How do you feel about renewable energy in general?
    c. Why do you believe Samsø began to use more renewable energy?
    d. Were you involved in the project in any way?
    e. Did the project affect you personally?
    f. Do you think the project was a success/ Did it achieve what it was supposed to?
5) What are some of the opinions you hear about the renewable energy project?
6) Now that the project is in place, how do you think it has affected the community?
    a. Have you heard anyone talk about how the project has affected the community?
7) Would you have any recommendations for other communities that want to use more renewable energy?
8) What do you think will be in Samsø's future / What would you like to see happen?