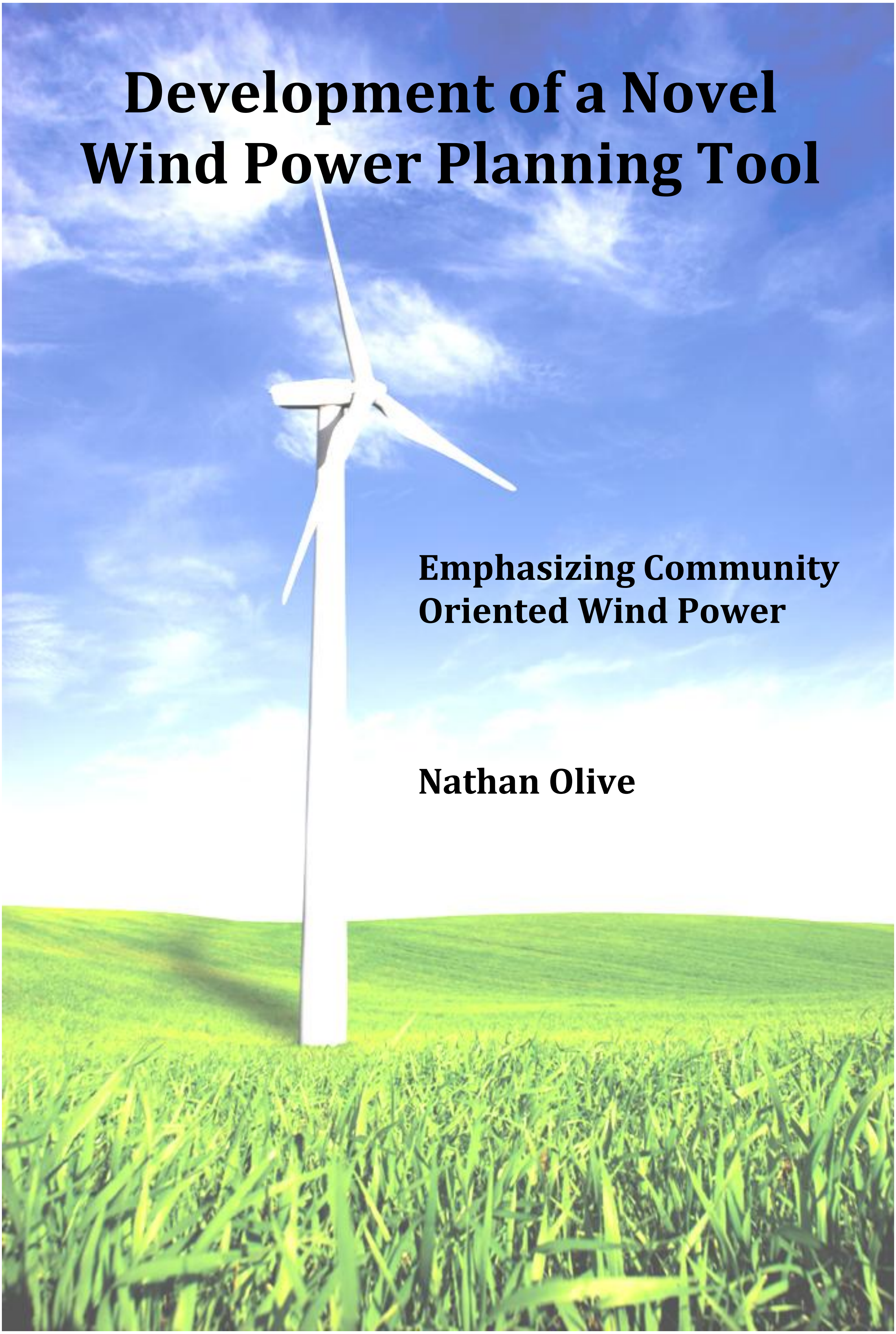
Development of a Novel Wind Power Planning Tool



Emphasizing Community Oriented Wind Power

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Title: Development of a Novel Wind Power Planning Tool:

Emphasizing Community Oriented Wind Power

Report Type: Master's Thesis

Study Program: M.Sc.

Sustainable Energy Planning and Management

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Date of Completion:

June 8, 2010

Number in Circulation: 4

Page Count: 88

ABSTRACT

The United States has experienced rapid growth in wind power implementation in recent years. However, only a very small percentage of this growth can be attributed to community owned projects, while the vast majority has been large scale and corporate owned. This style of development has negative connotations due to the exclusion of local stakeholders from project design and ownership. Two major sets of issues, institutional conditions and local stakeholder dynamics, have been identified as causative factors contributing to this situation.

Thus, this thesis has been conducted in an effort to better understand and address these problem sets. Two primary analytical approaches are followed, one for each of the major problem areas. The first uses established analytical techniques to describe the current institutional context in order to gauge its affect on community wind power. The second employs a derived theoretical approach to investigate local stakeholder dynamics involved in specific project settings.

This second approach has led to the creation of a novel planning tool called the Development Strategy Matrix (DSM). This tool is intended to enhance the ability of project managers (PM) to identify context specific conflict issues in unique project settings. A built in "Matching System" then allows the PM to select development strategies designed specifically for the identified conflict issues. To do this, the DSM utilizes two knowledge "libraries" that were constructed for this purpose. These libraries include a wide range of "conflict issues" and associated "solution strategies" drawn from a host of historical case studies and actor interviews. A derived methodology has also been presented in order to facilitate use of the DSM in an actual project planning process.

Results of the first analytical tract revealed specific characteristics of the current institutional system that hinder community wind development. These have been integrated into the DSM in order to reflect their broad project applicability. The second analytical tract has resulted in the compilation of the two knowledge "libraries" and a functional "Matching System", which together form the DSM planning tool. An accompanying Flexible Development Approach (FDA) has been designed in order to integrate the use of the DSM into an established wind project planning process. Hypothetical testing of the completed FDA indicates that it has the potential to significantly improve a wind developer's ability to identify conflict issues and associated solution strategies in unique local project settings.

Preface

This thesis was written during the 3rd and 4th semesters of the Master of Science Program: Sustainable Energy Planning and Management, Department of Development and Planning at Aalborg University, Denmark. This thesis is intended to fulfill the final requirements for attainment of the above mentioned academic degree.

The report is divided into seven chapters including the bibliography. Additionally, one appendix is included as a CD, which contains a Microsoft Excel file that directly relates to the project's results.

The Chicago method has been used to reference all sources in this report. The references in the appendix are listed separately as part of the included Excel file. In the text, references are written using the authors' surnames followed by the year of the reference, e.g. (Breukers and Wolsink 2007). If a source has the same author and year, then a letter (a, b, c, etc.) has been added after the year.

I would like to take the opportunity now to thank both of my supervisors, Frede Hvelplund and Anna Carlson, for their patience and assistance throughout this research process. I would like to thank the interviewees who lent me their valuable time and particular expertise. I would also like to thank my family, both at home and abroad, without whose support I would have been hard pressed to complete this thesis. And lastly, thank you, for taking the time to read the final manifestation of my lengthy research efforts.

CONTENTS

Table of Acronyms	
Acronyms: In Alphabetical Order	**Meaning of Acronym**
ARRA	American Recovery and Reinvestment Act
B (USD)	Billion (United States Dollars)
CCIs	Condensed Conflict Issues
CREB	Clean Renewable Energy Bonds
DSM	Development Strategy Matrix
ESTEEM	Engage Stakeholders Through a Systematic Toolbox to Manage New Energy Projects
EU	European Union
FDA	Flexible Development Approach
GHG	Green House Gas
IA	Institutional Analysis
ITC	Business Energy Investment Tax Credit
LLC	Limited Liability Company
MACRS	Modified Accelerated Cost Recovery System
MW and MWh	Megawatts and Megawatt hours
NIMBY	"Not In My Back Yard"
NMTC	New Market Tax Credits
PM	Project Manager
PPA	Power Purchase Agreement
PTC	Renewable Energy Production Tax Credit
RE	Renewable Energy
REAP	Rural Energy for America Program
REC	Renewable Energy Credit
REPI	Renewable Energy Production Incentives
TPTs	Thesis Planning Targets
US	United States of America

1 Introduction

Set against the backdrop of a global climate crisis and the reality that nature can only provide a limited supply of fossil fuel resources, wind power has emerged as an important source of energy for many countries. Wind power is widely recognized as one of the most mature, market ready renewable energy sources available today. Many nations have utilized wind power during their initial attempts to transition from a traditional fossil fuel based economy into an alternatively powered one. Denmark, with over 20% of their annual electricity usage coming from wind power, is perhaps the most successful practitioner of this energy transition (not including those nations heavily linked into hydropower use). Denmark has achieved this milestone based largely on its sustained tradition of co-operatively owned, distributed wind farm development. While many factors have helped make this situation possible (political, institutional, technological, etc…), it is fairly clear that historically consistent popular support for wind power projects has been an integral driving force (Sovacool, Lindbow and Odgaard 2008).

Taking Denmark’s story into consideration, an important question can be raised, why hasn’t this level of success been realized in other nations, which appear to enjoy similarly high public opinions of wind power? Numerous institutional and technological explanations have been put forth which describe Denmark’s success as the result of a perfect storm of favorable conditions, in which wind power was destined to succeed. However, this statement sells the Danish experience far short, and ignores its humble origins. As an alternative rationale, several researchers have identified an important sociological distinction between a person’s general support for wind power conceptually (which appears very high), and their often much less favorable opinion of wind projects individually, particularly when they are proposed in a familiar area (Wolsink and Maarten 2000), (Devine-Wright 2005), (Horst 2007).

A high percentage of concrete projects, as it turns out, receive much more opposition than general wind power opinion polls would suggest. The concept of NIMBY (Not In My Back Yard) opposition has been used for many years as an explanation of this divergent public opinion phenomenon. Essentially, developers and academics prescribing to this belief have assumed that resistant local residents were being selfish, claiming that they supported wind power generally, but then coming out in opposition to locally sited projects because they didn’t want them near their home. This perception has contributed to a general dismissal of opposition views on the grounds that they were based on the desire to be a clean energy “free-rider”. This perspective has led to countless instances of contention between local residents and developers, and has been blamed for numerous project failures (Cass and Walker 2009).

However, the NIMBY rationale has come under much scrutiny in recent years, being labeled by many researchers as an inadequate and often counterproductive assumption. It has been posited, that while the “true” form of NIMBY does indeed exist, it accounts for a very small percentage of the actual opposition that most projects face. Instead, a myriad of issues ranging from landscape impact objections to perceptions of unfair planning processes have been cited as significant causal factors leading to specific project opposition (Wolsink and Maarten 2000), (Toke 2005).

This expanded perception of why people commonly oppose tangible wind power projects reveals the need for a much greater understanding of exactly which issues incite controversy in a community. Furthermore, it is important to realize why these issues bring about such responses, and what can be done to minimize the conflicts. Towards these ends, a significant amount of research has been conducted in the last decade. However, academic discovery on its own is not enough. An enhanced understanding of these concepts must be translated into constructive action in order to improve local social acceptance of wind power projects. Without this connection from theory into practice, we can expect the future to hold more of the same; namely, a growing but still vast underutilization of this resource, wind, which has been given to us freely and inexhaustibly, directly from the heavens.

1.1 PROBLEM DESCRIPTION

The point of departure from which this thesis has embarked begins with the belief that there is a need to better understand and identify the causes of local opposition to specific wind power projects. Furthermore, in order to increase the implementation potential for individual wind projects, this improved level of understanding must be translated into measurable action; action that serves to enhance a developer's ability to address these issues in socially acceptable ways. It is important to realize that project success should entail more than just the construction of a functioning wind turbine. It should also mean that affected stakeholders are satisfactorily compensated for the specific "costs" that they are asked, and in some cases forced, to bear. These costs can be traditionally economic in nature (investment), but are also manifested through one's tolerance of a wind farm's visual and environmental impact on a landscape, its auditory output, or the perceived fairness of a project's design process (Krohn 1998). I have adopted the belief that these local objections are predominantly valid; and thus do not represent blanketed resistance born out of a NIMBY attitude. I've also concluded that these opinions play a significant role in the ability for developers to secure project planning permission from nearby communities. As such, the problem is essentially one of comprehension (of local stakeholders), problem solving (how to address local conflicts), and application (putting strategies into action).

1.1.1 TIGHTENING THE PROJECT SCOPE

In order to produce a more manageable thesis, a tighter scope of analysis must be established. Due to my national lineage as an American born citizen, and my belief that a massive untapped opportunity exists in this country with respect to community owned wind development, the United States has been chosen as the focal nation in this thesis.

The US has experienced an extremely slow rate of expansion for community owned wind projects compared to other forms of ownership. While large scale, corporate owned wind power has seen dramatic growth in recent years, the US can claim a mere 1,500 MW of community owned wind capacity (Windustry 2010) out of approximately 35,000 MW of total installed capacity, or just over 4 percent (WWEA 2009). By community owned, I mean that a significant percentage of the project should be owned by either local residents living near the proposed development or by the local municipality itself. Though one could claim that new wind usage of any kind in the US is cause for celebration, there exist a range of potentially problematic issues associated with this style of energy expansion. Perhaps the most troubling are related to conflicts identified through an enhanced understanding of local oppositional motivation, as discussed above. The following section more thoroughly investigates the possible ramifications associated with these issues in light of rapid corporate owned wind farm growth. It also presents an argument touting the direct and implied benefits that can be realized through more avid implementation of community owned wind projects in the US.

Sections 1.1.3 and 1.1.4 discuss two major sets of obstacles that I have identified as being particularly instrumental in perpetuating the status quo of large centralized electricity production; they have both hampered the implementation capacity for community wind projects in the US. The first set involves barriers present due to the prevailing institutional conditions affecting energy development in the US today. The second involves conflicts associated with the stakeholder dynamics that exist within specific project settings, particularly between developers and local residents in the communities nearest to concrete wind developments. These two sets of obstacles were identified based on an extensive review of relevant literature, in addition to several interviews with involved wind power actors.

1.1.2 What's So Wrong With Big Wind?

There are multiple reasons to argue for or against the expansion of large scale (approx. 50 MW and up) wind development in the US. The approach I have taken in this section involves two main concepts which argue against the merits of continuing this strategy. First, wind farms of this size are usually corporate owned projects; this style of development diverts the majority of financial benefits and project design control away from those actors most directly affected by the physical production of wind power (Mendonca, Lacey and Hvelplund 2009). Second, there are several negative connotations associated with the construction of very large, densely packed wind parks that smaller facilities do not experience on the same level. These two issues form the basis for why smaller scale, community owned wind farms are recommended as a more sustainable method of pursuing wind development in the US.

The vast majority of wind power in the US is produced from large wind parks owned by corporate actors (AWEA 2009, b). This trend has helped institutionalize the notion that wind farms are most economically viable and functionally efficient when constructed in this manner. However, a byproduct is that many local communities have been effectively alienated from participating in the project planning and ownership process. This exclusion leaves them ill-prepared to engage in wind power development negotiations, and often leads to what could aptly be called corporate abuse. These communities frequently end up bearing the burdens of wind power development (primarily landscape impact), without receiving any meaningful proportion of the benefits (i.e. financial revenue brought in from the sale of electricity and carbon credits). This situation is noteworthy for several reasons, the most important of which may be the observance of a growing public resistance to locally sited wind farms in the US (Crocker 2010).

By their very nature, wind farms are visually obtrusive. Because larger turbines equate to exponentially greater power outputs, the size of individual turbines has increased rapidly in recent years, further escalating the issue of landscape impact. Within a certain physical range, turbines are noticeably audible. Questions have also existed for decades over the possible impact wind parks have on avian wildlife. These concerns are all compounded when greater numbers of wind turbines are placed in a single location. The more turbines there are, the more obviously they will stand out against the landscape, the more noise they will produce, and the more likely that animals could be harmed (Jones and Eiser 2009). There has even been a "favorability gradient" proposed that suggests a "negative linear relationship between wind farm size and public support", indicating that as farms get larger, public support wanes (Devine-Wright 2005). These factors influence a person’s perception of a specific wind project; when the negative associations increase, public acceptance of wind power is bound to decrease. Thus, while economies of scale may be perceived as favoring the construction of ever larger wind farms, the symptomatic social effects linked to these facilities indicate that bigger isn’t necessarily better.

Having listed several reasons for why large scale, corporate owned wind developments can incite increased resistance from a local population, I will now suggest a few characteristics of community owned projects that could decrease this resistance. For example, it has been shown in numerous studies that a person sharing ownership in a wind project will be far more favorable towards it than someone without any financial stake in the venture (Devine-Wright 2005), (Mendonca, Lacey and Hvelplund 2009). The extension of ownership opportunities to the local community also brings in a significant amount of local income by way of taxes and owner revenue, which is more likely to be circulated back into the community than the earnings from a corporate owned project. Another benefit is the increased control over project characteristics that local residents usually have compared to corporate managed projects. Residents who believe they have been treated fairly and who have had an opportunity to legitimately participate in the planning process are much more likely to accept a proposed project than those who believe they were excluded or cheated (Agterbosch, Meertens and Vermeulen 2009), (Wolsink, Wind power implementation, The nature of public attitudes, Equity and fairness instead of backyard motives 2005), (Gross 2007). While there are many other points that would bolster the credibility of this argument, they have been left for further discussion until the body of this report.

I believe that a continued emphasis on large corporate wind farm development in the US will lead to a growing public backlash against the technology in general. It would also appear that the increasing disparity between the extremely wealthy and the average citizen will only be exacerbated by this continuing trend. The following sections briefly introduce the two major sets of barriers that I have identified as causal factors hindering an expanded role for community owned wind power in the US.

1.1.3 Community Wind Obstacles: U.S. Institutional Barriers

Institutional barriers in the context of this thesis are directly related to the entrenched philosophy regarding the "way things are" or the "way they ought to be". With respect to energy production, these concepts are personified through the range of actors participating in the energy system and their interactions amongst each other. Serious problems arise when this system fails to recognize its inherent inadequacies, or worse, when the actors in power actively fight against the evolution of the system in order to protect their preferred status quo. This situation is exacerbated by the observation that the perceived legitimacy of an institutional system becomes progressively stronger over time, as the dominant actors and traditional modes of social and political conduct survive. This phenomenon frequently results in the perpetuation of sub-optimal systems; these reinforcing trends make it extremely difficult to identify, much less alter, serious institutional inadequacies (Sine and David 2003).

In the US, the dominant institutional understanding of "proper" energy production has become ingrained in the psyche of most policy makers and citizens alike. For over a century, the US has built an electricity network that employs huge, centralized generating facilities, usually situated far away from most residential areas. This has perpetuated a historical disconnect that exists between most American citizens and the concept of energy production. Perhaps simply out of habit, but more likely due to the strong influence of special interest lobbying groups, this method has also served to reinforce the political belief that bigger is better. Unfortunately, while this aging electricity network is designed fairly well for an energy system based on the use of centralized coal and nuclear technologies, it is not particularly well suited for the use of site-specific, variable, or distributed forms of energy, such as wind and solar. These renewable methods are dependent on local environmental conditions to determine energy production, and are not strictly bound by the logics of "bigger is cheaper" (Crocker 2010).

Following this pattern, and to the detriment of community owned projects, federal incentive mechanisms for promoting renewable energy (RE) have consistently rewarded the construction of larger facilities owned by entities with extremely high tax burdens. This has severely hindered the ability for local residents to engage in wind power development on equal economic terms with their much wealthier corporate competitors. Regulatory requirements have also greatly increased the legal complications involved in developing co-operatively owned endeavors, which further impedes this type of citizen led project growth (Bolinger and Wiser 2006). All in all, the prevailing institutional conditions do not encourage the promotion of community owned wind power. However, strategies do exist that have proven manageable in recent years for getting around these barriers; the epitaph has not yet been written for community owned power production in this country.

1.1.4 Community Wind Obstacles: Local Stakeholder Dynamics

In the initial discussion, concerns were raised about the level of understanding that exists regarding local stakeholder objections to specific wind power projects. This is a critical issue to address because of its potential influence on the manner in which local stakeholder interactions are conducted. These local dynamics have been shown to play an essential role in the ability for wind projects to achieve final planning permission (Krohn 1998), (Cass and Walker 2009), (Horst 2007). They include the relationships between developers, local residents, local authorities, regulators, and transmission operators. Any combination of these actors can cooperate or disagree on a multitude of issues. When the latter is the case, projects can encounter far greater difficulty in achieving ultimate planning permission. While all of these relationships are important, this thesis will investigate the issue primarily from a developer's point of view. As such, some critical mistakes commonly made by developers are highlighted here to emphasize the need for an improved approach at managing stakeholder dynamics.

"Attitudes towards wind power are fundamentally different from attitudes towards wind farms, and this distinction is at the heart of most public attitude misunderstandings" (Wolsink 2005). This highlights a frequent mistake made by developers, which is to assume that general public support for wind power will lead to public acceptance of a specific project. This belief has blinded some developers to the challenges associated with wind power development. Project economics or technological barriers are usually considered the greatest obstacles, while in reality, local opposition or support for a particular project can prove equally influential (Toke 2005). The debate regarding the (in)validity of NIMBY as the primary reason people oppose wind projects is of critical importance. Developers taking a position of superiority or righteousness because they believe opposition is NIMBY motivated, and will therefore be scorned by the rest of the community, will inevitably alienate many local residents and severely damage their project's chance of success. Opposition should not be considered NIMBY outright, instead, it arises frequently from poor developer planning procedures, inappropriate project siting, or the exclusion of local stakeholders from project design (Wolsink 2005), (Devine-Wright 2005).

In summary, developers must embrace the fact that people and local opinions have a strong influence on the success of individual projects. The notion of "qualified support" has been used to better explain oppositional attitudes. It states that while a person can hold general support for wind power, there may be qualifying caveats to this support that are not met in a concrete development setting, thus transforming general support into specific opposition (Jones and Eiser 2009). However, it is very difficult for developers to gain this qualified support without knowing which conditions should or should not be met within varied local populations. Thus, poor developer practices are compounded by a general lack of operational knowledge, leading to frequent bouts of stakeholder conflict regarding a technology that receives overwhelming general support throughout much of the world (Cass and Walker 2009).

1.2 Project Boundaries

Before proceeding further with the research process, it is important to clarify aspects of wind power development that have been excluded from the outset of this analysis. In particular, while the widespread dissemination of wind power throughout the US is believed to be a critically important goal for the nation (and world), this thesis does not attempt to address the larger issues inherent within that grand objective. In other words, the analysis and results presented in this report are not expected to influence macro conditions or outcomes. With this broad project boundary in mind, the following topics, however important, have not been analyzed:

- Technical issues associated with significant wind power expansion (electric grid limitations and technical issues associated with the use of large amounts of variable energy).
- Governmental policy recommendations designed to increase overall wind power feasibility (revised incentive and regulatory structure).
- Proposals for institutional restructuring that would better enable newcomer admittance into the electricity supply market (changing the actor network power structure).

Points have been raised in the text that relate to these issues; but, they should only be seen as subjects for further reflection, upon which much research can be found throughout the relevant literature.

Likewise, it is necessary to establish a manageable scope of analysis relating to specific project characteristics by maintaining focus on the two main problem areas introduced above. Namely, how can stakeholder dynamics between developers and local residents be improved, and how should one work around institutional barriers at the local level of implementation? This has led me to primarily exclude many technical and administrative aspects associated with planning a specific wind project that I do not believe are directly related to these two main issues. These exclusions include, but are not limited to:

- wind resource assessments
- electric grid interconnection issues
- negotiating power purchase agreements
- turbine purchasing specifics
- infrastructure limitations
- and several aspects of the regulatory permitting process

While these subjects are considered vital to virtually every wind power project, they are viewed as falling primarily outside the scope of analysis for this thesis. Two possible exceptions to this statement involve the issues of grid interconnection and power purchase agreements. These are most definitely affected by prevailing institutional conditions in the US (Crocker 2010). However, due to research time constraints and their complicated legal structure, these two critical topics have not been addressed in this thesis. Having said that, they must be considered top priorities when engaging in an actual wind power project; they should be dealt with in parallel to the issues that are included in the remainder of this report.

Among others, the following two resources would prove valuable for negotiating these excluded aspects of wind power development. The first is the ESTEEM planning method (Engage stakeholders through a systematic toolbox to manage new energy projects), described in subsequent sections (ESTEEM 2008). The second resource is Windustry's "Community Wind Toolbox", which provides a guide outlining the steps involved in negotiating community based wind power projects in the US (Windustry 2006).

1.3 Basic Research Objectives

Having introduced the major problem focus and the initial project boundaries, it is now time to specify the underlying objectives for this thesis. These are derived from a desire to improve the ability for developers to engage in community inclusive wind power projects, specifically, by providing development techniques designed to address the problem issues identified in specific project settings. In general, the three main objectives involve improving a wind developer's ability to:

A. Identify and understand locally relevant conflict issues affecting a specific wind power project.
B. Select and employ appropriate solution strategies designed for these specific conflict issues.
C. Develop projects that positively affect communities, both socially and economically.

The main idea is that developers should be able to work in concert with local communities to help promote small to medium scale (under 50 MW), community owned wind power in the US. Emphasis is placed on improving the rate of project approval with respect to local objectors, while also increasing the social and economic benefits for the affected community. In reference to the local stakeholder dynamics problem area discussed previously, an improved understanding of the underlying issues driving wind farm opposition is attained in order to facilitate this cooperative developer-community relationship.

It is my view that wind project profitability must be ensured in an equitable manner in order to improve community owned implementation rates across the country. Despite a very strong natural resource potential in many areas, the ability to utilize federal incentives is still crucial for achieving economic viability for most wind projects. Unfortunately, the current US incentive system significantly hinders the ability for local investors to participate in proven cooperatively owned project structures, while at the same time, establishes an unofficial federally funded mandate in favor of corporate owned wind farms (Wiser, Bolinger and Barbose, Using the Federal Production tax credit to build a durable wind power market in the US 2007). In response, this thesis intends to describe the existing institutional conditions which have led to this situation. It will then provide a database of financing strategies and ownership structures designed to function within this situation that can be used to ensure equitable distribution of energy profits along the lines of who is actually bearing the burdens of their use. In this sense, developers and investors should be compensated fairly for their input, but affected communities should also be included in the economic calculations in a more equitable way.

Finally, the notion of flexibility regarding the selection of planning and development strategies is considered paramount for the ultimate contribution of a valuable resource. This flexibility is intended to allow the functional project results to be applied outside of the particular cases examined in this thesis. In other words, the thesis will identify conflict issues and solution strategies that hold relevance beyond the formative conditions present for any single case example. This should grant developers the ability to identify and address a wide variety of context specific obstacles in an informed manner without having to conduct extensive case-specific research on every potential setting.

Towards these ends, a novel planning tool is constructed. The tool compiles a broad range of commonly observed conflict issues together with a complimentary series of specifically tailored solution options. This is intended to help wind power developers plan projects in such a way that unique locally observed obstacles are accurately identified and appropriately addressed (within the confines of current institutional conditions), while maintaining an emphasis on providing equitable benefits to affected stakeholders. A methodology is also presented that integrates the use of this tool into several common stages of wind project planning and design. The specifics of this approach and related tool are provided in subsequent sections.

1.4 Specific Thesis Aims

Based on the problem description and research objectives described above, several main focal points have led to the construction of the Specific Thesis Aims. To start, I have acknowledged that there exists a frequent misconception regarding the motivation behind many local stakeholder objections to concrete wind power projects. This misconception has detrimentally affected the ability for developers to successfully garner local residents' support, due largely to developers' poor understanding of the notion of "qualified support". I then presented an argument touting the favorable benefits of community owned wind projects as opposed to the current standard of promoting much larger corporate owned farms. Unfortunately, the present institutional conditions in the US strongly support expansion of the latter option, while community projects are, in effect, discouraged by these same conditions.

In response to these focal points, I have set out to design a tool that will improve a developer's understanding of local conflict issues, provide a database of relevant solution options, and suggest ways in which future wind projects could be structured to more equitably compensate affected communities under existing institutional conditions. Based on this line of reasoning, the following Specific Thesis Aims are declared.

This thesis will:

a. *Describe current institutional conditions affecting energy development in the US with the purpose of identifying institutionally dependent conflict issues and associated solution options.*

b. *Construct a conflict issues and solution strategies library concerning local wind power planning obstacles, drawn from numerous project case studies and ongoing sociological research.*

c. *Organize these libraries into a functional tool that will improve a developer's ability to understand and appropriately address context-specific wind power planning obstacles in varied local settings.*

1.4.1 Specific Research Topics

This section more clearly defines five main topics that are integrated into the *Specific Thesis Aims*, and are included in the constructed planning tool. The following issues are associated with negotiating locally based wind power obstacles in pursuit of securing "qualified support" from the local community. They are also related to ensuring equitable economic terms for affected stakeholders and overall financial feasibility for the project within the constraints of current institutional conditions. They comprise the bulk of the subject matter that has been examined while building the two informational libraries. They are:

1. **Site Selection**: identifying acceptable locations based on local stakeholder concerns.
2. **Local Dynamics**: negotiating local stakeholder relations in a productive manner.

3. **Participatory Planning**: incorporating local stakeholders into project design stages.
4. **Ownership Structure**: establishing feasible and equitable project ownership structures within the constraints of current institutional conditions.
5. **Financial and Economic Issues**: identifying options for securing investment requirements and ensuring project profitability within the constraints of current institutional conditions.

These issues, henceforth referred to as the "thesis planning targets" (TPTs), are reflective of the two major problem areas addressed in this thesis. The first three TPTs involve local stakeholder dynamics, while the last two are more closely linked to negotiating unfavorable institutional conditions. The TPTs are primarily dealt with in actual development situations, on a case by case basis. As such, the remaining thesis content is dedicated towards facilitating the identification and management of these concerns within a variety of local settings in the US. With the inclusion of these main topics, the proposed tool, henceforth referred to as the Development Strategy Matrix (DSM), will serve as a valuable resource for project managers as they navigate the many hurdles related to community wind power development.

1.5 Hypothetical Case Study: The "Running Example"

In order to illustrate the connections between themes addressed in this thesis and their application in a hypothetical development setting, a "running example" will be employed. I will use this example to clarify the applicable relevance of major points discussed in the report. To do this, the running example is constructed as a hypothetical development situation, based on several common and critical issues identified during the literature investigation. The running example has been "threaded" through several chapters in order to tie together project themes by creating tangible connections between the arguments presented and a realistic development setting. In practice, this means that aspects of this example will be occasionally referenced in various sections of the thesis as they are deemed helpful.

The basic construct of the "running example" is as follows:

> *A developer has identified an area in the US that presents favorable wind conditions at several physical locations. This developer is not a local citizen, but is relatively familiar with the area. The potential project sites are all situated within a moderate distance (approx 10 km) of a small community (approx 5,000 inhabitants). The possible project sites are on land owned by individuals (possibly farmers) and would be visible to multiple neighboring residents. There have been no previous attempts to develop wind projects in this area, though most residents will have seen some turbines within an hour drive in any direction. There is some doubt as to whether the developer can raise sufficient funds to complete a profitable project. Unfortunately, the state in which this community is situated does not currently offer any substantial incentive mechanisms for wind development beyond those provided by the federal government.*

This short narrative could be a description of numerous communities in many parts of the US. The exact location is not considered critical for the application of this example. The important aspects in relation to this thesis are how the developer deals with local dynamics present in the community, and how the developer negotiates obstacles present due to the prevailing institutional conditions. When this example is referenced in subsequent chapters, the descriptive text has been indented and italicized as above.

1.6 Thesis Structure

The thesis structure is presented at this point in order to prepare the reader for the two divergent research paths taken in this project. The thesis follows a two-dimensional flow that has developed during analyses of the two primary problem sets introduced above (institutional barriers and local stakeholder dynamics). While these issues both influence the implementation capacity for community oriented wind development, they have been investigated using significantly different research methods. This divergent structure begins with the Specific Thesis Aims. The first one is dedicated to the identification of prevailing institutional barriers in the US today, while the second and third are related to the construction and application of the micro-oriented novel planning tool. However, each one still shares the overall goal of improving a developer's ability to negotiate locally manifested conflict issues.

In chapter 2, two varying theoretical approaches are introduced; the first is based on established research techniques, while the second presents a novel analytical strategy derived from a variety of literature resources and personal reflection. These theories help define the ontological perspective adopted throughout the research process. The project delimitations identified as a result of utilizing these two research themes are also presented in the second chapter.

The two-pronged investigation splits in chapter 3, where the first analytical research tract is pursued. This approach utilizes an established theoretical practice to produce an analysis of the current institutional situation facing wind developers in the US (called for in *Specific Thesis Aim, a*). This chapter includes an analysis of two broad institutional settings (macro and meso) and an examination of the most common institutionally dependent, locally relevant conflict issues (micro conditions).

Chapter 4 presents the second half of the two-dimensional approach. The derived theoretical methods are used to explain how the conflict issues and solution strategies libraries (called for in *Specific Thesis Aim, b*) were compiled. The chapter then describes the construction and intended functional abilities of the DSM planning tool (*Specific Thesis Aim, c*). An accompanying methodology is presented that facilitates the use of the DSM tool in a development setting; this is done in conjunction with the established project planning guide, ESTEEM. The "running example" is then used to illustrate the entire procedure during a hypothetical wind project planning process.

Chapter 5 reviews the results of the two analytical processes. These results are discussed in relation to the basic research objectives as well as the Specific Thesis Aims. The coordinated relevance of the two-dimensional analysis is highlighted in terms of how each set of results impacts the other. The most relevant of the identified conflict issues and solution strategies are presented to serve as a mini-guide that summarizes the basic lessons built into the DSM.

The final chapter presents the thesis conclusions. The Specific Thesis Aims are reviewed to see if and how these objectives were fulfilled. The DSM's real-world applicability is discussed, along with perceived weaknesses related to the methodological and theoretical bases taken in this thesis. Finally, ideas for future research and modifications related to the thesis's contents are discussed.

The following Figure 1 displays a graphical depiction of the six chapters and their major subject matter. The two-dimensional flow has been illustrated by the divergent subject paths taken during the analysis.

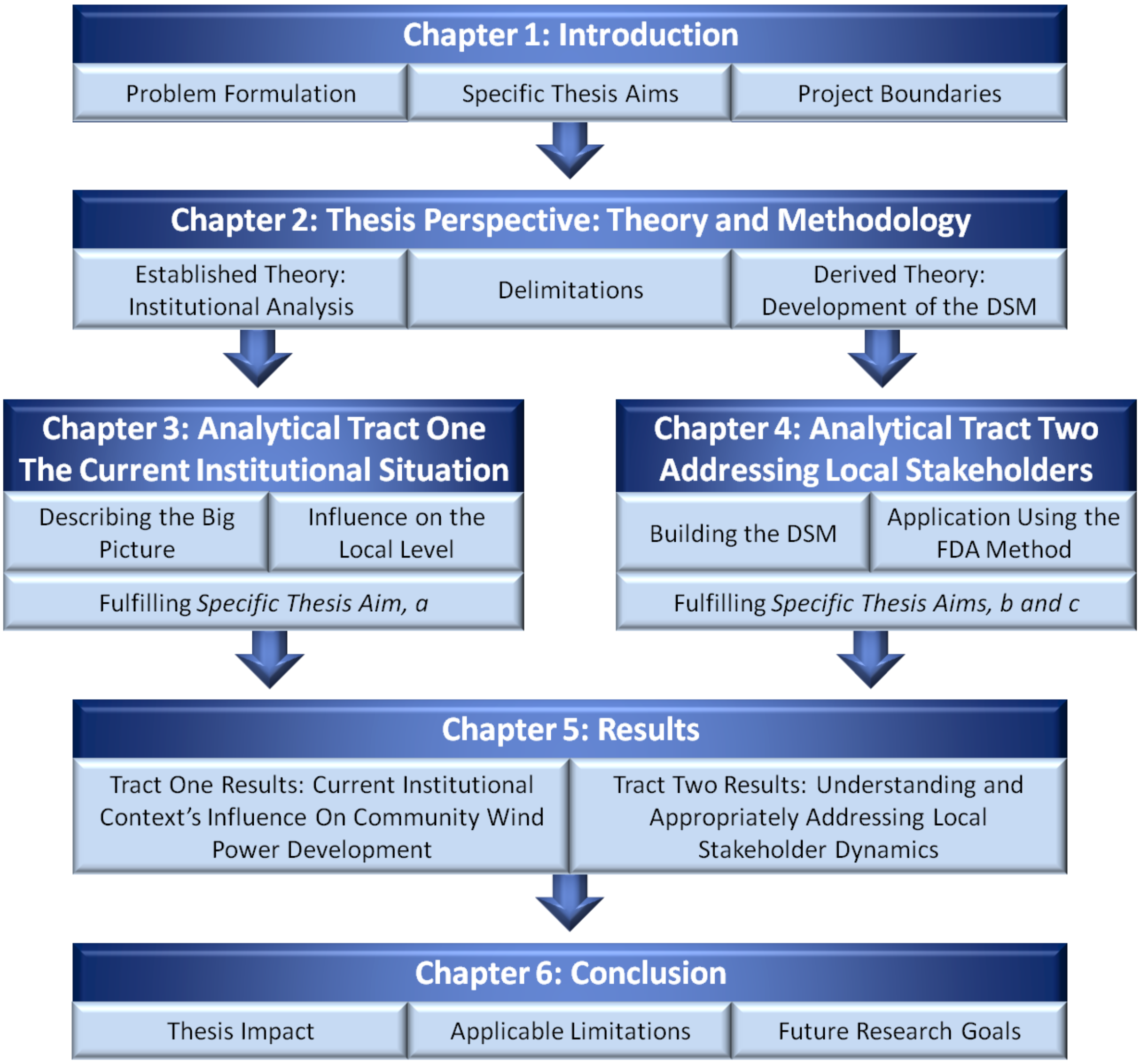

Figure 1: Thesis Structure including each chapter and its primary analytical topics. The divergent research paths taken in chapters 3 and 4 illustrate the two-dimensional approach followed throughout most of the project.

2 THESIS PERSPECTIVE: THEORY AND METHODOLOGY

This chapter describes the main theoretical concepts upon which the thesis is constructed. It also presents a methodological introduction for how the various analyses have been conducted in subsequent chapters, including the development and use of the DSM tool. Three main theoretical concepts have been utilized in order to fulfill the Specific Thesis Aims. The first two are based on established theoretical techniques. The Institutional Analysis approach is used to describe the "current situation" regarding wind power implementation in the US today. The established project development methodology called ESTEEM is then used to build a framework upon which the derived planning perspective is based. The final concept presented illustrates the theoretical basis for the functional use of the DSM tool. This derived perspective shares several functional similarities with ESTEEM, but also encompasses adaptations on multiple active research techniques. It is presented here as a novel planning methodology, which I have termed the Flexible Development Approach (FDA).

2.1 ANALYTICAL TRACT ONE: DESCRIBING THE CURRENT SITUATION

As mentioned in the "thesis structure", there are two distinct analytical tracts taken throughout the project. The first, presented in this section, is used to describe the current institutional situation affecting the implementation capacity of community oriented wind projects in the US. This goal is useful because the feasibility of certain development strategies is dependent upon this institutional structure.

Thus, in order to accurately identify the *institutionally dependent conflict issues and associated solution options* (*Specific Thesis Aim, a*), it is necessary to establish an understanding of the influential institutional conditions currently affecting wind projects in the US. This section aims to illustrate my perception of these conditions using the Institutional Analysis approach. This understanding will highlight the constrictive and facilitative conditions in place, and will allow me to more clearly define the DSM's role with respect to which obstacles it is intended to address. The perceived theoretical boundaries concerning the identification of feasible solution options are also discussed.

For some background on the general theory, Institutional Analysis (IA) can be used to analyze key societal aspects that influence an existing technological system. In its entirety, the theory enables a researcher to examine these key aspects via a set of analytical criteria in order to identify critical system inefficiencies with the intent of changing certain key elements of the existing institutional system, in effect, altering the "rules of the game". The goal is to facilitate the rise of a more optimal, socially desired alternative, ideally accompanied by a net gain in societal benefits (Hvelplund 2009).

However, recalling the defined project boundaries which specifically exclude the intention to alter broader system conditions, it is necessary to hone the IA approach down to a more applicable level. The IA theory has NOT been used to propose improved system-wide conditions. Rather, the first half of the IA procedure (identification of critical system inefficiencies), has been followed in order to identify key institutional barriers facing community owned wind power in the US. Barriers relating to the TPTs can then be incorporated into the development of the DSM through its conflict issues and solution strategies library (*Specific Thesis Aim, b*). In this way, wind developers will be better suited to negotiate the many obstacles facing them using techniques designed specifically for their local context, while also taking into account the facilitative or restrictive influences of broader national conditions. This view is based on a central pillar of the IA theory, the establishment of a “concrete institutional context”.

2.1.1 Institutional Analysis: Concrete Institutional Context

An essential step in the IA process is to develop an understanding of the cognitive elements affecting a specific technological system. These elements make up the “concrete institutional context” in which the current examination takes place. Major facets pertaining to this include: a description of the analytical macro context, an explanation of micro contexts relating to specific aspects of the macro context, and a cohesive examination of the relationship between the two (Hvelplund, Institutions and technological change- the east German Energy Case 2009). A meso contextual approach is also discussed in this thesis, and is intended to more concretely link the macro themes to the many micro contextual issues.

The macro context in this situation is perceived as the US federal system as it applies to energy production. It is composed of relevant actors, their interrelated power structures, broad social norms, and the dominant political atmosphere. These factors collectively make up the overarching macro conditions that affect virtually all activity within their sphere of influence; in this case, wind power projects in the US. These macro characteristics appear to be generally non-responsive to the desires of individuals, and are therefore effectively unalterable from an individual’s point of view. However, this does not imply that they are stagnant in nature. The broad factors that compose these macro conditions are constantly shifting; political will swings back and forth over time, dominant corporate players gain and lose market share as competition dictates, and social agendas evolve based on the collective desires of the American people. These shifts affect the perceived makeup and influence of macro conditions on the implementation capacity of community based wind power (Hveplund 2010).

The micro contextual issues are those that directly affect the TPTs for a given wind project. The micro context inherently consists of a variety of conditions spawning from the unique makeup of a given community. These represent the key areas of analysis when constructing the DSM, due to their connection to local social, economic, and physical characteristics. The micro context includes local stakeholders and their relations among each other (Hveplund 2010). This context also includes the options available to developers in terms of project design that are dictated by the prevailing macro and meso conditions. In other words, macro characteristics determine the range of micro conditions which are relevant for any given project or community. One example is the availability of federal incentives for different types of wind projects, which is dependent on political decisions at the federal level. Variability with respect to critical issues at the micro level compounded by the need to adapt to changing conditions at the macro level provides the motivation for establishing the “flexible” FDA methodology.

The final context considered relevant in order to effectively describe the concrete institutional context is the meso level. The idea of establishing a meso context is not explicitly called for in the IA theory, but I believe it can provide a measurable link between the overarching macro characteristics and the project specific micro conditions. To elaborate, I view the meso conditions as being the direct tangible results of the prevailing macro characteristics, primarily manifested as national financial policy mechanisms and electricity market regulations. Two examples that exist due to current macro conditions are the exclusive structure of federal tax incentives used to promote wind power, and the complicated regulatory hurdles faced by investors wishing to form co-operative ownership structures (Bolinger and Wiser 2006). These, in turn, directly impact the ability for individuals to pursue various financial and legal development options (micro contextual options). It could be argued that this meso context is redundant to its macro origins, but I believe that identifying a link between the somewhat abstract national macro conditions and the concrete micro characteristics of a specific project setting has genuine analytical worth. While shifts in the macro context may be difficult to perceive (i.e. subtle changes in political or corporate power structures), the resultant meso contextual impacts will be easily identifiable; they will most commonly be manifested as tangible legislative changes to national policy.

Institutional Analysis: Context Summary

To sum up, there are a multitude of micro characteristics which can be relevant to a particular wind project based on its unique local setting. Possible solution options available to address these identified micro issues are inherently influenced by the prevailing meso conditions (such as which incentives could be utilized with different types of ownership structures, based on existing federal legislation). These, in turn, are a function of the dominant macro conditions, which are constantly shifting over time. Together, these three analytical arenas make up the "concrete institutional context". Figure 2 displays this conceptual understanding, and lays the framework for the application and development of the FDA.

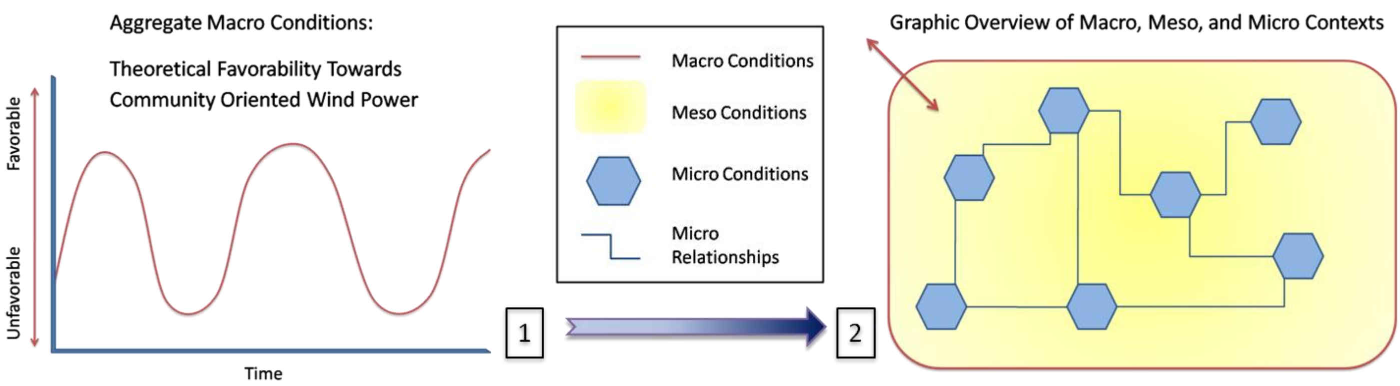

Figure 2: Graphic representation of the concrete institutional context.

Figure 2 provides a graphic summary of the theoretical concrete institutional context as it is perceived in this thesis. In the graph corresponding to box 1, the red line represents aggregate macro conditions in the US with respect to wind power. These conditions are shown to vary over time between situations of relative favorability and un-favorability, referring to the macro context's influence on the implementation capacity for community oriented wind power. For example, the election of environmentally friendly politicians, or the occurrence of energy related disasters which affect social consciousness (such as the ongoing offshore oil catastrophe in the Gulf of Mexico), would suggest a shift towards more favorable macro conditions with respect to RE (including wind power) in the US. Alternatively, falling fossil fuel prices combined with an increased lobbying influence for corporate actors in Congress would likely predicate a shift towards un-favorability.

The diagram corresponding to box 2 in Figure 2 illustrates all three contexts in an overlapping sense. The red outer line represents the macro context, which can expand or contract as conditions shift between favorable and unfavorable over time, corresponding to graph 1. The yellow filling inside the red border represents the meso context, which is directly defined by the current macro conditions, neither expanding beyond nor shrinking smaller than the red macro border in this graphic example. This yellow meso context represents the direct link from the macro setting to the micro conditions, which are represented by the blue hexagons in the box 2 diagram. These hexagons represent hypothetical micro conditions for a specific development area, and are embedded within the current meso context. As the prevailing macro conditions shift from favorable to unfavorable, they (theoretically) result in the revision of existing energy legislation (meso conditions). In the box 2 diagram this expansion or contraction would also affect the relevance of certain micro conditions, which could be deemed critical or unimportant based on the meso/macro contexts. For example, a local lending institution's willingness to finance community projects (micro condition) is largely based on existing federal incentives or loan guarantees (meso condition), which are in turn the result of federal political decisions (macro conditions) (Bolinger and Wiser 2006). The blue connecting lines indicate the intertwined nature of the relationships present at the local level (i.e. local actor relationships with permitting authorities, lenders, developers, etc…). This basic overview is built upon in Figure 3, section 2.2, to show how the FDA is intended to function within this understanding of the concrete institutional context.

2.1.2 Established Methodological Perspective: ESTEEM

The purpose of discussing ESTEEM in this chapter is to provide a link between the theoretical understanding of the current institutional influences discussed above, and the derived analytical tactics introduced in the following section. In this capacity, ESTEEM is more directly related to the second analytical tract (that of developing tools to improve local stakeholder conflict issue resolution), but also is helpful in applying the lessons learned from the IA tract into real-world development settings.

The ESTEEM method was designed to help promote social acceptance for RE projects through multi-stakeholder participation in project design as well as adaptation to local contexts. It is the functional result of the EU funded project entitled CREATE ACCEPTANCE (Cultural influences on Renewable Energy Acceptance and Tools for the development of communication strategies to promotE ACCEPTANCE among key actor groups), which aimed at achieving increased understanding of social aspects influencing RE project (non) acceptance (CREATE ACCEPTANCE 2008, b). These two interrelated resources share similar objectives to those stated in this thesis; namely, to improve the understanding of stakeholder acceptance issues and to translate that understanding into enhanced implementation of RE projects in varied local contexts. The following sub-sections provide an introduction to each, and briefly describe their relevance and dissimilarity to the current research.

CREATE ACCEPTANCE

The CREATE ACCEPTANCE project sought to identify key elements involved in social acceptance of RE technologies based on an analysis of recent and past experiences with RE projects. The researchers were also charged with transferring this improved understanding into tangible methods for attaining greater levels of project acceptance in varied social and institutional settings. The ESTEEM toolbox was created as one of five "work packages" that support the project conclusions (CREATE ACCEPTANCE 2008, b).

CREATE ACCEPTANCE is deemed relevant for this thesis due to its emphasis on understanding the local as well as the broader societal issues facing RE developers in a wide variety of settings. The examination of prior RE experiences to help determine key elements affecting a future situation was a particularly appealing facet, and has proven valuable during this research. Furthermore, CREATE ACCEPTANCE's analytical methods coincide well with the IA concepts introduced previously. This has allowed me to integrate the useful techniques from both perspectives into the construction of the conflict issues and solution strategies libraries. The major difference in approaches is that CREATE ACCEPTANCE was designed primarily from a European perspective. However, this should not pose a significant problem, because the social aspects investigated are primarily human issues, which, though affected by national social norms, are not as dependent on institutional conditions as financial or regulatory issues are.

ESTEEM

The creators of ESTEEM present this introductory statement: "In order to be successful, [RE] projects need to fit into various social contexts… ESTEEM is designed to help you find out how well your project fits into its social context, to learn about your stakeholders' concerns and expectations toward the project, and to identify mutually acceptable solutions to potential difficulties" (ESTEEM 2008). Towards these goals, ESTEEM provides a systematic method comprised of six steps that allow a project manager (PM) to "measure, analyze and facilitate societal acceptance of new energy projects" by organizing a constructive dialogue between project stakeholders and the developer. It is presented as an interactive website with links to tools and instructions guiding the user through each step. The two main goals are to ensure that communication between the PM and relevant stakeholders "meets basic requirements to enhance social acceptance" while also helping to identify problems and associated solution options from a multi-stakeholder perspective (CREATE ACCEPTANCE 2008, a).

These goals overlap succinctly with the stated research objectives, and coincide closely with the Specific Thesis Aims. For this reason, ESTEEM has served as a basic methodological blueprint influencing the construction of the proposed DSM tool and FDA methodology. Furthermore, because ESTEEM has been designed to guide a developer through every stage of RE project development, it can be used to fill in the developmental gaps present due to the intentional specificity of the DSM. ESTEEM is therefore a valuable supplementary resource for this thesis's functional results. However, there are several key aspects that have been identified as lacking in the ESTEEM process. Section 4.1 discusses these drawbacks, and provides an overview of how ESTEEM is intended to be used in support of the FDA.

2.2 Analytical Tract Two: Appropriately Addressing Local Stakeholder Dynamics

This section introduces the analytical concepts that have been derived for use in this thesis. They comprise the theoretical and methodological techniques that enable the second major analytical research tract and that are used to fulfill *Specific Thesis Aims b and c*.

The main focus for this second tract of analysis is predicated on a rejection of the traditional belief that NIMBY attitudes represent the primary causes of local opposition to wind power projects. Upon accepting this belief, it was clear that a greater understanding of personal motivating factors influencing specific project opposition was needed. This view is summed up by the notion of "qualified support", first discussed in chapter 1, which states that qualifying caveats can incite personal support or opposition from individuals for a particular project (Jones and Eiser 2009). Thus, the goal of identifying these caveats that trigger "qualified support" or "qualified opposition" in a variety of settings for various stakeholders was deemed a worthwhile research endeavor. This decision led to the creation of the conflict issues and solution strategies libraries which have been incorporated into the DSM.

2.2.1 FDA and DSM: Derived Tools' Theoretical Basis

The FDA methodology represents a novel theoretical approach to negotiating specific aspects of wind power development. At its core is a very simple concept, derived from actor interviews and an extensive literature review regarding historical wind power project case studies (Breukers and Wolsink 2007), (Khan 2003), (Karlsson 2009), etc… The concept can be summed up in the following statement:

> Each local situation is inherently unique.

Before proceeding further, it must be noted that this simple concept carries with it an important caveat. While each distinct situation is characterized by a unique set of conditions, influential characteristics will be shared within the confines of an overarching macrostructure (the *concrete institutional context*), as defined by the IA theory. Thus, the identification of recurring micro contextual themes within a shared macro-context provides the common thread that allows analytical comparisons of unique local situations to be deemed relevant (Wolsink and Maarten 2000). In other words, lessons learned from case specific examples can be applied to other similar micro settings, provided that they each share some common macro context. This, essentially, is the basis upon which the DSM's libraries are deemed relevant and useful. Acknowledging this analytical tactic, it is possible to return the focus of discussion to these unique local conditions and their affect on prospective wind power developments.

As stated in the Introduction, distinctive local characteristics have been shown to play an immensely important role for the implementation capacity of a given wind farm proposal; without local approval, the likelihood of project completion is minimal (Toke 2005), (Walker 2008). Unfortunately, the variety of reactions from local stakeholders, compounded by this perceived lack of understanding concerning their motivations, makes it difficult to design appropriate conflict resolution strategies. Furthermore, many developers don't have the time, resources, or desire to adequately investigate the prevailing conditions in order to create a carefully crafted, site specific plan. The common result is that blanket assumptions are made regarding local reactions to proposed wind projects. Any deviation from these presumed reactions are often written off as irrational or inconsequential objections. This recurring development theme has led to countless project failures at the local level, and contributed to a much slower rate of global wind power proliferation than might otherwise have been achieved (Cass & Walker, 2009).

2.2.2 FDA AND DSM: DERIVED TOOLS' METHODOLOGICAL BASIS

So, if each development situation is inherently unique, requiring specifically tailored strategies, yet many developers lack the time, resources, or desire to construct said strategies; what can be done? The solution proposed herein is the Development Strategy Matrix (DSM). This tool provides the means by which a wind power developer can learn from historical project examples to identify and address critical conflict issues within their local project setting. Within the constraints of prevailing institutional conditions, this tool will provide a navigable database of solution options designed to address the most common and critical conflict issues revealed during this thesis's two analytical research tracts. In order to integrate the DSM into a realistic project planning procedure, a guiding methodology has been constructed called the Flexible Development Approach (FDA). This methodology utilizes ESTEEM's comprehensive planning guidelines in order to construct an adaptable wind power planning framework that makes optimal use of the DSM tool. In order to accomplish this, the following steps are necessary:

1.) A method for the relatively swift and accurate identification of relevant characteristics affecting a proposed wind project must be established. These include a range of issues such as those encompassed within the current situation IA investigation, as well as the unique micro conditions specific to the thesis planning targets (TPTs).

This task serves two main purposes; the first is to identify the "low-hanging fruits" with respect to potential wind projects so that efforts can be focused on those with fewer and more manageable obstacles. The second comprises the primary motivation for the construction of the *conflict issues library*, which has been built into the DSM. By providing this database of common and critical wind power obstacles, developers will be better prepared to recognize similar problems in their specific project setting without having to invest too much time or resources. This step helps to facilitate the solution option identification stage of the FDA, described below as point number 2.

2.) A method must be established for choosing and implementing appropriate planning strategies that are specifically designed to address the issues identified in step 1. The ability to utilize novel tactics supplementary to historically extracted ones should be inherent in the final product.

This task should enable developers to effectively address the critical TPT related issues identified in step 1, using proven and unconventional solution options. This task also coincides with a dedicated ESTEEM stage, but here the DSM serves as a more highly specified tool. A description of how the ESTEEM methods can be used to supplement the targeted FDA steps is provided in chapter 4.

The DSM's database of potential solution options should greatly enhance a developer's repertoire for dealing with locally identified conflict issues. The accompanying FDA methodology should ultimately guide a developer through the use of the DSM in order to improve their ability to address unique regional and local characteristics. The user can learn from these examples, and adapt their methods to more appropriately address the initially identified, the expected, and hopefully the unforeseen obstacles that arise related to the TPTs. This process should help developers to design highly specified planning strategies, drawn from a constructed database of proven as well as novel techniques, in order to avoid or convert into facilitative assets the most significant obstacles facing a specific wind power project.

2.3 Integrating Two Analytical Tracts: Addressing Small Issues In a Big World

The ultimate goal for this thesis is to produce a relevant and functional tool that will improve a wind developer's ability to successfully complete community inclusive wind power projects. A compilation of theoretical approaches have been employed in pursuit of this objective, including: the institutional analysis theory, the ESTEEM framework, the novel DSM tool, and the accompanying FDA methodology.

As the two primary analytical tracts merge together, it becomes apparent that a PM must understand the influence of the prevailing concrete institutional context on their development setting's specific micro characteristics. They should engage in deliberate planning methods that allow them to identify and address local development obstacles using appropriate solution strategies within the confines of these institutional boundaries. Towards this end, ESTEEM provides a supplementary method to be used in tandem with the DSM tool to facilitate this deliberate planning approach. The DSM provides the knowledge databases, along with a built in navigation system, that provides the means with which to identify and address these personalized local obstacles. The FDA ties these components together by identifying the stages of wind power planning for which the DSM tool is applicable, and then directing the developer back to ESTEEM (or another preferred method) when the DSM is no longer relevant.

Figure 3 provides a graphic overview of this theoretical and methodological synthesis, bringing together the IA perspectives discussed in section 2.1, the facilitative aspects of ESTEEM introduced in section 2.1.2, and the micro contextual concepts addressed by the DSM, shown in the previous section. This overall perspective is presented as a methodological step map, which is intended to illustrate the general concept behind conducting an FDA examination on a particular case.

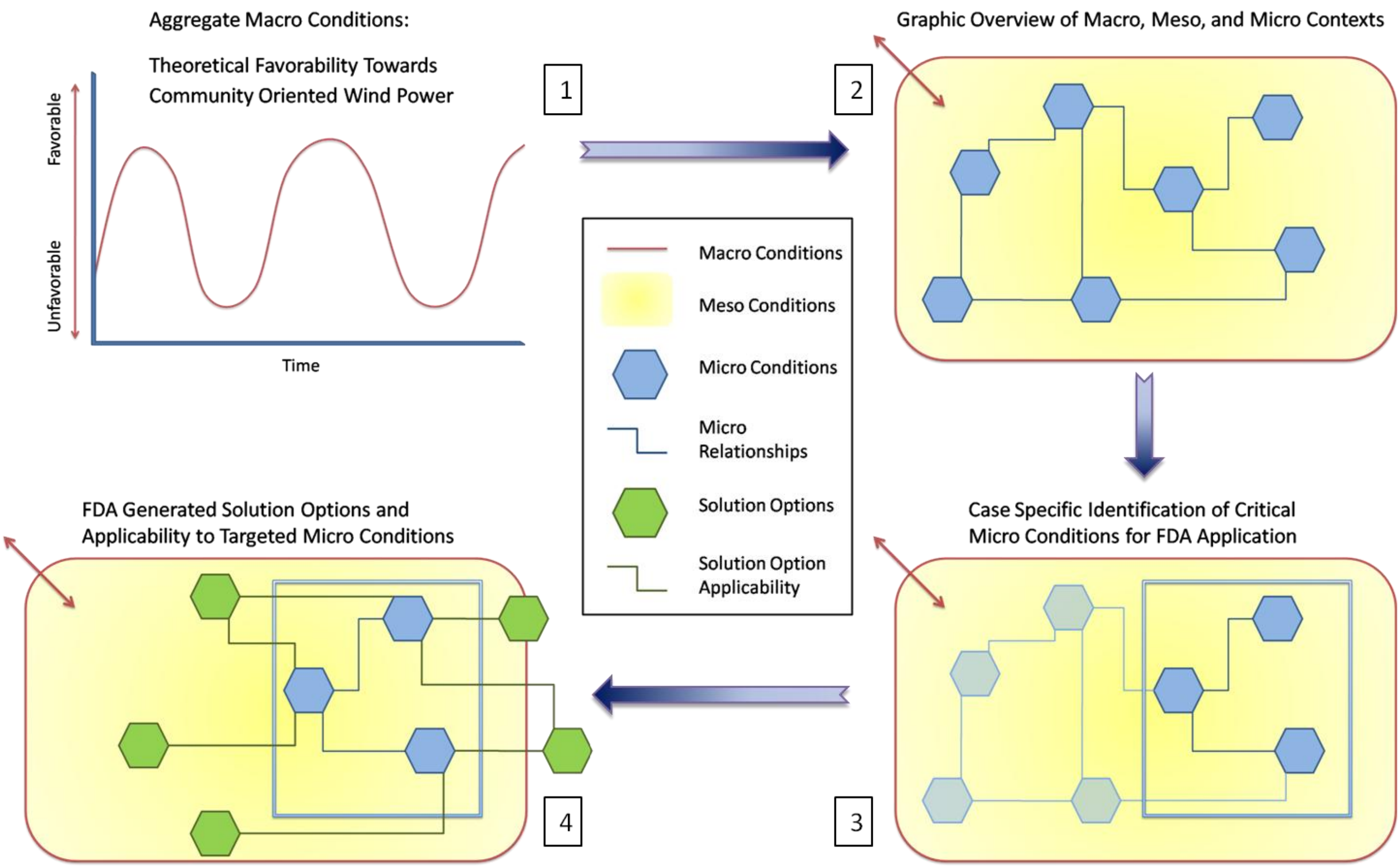

Figure 3: Synthesis of relevant theories into a functional FDA methodology. The diagrams corresponding to boxes 1 and 2 represent the results of the first analytical tract taken, specifically the assessment of the prevailing concrete institutional context. This understanding influences the functional application of the FDA and use of the DSM tool during the stages of conflict identification (diagram 3), and solution strategy procurement (diagram 4). The institutional understanding dictates the feasibility of certain micro characteristics and solution options at both of these levels. The flexibility of the FDA procedure is intended to allow a project manager to adapt his/her planning strategies to reflect the prevailing institutional conditions as they shift over time.

Figure 3 builds upon the graphic depiction of the concrete institutional context (boxes 1 and 2), shown previously in Figure 2. The diagrams corresponding to boxes 3 and 4 represent an application of the FDA to a specific case. Step 3 shows the conflict issues identification stage, in which the most influential and potentially obstructive TPT characteristics are determined. ESTEEM provides a useful basic approach to follow until this point. However, the DSM is particularly suited for this stage due to its conflict issues library. This database contains a compilation of common and critical TPT related issues historically faced by developers. The micro contextual issues included in the library and identified as locally relevant at this stage (diagram 3) are represented in the figure by the dark blue hexagons situated within the highlighted blue square. This indicates that of the many possible micro conditions present, these three were deemed most influential in this hypothetical development setting. The specific use of the DSM in this conflict issues identification stage is detailed in chapter 4.

The "running example" proves useful here as an explanatory tool. The three highlighted conditions in this scenario could be: the developer's status as an "outsider", the relative proximity of the potential sites to the local community, and the expected difficulty in acquiring sufficient project investment.

The diagram corresponding to box 4 in Figure 3 shows the identification of solution strategies (represented by green hexagons) for these three specific conflict issues. The ability to select appropriate strategies from the compiled solution strategies library has been built into the DSM tool. A developer will be able to follow the DSM's methodology from conflict identification (box 3) through to solution option procurement with relative ease (box 4). As seen in the figure, there are multiple solution options linked to each issue. Some of the green solution hexagons are situated outside of the hypothetical meso conditions (yellow filling) and macro boundaries (red border line). This is intended to portray potential solution options that are deemed infeasible due to the prevailing concrete institutional conditions.

In the "running example" the possible solution option of utilizing additional state incentives to achieve financial viability is not available. This is based on the basic meso context understanding that this particular state does not offer additional incentives to those present at the federal level.

As the macro conditions fluctuate in either direction, shown by the box 1 graph, certain solution options may become more or less feasible. For example, if federal or state legislation were to provide additional incentives for community based wind power (a shift towards more favorable macro conditions, indicating an expanding macro/meso area in the graphic example), then the previously infeasible solution option (utilize additional economic incentives) suddenly becomes much more viable. This underlies the importance of flexibility in the FDA; varying conditions must be recognized and addressed rapidly according to the current situation. In this manner, the toolbox designed in this thesis combines aspects of IA theory, the ESTEEM methodology, and novel FDA concepts to enhance the ability of local wind developers to successfully complete community inclusive projects within unique local settings.

2.4 Information Gathering

Most of the research data used in this report has been gathered from two types of peer-reviewed journal articles. The first was mainly composed of relatively broad academic investigations concerning the sociological and psychological aspects related to public opinion of wind power in general and locally based projects in particular. This type of research has gained traction in the last decade (based on the number of relevant articles in publication), and is thus an interesting field of investigation. The second group was primarily case studies of specific development attempts written by academics looking back upon the particular case's circumstances. These studies were seen as a good resource for collecting concrete examples of conflict issues and solution strategies drawn from real world situations.

Several actor interviews were conducted, including: a Swedish developer working on community based wind projects, an American developer/consultant working on a variety of US wind power projects, and a US based policy advocate in favor of open market access and revised institutional conditions. These interviews were conducted via email, phone, and in the case of the Swedish developer, a lengthy, semi-structured face to face interview. For the US interviewees, a structured questionnaire was sent out via email concerning the main research topics. This was then followed up by a phone interview in which the interviewee's main areas of expertise were explored in more detail. These interviews helped verify and contextualize the more academic data that was gained by examining many of the journal articles.

Finally, several wind power planning guides available via the internet were consulted in order to hone the scope of analysis down to a more manageable level. The Windustry website and their Community Wind Toolbox provided valuable practical information regarding the steps necessary for completing a community based project (Windustry 2006). Windustry also contained useful links to other resources, including various wind power associations and governmental websites that held information regarding wind power statistics and regulatory and legislative explanations. The EU project CREATE ACCEPTANCE provides full access to their research and resultant tool (ESTEEM) on their website (CREATE ACCEPTANCE 2008, b). This project helped guide the methodological formation of the proposed DSM tool presented in this thesis. These sources have all been cited in the report when appropriate.

2.5 Delimitations

The most significant delimitations that I have considered regarding this thesis are discussed in this section. These involve intentional project constraints built in as part of the original project boundaries, as well as potential theoretical criticisms aimed at the techniques employed during the analytical processes used during this report. The perceived impacts of the following considered delimitations on the validity and applicability of the ultimate project results are discussed as part of the final thesis conclusion, in chapter 6.

Perhaps the most obvious concern that could be raised about the research tactics used in this report has to do with the application of lessons learned from specific cases towards the construction of a broader planning tool. While this approach was theoretically described and defended earlier in this chapter, potential problems do exist in adopting this strategy. I have stated that unique situations can contain comparable and useful lessons for other unique situations, provided that they share some macro contextual similarities. However, this statement cannot be taken as a blanket rule of thumb. It is essential that these comparable similarities exist in the right contexts. For instance, just because two American cases share a macro related federal political system, does not mean that the local social dynamics will be interchangeable. Rather, the belief that these cases are comparable is based on an understanding of differences inherent in every local setting, combined with an acknowledgment that even if a similar conflict issue has been observed before, the local dynamics in your targeted location must be understood before any appropriate solutions can be recalled. The comparative analyses are simply acting as references for developers to use when examining their current setting, and are thus not to be seen as exact replicas of what they should expect from a given local populace.

Related to this discussion, is the possible delimitation of including conflict issues and solution strategies drawn from foreign based wind power case studies. There will be definitive differences in the macro contexts between European and American cases (as well as one each from Japan and Australia). However, it is believed that the aspects of human dynamics involved in these cases make them worthy for inclusion into the DSM. By this, I mean that because communities from all over the world exhibit some similar forms of social interaction (i.e. between neighbors, local leaders, or other resident relationships); it is possible to include examples from these cases for use by American developers. In fact, I believe these foreign lessons comprise an essential part of the DSM. This is because experiences in the US with community based wind power are relatively limited, while in Europe it is an established practice; this experience should thereby be used as an educational example to American entrepreneurs.

A significant delimitation concerning the potential applicability of this thesis to a real world project setting is related to the essential aspects of wind power development which have been excluded from analysis. Among others, this thesis excludes issues such as grid interconnection and power purchase agreement negotiations. These two tasks have proven particularly troublesome for American wind projects, and thus represent aspects of development that should be carefully considered before engaging in a concrete planning process (Crocker 2010).

The DSM is designed with the intent of being a “context-flexible” planning tool. However, application of the “institutionally dependent” solution options is predicated on an understanding of current institutional conditions. Thus, if major institutional shifts occur (such as the introduction of a Feed-in-Tariff system) then the related DSM solution strategies may no longer represent favorable or feasible options.

Another delimitation of note could be directed at the intention to co-integrate the use of the DSM with aspects of the ESTEEM method. I have attempted to provide ample explanation for how these two resources could be used in parallel with each other (chapter 4), but I have not had the opportunity to test this hybrid method out. As such, it is not known whether the tools will smoothly supplement each other; if perhaps the process would be redundant; or worse, if they are simply not compatible in an actual development setting.

Finally, related to the previous point, I have not had the time or resources to test out the FDA or DSM on an ongoing wind power project. This test case would have given me valuable information that could be used to revise the proposed tool and method so that they could more appropriately meet an actual developer’s needs. This step is recommended for anyone wishing to utilize the thesis results or to conduct additional research on this method. It would serve as a means of verifying the FDA and DSM’s real-world functionality, and is something I hope to do in the future.

3 Analytical Tract One: The Current Situation

This chapter describes the process and results from the first analytical research tract taken in this thesis; it is dedicated to describing the current institutional situation faced by wind power developers in the US today. This analytical approach is based on the institutional analysis (IA) methodology. However, the traditional IA goal of suggesting wholesale institutional revisions has not been included as a thesis objective; thus, this "active" part of the IA philosophy has not been conducted. Instead, the amended IA process will help to identify the most prevalent regulatory, institutional, and financial obstacles affecting the locally relevant TPT's in the US. The goal is to provide community wind entrepreneurs with an accurate understanding of these existing institutional barriers. Upon describing these characteristics, their potential impact on the many micro contexts affecting a potential wind project is summarized. It is important to understand these "external" macro forces in order to design a mechanism capable of negotiating their local manifestations. The results of this chapter's analyses establish the theoretical boundaries that determine the importance/relevance of certain micro-conditions, and the feasibility of potential solution options (described graphically in the previous chapter, Figure 3). This connection is critical when applying the results of the second analytical tract, discussed in chapter 4, to an actual wind project setting. All descriptions in this chapter concerning the methodology and theoretical basis for the IA analysis are drawn from (Hvelplund 2009).

3.1 Normative Elements: Preliminary Assumptions for the Institutional Analysis

The preliminary methodological steps of an institutional analysis involve the establishment of analytical normative components. These include: who is conducting the investigation, why it is necessary, and what are the specific targets of analysis? These steps help define the perspective from which an analysis takes place so that the cognitive elements pertaining to the *concrete institutional context* can be more accurately understood. In order to facilitate a manageable work load, the normative components of this analytical process are summarized as preliminary assumptions in this section.

Who Is Conducting the Investigation?

Me; I am currently a graduate student in pursuit of a Master of Science degree in Sustainable Energy Planning and Management from Aalborg University, Denmark. Until recently, I have lived primarily in the US, and have thus developed my own personal perception of the conditions present in that country. As may have been derived from the introductory chapter, this research is motivated by a personal desire to participate in the growth of community oriented wind power. I believe there is an ethical imperative linked to the need for increased RE utilization; but, I also see this field as an opportunity to pursue a lucrative and morally satisfying career path. Thus, this thesis has been written from the perspective of a graduate student at Aalborg University, and as a potential wind power developer.

Why Is This Investigation Necessary?

Inadequacies in the US's energy system are well documented. Some of the most troubling aspects include: a heavy reliance on non-replenishing fossil fuels, a growing inequity in the US's international energy balance of payment, massive GHG emissions, and poor utilization of the economic benefits of RE (D'Amica 2008), (EIA 2008), (Tol 2004), (Heintz, Pollin and Garrett-Peltier 2009). As a means of combating these issues, wind power has seen significant growth in recent years. However, as discussed in the introduction, the primary means for this growth may not be beneficial for the long term health of the wind industry. This IA investigation is dedicated to describing the current institutional conditions present in the US so that critical obstacles can be assessed. Based on this understanding, a functional tool is constructed that helps developers to identify and address critical conflict issues, presumably leading to enhanced acceptance of community inclusive wind projects on a case by case basis.

What Are the Specific Targets of Analysis?

Based on discussions in the previous chapters, the primary areas of interest for an IA investigation include federal conditions as well as local characteristics that affect potential wind power development projects in the US. An overall goal of improving the ability for developers to construct community inclusive wind power projects has been set. Towards this end, the thesis intends to present a functional planning tool which can be applied to numerous development settings. No single physical site is isolated as the project's sole point of emphasis; instead, the main areas of analysis encompass the institutional, social, and economic barriers influencing the locally relevant TPTs that have commonly hindered wind power development in diverse local situations.

Additional Institutional Analysis Assumptions

The IA theory calls for an investigation of how radical the proposed technological change would be with respect to the current institutional system. The more radical a proposed change, the more vehemently entrenched interests will resist it. However, due to the project boundaries, this analysis is NOT a focal point for the thesis. It should be noted, though, that an expansion of locally driven wind power may actually reduce the need for immediate wholesale technological changes. Indeed, one of the perceived benefits of building a bottom-up industry is that system wide changes can be brought online incrementally, in step with the rate of expansion of dispersed, locally based wind power (Crocker 2010).

3.2 COGNITIVE ELEMENTS: CONSTRUCTING THE CONCRETE INSTITUTIONAL CONTEXT

The concrete institutional context is composed of macro, meso and micro contextual levels. These condition sets overlap through a multitude of pathways creating a complicated network of influential characteristics. I have claimed that these prevailing conditions experience shifts over time. However, it is still essential to understand these characteristics as they exist presently, in order to effectively utilize currently feasible development options for specific wind power projects.

My perception of these three contextual levels has greatly influenced the construction of the DSM. In an attempt to illustrate this beyond a theoretical conceptualization, the following sections summarize my view of the prevailing macro and meso conditions in the US, and their affects on community wind power. This summary represents the results of the first major analytical research tract followed in this report. The perceived micro context is also discussed in this section, but because this contextual level is seen as being unique to each individual development setting, descriptions of specific local characteristics have not been included. Instead, the predominant institutionally dependent micro issues seen in the US are presented in relation to the meso conditions that most directly influence their local manifestations.

3.2.1 Macro View: The Big Picture

The actors, dominant characteristics, and power relations outlined in this section provide an overview of the macro-context relating to US energy production. The basic relationships between these actors are considered with respect to national energy policy design. This result helps determine how the current situation at the national level affects meso and micro conditions in local development settings. Thus, while major system changes are not sought, understanding the influence of these macro conditions on local characteristics is of paramount importance when applying the DSM to a concrete project setting.

The most relevant actors on the national level, as I see it, include: the federal government and its two party political system, individual states, economically dependent interests, and economically independent organizations. This does not include an analysis of the many regulatory bodies which oversee all manner of development issues; they have been excluded due to the stated project boundaries. Summary descriptions of the examined actors' roles and a basic analysis of the power relations among them are provided. Figure 5 is introduced to serve as a visual illustration showing my view of the actors and power relations comprising the concrete institutional context in the US. These macro analyses establish the boundaries within which comparative micro analyses are carried out.

US Federal Government and the Two Party System

The main issue relevant at this level is the establishment of national energy policy. The primary actors participating in this activity consist of the President and members of the two Houses of Congress. Despite possessing a political majority throughout the federal government, President Obama is finding it very difficult to promote his domestic agenda, due in large part to the nature of the American governance and political system. This system is defined largely by a politician's desire to remain in office, a trend which has contributed to a distinct lack of long-term vision or stable policy formulation with respect to energy issues (Crocker 2010).

Directly related to the actors within the US federal government is the long standing prevalence of a two party political system. The two dominant groups have traded power over time in a relatively equal ebb and flow; a trend that can be associated with two major political themes. The first is that most legislative measures enacted by the more extreme actors during their time in power are usually reversed by the opposition once the tides switch. The second is that most lasting legislation has been conceived from a centrist point of view, requiring concessions from both parties, and commonly resulting in laws that are prohibitively weak (Hofmeister 2009). As these two groups become increasingly partisan and less willing to compromise, the prospects of effective centrist progress fade further away.

With respect to national energy legislation, neither party has been able to pursue a meaningful tract towards change; instead, both seem to have settled for perpetuating the status quo. Without the influence of viable political alternatives, the US's two parties are much less beholden to publicly popular, yet politically volatile issues (such as carbon taxes). Furthermore, in an electoral system that requires constant campaigning, support of one's party is crucial to the longevity of a politician's career, meaning that those who break ranks often lose their seat soon after. The influence of special interests is also of paramount importance, as these groups have attained persuasive access to political actors using massive campaign contributions and "expert" lobbying. The result is that politicians have consistently ignored the long term interests of the nation regarding energy independence and RE expansion (Hofmeister 2009).

Thus, the US political system, reliant upon two dominant parties, reinforces the legislative obstacles built into the federal governance system. This reduces the ability for third party activists or grassroots public movements to influence national politics. In my assessment, these factors indicate that the current incentives and regulatory conditions (described in the meso context section below), can be expected to last well into the foreseeable future. This perspective strengthens the call for a community oriented, micro contextually adaptive wind project planning tool that is designed to operate within the existing institutional setting.

Individual States

The US's 50 states have been included as a group in this federal analysis due to their role as independent RE regulators and promoters. Due to the absence of a comprehensive national RE policy, each state is left to promote (or not) wind power in its own manner. While this has led to some success (seven states have over 1000 MW installed wind capacity to date), it has left most lagging far behind. Despite many states possessing strong wind resources, over half have less than 100 MW installed and 15 have no utility scale wind power whatsoever (AWEA 2009, a). Furthermore, because of the extremely varied nature of state wind incentive programs, it is difficult to translate effective fiscal development strategies from one state to the next. A coordinated federal effort would greatly alleviate the confusion faced by developers working across state borders. In the ongoing absence of this effort, the DSM tool, developed in the thesis's second analytical tract, is intended to address some of these issues in their local settings.

Economically Dependent Interests

The range of stakeholders in this category is large, including: fossil fuel suppliers, power producers, transmission companies, utilities, manufacturers and unions. The most dominant among these have enjoyed a virtually uncontested reign as the US's preeminent energy actors for decades. Despite modest internal competition induced by the recent liberalization of many electricity markets, competition from alternative technologies has historically been extremely weak. As such, the influence of these traditional stakeholders on the direction of national energy policy can be seen throughout the past century.

The physical evolution of the electric system has been tailored to the requirements of large scale, centralized power producers. Federal financial assistance has reinforced this trend by favoring these traditional stakeholders. As shown in Figure 4, from 2002-2008, federal subsidies for fossil energy sources totaled 72 Billion USD (B USD), of which over 50 B USD went to tax exemptions for some of the largest and most profitable corporations in the world. Compare this to only 12.2 B USD in incentives for renewable sources during this time and federal favoritism becomes apparent (corn ethanol received an additional 16.8 B USD, but has recently been questioned from a climate change point of view) (ELI 2009).

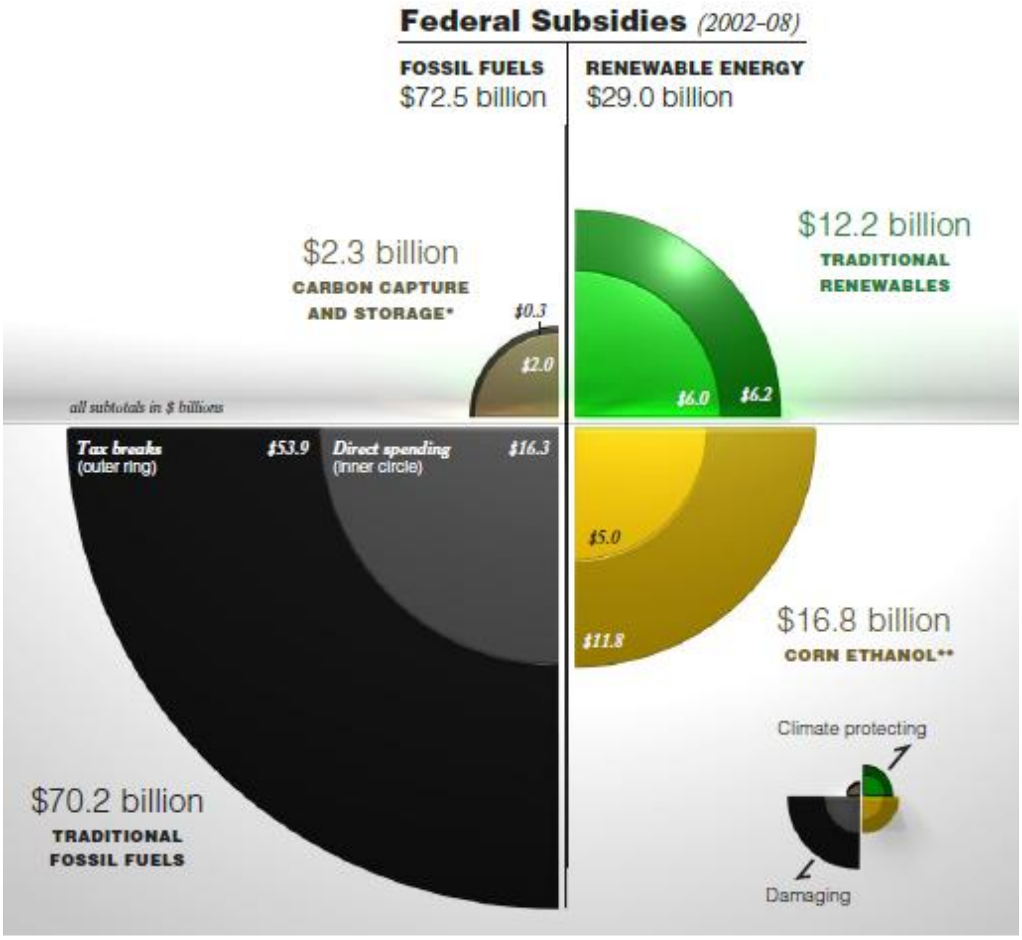

Figure 4: Graphical depiction of federal energy subsidies during President Bush's two terms (ELI 2009).

This incentive structure is no accident. The fossil fuel industry has consistently blocked attempts to re-work the tax code that would remove permanent tax breaks enjoyed by oil and coal companies (Crocker 2010). Similarly, they have succeeded in restricting federal RE incentives to rapidly expiring short-term measures, severely limiting their accessibility to many potential users (Mendonca, Lacey and Hvelplund 2009). This has been a major issue for decades; while neo-classical economists tout the success of the "free market" in its ability to spur energy development, they simultaneously cement the status quo by directing billions of dollars in federal handouts to the most powerful industry actors.

To suggest, however, that wind power has been completely shut out of the energy system would be inaccurate. Thanks to competitive economies of scale, state level incentives, and rising traditional fuel prices, large scale wind power has seen a growing influx of installations in the past decade. Even so, with 8500 MW of new capacity in 2008, the national percentage of electricity generated from wind in 2009 is projected at only 1.5% (AWEA 2009, c). From an equitability point of view the situation is worse, as the majority of these new wind projects have been undertaken by the same corporate energy actors that have traditionally dominated the market. As the intent of this thesis is to help alleviate barriers faced by community wind projects, this continued trend of corporate dominance is an area of particular interest.

While fighting to retain their traditional market share, most corporations realize that a transition to more sustainable means of energy production is inevitable. Therefore, they will position themselves as the de facto option for RE development, when it is sought. This is reflected in their support for federal production incentives that are accessible only to parties who possess large tax appetites, exempting most individuals and community partnerships (Bolinger and Wiser 2006). Similarly, an emphasis on fulfilling state renewable portfolio standards with the lowest cost option promotes the construction of huge wind farms to better capture economies of scale. While this may increase RE use as a whole, it does not provide the benefits associated with community ownership, discussed in chapter 1.

These market and industry barriers represent a major focus for the DSM. It has been designed with the intent of opening doors for individual and cooperative entrepreneurs who would not otherwise be able to enter the wind energy market due to legislative or economic obstacles. A number of solution options are identified in the DSM that will help level the playing field for non-corporate wind power developers.

Economically Independent Interests

At the national level, these actors primarily include politically motivated organizations whose roles and constituencies vary greatly. Several groups have emerged in recent years with the advent of social networking. Examples such as MoveOn.org and Repower America operate on a donor supported basis and boast millions of members (MoveOn 2009), (Repower America 2009). With the backing of major political and social figures like Al Gore, they have succeeded in raising the profile of issues such as climate mitigation and RE expansion. While their impact cannot be verifiably measured, more media attention does appear to be focused on these issues. Political candidates are now speaking more commonly in terms of "how" to achieve these goals rather than "if" they should be goals at all. However, the federal government has not yet adopted any binding legislation regarding GHG emissions, nor has it established a comprehensive RE policy. Furthermore, in the face of increasing political polarization, some intense reactions to this shifting discourse have emerged that threaten to negate important gains made by the public environmental movement.

In opposition to these organizations have sprung a series of groups designed to slow the ponderous public march towards meaningful action on climate and energy issues. These groups, most recently epitomized as “Tea Party” activists, have been organized and instructed by conservative political insiders to use tactics that disrupt debate and spread alternative “scientific evidence”, all in an effort to derail any progressive legislative proposals (CNN 2009). These attempts have certainly captured the media’s attention, and have succeeded in reviving some aspects of the climate change debate previously believed settled. However, their impact on policy developments is similarly uncertain.

US Actor Power Relations

Power relations among these many stakeholders are extremely complex. Interactions occur through multiple discursive and legislative avenues, some being far more transparent than others. For instance, while the official delineation of executive and legislative power is fairly well spelled out in the US constitution; personal egos, regional concerns, and procedural tactics all affect the outcome of legislative deal-making. Similarly, powerful lobbying outfits that support narrow special interests have attained unprecedented access to political lawmakers. These relationships are perhaps the most notorious in their nature because they imply that the will of the nation’s citizens can be usurped by the desires of an influential and morally ambiguous minority. Related questions could also be raised regarding many regulatory bodies, as these agencies often conduct their business behind closed doors.

On the other hand, the American public is barraged daily by a highly visible battle to control the content and tenor of policy discourse. This debate is conducted on a grand scale through the US’s 24 hour news networks. Political players vie for headlines and popular momentum using a variety of tactics which often play off the fears, emotions, or ignorance of various segments of the nation. Furthermore, national marketing campaigns have been rolled out by special interests and grassroots organizations that take vastly divergent viewpoints regarding climate change and national energy concerns. Unfortunately, as nearly every major media outlet is now under the control of a larger corporate entity, whose leadership may harbor specific policy or ideological objectives, the perceived independence that these organizations once touted is under serious scrutiny.

Overall, there is a nearly indecipherable cacophony among the multitude of actors at the macro level, often resulting in public frustration or apathy. While healthy debate is important when examining alternatives, the hectic and often virulent situation in the US has more recently succeeded in diminishing the prospects of meaningful progress.

In an attempt to identify the critical relationships existing in this context, Figure 5 was constructed to serve as an actor network map. Avenues of influence between these actors are displayed to show the complexity of political, social, and institutional conditions as they co-influence energy policy design. It should also be seen as an indication of the subtle fragility of this system. If one actor gains dominance over another, power relations can shift dramatically, leading to any number of legislative (meso) results. The relationships portrayed below are to be considered very basic representations of my perception of reality, and should primarily be used to help visualize the complexity inherent in this macro context.

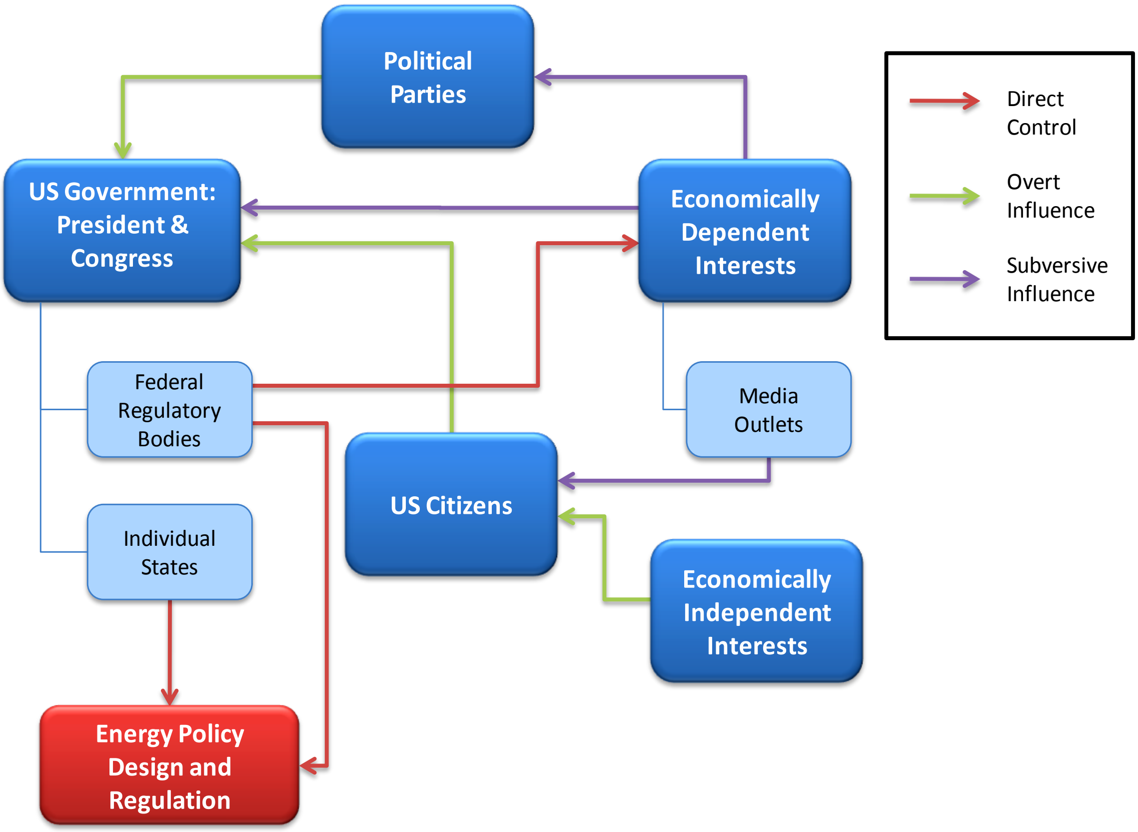

Figure 5: US macro-context actor network map. The red box symbolizes national energy policy creation and enforcement while the dark and light blue boxes represent various actor groups at the national level in the US. The relationships among the groups are summarized along the lines of direct control, overt influence (meaning publicly open influence), and subversive influence (indicating possible examples of covert agenda setting).

US Macro View: Summary and Relevance

There is little in recent history that would induce optimism regarding the potential for substantive or transformative energy legislation in the immediate future. Therefore, the macro-view regarding federal climate/RE policy should be understood as follows: until a new bill has successfully negotiated the entire legislative process and is signed into law by the President, then it is assumed that the current RE policy situation will persist into the foreseeable future. This current situation is one in which existing macro conditions are not overly favorable for the dissemination of community based wind development.

Thus, the existing institutional framework is reflective of current political dynamics, and is assumed to be in place during the application of the FDA methodology. Having said this, as the FDA is designed to function within a variety of conditions, the inevitable shifting of US macro conditions should not drastically alter the application of the DSM tool with respect to institutionally dependent conflict issues (excepting drastic overhauls such as a Feed-in-Tariff model). The extrapolated strategies provided for a given location may change based on differing national policy, but the methodology for producing these strategies remains intact. As such, the FDA should be useful under a range of macro conditions.

3.2.2 *MESO VIEW: LINKING THE BIG PICTURE WITH THE LOCAL PROJECT*

This section is intended to describe the analytical bridge connecting the macro conditions with the micro contexts encompassed by the TPTs. The policies presented here exist as a direct result of the prevailing macro characteristics, and as such, are subject to review within the thesis's first analytical tract. The major subjects of analysis are national financing and incentive mechanisms available to wind power projects. These are considered non-site specific, but are directly related to the implementation capacity of community oriented wind projects across the US. Thus, the results of this section help establish an understanding of the current situation with regard to which micro conditions and solution options can currently be deemed relevant for inclusion into the conflict issues and solution strategies libraries.

Despite lacking a comprehensive or consistent federal RE policy, a variety of nationally available financial incentives do exist in the US. The most utilized programs for utility scale wind power at the federal level are the Renewable Energy Production Tax Credit (PTC), Business Energy Investment Tax Credit (ITC), and the Modified Accelerated Cost Recovery System (MACRS). The ability to benefit from these programs is highly dependent upon the size of the proposed project and on the tax "appetite" of project investors. Additional mechanisms such as federal grants, loan guarantees, and other investment incentives also exist, but are highly specialized in terms of what types of entities are eligible. These include: Clean Renewable Energy Bonds (CREB), Renewable Energy Production Incentives (REPI), New Market Tax Credits (NMTC), and the Rural Energy for America Program (REAP) (Windustry 2008).

These federal mechanisms are summarized with respect to their eligibility requirements and potential financial benefits for wind power developers. Associated actors from the previous macro section are referenced when appropriate regarding their capacity as relevant stakeholders affecting the stability or projected future manifestations of these policies. Thus, the following provisions constitute the federally available incentives currently considered as viable development strategies in the DSM.

Renewable Energy Production Tax Credit (PTC)

The PTC is the most widely utilized incentive available in the US to date. It provides an inflation adjusted tax credit valued, in 2009, at 21 USD/MWh of electricity produced for the first ten years of operation. This fairly substantial incentive has served as the primary means of promoting RE since Congress created it in 1992. It has been credited with spurring the majority of growth in large scale wind power installations over the last decade (Wiser, Bolinger and Barbose, Using the Federal Production tax credit to build a durable wind power market in the US 2007). However, in its current form, the PTC carries with it major drawbacks that have consistently plagued the US wind industry.

Foremost, the PTC is typically only renewed by Congress for one or two years at a time, having been allowed to expire on three separate occasions. This uncertainty has severely damaged investor confidence and subsequently increased project risk assessments. Additionally, during periods of expiration, there has been a virtual standstill in turbine installations nationwide. This uncertainty, combined with the related boom and bust cycle, has been blamed for the following detrimental wind industry effects: slowed overall wind development, increased project costs, limited domestic manufacturing industry growth, and reduced expenditures on R&D (Wiser, Bolinger and Barbose, Using the Federal Production tax credit to build a durable wind power market in the US 2007). Figure 6 shows the up and down trend of annual wind installations as a result of the PTC's instability.

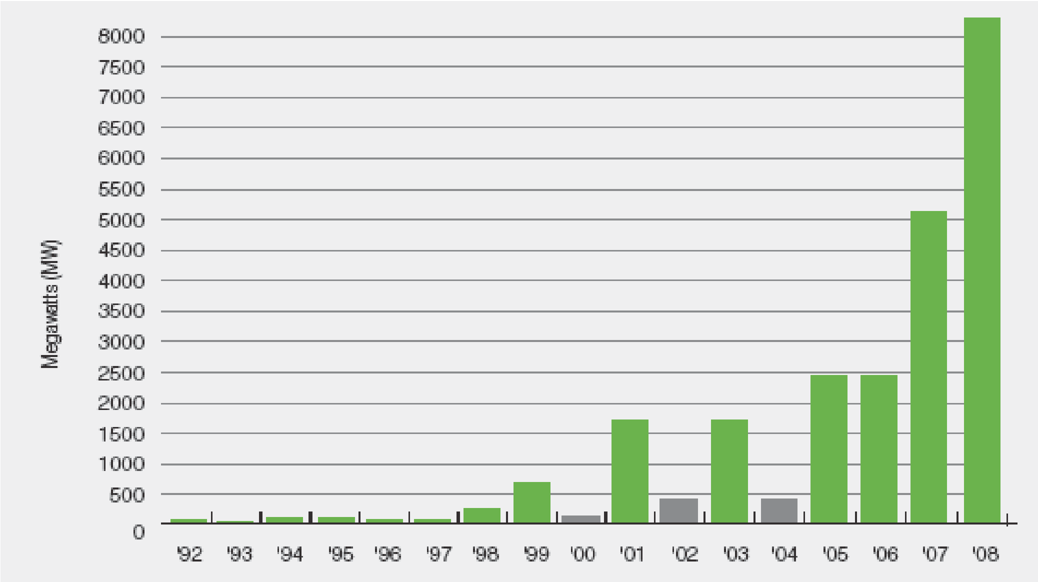

Figure 6: Annual installations of wind power in the US. Green bars indicate years in which the federal PTC incentive was relatively stable. The grey bars (years 2000, 2002, and 2004) show the years immediately following expiration of the PTC (which occurred in '99, '01, and '03). Since 2004, the PTC has been renewed without lapse, leading to the significant increase in annual installations, even if they are mostly corporate owned projects (AWEA 2009, d).

Another drawback, more closely linked to community wind development has to do with the eligibility requirements for those seeking to utilize PTC benefits. This incentive has traditionally been accessible only to entities with a tax "appetite" (the amount of federal taxes they owe annually) that is at least as large as the annual benefits from the PTC. For instance, a 5 MW wind farm operating at a fairly reasonable 33% capacity factor would produce approximately 14,500 MWh/year; this equates to a potential tax credit of 300,000 USD annually for the first ten years of operation. However, as this credit can only be claimed by a project stakeholder who owes this much every year in federal taxes, many smaller investors, or entities that are exempt from federal taxes, are unable to collect this incentive in its entirety. An additional caveat makes a differentiation between material participants and "passive" stakeholders, meaning that a group of owners who collectively owe enough in income taxes would have to be actively involved in the running and maintenance of the wind farm in order to qualify for the PTC (on the order of 500 hours per year), which is quite rare (Windustry 2008). These qualifiers have severely hindered the ability for local wind entrepreneurs, non-profit organizations, electric cooperatives, or most governmental bodies to access the PTC; thereby limiting their ability to compete economically with conventional technologies or large corporate wind power developers.

While it can be quite difficult for community owned projects to access this important incentive, several novel ownership structures have been devised that work around these barriers. The most promising, known as "flip" ownership models, are discussed in section 3.3. Additionally, legislators included some important expansions to the PTC in the 2009 American Recovery and Reinvestment Act (ARRA), or "stimulus" bill. Most significantly, the PTC was extended to 2012, providing a brief period of stability for wind developers (DESIRE 2009).

Looking towards the future potential of the PTC, it is estimated that a ten year extension could reduce the cost of wind projects by up to 20 percent. This could also significantly increase domestic turbine manufacturing and related job creation (Wiser, Bolinger and Barbose, Using the Federal Production tax credit to build a durable wind power market in the US 2007). However, unless the eligibility criteria are expanded to allow entities with limited or no tax liability to access the PTC, then it is unlikely to be an equally powerful tool for community owned wind projects. One suggestion, explored in a number of state programs, is to allow the tax credits to be sold, thus allowing small investors and public entities the means with which to utilize this incentive. However, for application of the FDA in the existing regulatory environment, the PTC is considered to remain as written; thus requiring community developers to utilize innovative methods in order to capture its important economic benefits.

Business Energy Investment Tax Credit (ITC)

The ITC has traditionally served as an incentive for small scale RE projects. It provides a federal tax credit valued at 30% of the investment costs for "qualified property", meaning new equipment that "is used as an integral part of the wind energy facility" (Yarano and Mertens 2009). This credit is authorized for eligible systems placed in service by the end of 2016, making it one of the most stable federal RE incentives available. Unlike the PTC, there is no requirement that energy must be sold, only that the completed facility produces electricity. This means that the turbine can be utilized "behind the meter" for onsite use, instead of having to sell electricity on the market. This is significant in that it reduces the need to secure a PPA in order to assure long term project profitability. Furthermore, because the facilities are generally smaller and less expensive, it has traditionally been a more accessible incentive for community based wind power than the PTC, as the required tax appetite is much lower.

Recent legislative revisions included in ARRA have expanded the scope of the ITC in an effort to spur large scale investment in the tight credit climate. Projects of all sizes that are eligible for the PTC can now elect to receive the ITC 30% credit in lieu of the PTC. While this effectively removes the turbine size limitations, it does require that the project meet PTC eligibility, thus also removing the behind the meter option. A second very important addition allows developers eligible for either the PTC or ITC to instead choose a cash grant payment from the US Treasury Department equal to 30% of their investment costs. This is particularly useful for investors who don't carry a sufficient tax appetite needed to utilize the PTC or ITC credits; it effectively levels the playing field among financially diverse stakeholders for gaining access to these crucial incentives. However, this option is only available to projects which begin construction by the end of 2010, greatly limiting its long-term usefulness (Yarano and Mertens 2009).

In general, the ITC is more accessible than the PTC for most community based projects. The ability for investors to choose a cash grant significantly expands the range of actors that could benefit from either mechanism, but the expiration date makes it unlikely that future projects will have this opportunity. Thus, while the ability to choose the ITC instead of the PTC does provide a useful option for developers looking to establish alternative ownership structures; once the cash grant option expires, the disparity between community and corporate actors regarding access to these incentives will remain largely intact.

Modified Accelerated Cost Recovery System (MACRS)

MACRS refers to the federal government's program for allowing accelerated depreciation of commercial and industrial assets. In this case, it applies to the 5 year allowable depreciation of most RE generators, including wind turbines. This effectively allows a wind farm owner to write off the value of the turbines over 5 years instead of 20, thus reducing their reported federal tax burden (DESIRE 2009).

This program allows a project owner to reduce its income tax liability by the amount of depreciation in a given year, thereby freeing up additional cash for near-term use. However, similarly to the PTC, these incentives are dependent on the investor's existing tax appetite, and are therefore difficult for non-corporate owners to utilize. The usefulness of the MACRS program for most community wind developers may lie in the ability to entice larger investors into the ownership scheme by allowing them to receive the depreciation benefits, while reducing the debt or equity requirements on the local stakeholders.

Clean Renewable Energy Bonds (CREB)

The current CREB program allocates 2.4 B USD worth of zero interest bonds for use by local or state governments, municipal entities, and rural electric cooperatives. These bonds are backed by the federal government, which offers tax credits to the bond holders/lenders in lieu of the traditional interest payment usually made by the issuer/borrower. The CREBs are reserved for RE investments made by non-taxable public entities, partially filling the void left by certain exclusions in the PTC tax structure. The bonds are distributed by the Department of Treasury starting with the lowest cost projects, until the total fund has been exhausted. There is no expiration date on the current amount, but there is also no indication of future allocations, and thus little certainty that this incentive will persevere (DESIRE 2009).

The CREB program does hold considerable potential for use in community wind projects, though the terms of ownership and revenue distribution would have to be carefully drawn out in order for public/ private partnerships to remain eligible for the incentive. These restrictions may make it difficult for use by developers looking to construct for-profit wind farms, but could be extremely useful to communities wishing to develop municipally beneficial projects. Much like the MACRS program, this incentive may be most helpful in designing innovative community ownership structures.

Renewable Energy Production Incentives (REPI)

The REPI program is designed to extend RE incentives to public entities which lack tax appetites necessary to harness the benefits of the PTC. Operated by the Department of Energy, REPI authorizes a production incentive equal to that of the PTC for qualified facilities in operation before 2016. The main differences between REPI and the PTC are that receiving entities must be a government, tribal, or non-profit electric cooperative; and, more importantly, funds are allocated on an annual basis by Congress. They are therefore not guaranteed to all eligible RE producers in a given year. In 2007, 2.7 B USD was allocated for REPI, while an additional 11.25 B USD worth of eligible production went unpaid. Because of this uncertainty, REPI cannot be counted upon as a steady revenue stream (USDOE 2007).

While the REPI incentive has the potential to serve as a valuable tool for promoting community based wind development, in its current state, it cannot be relied upon by the vast majority of eligible projects. The concept, however, is one that shares positive aspects with the highly successful Feed-in-Tariff models used by many European countries. Extending REPI eligibility to non-public entities who still don't meet the PTC tax requirements as well as fully funding the program for each generator's first 10 years of operation could create a massive boon in community wind development. However, without any indication that this will happen, the REPI program is not considered a reliable development incentive.

New Market Tax Credits (NMTC)

The NMTC program directs private capital investments into communities of need in the US. The NMTC grants a federal income tax credit to investors who provide equity investments in Community Development Entities (CDE), which in turn provide equity investments or loans to eligible projects. These projects are authorized based on their economic impact or job creation potential for communities with low median income or significant out-migration over a period of time. The investor receives a federal tax credit which can be applied to any federal income liability. The credit is spread out over a seven year period at a fixed rate, after which the initial investment can be redeemed (Windustry 2008).

This program is not limited to RE developments, but wind projects are considered eligible for CDE and NMTC incentives. This provides an additional method by which developers can raise valuable capital needed for utility wind projects, particularly in areas which have suffered sustained economic hardship. While the initial allotment of 23 B USD is almost entirely committed, Treasury Secretary Tim Geithner recently announced 5 B USD of additional NMTC funding for 2010 (USDT 2009). While it is unclear how much longer this program will be extended, it appears to be a preferred method of encouraging private investment, and is thus considered to be a viable strategy for financing projects in qualified areas.

Rural Energy for America Program (REAP)

REAP is operated by the US Department of Agriculture for the purposes of promoting energy efficiency and renewable energy developments for farmers and small rural businesses. 350 Million USD has been approved until 2012 to be issued through a competitive grant process for qualified applicants. Awarded funds can be used to supplement up to 25% of total project expenses, not exceeding 0.5 M USD per grant. 10% of total REAP funding can be used to finance feasibility studies for qualified projects. The REAP loan guarantee program allows RE developers to negotiate better terms with commercial lenders by having the US government guarantee a majority portion of the loan, up to 25 M USD. Eligible applicants include individuals who gain at least 50% of their gross annual income from agricultural activities, small business operating in rural areas, and rural electric cooperatives (USDA 2009).

This program is a potentially valuable source of financing for rural wind developers. The major drawback is the relatively small amount of total funding available. Despite this issue, REAP is considered to be a potentially viable financing development strategy for qualified projects, particularly for initial feasibility study costs which are often the most risky aspects of smaller scale wind power projects.

3.3 Micro View: What to Do Within The Current Institutional Context?

The micro view presented here discusses some major characteristics to consider at the local level of wind power implementation. These are reflective of the two major categories explored in this thesis's two analytical tracts; the first being local manifestations of the institutional macro and meso conditions discussed above; the second involving local stakeholder dynamics. The latter are discussed only briefly in this section, with more detail presented in chapter 4 and Appendix A. The first group comprises the primary focus for this section due to their connection to the analytical research tract that has been followed in this chapter. These micro characteristics are directly affected by the broader institutional conditions described above, and are therefore deemed relevant for fulfillment of *Specific Thesis Aim, a*.

The institutional micro issues discussed in this section are primarily focused on identifying feasible local development options for maneuvering around prohibitive regulatory meso conditions. This is important so that community projects can access the substantial incentives that are available at the federal level. Without discussing possibilities for altering the macro context, the most effective means for utilizing these incentives are related to the type of project ownership structure employed. Despite the many legal and regulatory obstacles, several innovative structures have been explored that significantly improve a developer's ability to harness crucial incentives. These are considered micro contextual issues because they are reliant upon local circumstances, and are functionally dependent upon prevailing meso conditions. A brief review of some critical local stakeholder dynamics are presented below, followed by a broader analysis of the most promising ownership models recently evaluated in the existing literature.

3.3.1 Analytical Tract Two, Current Micro Situation: Local Stakeholder Dynamics

Micro conditions affecting local stakeholders' resistance to wind power projects are primarily reflected by the first three TPTs; reactions to site selection, local resident dynamics, and the perception of the planning process undertaken by the developer. These are issues that have recently been found to have a much more vital role in the success rate for wind projects than previously believed. Because of this, an improved understanding of these issues, and their root causes, has been called for. This research goal has influenced the second analytical focus for this thesis (primarily presented in the next chapter), and is directly related to the creation of the conflict issues and solution strategies libraries called for in *Specific Thesis Aim, b*. They are discussed briefly in this chapter due to their relevance in describing the "current situation" regarding wind development in the US.

The primary micro contextual issues inciting local stakeholder resistance as reported in academic literature, case studies, and by the interviewees in this report are as follows:

1. Local opposition by neighbors of proposed turbines is a serious roadblock for many projects. This type of opposition has commonly been written off as NIMBY motivated, though recent research suggests numerous alternative reasons for why local residents oppose specific projects.

This is perhaps the most misinterpreted local reaction to wind project proposals (as discussed in the introductory chapter). Numerous alternative reasons for opposition are suggested, including: site selection issues (mentioned below, step 2), resistance based on local actor relationships (Krohn 1998), perceived unfairness of the planning process (Jones and Eiser 2009), and perceived inequity in the ownership/ revenue model used (Karlsson 2009). These types of issues are complex and unique to each local setting. Therefore, a comprehensive understanding of a project's micro setting is highly recommended in order to appropriately address this range of issues. This task is detailed in the following chapter, during the description of the "conflict issues identification" stage.

2. The perceived effect of project site selection in terms of aesthetic impact and resident "attachment" to the landscape is considered by many researchers as the number one reason for why local residents object to specific wind power proposals.

This type of issue is cited in numerous case studies and academic articles as an explanatory reason for the discrepancy between general support and specific opposition to wind power projects. One such example states, "If the perceived visual quality of a project is positive, people will probably support it. If the perceived visual quality is negative, people may become opponents, even though they remain in support of wind power in general" (Wolsink and Maarten 2000).

3. Poor developer practices during interactions with the local community during the project's planning, development, or construction stages.

This issue has been cited in many case studies as a primary reason for why initially neutral and even positively leaning local residents develop decidedly negative attitudes as a project progresses within the community. Withholding information, presenting false information, conducting negotiations with certain stakeholders behind closed doors, and project planning without participation from local stakeholders are all prime examples of developer practices that inevitably lead to opposition (Krohn 1998), (Cass and Walker 2009), (Devine-Wright 2005).

While there are a multitude of related and independent issues that also affect the local reaction faced by a given project, these are too many to list here. Chapter 4 describes the "conflict issues library", the "solution strategies library", and the DSM tool, which links these two databases together to form a functional planning methodology. The process for identifying these local stakeholder issues and associated solution tactics is also presented in the next chapter, fulfilling *Specific Thesis Aims b and c*.

3.3.2 *ANALYTICAL TRACT ONE: INSTITUTIONALLY DEPENDENT MICRO CONDITIONS*

The remaining sub-sections in this chapter discuss the institutionally dependent micro conditions present in the US which reflect the fourth and fifth TPT categories: establishing equitable and profitable ownership structures, and successfully acquiring the financial resources needed to complete community oriented wind projects. The related micro issues detailed below present several wind project ownership structures which are currently used as a means of negotiating these two TPT categories within the constraints of the current concrete institutional context in the US. Accepting that this concrete context is prone to cyclical shifts, these micro options may not be entirely relevant in future institutional settings. However, in the present climate, addressing these institutionally dependent micro conditions in combination with the macro and meso investigations shown above, essentially completes the analytical tract one investigation related to *Specific Thesis Aim a*.

Traditional Ownership Models: Land Lease and Single Owner

The most common method of local involvement in wind farm ownership is restricted to that of landowner. In this model, a local resident is offered a lease payment from the project developer for the right to construct wind turbines on his/her land, typically in the range of 2,000 – 10,000 USD per year for each turbine (Bolinger and Wiser 2006). The landowner has nothing more to do than accept the existence of the new wind facility on his land. While this may seem like a decent deal, many potential issues can arise through this structure. As discussed in chapter 1, without receiving any compensation of their own, other local residents may feel that they have been unfairly burdened with this new development, without having had the opportunity to participate in the planning stages or share the profits. This can incite jealousy, opposition, and outright conflict (Cass and Walker 2009). Aside from this, "the lease payments made to farmers by commercial wind project developers typically pale in comparison to the amount of income the farmer could earn if he instead owned the turbine himself" (Bolinger and Wiser 2006). This suggests that a landowner with the financial means to construct a project of his own would be far better off doing so. However, single ownership does not solve the social issues that can arise within the rest of the community. It also entails far greater risk and responsibility.

"Simple" Multiple-Owner Structures

A common practice among farmers is the cooperative structure. In this arrangement, the owners of an investment extract benefits through its use (for wind turbines this would mean electricity consumption). However, this structure requires the cooperation of a distributing utility in order to use existing electric grids. This is very unlikely in most cases, and therefore the traditional cooperative model is not considered widely feasible. Instead of this traditional cooperative setup, a multiple-owner structure can be employed. The LLC model (Limited Liability Company) is perhaps the most feasible alternative. This method maintains the cooperative principles of shared ownership; but also allows for single taxation (as in a partnership), bestows individual legal protection to each investor (as in a corporation), and permits flexibility in financial and regulatory matters (Bolinger and Wiser 2006).

The "simple" multiple local owner structure is set up as a share issuing LLC. In this case, the developer group will issue shares to interested investors as a means of raising equity (usually between 1,000 - 10,000 USD per share). Shareholders are then considered owners proportionally to the amount they've invested, distributing the revenue accordingly. This is similar to many successful European examples. Unfortunately, in the US, a company raising equity through share offerings is required to register with the Securities and Exchange Commission. This usually requires, at minimum, tens of thousands of dollars in legal fees, which can be prohibitive for smaller projects. Additionally, difficulty in accessing the PTC may still be present. Each investor is eligible to claim their proportional amount of the PTC, but if they don't have a sufficient “passive” tax burden to offset the fraction of the credit they're entitled to claim, then they will still not be able to benefit from the PTC. However, as many farmers do collect some passive income through field, pasture, or machinery rentals, then the smaller PTC amounts eligible to each part-owner may make this a viable structure in certain circumstances (Bolinger and Wiser 2006).

While a simple solution to this ongoing tax problem would be to allow the PTC credits to be traded on market, this has not been embraced at the macro level. Having gotten tired of waiting, several developers have proposed novel ownership models that attempt to circumnavigate the issues of tax liability. The two most prevalent structures being given significant consideration in the literature to date are the Minnesota and Wisconsin style “Flip” models.

LLC: "Minnesota-Style Flip"

This ownership structure prescribes that a partnership between a single landowner and a larger corporate entity be established. The corporate partner should contribute 99% of project financing as equity upfront. They will then receive the proportional revenue, RECs (Renewable Energy Credits), and importantly, the PTC and MACRS benefits for the duration of these incentives. After the PTC expires (10 years), or a minimum payback threshold is reached, the corporate partner "flips" its 99% stake over to the landowner in exchange for his/her 1% stake. The landowner is then able to receive the bulk of the production revenue without any debt obligation for the remainder of the project’s lifespan. This is an effective means of promoting local ownership while also creating competitive economic terms within the current meso incentive structure. The major drawback is the need to find a willing corporate partner to put up the 99% equity stake. Additionally, the agreement with only one local landowner could incite local resistance as discussed previously in the single landowner description (Bolinger and Wiser 2006).

LLC: "Wisconsin-Style Flip"

The Wisconsin-Style Flip structure differs from the Minnesota model in three main ways. First, instead of a single landowner, an LLC comprised of local investors buying relatively small shares is joined by a corporate investor in order to fully utilize the PTC and depreciation incentives. Second, the local LLC raises approximately 20% of the project costs through share offerings (as opposed to 1%), but then loans this amount to the corporate partner, so it is now structured as debt financing instead of equity. The corporate partner should put up 30% of its own resources as an equity stake and then borrow the remaining 50% from a commercial lender. This leaves a 70/30 debt to equity ratio, and the corporate partner operating as sole owner of the project. Third, at the end of the 10 year PTC period (or when minimum payback is reached), and after the corporate partner has repaid the entire 50% commercial lender debt, they then drop out of the project. Full ownership is transferred over to the local LLC in exchange for the corporate partner retaining the original 20% stake it was loaned by the local LLC (but also having paid interest to the LLC on the debt throughout the 10 years) (Bolinger and Wiser 2006).

At this point, the local LLC is essentially left with 100% ownership of a debt free wind farm. The initial stake paid in by local investors is much higher (20% as opposed to 1%), but the LLC does receive interest payments throughout the first 10 years (though the actual debt amount remains unpaid). There are major questions, however, regarding tax issues, because this structure (as of 2006) had not yet been employed in an actual project setting. Additionally, the regulatory issues involved in share offerings may still be present, and thus could raise costs and complexity considerably. However, because a multitude of local investors can be included in this structure, it has the potential to greatly improve acceptance levels within the community. It may also be more enticing for corporate partners, as the equity requirement on them is only 30% as opposed to nearly 100%.

Ownership Structure Summary:

In short, there is no perfect structure for promoting community ownership in the US. The options shown above provide various pros and cons in terms of equitable stakeholder distribution and financial investment acquisition. There are a multitude of other possibilities which could be discussed in this section, but in an effort to reduce the raw amount of data provided, the current list will have to suffice. Alternative ownership suggestions are included in the solution strategies library, which can be referenced as part of the DSM in Appendix A. In general, each PM will have to examine the capabilities of his/her investors, the desires of the local community, and the prevailing meso conditions at the time of project development in order to select appropriate ownership and investment strategies.

The simplest method in which local ownership is ensured is probably whole ownership by a single landowner. Unfortunately this has been shown to create resistance within the affected community in many cases. This also requires the landowner to possess significant resources in order to achieve initial financial viability for the project. The "multiple owner structure" would appear to be the most favorable community inclusive method due to its many local investment opportunities, but faces major challenges with respect to utilizing crucial federal incentives, and may be penalized due to regulatory restrictions on public share offerings. The two “flip” structures offer enticing means of combining the economic benefits enjoyed by large project investors with the social benefits of local project ownership. Each structure is designed to maximize a project's ability to fully utilize the federal PTC and MACRS incentives. Furthermore, the corporate partner brings ample initial capital, and likely much improved commercial lending rates due to their larger financial portfolios. However, in each case the local investor(s) must wait a decade before acquiring ownership. The legal complexity of the contracts required to protect each party also presents a daunting challenge, and the ability to enroll a willing and capable corporate partner is by no means assured.

Each structure described above has its benefits and drawbacks. The one constant for wind developers in the US is that it won't be easy. The institutionally ingrained regulatory and incentive framework presents obstacles at every turn, and this report doesn't even address the issues raised by the multitude of different state systems in place. The bottom line is that a legal and financial expert will be absolutely essential in order for any complex local ownership structure to be successfully established.

4 Analytical Tract Two: Building a Toolbox for Addressing Local Stakeholder Dynamics

The main focus of the thesis has been to improve our understanding of, and ability to, identify locally relevant wind power planning conflict issues; and then to construct a tool that will enhance a developer's ability to address these identified issues using proven and novel solution strategies. In order to accomplish this level of understanding I have engaged in two primary analytical research tracts. The first tract focused on describing the institutional barriers present in the US that are currently hindering (or facilitating) the implementation capacity for community oriented wind power development. This analysis was presented in chapter 3, and fulfilled the primary goals set forth in *Specific Thesis Aim a*.

The second analytical tract taken in this thesis has revolved around the identification of conflict issues related to local stakeholder dynamics within communities directly affected by prospective wind projects. This approach has led to the development of a conflict issues library, which identifies a wide range of potential problems involving local stakeholders (developers, residents, local authorities, etc…). This database is accompanied by a solution strategies library, which lists a series of potential solution options designed to address the conflict issues included in the first library. This task has been undertaken throughout the research process; the full list of results is available in the completed libraries included in Appendix A.

The current chapter continues along this second analytical tract by describing the process followed during the compilation of these two libraries, thus fulfilling *Specific Thesis Aim, b*. The methodological steps behind the creation of the novel wind power planning tool, referred to in this report as the Development Strategy Matrix (DSM) are also presented, as is an accompanying functional methodology called the Flexible Development Approach (FDA). These two steps effectively fulfill *Specific Thesis Aim, c*.

Towards these last two main thesis objectives, this chapter presents the tools, both existing and proposed, which are suggested as a means of improving a developer's ability to complete profitable, community oriented wind projects. The chapter begins with a description of the existing ESTEEM methodology in order to illustrate its relevance in the creation of the DSM tool, and to facilitate its use in tandem with the proposed FDA methodology. The two knowledge libraries are then described along with a novel "Matching System" that was constructed in order to provide functional user capabilities for the DSM. Supplementary steps from ESTEEM have been extracted for use in tandem with the DSM to form the FDA planning methodology. The completed method is then applied in a hypothetical setting using the "running example" as the case study. This is done in order to demonstrate the FDA's ability to integrate the DSM tool into a wind project planning process. The actual DSM tool and associated libraries are included on an accompanying computer disc in Microsoft Excel format, as Appendix A.

4.1 ESTEEM: Providing an Established Methodological Framework

With the intent of defining ESTEEM's role in the creation of the DSM and FDA, an overview of the ESTEEM methodology is provided in this section. ESTEEM was put together in order to improve the working relationship between PM and vested stakeholders involved in RE project development. ESTEEM provides a series of steps and tools designed to enhance understanding, communication, and cooperative solution management between these main parties (ESTEEM 2008). These goals and the methods used to achieve them, share many similarities with those set forth in this thesis. As such, ESTEEM has served as a basic framework for the construction of the DSM tool. It is also seen as a helpful supplementary resource during application of the full FDA methodology. Aspects which are considered particularly relevant to the current thesis are highlighted. Potential problems with the methodology have been identified, and improvements built into the FDA are mentioned. The final integration of the ESTEEM and FDA methodologies is described in section 4.3.

4.1.1 How Does It Work

The target ESTEEM user is a dedicated consultant working closely with the PM. The process begins with a pre-assessment test to determine the usefulness of the tool for a particular project. An interactive website then directs the user through the following six involved steps.

1. **Project Past & Present**: Together with the PM, the consultant constructs a project narrative dating back to its origins. A description of the institutional and social context in which the project exists is called for. Defining moments from its past are identified and a table of the major actors, as seen by the PM, is constructed.

2. **Vision Building**: The consultant is now tasked with compiling "visions" of the project from the PM and "core stakeholders"; this group is identified based on the main actors table developed during step 1. The stakeholder visions are constructed by asking them to react and respond to the PM's current and future vision for the project.

3. **Identify Conflict Issues**: The consultant utilizes a "key issues table" to determine potential areas of conflict based on the visions compiled in step 2. This table also helps highlight areas of consensus which can be used as points of compromise between various stakeholders. An "Issues Ranking Table" is then constructed which helps identify the conflicting issues in terms of urgency ("how costly and risky it might be to not deal with it rapidly") and importance ("how much project success depends on solving it"). This allows the consultant to identify issues which are most crucial to project acceptance or success, and directs the PM's attention to these issues.

4. **Portfolio of Options**: This step is intended to help identify aspects of the project that could/ should be modified in order to improve stakeholder support and increase the likelihood of project acceptance. An "issues solution table" is constructed based on ideas developed by the PM and consultant, considering the key issues identified in step 3. The PM is instructed to select his/her preferred solution options while the consultant is tasked with identifying the most favorable options from the stakeholders' points of view in preparation for future negotiations.

5. **Getting to Shake Hands (Stakeholders Workshop)**: ESTEEM instructs the consultant to conduct a comprehensive workshop in which the PM and all core stakeholders are invited to participate. The overall narrative of the project is presented along with the key conflict issues identified; the intent is to elicit solution options directly from the stakeholders. The PM's solution options developed in step 4 are also presented in order to gauge stakeholder response. The workshop results are later distributed to all participants in a summary meeting report.

6. **Action Planning**: This step determines which of the solutions preferred by local stakeholders are most feasible for the PM. Recommendations for a concrete course of action are presented to the PM by the consultant. ESTEEM calls for the following action plans: a short-term action plan, collaboration plan, long-term monitoring/ capacity-building plan, and a communication plan.
    - The above step descriptions are paraphrased from: (ESTEEM 2008).

Essentially, the consultant develops a picture of the present and future condition of the project as envisioned by the PM and relevant stakeholders (i.e. regional authorities, policy makers, financiers, local government, local residents, competitors, etc…). These "visions" are then compared to determine areas of agreement and conflict between the many actors. Aspects of the project that are expected to elicit the greatest potential conflict are listed in a "conflict issues table", and ranked according to their importance regarding ultimate project success and timeframe urgency. The PM and consultant work together to propose a series of solution options for each of the identified conflicts; a "feasibility ranking" is assigned to each potential strategy. The consultant then engages stakeholders during a workshop through a structured discussion focusing on the major conflict issues identified in step 3, with the intent of eliciting possible solution options from the attendees. The stakeholders' proposals can then be brought into consideration along with the PM's preferred strategies to determine the most acceptable and feasible course of action for the project. The final step has the consultant and PM organize the identified solution options in terms of four dedicated action plans.

With these action plans in hand, it is believed that the PM will be better situated to gain local popular support, improve collaboration with influential stakeholders, and be more aware of possible future institutional or policy obstacles. It is recommended that between three and six months be given for completing the entire process (ESTEEM 2008).

4.1.2 How Is It Relevant

ESTEEM has served as a methodological foundation for the construction of the FDA. This is based on the observation that ESTEEM was designed with the same general objectives and analytical approach in mind. For example, ESTEEM presents a methodology and tools to use in an effort to improve the rate of acceptance for RE projects. It emphasizes collaboration between the PM and affected stakeholders to determine the most feasible and mutually favorable solution options for identified conflict issues. The authoring researchers also utilized previous case studies as their primary reference source in determining the most crucial development aspects to address. These characteristics are all similar to the main concepts inherent in the construction of the DSM and use of the FDA; making the background research and functional outputs of ESTEEM particularly relevant for this thesis.

Because of these similarities, ESTEEM is seen as a useful framework upon which the FDA can expand. However, unlike the FDA, ESTEEM is intended to guide a user through virtually all stages of project planning related to stakeholder acceptance. With this in mind, steps 3 and 4 ("identify conflict issues" and "portfolio of solution options") in the ESTEEM process most closely relate to the issues encompassed by the Specific Thesis Aims, and are most compatible with the FDA methodology.

4.1.3 Why Isn't It Sufficient

After reading the previous section you may be wondering why the FDA is necessary at all if ESTEEM already addresses the primary objectives set forth in this thesis. There are several reasons, summed up in the following four related concepts, listed here and discussed in the sub-sections below: there is a need for higher specificity relating to particular technology types, an over reliance exists on the PM's existing knowledge base, issues with its successive decision process jeopardize the validity of results, and an inverse relationship between information availability and project planning flexibility limits the stages of project development in which ESTEEM is useful. These concepts represent weaknesses identified within ESTEEM that have been improved upon in the FDA. Short descriptors of the improvements made in the FDA are listed along with these four ESTEEM problem issues.

Higher Specificity

ESTEEM has been designed to promote social acceptance for a multitude of technologies in a wide variety of settings. As such, the steps, tools, and corresponding instructions are somewhat vague. Furthermore, the guided method is intended to address issues and engage stakeholders at multiple levels of involvement (local, regional and national stakeholders; infrastructure considerations; manufacturers; local residents; etc…), which also contributes to the tool's broad and interpretive nature.

The FDA significantly tightens the focus of analysis and instruction towards wind power development in the US, particularly with respect to the locally relevant TPTs. The specified libraries of conflict issues and solution options included in the DSM provide a much more comprehensive guide for negotiating these aspects of RE acceptance. For example, the DSM includes specific wind related conflict issues and solution options related to visual impact, shadow flicker, and avian wildlife endangerment. It also includes institutionally dependent issues identified in the first analytical tract, such as how to make optimal use of the existing meso conditions by employing ownership structures designed specifically for use in the US. Where ESTEEM provides a useful, yet general framework for conducting socially inclusive project planning, the DSM contains pre-constructed knowledge databases which help to produce specified tactics for use in local wind development settings in the US.

Reliance on Existing Knowledge

ESTEEM places full reliance on the consultant and PM to be able to accurately produce the method's important data. There is no built in knowledge base that suggests possible issues to investigate. Furthermore, the instructions guiding the user through each stage of the process are vague (due to the general nature of ESTEEM), leaving much interpretation up to the consultant and PM. This could mean that less experienced users may omit some crucial information (i.e. identifying relevant stakeholders, inaccurately describing the most impactful conflict issues, or failing to examine a sufficient variety of solution options). As described in the next point, this can lead to major methodological errors.

In contrast, the FDA provides a concrete reference tool in the form of the DSM, which is designed to improve a PM's ability to identify relevant conflict issues and appropriate solution options within varied local settings. The embedded conflict issues and solution strategies libraries should enhance the accuracy and efficiency of these two important steps in the development process, reducing the chance that user error could lead to the omission of critical information. Furthermore, the inclusion of novel solution options into the DSM expands a developer's repertoire beyond the common techniques used to address specific conflict issues. By providing this important reference tool in the DSM, PMs will start the planning process with the ability to learn from previous examples, while also being able to experiment with potentially helpful, as of yet, unproven strategies. This should reduce overall reliance on the PM for producing all of the relevant information, thereby reducing the likelihood of user error.

Successive Decision Impacts

ESTEEM is a successive building system, meaning that each completed step provides the information used in subsequent decision processes. For instance, the actor visions compiled in ESTEEM's step two are used to build the "conflict issues table" in step 3. While this is a fairly efficient method for reaching complex, multi-variable conclusions, it also means that any errors or incorrect assumptions made during one step will be carried on throughout the rest of the process. Most anyone who's taken a physics course can attest to the dangers inherent in this type of computation. An impactful error, particularly early on, has the potential to drastically alter the final outcome. This problem is further compounded by the previous issue concerning ESTEEM's reliance on the existing PM and consultant knowledge base. One possible scenario could involve a PM under the assumption that a neighboring resident is exhibiting NIMBY tendencies and therefore cannot be dealt with rationally. This can lead to the neighbor being excluded from project design stages, and an aura of project planning exclusion may arise. This type of planning approach has been shown time and time again to incite heated resistance from local residents.

The DSM proves useful in this sense by allowing a PM to conduct a basic reality check using the knowledge libraries. Instead of relying on information put together exclusively by the users to produce successive planning decisions, the DSM allows a PM to reference a host of observed conditions found in similar settings. This should reduce the possibility that an early assessment error could go unnoticed throughout the rest of the development process. Using the previous example of the "NIMBY" neighbor, the DSM suggests a host of alternative rationales for that resident's initial attitude, which should be considered before writing off the objection as selfish or irrational. The solution strategies library can then be consulted to see which planning strategies might be feasible from the PM's perspective in order to alleviate this particular concern. By including this stakeholder in the planning process, it is more likely that the rest of the community will perceive the process as being fair and open (Walker, Emotion and rationality: The characterisation and evaluation of opposition to renewable energy projects 2009).

Information vs. Flexibility Gap

The need to identify and interact with relevant stakeholders may hinder the ability for ESTEEM to be utilized early on in a project's planning cycle. This is because it isn't always clear which actors will come out in support or opposition to a given wind project until the prospect is upon them. Considering the successive decision issue discussed above, those not initially identified using the ESTEEM method may be left out of the negotiating room when it comes time to conduct the stakeholders' workshop. This could in turn lead to heightened opposition due to a perceived absence of participatory decision making.

Thus, ESTEEM may suffer from a case of "catch-22". It can be considered most accurate in its project description and solution outcome process the further along in a project it is utilized (implying more accurate information is available at a later stage of project development). However, the recommended "action plans" will be most helpful for a PM and the affected community if the ESTEEM process is conducted as early as possible in the planning stage, when more drastic design changes are still feasible.

Once again, by providing the DSM reference tool, the FDA will make it easier to identify relevant stakeholders and assess their possible opinions regarding the project, irrespective of what stage the project happens to be in. This is based on the ability to reference the conflict issues library prior to engaging in advanced development stages. This should help alleviate the information gap, allowing a project in its earlier stages to make use of these analytical tools without sacrificing significant knowledge reliability.

4.2 Development Strategy Matrix: Building the Novel Planning Tool

This section brings the previous theoretical discussions to a practical culmination with the presentation of the proposed DSM tool. The research presented here provides the critical elements necessary for fulfilling all three Specific Thesis Aims. The individual components which make up the DSM are initially presented, after which the completed functional tool is described. The first components discussed are the conflict issues and solution strategies libraries, called for in *Specific Thesis Aim, b*. These results are then compiled into an operational matrix format using Microsoft Excel, representing the functional heart of the developed DSM tool. This heart is linked together by a built in "Matching System" which I have designed specifically for the DSM. The specific methodological steps leading to the completion of the DSM are then shown. This is followed by a brief description of how the DSM is designed to be used in practice from a theoretical standpoint.

Section 4.3, which describes the full FDA methodology, provides a tangible example of the DSM in practice using the "running example", introduced in the first chapter. Ultimately, the DSM should provide developers with an increased ability to identify and understand the most impactful TPT related micro conditions present in their development setting, while also helping them to match these issues with innovative, as well as historically successful solution strategies.

4.2.1 Development of the Conflict Issues and Solution Strategies Libraries

This section is intended to describe how observed micro conditions from historical wind development cases have been compiled into an accessible knowledge database. The analysis of numerous case study reviews and actor interviews provided the primary means of gathering this data. As a result of this process, relationships between the major conflict issues identified, the strategies used to address them, and the ultimate project outcome (i.e. success or failure, and for whom?) have been determined. The most common and critical relationships, as perceived through the prism of this thesis, are compiled to form the conflict issues and solution strategies libraries. This task is essential for constructing the DSM, and directly fulfills *Specific Thesis Aim, b*.

The section begins by revisiting the concept of project "success". A description of the methodological procedure used to construct the conflict issues library is then presented. The summarized results of this process are illustrated in table format as they exist in the DSM. The solution strategies library is then introduced and described in a similar manner. To construct these libraries, condition relationships were drawn from a combination of directly referenced, indirectly derived, and partially assumed information extracted from the sources referenced in the DSM. The full conflict issues and solution strategies libraries are included in the actual DSM tool, which can be accessed as Appendix A.

Defining Project Outcome "Success"

Before delving further into this chapter's content, it is important to reiterate a point first mentioned in chapter 1; specifically, how is a "successful" project defined? I will not try to place exact parameters on this determination; but, in general, success should consist of the following three main characteristics:

1. The completion of a functioning wind farm. This is the most straightforward and basic criteria.

2. The second is more subjective, and should be seen as follows: locally affected stakeholders (primarily residents or communities near the development area), should feel satisfied with the manner in which the ultimate project outcome was decided. This means that a sense of "procedural justice" should be achieved within the affected community, referring to perceived fairness of the planning process (Gross 2007). This is seen as corresponding very closely with the notion of "qualified support", first mention in chapter 1. In general, this will entail that local residents are given the opportunity to participate in project design and may have the chance to invest in the project as part owners (or receive economic compensation in some other form).

3. The final measure of success is related to project profitability. Because the US economy is predicated on a capitalist mantra, I do not believe that community oriented wind power will grow by any substantial amount unless it is seen as a profitable enterprise by those involved in its development. This means that the developers and investors will have to be able to complete projects that offer long-term economic stability and acceptable profit margins. This may also mean that competitive energy companies could lose out on existing market share, which may incite corporate resistance at any number of contextual levels. However, this potential consequence is outside the bounds of the current research.

Conflict Issues Library

The conflict issues library was constructed as a direct result of the stated need for an improved understanding of local stakeholder opposition to specific wind power projects. This knowledge database was developed during the entire course of research dedicated to this thesis. Both of the major analytical tracts followed have produced a large number of relevant conditions to consider. Input factors such as dominant institutional and social conditions were examined from a wide range of literature analyses, project case studies, and related interviews. Upon determining each cases' applicability to the current situation in the US (based on the discussion in section 3.2), relevant micro characteristics were extracted from each reference source. These conditions were deemed appropriate based on their relevance to the TPTs and at least one of the following criteria: their occurrence in historical case studies, analysis of them in leading academic research articles, or their citing by one of the experienced actor's interviewed for this project.

The many conditions identified in this way were compiled into a preliminary database. They were input in the manner in which they were presented by the original source. For instance, one author stated the analysis; "If the opposition [to a wind project] is to be minimized all involved parties have to be offered real opportunities for influence on a project. Decision making over the heads of the local people is the direct way to protests" (Krohn 1998). This statement was input into a spreadsheet along with many other micro characteristic observations relating to the TPTs. These factors were compiled into a large database that made up the initial draft of the conflict issues library.

In order to more efficiently organize and navigate this large initial database, similar issues were combined into major categories, sub-major categories, and finally into "condensed conflict issues" (CCIs), which are composed of slightly broader descriptions derived from each of the individual analyses. The following table shows the five major categories (which correspond to the five TPTs) and each of their sub-major categories that makeup the conflict issues library. The CCIs are described in further detail in the discussion after Table 1.

Table 1: Presentation of the five major categories and their related sub-major categories that comprise the completed conflict issues library. The sub-major categories shown here each contain at least one CCI in the completed library. An example of one major category as it is input into the DSM is shown in Table 2.

Major Categories:	Site Selection Issues	Local Dynamics Issues	Participatory Planning Issues	Ownership Structure Issues	Financial and Economic Issues
Sub-Major Categories:	Visual Impact	Actor Relationships	Exclusion of Stakeholders	Design of Ownership Structure	Competitive Market Ability of Wind Power
	Other localized Physical Impacts	Identifying Opposition and Support Prior to Development	Disrespecting/ Misinterpreting Local Stakeholders	Types of Ownership Structure; Associated Issues	Ability to Acquire Initial Investment
	Landscape Attachment (cultural and historic value)	Dedicated Opposition	Perceived Equity and Fairness in Planning Process		Other Economic Effects on the Community
	Environmental Impact	Negative General Public Opinion			
	General Site Selection Issues				

Table 1 shows the results of condensing the identified issues into five major categories and their subsequent sub-major descriptions. To obtain the specified CCIs, extremely case specific characteristics were replaced with more broadly applicable descriptions, while making sure to retain the original ideas' main emphasis. To illustrate this process, I've included another conflict issues excerpt that maintains the theme from the previous paragraph's example: in a separate wind development case study it was reported that "none of the interviewees felt that the [project planning] process allowed people's voice to be heard, views to be expressed, or debate and discussion to be enabled." As a result of this, an opposition group formed and became dominant in the discourse, presenting an inaccurate picture of the community's actual feelings towards the project (Gross 2007). This statement was combined with the previous example (and many others not quoted here) to form the following CCI: "Exclusive, top-down style decision making incites local opposition". This was then filed under the sub-major category entitled: "Exclusion of Stakeholders" and the major category: "Participatory Planning Issues".

The original source from each individual case was listed alongside the new CCI. In the example above, the CCI contains seven references, meaning that in at least seven of the resources examined during the construction of the conflict issues library, that type of problem was cited. In this way, it was possible to establish a rough estimate showing the frequency with which each specific type of issue was cited in the examined sources. While there is probably an element of personal bias present due to the filtration process used when condensing these issues, this frequency estimate is seen as a decent way of identifying the most common and impactful micro conditions present in many local communities. A "frequency ranking", which simply lists the number of references in which the issue was cited, has thus been included in the conflict issues library to show the results of this rough ranking system.

In order to illustrate a more detailed portrayal of the library building process, the following Table 2 presents the final condensed version of one of the five TPT related major categories included in the conflict issues library. The example shown is the “Participatory Planning” category, along with its three sub-major categories. The CCIs listed in each sub-major category are shown in this table along with a more detailed “paraphrasing description”. The “frequency ranking” is listed for each CCI to give an indication of how many of the examined references listed that type of issue. In the actual conflict issue library, detailed excerpts from each reference that directly mention each CCI are included after the paraphrased description, as are the actual referenced sources.

Table 2: Conflict Issues Library, “Participatory Planning” major category in summary form: the major category is shown in the red header, sub-major categories are displayed in light blue on the left, and CCIs in plain white. The included “frequency ranking” indicates how many examined sources referenced that type of issue.

Major Category: Participatory Planning Issues			
Sub-Major Categories	**CCI Summary Description**	**Paraphrased Description**	**Frequency Ranking**
a. Exclusion of Stakeholders	i. Exclusive, top-down style decision making incites local opposition	Top-down decision making regarding wind installations is a sure-fire way to stir up opposition. The decide-announce-defend model is a classic example of exclusive planning, and usually leads to opposition.	7
b. Disrespecting/ Misinterpreting Local Stakeholders	i. Respecting the existence, validity, and influence of stakeholder concerns during project design and not taking resident reactions for granted	Developers must embrace the fact that people and local opinions have a strong influence on individual projects. Taking a position of superiority or righteousness will inevitably alienate many local residents. "It is one of the most common mistakes in facility siting to take general support for granted and to expect people to welcome developments they claim to support." (Wolsink, 2000)	6
	ii. Poor communication between Developers and Stakeholders	"Communication always misses its targets when it does not address the real concerns of the people to whom the message is directed." (Wolsink, 2005) This poor communication can lead to misunderstandings, bad information circulating in the community, and ultimately decrease the chances of project success.	5
c. Perceived Equity and Fairness in Planning Process	i. Local Stakeholders perception of fairness and transparency in the planning process	Perceived equity and fairness are extremely influential factors. Transparency in the planning process, particularly regarding local actor negotiations, is also very important. Most residents are more concerned with process fairness than with the ultimate outcome as a fair process should ensure a fair outcome for the community.	8
	ii. Perception of "winners and losers" in the community	Local stakeholders often feel that the process and outcome favors one person or group over another, leading to perceived unfairness	4

The other four major categories (corresponding to the four remaining TPT issues) are all listed in the conflict issues library in a similar manner to that shown in the table above. The use of the small lettering before the sub-major categories and before the CCIs is explained later, in the “DSM Matching System” sub-section.

Solution Strategies Library

The solution strategies library was constructed in much the same manner as the conflict issues library. The same three types of resources were used to extract possible solution options intended to address at least one of the listed CCIs. A similar process was followed, in which statements taken directly from the sources were input into an initial database, before being condensed into slightly more general solution descriptions. The references were again maintained throughout the process in order to keep proper citing practices and to show a "frequency ranking" for solution strategies as was done for the conflict issues.

There were several significant differences, however, when constructing this library as opposed to the conflict issues library. I began my initial solutions search based on the conflict issues identified in the initial database. Development strategies found in case studies and academic journal articles that were deemed relevant and useful for dealing with a particular conflict issue were input into the same Excel Spreadsheet that housed the growing conflict issues library; solution options were organized in accordance to the conflict issue that initiated the search. After going through numerous references and extracting solution options in this manner, I then condensed similar strategies. However, instead of creating a new set of categories for the solutions library, I maintained the conflict issues library headings from before (major categories, sub-major categories, and CCIs). I then took the liberty of adapting similar strategies into new condensed formats. I did not worry about eliminating multiple strategies tied to each CCI. Instead, when it was deemed inappropriate to further combine solution options, the remaining options were linked as solution strategies 1, 2, 3, etc… for each of their corresponding CCIs. In this manner, the number of different solutions was condensed without reducing the variety of solutions associated with each CCI.

A further difference is related to the inclusion of unproven options into the solution strategies library. This was done in order to broaden the range of strategies that would be listed for each CCI. I've input my own suggestions for strategies that were not found within the examined resources. These are primarily productions of my personal invention, but will almost certainly resemble some existing strategies that I have simply not come across during the course of this analysis. As such, I cannot guarantee their complete uniqueness. In the solution strategies library, these suggestions are accompanied by the reference (Olive, 2010); if that is the only reference, then that strategy should be considered unproven in practice. In addition to expanding the range of solution options, it was believed that these "novel" solutions could illicit some discussion and debate about alternative problem solving strategies that have not yet been widely discussed in peer reviewed literature.

During the library building process, it became apparent that an efficient matching system was needed to keep the multitude of conflict issues and solution strategies organized. This system was devised on a mostly ad hoc basis using Excel's built in features. The end result is a matching system that links each solution strategy to its associated CCI and respective references. The full description of this matching system is given in the following section. Table 3, illustrating the organization of solution options and conflict issues, is also provided in the next section. For a brief overview of some solution strategies included, the results discussed in chapter 5 present the most viable solution options found corresponding to the top five conflict issues identified during this research. However, because there are too many solution strategies to list as a full table in the text, the reader is instructed to consult the DSM tool (appendix A) to see all of the included solution options.

DSM Matching System

The DSM's built in Matching System is the pivotal feature that turns the informational databases that are the conflict issues and solution strategies libraries into a functional wind power planning tool. It is also the essential element for fulfilling *Specific Thesis Aim, c*. The matching system was designed during the construction of the two libraries, within the Excel spreadsheet used for the initial library databases. Basically, I determined that each CCI and solution option needed its own individual "tag", or nickname that could be referenced without having to describe the issue at length. This tag could then be used to link each associated solution option to its respective CCI. An additional label was required to differentiate multiple solutions for one CCI.

For instance, in the major category "Participatory Planning" issues (**PP**); subcategory "b. Disrespecting/ Misinterpreting Local Stakeholders" (**b.**); there are two associated CCIs. If we take the second of the two, "ii. Poor communication between Developers and Stakeholders" (**ii.**); the resulting CCI tag in the DSM is: "**PP b.ii**". In the solution strategies library there are three separate solutions linked to this specific CCI. The tag for each solution begins with the CCI tag, but then includes its respective solution number as it is listed in the library (not reflective of perceived efficacy). For instance, the first solution strategy in this example is tagged: "**PP b.ii.1**"; while the third would be: "**PP b.ii.3**". This label system evolved during the construction of the two library databases into its current state.

While designing the labeling system, I also created an indexing system that allows the user to see every major category, sub-major category, CCI, and solution option using the shortest possible tag. The index can be referenced to find the exact worksheet and cell of the DSM's Excel file in which the desired CCI or solution option is described in detail. In this manner, a user can quickly locate any of the included data and learn more about it. This index is presented as the first worksheet in the Excel file; it is called the "Master List" and is thus the "title window" when the DSM tool is opened.

One more facet of the matching system to note is the development of a "cross-context" matching feature. This was designed to enable solution options primarily designated for a specific CCI to be linked to CCIs which share similar characteristics. For example, when using the DSM to address the Local Dynamics issue of "Specific opposition by neighbors of proposed turbines (often called NIMBY)" (LD a.ii) there is one primary solution option linked to this issue (labeled in the matching system as solution option: LD a.ii.1). However, there are at least six other strategies that have been identified as relevant to this CCI, but that are primary solutions for alternative CCIs. These include strategies linked to Site Selection issues (choosing pre-determined socially preferred project locations), alternative Local Dynamics issues (utilizing developer connections in the community), Participatory Planning issues (avoiding "top-down" planning practices), and Ownership Structure issues (ensuring economic opportunities for locally affected residents). All of these solution strategies are believed to be applicable when addressing the conflict issue of local neighbors' objections. This shared relationship between solution options and various CCIs is common in the DSM. Therefore, I have labeled these shared strategies as "collaborative solution options". They are simply listed according to their "tag" next to the primary solution option in each major category page and in the "Master List". In this way, it is possible to provide multiple solutions to different conflict issues without having to repeatedly input very similar solution descriptions. This significantly reduces the length and complexity of the DSM.

The following Table 3 displays a summarized example of this matching system taken from the "Master List", as can be seen in the actual DSM tool. It shows the first major category, "Site Selection", the first two sub-major categories included and the three linked CCIs. The CCI tag and the solutions strategies tags for each of these CCIs are shown to illustrate how the Matching System links various data points.

Table 3: The major category "Site Selection Issues" is shown with its first two (of five) sub-major categories. The "CCI Tag" for each conflict issue is listed along with all the "Primary Solution Tags" and the "Collaborative Solution Options". In the DSM, the cells containing these "tags" are linked to the actual position in the Excel tool that the CCI or solution option is situated. Thus, when using this indexing system, one can quickly locate the detailed description for each of these DSM inputs as it exists in its respective knowledge library within the DSM.

Site Selection Issues	CCI Summary	CCI Tag	Primary Solution Tag	Collaborative Solution Options		
a. Visual Impact	i. Local opinions on the visual impact of the proposed wind farm	SS a.i	SS a.i.1	SS c.ii.1	SS e.i.1	
			SS a.i.2	SS a.ii.1	SS c.ii.1	LD a.ii.1
			SS a.i.3	LD d.ii.1		
			SS a.i.4			
	ii. Size of proposed wind farm	SS a.ii	SS a.ii.1	SS a.i.3		
b. Other localized Physical Impacts	i. Noise and shadow flicker are concerns for nearby residents	SS b.i	SS b.i.1	SS a.i.1		

A basic knowledge of Excel is required to navigate the DSM tool. It is a future goal of mine to construct a programmed navigation system which would allow a user to select their desired CCI's from a browser list, and then be automatically directed to a page in which linked solution options are shown. However, due primarily to time constraints, this feature was not completed for inclusion in this thesis.

4.2.2 DSM: Construction and Presentation

The conflict issues and solution strategies libraries, described above, were created as a means of compiling information from historical examples that were deemed reflective of the current micro conditions affecting community based wind development projects. The DSM represents a step further, towards the tangible application of this knowledge in real-world development settings. To do this, it constructs a compilation of the two libraries through a manageable matrix format. The designed matrix format makes it easier for the user to link potentially problematic micro conditions present in a concrete project setting to specifically tailored solution strategies. The DSM's built in Matching System facilitates the linking process between the two aforementioned libraries. This feature is the central element creating functional value for the DSM, and essentially fulfills *Specific Thesis Aim c*.

The next section provides a brief review and expansion of chapter 2's discussion concerning the methodological basis relied upon to create the DSM. This is followed by a description and presentation of the completed DSM, as it is intended to function within the FDA methodology.

DSM: Methodological Construction

To reiterate the arguments presented in chapter 2, the *every local situation is unique* concept does not automatically discount the use of comparative analytical techniques. The inherent relationship between the macro, meso, and local micro conditions for any given case indicate that a common set of characteristics exist in which locally focused comparative studies may be carried out (M. Wolsink 2000). By focusing on a variety of specific case studies which share some of these broader characteristics, conflict issues and associated solution strategies have been identified with respect to the TPTs. Patterns of success or failure are found within these observed relationships, thereby providing a historical understanding that future projects can benefit from. Introducing unconventional solution strategies enhances the range of options available to PMs, while also encouraging a discussion about new and alternative ideas for promoting locally based wind power.

The CCIs included in the final conflict issues library were used as the starting point for constructing the DSM. These categories were matched up with their corresponding entries in the solution strategies library. In this way, a basic matrix was created that correlates commonly observed sets of conflict conditions with specific solution strategies that have led to various levels of community wind implementation. I believe this knowledge database is applicable to most current development settings within the US due to its inclusion of a wide variety of historical project characteristics combined with an understanding of solution option feasibility with respect to current meso conditions.

An organizational matching system was designed based on the conflict characteristics and referenced sources for each issue included in the DSM. This matching system links the conflict issues and solution strategies libraries together in a functional format. It is the component that transforms the large database of information contained in the two libraries into an actual planning tool that has tangible value for prospective developers.

Compiling all of these concepts into a single DSM tool allows a PM to harness this important knowledge base without having to conduct extensive research on their own. The PM will be able to refer to the DSM in order to aid in the identification of the most impactful micro conditions affecting their particular case. They will then have access to descriptions of historical and innovative solution options designed to address the specific conflict conditions that reflect their own situation. This ability represents the pivotal improvement in the FDA compared to the broad ESTEEM approach.

DSM: Presentation and Usage

For ease of use, and in fulfillment of *Specific Thesis Aim, c*, the DSM tool has been designed as an interactive program map, based on a Microsoft Excel database created specifically for this thesis. Generally, a user will begin by identifying their most critical micro problem areas using the compiled conflict issues library as a reference source; this is referred to as the "conflict identification" stage.

Upon selecting the most applicable descriptions for their specific project conditions, the DSM's built in Matching System directs the user to the associated solution options linked to each identified CCI. In addition to the primary strategies identified in this manner, a cross-context matching process has been included. This cross-context process links solution options that are primarily designed for a particular CCI to other issues that share certain critical characteristics; these are called "collaborative solution options" in the DSM. The entire process of procuring solution options in this manner is referred to as the "solution identification" stage. Both of these steps are described in the two diagrams shown on the following pages, Figure 7 and Figure 8.

Upon following the matching system through the identification of all relevant solution options, the user can then select their preferred strategies from those presented. The DSM has been designed to reflect a multitude of common local characteristics; however, the included issues are not intended to reflect exact micro conditions in unique concrete settings. Therefore, the ultimate decision as to which issues and options are relevant in their particular setting is left to the PM. The main caveat to this responsibility is that the PM must understand the constraints imposed by current meso conditions in their area (particularly incentive availability or special legal/regulatory requirements). Without this understanding, the DSM could produce inappropriate results that do not reflect the existing institutional constraints in a specific project setting.

To re-illustrate the understanding established in this thesis regarding the current concrete institutional context in the US (chapter 3), the following Figure 7 is shown. It is an amended version of Figure 3 (chapter 2) which details an understanding of the synthesis between the US's major institutional influences and the micro-related novel planning approach presented in this thesis. It is shown here to reinforce the theoretical links between these two major analytical concepts.

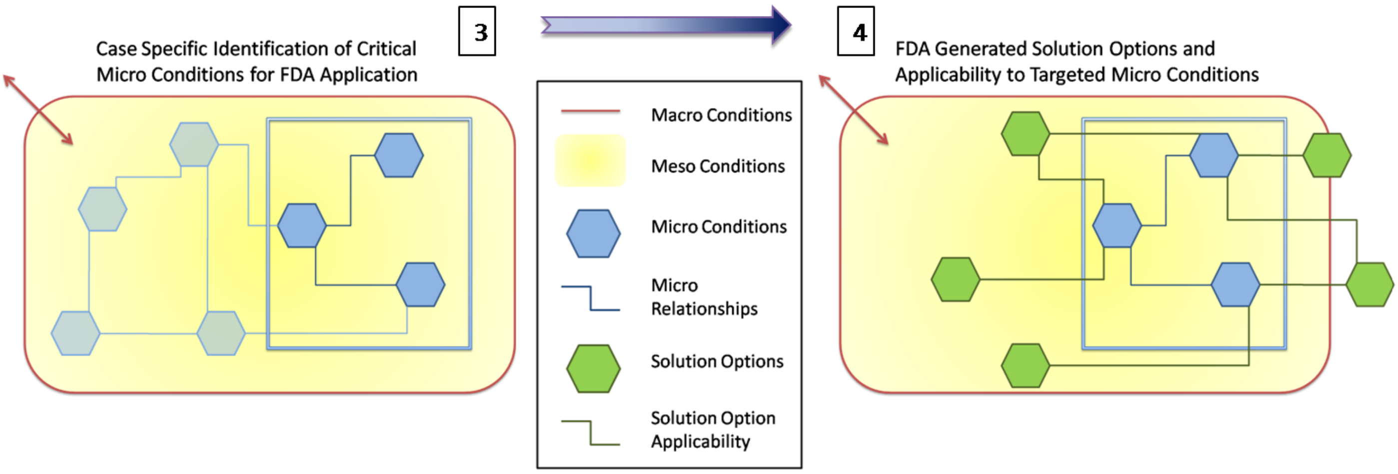

Figure 7: Re-illustration of the synthesis between a concrete institutional understanding of the US energy system and the derived FDA planning approach discussed in this chapter. To refresh, the red border represents macro conditions, which tend to shift between favorable and unfavorable over time. The yellow filing represents meso conditions which (presumably) shift along with macro characteristics. The blue hexagons symbolize micro conditions. Step 3 (keeping in mind the original depiction in Figure 3) represents the "conflict identification" stage of project development in which the conflict issues library in the DSM is used. Step 4 shows the "solution identification" stage in which the built in Matching System produces a set of solution options for the identified conflict issues. Both of these functional steps must be conducted while considering the institutional constraints in place due to current meso conditions.

Figure 7 was re-introduced in order to set the stage for presenting the following illustrative DSM diagram. Figure 8 shows a basic graphical representation of the DSM in action (accepting the concrete institutional understanding established above). The blue rectangles represent CCIs included in the conflict issues library that would be identified during the "conflict identification" stage for a specific project setting. They are also representative of the blue hexagons in Figure 7, which portray hypothetical micro conditions present within the prevailing macro and meso context. The dotted orange line in Figure 8 represents the division between the two embedded libraries, and shows the point at which the built in Matching System is utilized. This Matching System links the identified CCI's to their associated primary and collaborative solution options. The established links are represented by either red or purple connecting lines in Figure 8. Red indicates a link from the CCI to one of its primary solution options, while the purple lines indicate a link from the CCI to one of its collaborative solution options (as shown in Table 3). In Figure 7, the solution options are represented by green hexagons, and are linked to the hypothetical micro issues via green lines. Each conflict issue and solution option shown below, in Figure 8, is labeled with the "ID tag" that accompanies it in the DSM. The Site Selection Issue examples shown in Table 3 have been used in Figure 8 as representative inputs for the model (major category, sub-major categories, and CCIs).

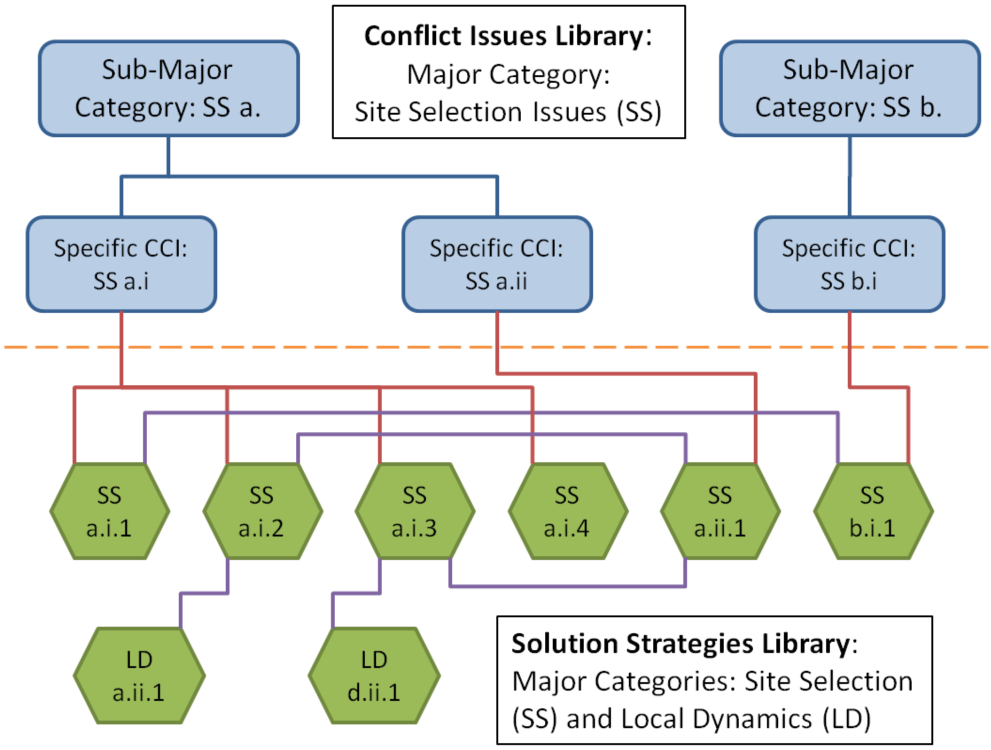

Figure 8: Graphical depiction of the DSM in action. The Major categories, sub-major categories, specific CCIs, primary solution options, and collaborative solution options shown here are all taken from Table 3, which is representative of the actual DSM tool. In this diagram, the red lines indicate primary solution relationships between the blue CCIs and the green solution options. The dotted orange line symbolizes the built in Matching System linking the CCIs to the solution strategies. The purple lines represent "collaborative solution" relationships between different solution options. For example, when considering the specific CCI (SS a.ii), there is one primary solution option (SS a.ii.1) and two collaborative solution options (SS a.i.2 and SS a.i.3). If you decided to use either of these collaborative solution options then you would be further directed to examine their collaborative options (LD a.ii.1 and LD d.ii.1). It is up to the PM to decide which of the suggested solution options he/she can use in their specific development setting. All of these micro conditions (CCIs and solution options) are dependent upon the prevailing meso conditions at the time of project development, which are in turn a product of the overarching macro context (as shown in Figure 7 above).

By providing this DSM tool, PMs should be able to adaptively tailor their choice of project strategies to meet their specific micro conditions. The ability to reference an established database of development tactics allows the PM to exhibit flexibility when faced with a range of obstacles. In this manner, the DSM provides a functional comparative tool that helps predict a variety of wind project obstacles at the local level of implementation. The tool should also aid in the identification of appropriate planning strategies in order to maximize desired project outcomes. The built in Matching System provides the ability to navigate through the DSM's embedded knowledge databases in order to swiftly identify relevant conflict issues and efficiently extract appropriate solution options. The remaining steps for completing the broader FDA procedure are discussed in the following section.

4.3 FDA Functional Methodology: Applying the Novel Planning Tool

This section details the functional steps required to apply the FDA to a wind power project. Preceding discussions from this chapter are combined to form the targeted methodology shown here; this contextualizes the DSM planning tool, and allows it to be applicable in a real-world setting. The description in this section is first presented in fairly general terms, without reference to a specific case. This is intentional, because the FDA is meant to be applicable for a variety of settings throughout the US, as stated in the original research objectives. A concrete example is then presented using the hypothetical "running example", introduced in chapter 1.

The following discussions revisit some key aspects concerning the FDA that should be noted. After these come the step by step instructions for applying the proposed tool. Because the FDA is not intended to act as an all inclusive development guide, several steps have been borrowed or adapted from the ESTEEM model; the areas in which ESTEEM is expected to play a supporting role have been highlighted.

Who Should Use the FDA and Why?

It is a common conception that wind developers, especially those coming from outside their target development area, will have inherently opposing views than those held by local residents on what constitutes success regarding wind power projects (Gross 2007), (Jobert, Laborgne and Mimler 2007). While acknowledging this perception, the FDA is still intended for use by a project manager. However, the goal of the FDA is most definitely NOT to coerce the local populace into accepting any proposed project. Instead, the functional goal, reflected by the research objectives discussed in chapter 1, is primarily twofold:

1. PMs should be able to negotiate institutionally dependent conflict issues in their local setting in order to construct community owned, profitable projects, as described by the first analytical research tract taken in chapter 3.

2. The FDA should enable PMs to better understand and respond to the causes of specific project opposition within an affected community that relate to local stakeholder dynamics. This has been the goal of the second analytical research tract followed; the process has resulted in the conflict issues and solution strategies libraries, presented in the current chapter.

Maintaining an emphasis on financial viability within current institutional constraints is indeed an essential task for PMs, but it may prove equally important to ensure that the local community is satisfied with the planning process, and the ultimate manifestation of a wind power project. Towards these ends, the FDA provides the tools necessary for PMs to adjust a project's features to reflect those values held dear by an affected community, while also enabling them to pursue feasible financial avenues using innovative ownership structures that ensure a significant portion of local participation. This ability is based on lessons learned from historically relevant cases as well as from leading academic research.

When Is It Applicable?

The FDA is intended for use early in a project's development, ideally during the initial design stages. This is in contrast to ESTEEM, which can be used at any point, but has inherent weaknesses related to either information availability if applied early, or design adaptation flexibility if used in later project stages. This earlier application design is based on features built into the DSM, which allow the user to reference historically observed relationships in order to identify potential conflict issues earlier and more easily for a given development setting. This is advantageous because a PM can begin to incorporate project features that have been shown to placate local objections from the outset. This has the dual purpose of helping to improve initial local support and minimize time spent on redesign later on. However, the embedded solution strategies library could also prove useful to projects which have become bogged down in difficult stakeholder or legal negotiations. It may be helpful to take a step back from an ongoing project and consult some alternative development strategies using the DSM in order to restart a productive planning process. In this sense, while it is ideally intended for use early in a project's development, the DSM tool can also provide value for projects in their later stages.

4.3.1 FDA and ESTEEM: How Should They Work Together?

The functional FDA methodology is presented in this section in an abstract sense, meaning that specific project characteristics are not listed; but, the stages of development in which it is intended for use, and the actual procedural steps, are outlined below to give an overview of the process. This process is presented here in tandem with aspects of the ESTEEM methodology. While it is not essential to use the FDA in conjunction with ESTEEM, in order to show critical project design stages which are not included in this report, the functional FDA steps are illustrated in this manner. The description below begins by borrowing from the initial stages of ESTEEM. These guide the user to an understanding of the current project situation and help in the identification of important actors and stakeholders. If this knowledge is already known by the user of the FDA (an involved PM for instance), then the first two stages may not be necessary. On the other hand, if the FDA is to be used by someone other than the PM who hasn't been involved closely in the project, then the first two steps may be more useful. As a note, all references to ESTEEM in the following paragraphs are drawn from (ESTEEM 2008).

Project Past and Present

If the FDA is being applied at the beginning of project conception, then there will be very little to report here. However, if someone wishes to utilize the FDA after a project has been ongoing, then it is recommended that ESTEEM's suggested step 1 be followed as written (please refer to ESTEEM's guidelines for details). The most relevant aspect in relation to the FDA is the identification of critical events in the project's history which help to identify previous areas of contention or success (i.e. local stakeholder conflict, site selection disputes, permit issues, etc…).

Identify Actors (Vision Building)

The PM should identify the actors perceived as relevant for the proposed project. This is important for discovering which stakeholders represent the most influential local concerns. ESTEEM provides some guidance here, including instructions on how to fill out a relevant actor network diagram. The DSM provides an additional resource at this stage by allowing the PM to consult the embedded conflict issues library in order to get a picture of why certain groups have traditionally resisted wind power projects.

The FDA method recommends, at this stage, that the PM or an associate spend some time "scouting" the targeted area in order to establish a personal understanding of the affected community prior to proposing any development. Inquiries should be conducted into the nature of the community, particularly with respect to the potential objectors listed in the DSM. Eliciting concerns from these groups before presenting a project publicly will allow the PM to preemptively avoid potential design conflicts such as project location, size, and possible ownership structures. This is also a good opportunity to establish some positive relationships between the developer's team and the community.

After an initial period of local immersion (a few days or a week, perhaps), the PM, or the FDA consultant, should then approach the identified influential stakeholders and have them describe their future visions for a potential wind project in their area (as detailed in ESTEEM). These visions will serve as a supplement to the DSM in proceeding FDA stages. However, this step may not be advisable in all circumstances. Depending on the developer's wishes for the project to remain confidential, it may be necessary to proceed without consulting some or all of the stakeholders prior to following the remaining FDA steps.

Identify Conflict Issues

This "conflict identification" stage utilizes both ESTEEM and FDA methods. If visions from local stakeholders were gathered as described previously, then these can be compared with the PM's vision to identify conflict issues in the manner that ESTEEM suggests. In combination with the suggested community "scouting", referencing the embedded conflict issues library in the DSM should allow the PM to more accurately determine potential areas of local stakeholder conflict. This established database of knowledge can serve as a "brainstorming guide" for PMs when listing the possible project conflicts with respect to particular communities. This process should help to identify conflict issues that may not have been revealed during ESTEEM's vision building process, or those that would otherwise be misinterpreted by more traditionally minded developers (remember the common NIMBY excuse for opposition).

If the developer wishes to remain confidential during early stages of project planning, then the DSM will be particularly helpful for predicting possible conflict issues. In this case, the person "scouting" the perspective community will have to produce a thorough picture of the influential micro dynamics present so that they may be compared with those listed in the DSM. They would have to accomplish this without revealing the exact nature of their mission, however, which may come back to hurt the project's opinion within the community due to perceived "covert" planning practices. In either case, this "confidential" strategy would likely reduce the overall accuracy of identifying case specific issues compared to a more open approach (though the DSM's knowledge base should improve this accuracy compared to ESTEEM's user knowledge method). In general, it is recommended that stakeholders be approached as early as possible in order to foster an atmosphere of participatory decision making, as well as to build trust and familiarity between PM and local residents.

ESTEEM's use of an "issues ranking table" is considered to be an excellent concept. Thus, it is recommended that upon identifying the conflict issues, through either method discussed above, ESTEEM's "issues ranking table" should be constructed by the PM in order to prioritize his need to address specific issues. The DSM has some measure of this concept incorporated through its "frequency ranking" feature; but, as this is not considered to be a micro contextually sensitive method of establishing issue criticalness, the ESTEEM ranking table is also recommended for use at this stage.

Solution Strategies (Portfolio of Options)

This stage is where the FDA really distinguishes itself. The solution strategies library provides a knowledge base of historical and unconventional solution options linked to commonly observed wind power conflict issues. The DSM is designed to utilize the results from the previous "conflict identification" stage in order to produce a list of associated solution strategies. The DSM's built in Matching System facilitates this process for the user as described in the previous section, and illustrated in Figure 8. I believe that this feature should greatly improve the PM's ability to select case appropriate strategies to employ towards each identified issue. The detailed descriptions listed for each solution strategy in the DSM provide further assistance towards understanding their intended implementation. However, it will be essential for the PM to adapt each solution option to the specific micro conditions present in their targeted development setting. It is also necessary that the prevailing meso conditions be understood as they exist at the time of implementation; for the current meso situation (at the time of writing), chapter 3 should be consulted. Particular local characteristics may require any number of variants to the suggested solution strategies, but in general, the solutions included in the library should prove beneficial, and at the least, should increase the range of options available to a PM. The hypothetical case study shown below demonstrates this process, and should be consulted in order to gain a better understanding of how these strategies are chosen in practice.

This process essentially combines the results from both of the major analytical tracts followed throughout the thesis. The institutionally dependent conditions are considered in tandem with the locally specific stakeholder dynamics issues in order to assess a development setting and then produce specified solution options drawn from the established knowledge database included in the DSM.

Continuing With ESTEEM

Though it is not considered essential within the scope of this thesis, the last two steps of ESTEEM are considered to be extremely worthwhile endeavors for a project's ultimate acceptance in a community. These include conducting the stakeholder workshop, in which conflict issues are discussed amongst the relevant stakeholders with the intent of having them suggest their own solution options. And the development of four types of action plans. The conflict issues and solution strategies identified using the DSM can be incorporated into these stages as suggestions to be debated during the workshop and as part of the various action plans when appropriate. The main point to consider for completing the FDA is that the PM will ultimately have to decide which strategies most appropriately match the micro conditions present in the specific development setting. If you wish to investigate further, then please refer to the ESTEEM reference (ESTEEM 2008).

4.3.2 FDA: Application to a Hypothetical Case Using the "Running Example"

This section attempts to present a practical example in which the above methodological discussion is applied to a test case. Due to research time constraints, the "running example", introduced in chapter 1 will serve as the project case study. The goal of this exercise is to demonstrate the process of applying the DSM tool to a concrete development setting (even if it is a hypothetical situation). Conflict issues have been identified based on the initial description of the case setting; some additional creative liberties have been taken in order to account for the lack of onsite knowledge availability. Solution options tailored to these specific conflict issues are then generated from the embedded solutions strategy library using the built in DSM Matching System. The whole process is described below.

Project Past and Present (Case Description)

For the reader's benefit, the original description of the "running example" is repeated here:

> *A developer has identified an area in the US that presents favorable wind conditions at several physical locations. This developer is not a local citizen, but is relatively familiar with the area. The potential project sites are all situated within a moderate distance (approx 10 km) of a small community (approx 5,000 inhabitants). The possible project sites are on land owned by individuals (possibly farmers) and would be visible to multiple neighboring residents. There have been no previous attempts to develop wind projects in this area, though most residents will have seen some turbines within an hour drive in any direction. There is some doubt as to whether the developer can raise sufficient funds to complete a profitable project. Unfortunately, the state in which this community is situated does not currently offer any substantial incentive mechanisms for wind development beyond those provided by the federal government.*

Identify Actors (Vision Building): What Do the Stakeholders Want?

In preparation for identifying conflict issues in both ESTEEM and the FDA, the major actors relevant to the micro context are discussed. In this example, the stakeholders would likely be the developer, potential landowners, neighboring residents, local officials, and any involved financial institutions. Building these actors' visions is slightly more difficult in a hypothetical example, primarily because non-existent actors can't be asked what they want. However, for the sake of argument I will suggest a few basic visions from these stakeholders that could be found in a location fitting this description.

1. The developer is looking to build a wind park in the 5-10 MW range, consisting of 1.5 MW turbines. He wants to maximize the project's power production and profitability.

2. Landowners in this case are farmers who view their land as a utilitarian asset. They require a healthy financial return on any land dedicated to wind turbines and minimal disruption of their other farming activities.

3. Based on preliminary "scouting" of the community, it was determined that local residents are weary of this project for several possible reasons. It is the first of its kind in the immediate vicinity; the developer is relatively unknown, and has therefore not yet established a high level of trust in the community; and residents of the community are weary of the possible visual impact the project could have on the countryside.

4. Local officials aren't sure what to make of the project because their constituents' opinions are relatively unknown, and they haven't engaged in this type of permitting process before.

5. Local financial institutions are interested in the economic prospects of wind development, but would require substantial financial security before investing in an unfamiliar commodity.

Identify Conflict Issues

Because ESTEEM requires accurate actor vision comparison, the conflicts identified in this case are based primarily on referencing the DSM's conflict issues library. The following potential issues were identified (conflict issues are referenced by their CCI "tag"):

1. The conflict issues library suggests that a common problem in this situation could involve neighboring landowners. Jealousy and opposition can arise from those not included in the land-lease or ownership offers (LD a.ii). Also, if some actors are negotiated with in private this can incite perceived process un-fairness, which very frequently leads to project opposition (PP c.i).

2. Several community issues could be present in this situation. The following lists only a few possible examples: fear of the unknown, (LD d.ii); possible distrust of the developer (OS a.iii); and concerns about the potential visual impact (SS a.i). These issues have been shown to historically instigate an initial negative response from affected stakeholders.

3. A lack of "actionable knowledge" on the part of local residents and local officials could damage the project's chance of success (LD d.iii). This is reflective of a lack of information regarding energy production in the local populace (specifically how they could more directly benefit from it), and a lack of approval process knowledge from local officials.

4. Finally, the common problem of acquiring sufficient financial investment is present in this case, as the developer does not have the backing of a wealthy corporate investor (FE b.i), (FE b.ii). This also brings about issues in the ownership structure employed if federal incentives are to be harnessed (OS a.ii).

These are by no means an exhaustive list of potential conflict issues, and are simply presented as an example of the types of issues that referencing the conflict issues library will highlight in an actual project setting.

Solution Strategies (Portfolio of Options): Using the DSM Matching System

Once the PM is satisfied with his analysis of the conflict issues present in the local project setting, this "solution identification" stage in the FDA process is easy. The PM will simply consult the DSM's solution strategies library using the CCI tags associated with the conflict issues identified in the previous step. All associated primary and collaborative solutions are linked in the DSM to each CCI via the built in Matching System, and are labeled using individual solution strategy "ID tags". It is then up to the PM to decide which of the suggested strategies best fits his particular case. In order to illustrate this process, the following

Table 4 is provided. The CCI tags identified in the previous step are listed along with all matched primary and collaborative solution options. In the interest of reducing the length of discussion, only one of the CCIs corresponding to each of the four conflict categories discussed above has been included. Additionally, only one solution option will be summarized for each CCI in the table, the full description and the rest of the issues can be found in the DSM tool (Appendix A).

Table 4: Summarized results of the solution strategy stage using the DSM's built in matching system. Upon identifying the relevant conflict issues, the PM simply follows the DSM's Matching System in order to elicit associated solution options. Detailed descriptions of these solution options are included in the actual DSM, while only a short summary of one strategy is shown in this table. The PM must then decide which of these solution options best fits the prospective wind project considering the influence of current meso and micro conditions.

CCI Tags	Primary Solutions	Collaborative Solutions	Solution Example (Short Summary)
PP c.i	PP c.i.1 PP c.i.2	PP b.ii.2, LD d.ii.1 PP b.ii.2, LD c.i.3	**PP c.i.1**: "fair process effect", engage community members in a transparent and open planning process.
SS a.i	SS a.i.1 SS a.i.2 SS a.i.3	SS c.ii.1, SS e.i.1 SS a.ii.1, LD a.ii.1, … LD d.ii.1	**SS a.i.3**: "photo mock-ups", generated photos should be shown as examples of the turbines in the actual landscape proposed.
LD d.iii	LD d.iii.1	SS d.i.1, LD a.i.3, LD d.ii.1	**LD d.iii.1**: Early and dedicated efforts to educate the community.
FE b.ii	FE b.ii.1 FE b.ii.2 FE b.ii.3	OS b.ii.2, OS b.iii.1 OS b.i.2, OS b.iii.2 OS b.i.1	**FE b.ii.2**: Expanding calls for investment to include non-local residents. Could present as a "green" investment option fund.

Continuing With ESTEEM (Enacting the Solution Strategies)

The final stages of wind project planning have not been directly addressed in the FDA methodology. Instead, at this point the PM should refer back to ESTEEM or their original development process. The important point is to determine which of the DSM produced solution strategies most appropriately fit the current micro setting in the prospective project location. As mentioned previously, the stakeholders' workshop stage in ESTEEM is recommended as a useful method for determining local actors' responses to the identified solution options. By engaging these stakeholders in this type of a workshop the PM will actually be carrying out several of the recommended solution strategies (PP c.i.1, for example). This should then be followed by a formal plan in which selected strategies are enacted throughout the remainder of the project planning and development stages. It is important, however, to remember that conditions (both macro and micro) can change very quickly. Therefore, a PM must remain vigilant in considering these institutional and local influences during project development. If new issues arise, the DSM can prove useful once again for determining possible solution options. This process will continue until the project is complete.

4.4 BUILDING THE DEVELOPER'S TOOLBOX: CHAPTER SUMMARY

This chapter has described the process by which the second and third Specific Thesis Aims have been addressed. In particular, the conflict issues and solution strategies libraries have been presented. The formal contents of these knowledge databases are not shown in the text (this can be seen in Appendix A), but the process by which they were compiled is described, thus fulfilling *Specific Thesis Aim b*. These two libraries have been combined into a single Excel format, and a built in "Matching System" has been designed linking the many conflict issues to their associated solution strategies. These features comprise the DSM planning tool, which has been constructed as the main result of the second analytical research tract taken in this thesis (to conduct an examination and establish an improved understanding of local stakeholder dynamics). In order to apply the DSM tool to an actual project setting, the accompanying FDA methodology was created. This process borrowed several key aspects from the established ESTEEM method in order to present a comprehensive wind power planning process that highlights the functional abilities of the DSM tool. Finally, a "hypothetical example" was presented in order to demonstrate the actual steps taken in a real-world setting. The remaining chapters 5 and 6 review the results of both analytical tracts followed, and then present the final thesis conclusions.

5 RESULTS

In this chapter, major results from the two primary analytical research tracts taken throughout this thesis are presented. These analytical tracts have focused on two main sets of issues affecting community oriented wind power development in the US. They have guided my research towards the fulfillment of the Specific Thesis Aims set forth in chapter 1. Results from each preceding chapter are presented here in summary form, beginning with a recap of the problem formulation and ending with a discussion concerning what type of contribution the developed DSM tool and FDA method could make towards improving the rate of implementation for community oriented wind power in the US.

5.1 PROBLEM DEFINITION: WHY ALL THE TROUBLE?

The original problem identified as the impetus for this thesis was the very low proportion of community oriented wind power in the US. This was seen as a problem because the current method of large scale, corporate owned wind development carries with it some significant drawbacks for locally affected stakeholders (particularly, issues involving equitable remuneration for bearing project "costs"). Two primary sets of causes were described that are believed to have led to this situation. The first involved prohibitive institutional conditions existing throughout the US. These include the federal incentive system used to promote energy development and the complicated and exclusive nature of the federal regulatory system. The second set of issues involved conflicts related to local stakeholder dynamics with respect to concrete wind projects. A consistent discrepancy has been observed regarding a populace's opinion of wind power in general and people's reactions to locally sited wind projects specifically. The NIMBY rationale has been commonly used to describe this behavior. However, the validity of this response has been seriously contested in the last decade. Furthermore, the misrepresentation of stakeholder objections has been shown to significantly increase local resistance. Thus, I purported that a lack of understanding on the part of developers with respect to the causes of specific project opposition, in combination with unfavorable institutional conditions, represented two significant problem areas affecting community oriented wind power development in the US.

5.2 RESEARCH OBJECTIVES AND TACTICS: WHAT CAN I DO?

In response to the problems identified above, I developed a set of general research objectives leading to three Specific Thesis Aims. The general objectives have guided the basic tenor and perspective for the thesis, while the specific aims have dictated the exact areas of analysis that have been investigated. The general objectives set forth my intention to improve a developer's ability to identify and respond to locally relevant conflict issues in specific development settings, while also establishing an emphasis on developing projects that positively affect local communities. The Specific Thesis Aims provided the following three particular research targets:

This thesis will:

a. *Describe current institutional conditions affecting energy development in the US with the purpose of identifying institutionally dependent conflict issues and associated solution options.*

b. *Construct a conflict issues and solution strategies library concerning local wind power planning obstacles drawn from numerous project case studies and ongoing sociological research.*

c. *Organize these libraries into a functional tool that will improve a developer's ability to understand and appropriately address context-specific wind power planning obstacles in varied local settings.*

These specific objectives led to the adoption of two primary analytical research tracts that have been followed throughout the thesis. The first tract was devoted towards fulfilling *Specific Thesis Aim a*; it involved the utilization of an established research technique called Institutional Analysis (IA) in order to describe the prevailing institutional conditions affecting wind development in the US. Micro conditions relating to this broad understanding could then be more appropriately addressed within local setting. The results of this analysis were presented in chapter 3, and are summarized in the following section.

The second analytical research tract was devoted towards improving a prospective developer's understanding of the causes of local stakeholder opposition to specific wind power projects; and also, to enable them to more efficiently respond to these particular conflict areas. This tract is primarily dedicated towards fulfilling *Specific Thesis Aims b and c*. The results from this second analytical tract are encompassed within the constructed conflict issues and solution strategies libraries as described in chapter 4, and that exist in full in the Development Strategy Matrix (DSM), Appendix A. To accomplish the goals set forth in this second analytical tract, I developed my own perspective of how locally relevant conflict issues should be understood and addressed by project managers (PM) within the context of an unfavorable and unstable institutional system. This perspective was originally described in chapter 2, but I have included a review of its main emphasis here in order to contextualize the other chapter's results.

Essentially, I stated that the aggregate macro conditions in the US experience cyclical shifts over time, trending between favorable and unfavorable with respect to their influence on community oriented energy development. These macro conditions are responsible for the manifestation of energy policy, which is reflected by existing meso conditions (i.e. incentives and regulatory requirements). As macro characteristics shift, so do the resultant meso conditions. This meso context, in turn, directly influences the relevance of certain micro conditions and the feasibility of various development options. This is reflected in the top half of Figure 9 (shown below), and provides the theoretical basis for conducting the first analytical research tract.

The second tract really begins with the bottom half of Figure 9, and represents my derived theoretical approach to identifying and addressing locally relevant stakeholder conflicts. This perspective has resulted in the formulation of the DSM and its accompanying methodology, the

Flexible Development Approach (FDA). In the figure below, stage 3 represents the point at which a PM can utilize the DSM to engage in a "conflict identification" process. This is where the improved understanding of conflict issues established in this thesis is useful. Stage 4 represents the "solution identification" process, using the DSM's functional abilities; these provide solution strategies designed for the concrete conflict issues observed in a specific project setting. The goal of improving a developer's ability to respond to the more intricately understood conflict issues is represented by this step. The full process is reviewed later in this chapter, during the summary section describing the analytical tract two results.

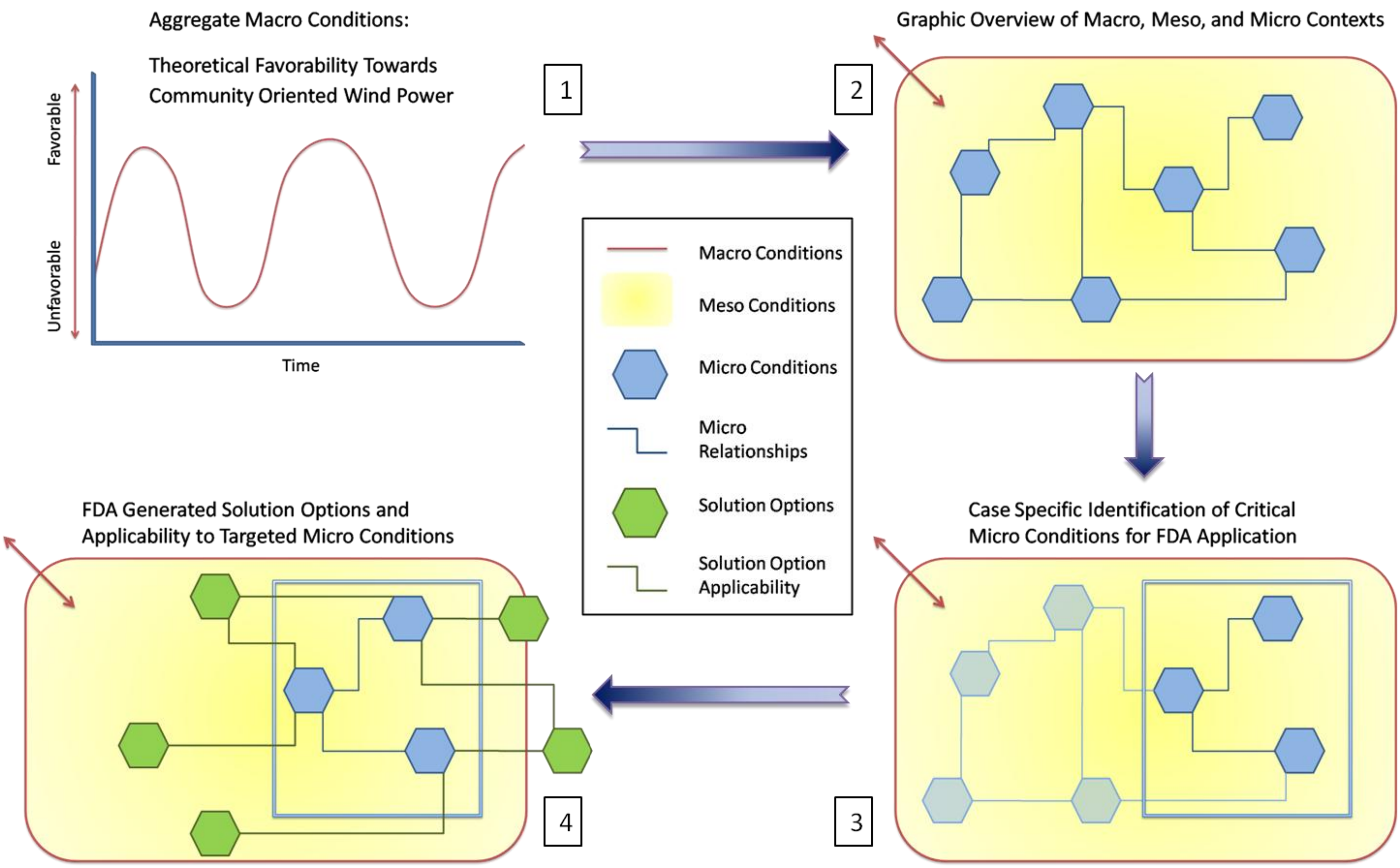

Figure 9: Synthesis of relevant theories into a functional FDA methodology. The diagrams corresponding to boxes 1 and 2 represent the results of the first analytical tract taken, specifically, assessment of the prevailing concrete institutional context. This institutional understanding dictates the relevance of certain micro characteristics and feasibility of certain solution options during the next two stages of project planning. These steps show the functional application of the FDA and use of the DSM tool during, conflict identification (diagram 3), and solution strategy procurement (diagram 4). These two stages represent the investigative results of the second analytical research tract, involving local stakeholder dynamics. The flexibility built into the FDA procedure is intended to allow a project manager to design his/her development strategies to work within the prevailing institutional conditions, and to adapt accordingly, as these conditions shift over time.

5.3 Analytical Tract One Results: How Does the Current Institutional Context Affect Community Oriented Wind Power Development?

While it was reported in the previous section that the prevailing "concrete institutional context" is non-stagnant, and thus requires a fluid comprehension over time; it has also been deemed essential to understand the current institutional situation in order to effectively describe the existing institutionally dependent barriers facing community wind power projects. This understanding can then be integrated into the developed planning tools in order to help PMs identify potential obstacles and select appropriate solution measures.

The analytical process used to establish this contextual understanding was based primarily on the IA theory, described in chapter 2. This investigation drew from academic references and actor interviews, in addition to my own knowledge and perception regarding the American political system, economically dependent energy actors, and grassroots organizations. The results of the analysis paint a picture of macro and meso institutional contexts which are not at all favorable towards the implementation of community oriented wind projects. These broader contextual levels influence the micro characteristics that must be considered in development settings within the US. The primary barriers identified during this analysis are shown here.

1. At the macro level, the traditional mode of electricity production in the US involves large centralized facilities situated far away from residential areas. This has perpetuated a sociological disconnect between the American people and the notion of energy production. It has also allowed traditional energy interests to coalesce power from a top-down position using disproportionate amounts of political influence. The evolution of the energy system reflects this situation from a physical, regulatory, and policy sense; all of which are not currently favorable towards community based wind development.

2. With respect to the meso context, the financial incentive mechanisms used to promote different types of energy development also do not favor community style projects. It was shown in Figure 4 (section 3.2.2), that an overwhelming majority of federal subsidies for energy production over much of the last decade have gone towards traditional fossil fuel technologies. Of the subsidies that have been allocated for RE sources, by far the most economically beneficial one for wind generators, the Production Tax Credit (PTC), has a severely limiting accessibility clause linked to investors' annual tax liability. This restriction makes it very difficult for non-corporate investors to access the majority of the available incentive, essentially establishing a federally funded mandate in favor of large scale, corporate owned wind projects.

3. Transitioning from the meso to the micro context, the regulatory and legal structure in place affects the type of ownership structures that can be feasibly employed in various settings. For instance, the tax liability issues tied to the PTC could possibly be negated through a multiple-owner structure. However, legal requirements for issuing ownership shares in this manner are complex and expensive. Other options include corporate/private partnerships in order to harness these incentives, but they too face difficult legal and regulatory barriers. While there are viable options available for promoting community ownership in the current

institutional context, nearly all of them require complex legal maneuvering, and none could be called “easy”.

In summary, the first analytical research tract has revealed that the current “concrete institutional context” is generally unfavorable towards community oriented wind development. There are some indications that positive changes could be on the horizon (perhaps as some form of cap and trade system), but even these indicators can only be taken as speculation at this point. Thus, for the purposes of this thesis, the available incentives, regulatory issues, and feasible ownership structures discussed in chapter 3, and included in the DSM tool, are representative of the *institutionally dependent conflict issues and associated solution options* that are deemed relevant within the current institutional setting, as called for in *Specific Thesis Aim, a*.

5.4 Analytical Tract Two Results: Understanding and Appropriately Addressing Local Stakeholder Dynamics

This second analytical research tract induced the construction of a method by which PMs could more accurately identify the actual causes of local opposition to specific wind power projects, and then extract appropriate strategies for addressing these conflict issues. Towards these goals, a significant amount of research was conducted using historical case studies, academic research articles, and experienced actor interviews. Throughout this process, I gathered data from these sources that presented rationales for why specific wind projects may have received opposition from local residents, even though wind power in general was perceived very highly. What I found was a large number of legitimate reasons for this discrepancy. I input these reasons, calling them “conflict issues”, into a knowledge database that I constructed for this purpose using Microsoft Excel. I also examined the development strategies used by PMs faced with these conflict issues in various local settings. A corresponding database was built using the “successful” strategies found during this search. These “solution strategies” were input into the same Excel file, corresponding to their original conflict issue. Eventually, these two databases were refined to form the *conflict issues and solution strategies library concerning local wind power planning obstacles* that was called for in *Specific Thesis Aim, b*.

The detailed process by which these libraries were formed was described in chapter 4. The full conflict issues and solution strategies libraries can be found in the DSM tool, Appendix A. I have listed the most common conflict issues for each of the “major categories” included in the conflict issues library in this section. This should provide some idea of which types of issues were most frequently identified during the research, and how they are presented in the DSM. I have also included the most frequently listed solution option for each of these conflict issues (there is often more than one solution option for each issue, but only one is listed here). These strategies can be considered as the top recommendations produced by this thesis for dealing with the most common locally relevant conflict issues. These examples are shown in the following Table 5.

Table 5: Most frequently cited conflict issue for each major category and the most frequently cited solution strategy for each issue. These represent a small sample of the data included in the knowledge libraries in the DSM tool.

CCI "tag" and Issue Summary	Conflict Issue: Paraphrased Description	Top Solution Option Linked to This Conflict Issue
SS a.i: Local opinions on the visual impact of the proposed wind farm	The perceived visual impact of a proposed wind project is the most important consideration for most local residents. This can create both positive and negative reactions, but negative reactions appear to incite much stronger opposition than positive does support.	**SS a.i.1**: Industrial and military areas seen as environmentally damaged were seen as acceptable locations by an overwhelming majority for wind expansion. Seeking sites near existing electricity plants, particularly large ones, could be a very good option for reducing local opposition. Similarly, proposing isolated sites may be good, though if they are used for wildlife recreation then this may backfire. Current agricultural land also presents a promising geography for wind because turbines do not prevent cultivation and the land is already being used in a utilitarian way.
LD a.ii: Specific opposition by neighbors of proposed turbines (often called NIMBY)	Local opposition by neighbors of proposed turbines is a serious roadblock for many projects. This type of opposition is commonly written off as NIMBY, though much recent research suggests that there are many valid reasons why a neighbor would oppose a project that go beyond the simple not in my back yard theory.	**LD a.ii.1**: Neighboring landowners are particularly important due to the fact that they are directly impacted by an adjacent project and their subsequent likelihood to present strong opposition if they feel wronged. They should be contacted early on in the process, should be given an opportunity to participate in the planning process, and if possible, be presented with the opportunity to share ownership by investing in the project (or through "neighbor land leases"). These steps all help to ensure the perceived "process fairness". If negotiations are held "behind the back" of the landowner's neighbors then serious resentment and opposition can arise.
PP c.i: Local Stakeholders perception of fairness and transparency in the planning process	Perceived equity and fairness are very influential factors, as is transparency in the planning process. Most residents are more concerned with process fairness than with the ultimate outcome, as a fair process should ensure a fair outcome for the community.	**PP c.i.1**: Objectors may ultimately accept a decision to proceed as long as they feel they were treated fairly during the decision process, this is called the "fair process effect". Research also suggests that "one of the key ways in which a climate of trust can be fostered is through responsive and fair engagement with host communities and through encouraging local, co-operative ownership of projects." (Jones, 2009) Engaging community members using clear terms and a transparent negotiating process can improve the project's image.
OS a.ii: Complexity of many ownership structures and the difficulty replicating structures in other locations	The complexity of some ownership structures makes them extremely confusing legally intensive. Combined with different regulatory situations across the US, this complexity also makes it difficult to replicate certain ownership structures in some situations.	**OS a.ii.2**: Several examples of successful community projects include partnerships between the community and an organization that has expertise in wind development, particularly in how to set up complex ownership and investment mechanisms. This partnership is intended to increase a local developer/owner's ability to navigate the complexity involved. It can also increase the level of trust between the community and the developer if they see that the project is being supervised by an established organization that they are familiar with.
FE b.ii: Inability to raise sufficient capital	High upfront costs of wind power require significant capital to be raised initially. This is a problem for many smaller/ private potential owners	**FE b.ii.1:** Innovative co-ownership models may entice larger developers to work with communities as a proactive means of improving their public image, and to prepare for potential future government regulations on GHG emissions. "If co-ownership proves productive in helping to secure planning permission, particularly for wind farms, it could become more widespread as standard industry practice" (Walker, 2008). This could open up more equity from larger partners and provide better lending terms from banks who feel more secure due to increased developer collateral for the project.

The composition of these two libraries essentially fulfilled the second Specific Thesis Aim by providing an improved understanding of the root causes and possible solutions related to specific aspects of wind project opposition. However, this was not deemed sufficient for improving a PM's ability to utilize this improved knowledge in a real-world development setting. To accomplish this task, a functional method had to be devised by which a PM could efficiently navigate these large libraries in order to access the particular bits of information that hold relevance to their specific project setting. Towards this end, I designed a built in "Matching System" that enables a PM to efficiently navigate the DSM's large knowledge databases.

Essentially, the Matching System is based on an Excel linked labeling system using Condensed Conflict Issue (CCI) "ID tags" for the conflict issues in the first library, and associated "solution strategy tags" for their corresponding primary solution options. Compatible solutions were also linked together as "collaborative solution options" in order to maximize the range of strategies available for each CCI without having repetitive entries. A "Master List" was created as an indexing tool in the DSM Excel file, so that detailed descriptions for each CCI and solution strategy would be readily accessible from a single worksheet. This is re-illustrated in Figure 10, using the first two entries in the conflict issues library.

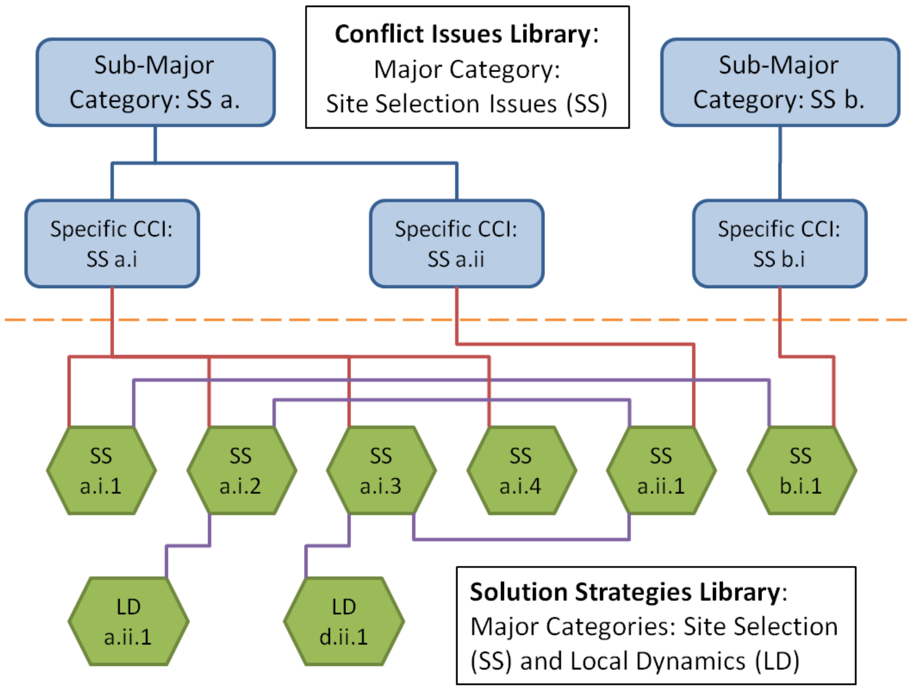

Figure 10: Graphical depiction of the DSM in action. The Major categories, sub-major categories, CCIs, primary solution options, and collaborative solution options are all entries in the actual DSM tool. The red lines indicate primary solution relationships between the blue CCIs and the green solution options. The dotted orange line symbolizes the built in Matching System linking the CCIs to their solution strategies. The purple lines represent "collaborative solution" relationships between different solution options. For example, the specific CCI (SS a.ii) has one primary solution option (SS a.ii.1), and two collaborative solution options (SS a.i.2 and SS a.i.3). If you decide to use either of these collaborative options, then you would be further directed to examine their collaborative options (LD a.ii.1 and LD d.ii.1). It is up to the PM to decide which of the suggested solution options he/she can use in their specific setting. All of these micro conditions (CCIs and solution options) are dependent upon the prevailing concrete institutional context at the time of project development (as shown in Figure 9, above).

The final step taken in pursuit of achieving real-world applicability for the DSM tool was to establish the accompanying FDA planning methodology. Because the DSM only deals with a limited range of wind development issues, this integration was necessary in order to show when and how the DSM could fit into a broader wind project planning process. The established planning method called ESTEEM was used as a functional foundation towards this goal, due primarily to its numerous theoretical similarities with the derived analytical tract two approach that was followed during the construction of the DSM. As such, the FDA was described using ESTEEM's basic six step process, though several important improvements were cited in relation to applying this thesis's methods to community oriented wind projects as opposed to those provided by ESTEEM. As a quick review, the following Figure 11 presents the abridged step process for conducting an FDA examination based on ESTEEM's original model.

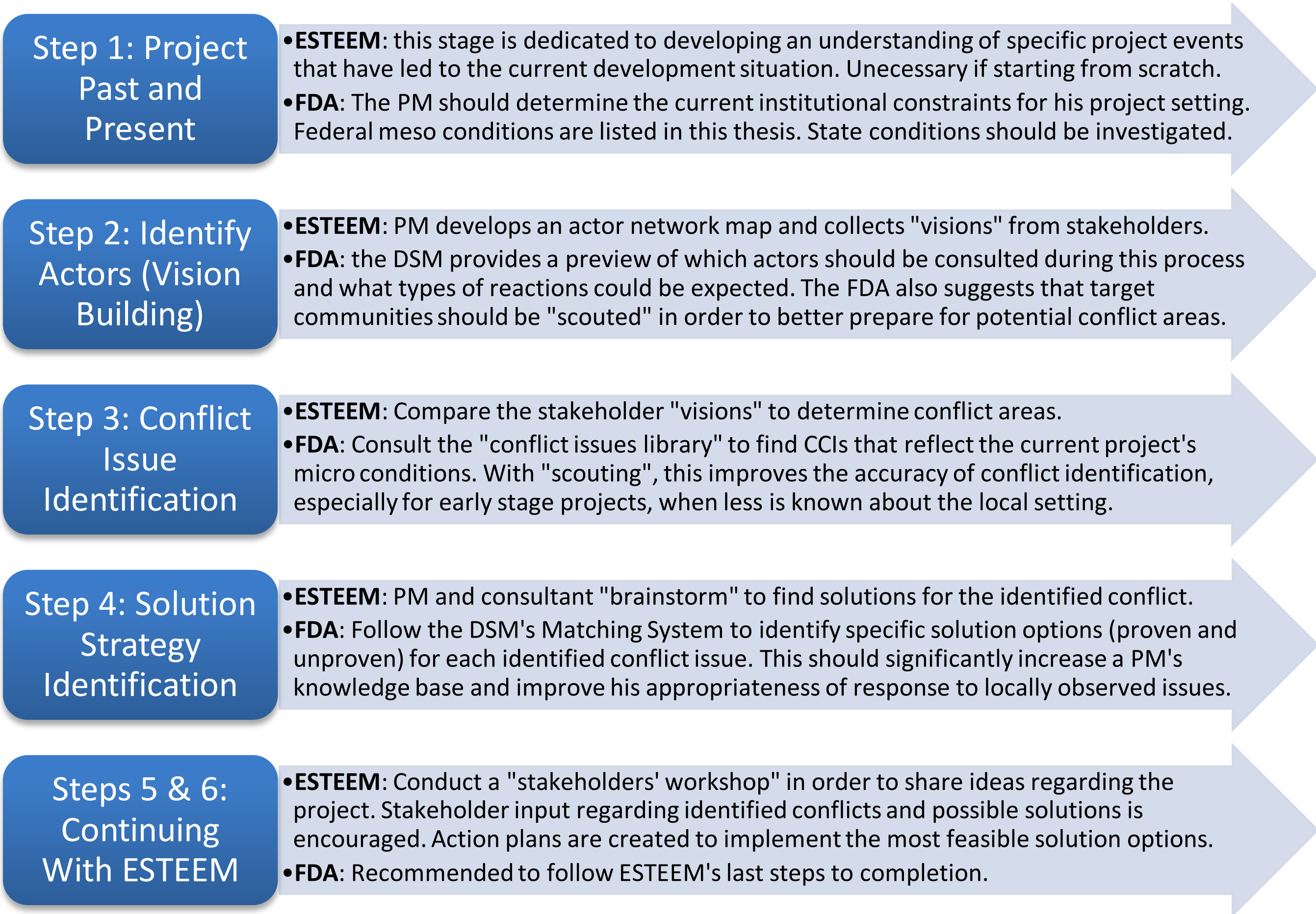

Figure 11: Review of a wind project planning process as described by ESTEEM. The stages of the entire process have been summarized with respect to the tasks outlined in ESTEEM as well as the additional steps included in the FDA methodology. The highlighted aspects focus on the FDA's improvements upon the original ESTEEM method through the use of the DSM tool. The full description, including a hypothetical case example, can be found in section 4.3.2.

This represents the final analytical result produced by this thesis. The FDA now allows the DSM to be employed in an actual project environment as a *functional tool that will improve a developer's ability to understand and appropriately address context-specific wind power planning obstacles in varied local settings*; thus completing the second analytical research tract, and fulfilling *Specific Thesis Aim, c*.

6 Conclusion and Reflections

This thesis identified two major problem areas related to the slow growth rate of community oriented wind power in the United States (community oriented implies that a significant portion of the project should be owned by local residents, or the local municipality). The first problem area involved historically ingrained institutional barriers related to the energy system in the US which are compounded by the influence of traditional actors on the evolution of this system. The second discussed issues related to local stakeholder objections to specific wind power projects. These two problem areas led to the development of the stated research objectives and Specific Thesis Aims. They also led to the establishment of two divergent analytical research tracts used to investigate each problem area.

The first analytical tract employed an established research method called Institutional Analysis to define the constraints currently limiting community wind power implementation due to prevailing institutional conditions in the US. The results indicated that conditions were generally unfavorable towards this type of energy development, though they did not make it completely infeasible. Instead, community based projects generally have to pursue extremely complicated legal arrangements regarding their ownership structure. This is necessary in order to access the substantial but exclusive federal incentives available for RE producers, provided these producers meet very restrictive eligibility requirements. These requirements currently encourage corporate owned projects while significantly discouraging community oriented ones. These results fulfilled the first Specific Thesis Aim.

The second analytical tract engaged in an examination of the rationale behind local objections to specific wind power projects. The traditional NIMBY excuse was deemed inaccurate as well as harmful to overall project success; thus, alternative reasons were sought using information extracted from relevant academic articles, case studies, and actor interviews. The investigation revealed a multitude of causes for local opposition, many of which relate to a developer's handling of the project planning process. This research approach also focused on identifying development strategies that could be used to minimize project conflict. These strategies were seen as potential solution options for the most common and critical conflict issues observed in local project settings. It was found that inclusion of local residents into early project design stages, offering ownership opportunities to nearby residents, and ensuring that the approval process is transparent and fair, represent a few of the most critical aspects to consider in regard to local stakeholder objections. This understanding fulfilled the second stated Specific Thesis Aim.

Upon developing a more intricate understanding of the causes of local project opposition and the means by which this opposition could be minimized, the goal of utilizing this knowledge in real-world development settings was pursued. Towards this end, the conflict issues and solution strategies libraries were compiled and linked together to form the functional DSM planning tool. This tool is intended to allow a project manager to reference the embedded knowledge databases in order to improve his/her ability to identify critical conflict issues and appropriate solution options in unique local development settings. To integrate the DSM tool into a broader wind power planning process, the FDA methodology was introduced. This methodology was based on an existing RE project planning guide called ESTEEM. Building on ESTEEM's comprehensive approach, the FDA introduces key improvements that allow the DSM to provide highly specified planning advice during critical stages of wind power development, such as during the engagement of local residents and for negotiating specific US institutional obstacles. This functional tool and derived methodology essentially fulfill the third and final Specific Thesis Aim.

6.1 Thesis Impact: What Have I Actually Contributed?

My initial goal in conducting this thesis project was to establish a strategy for promoting community oriented wind power in the US that I could use upon graduating from Aalborg University. In assessing the final product, I feel that the constructed DSM tool could actually prove valuable to a developer interested in promoting small to medium scale wind power projects. The most important aspects, as I see them, are the two embedded knowledge libraries. They provide the ability for a developer to assess a potential project setting without investing too much time or resources, with the purpose of determining the general aspects of a prospective wind project that could incite significant local opposition (or support). This assessment ability is predicated on a basic understanding of the micro conditions present in a prospective community, as well as the broader institutional constraints in place (the latter of which are described in their current form in this report). Upon identifying some key aspects of a unique local community, the DSM can be referenced to determine the most likely sources of conflict based on examples from previous experiences. Furthermore, the solution options included in the DSM provide multiple strategies that could be employed to minimize or avoid the potential conflict issues. I believe the thesis results are most helpful if they are applied before fully engaging in a concrete development process. As such, the DSM may be a better tool for developing initial project plans rather than adjusting development approaches on the fly.

I can say confidently, that the DSM will help to reduce instances in which local residents' objections are misunderstood, particularly by reducing a developer's use of the NIMBY excuse to discredit these reactions. I am also fairly certain that the DSM will improve a developer's ability to achieve the notion of "qualified support" within a local populace. This term refers to a person's willingness to accept a wind project, provided that certain positive criteria are met, and that specific negative criteria are avoided. The ability to achieve "qualified support" is based on the specific inclusion in the solution strategies library of numerous stakeholder integration strategies, which all serve to improve the perceived fairness of a planning process. Thus, the DSM should significantly improve a developer's ability to positively engage local residents during wind project planning stages.

I also believe that the description of the concrete institutional context provided will improve a developer's ability to work around existing barriers towards creating more community inclusive style projects. While it is a shame that it is such a complicated endeavor to promote community owned projects in the US today, the inclusion of innovative strategies used by non-corporate developers to access crucial federal incentives should prove extremely useful in many project settings. Furthermore, the understanding that conditions are fluid is an important notion to consider. This may be second nature to seasoned developers, but coming from a position of inexperience, I believe that this perception is crucial to maintaining process flexibility. As new options come online (or old ones disappear), it is essential that project managers be prepared to adapt accordingly.

Thus, I believe that the thesis has produced a worthwhile set of results, both from an academic standpoint and from the perspective of a future wind power developer. I look forward to employing some form of these tools in the future.

6.2 Limitations: Are the Results Applicable in the "Real World"?

Having explained why I believe this thesis has actual value, it is important now to consider the ways in which it is limited. This is essential in order to gauge the thesis's applicability in a real-world setting, as this is the ultimate goal for its future value. The idea that the DSM and FDA can be applied in an actual development setting is dependent upon several key understandings, which were first discussed in the Introduction as project boundaries, and then again in section 2.5, "Delimitations".

Foremost, significant aspects that are crucial to the ultimate success of a wind power project have been excluded from the outset of this thesis's analysis. These include broader notions associated with widespread expansion of dispersed wind power (such as technical and political issues). But, more importantly, practical micro characteristics were also excluded, with examples such as:

- wind resource assessments
- electric grid interconnection issues
- negotiating power purchase agreements
- turbine purchasing specifics
- infrastructure limitations
- decommissioning responsibilities
- important aspects of the regulatory permitting procedure

These steps in a real-world wind development process are absolutely critical to achieving project success; their omission represents serious gaps in the FDA's standalone capacity. As such, they must be dealt with in some manner other than through the tools provided in this thesis.

Another question regarding the functional validity of the DSM and FDA is that I have not actually tested them in a real-world setting. This means that I can only speculate as to how the suggested planning methodology would work in practice, including how it would mesh with the supplementary ESTEEM tool. I can also not attest to the DSM's ability to be referenced "on the fly", meaning that in a hectic development setting, a PM may not be interested in referencing a computer program before making quick, project crucial decisions.

I have identified two issues which could be used to criticize the validity of the results with respect to the two main theoretical positions taken in this thesis. First, in describing the current "concrete institutional context", I have dedicated a significant amount of research towards explaining a concept that I readily admit undergoes constant change. Furthermore, I have dedicated two of the five "Major Categories" in the DSM towards addressing issues specifically linked to this current institutional setting. If significant changes were to occur at the macro or meso levels (i.e. introduction of a Feed-in-Tariff or cap-and-trade model, or the elimination of all RE subsidies), then the majority of this dedicated portion of the DSM becomes flawed at best, and obsolete at worst. However, I have included some solution options in both of these categories that come from foreign examples; these may actually become more feasible in the event of significant institutional shifts. But, in general, this potential flaw is a legitimate risk inherent in the DSM. The most effective (though not necessarily efficient) solution may be to re-assess the macro and meso contexts on an annual basis and update the conflict issues and solution strategies libraries accordingly.

The second issue that could be raised against this thesis's theoretical approach involves the origin of the sources used to extract the conflict issues and solution strategies. I developed these libraries using data from all over the world (primarily the US and Europe, but also Japan and Australia to some degree). Because of this, I cannot guarantee the appropriateness of applying lessons learned from foreign examples towards unique local development setting in the US (or really anywhere for that matter). Thus, I have run the risk that issues or solutions may have been included for use in the DSM that do not hold much relevance to the US. My main defense is that I believe the lessons learned from foreign examples could allow US developers to avoid some of the same mistakes, or to direct their attention towards strategies that have proven extremely successful overseas, but maybe haven't been given a legitimate shot in the US. Additionally, during the process of condensing the included issues to form the CCIs, I made efforts to broaden the applicability of each issue described to minimize the likelihood that a very case specific characteristic would negate the validity of the entire issue (or solution option). However, in general, this criticism represents a risk that I was willing to take throughout the analytical process.

6.3 REFLECTIONS… AND THE FUTURE

Towards the future, if I were to continue this line of research I could identify several areas of improvement. Some of these include the following ideas:

1. Functionally, I would like to develop a supplementary tool that helps a user navigate the DSM's large knowledge database. I believe this tool could be built without too much complexity using the Visual Basic programming language. I envision it in a browser format, initially showing the conflict issues library. The user could skim through short descriptors of the CCIs; moving the cursor over one of these descriptions would produce a "pop up" window that describes that issue in more detail. The user could check boxes next to each of these conflict issues; when ready they could click a "produce solutions" button that would bring up another window in which each issues' associated solution options were displayed. A further series of choices could eliminate the unwanted options, and the result would be a list of the identified conflict issues and preferred solution options that the user has deemed appropriate for his/her setting.

2. In order to increase the DSM's comprehensiveness, I would expand its range of analysis to include some or all of the excluded issues mentioned in the previous section. The most important appear to be those involving grid interconnections and power purchase agreements. These have been cited as two of the most difficult aspects involved for wind power development in the US (particularly for smaller projects). I believe a similar analytical process could be followed in order to expand the DSM to include these issues. I would also like to conduct more actor interviews regarding all of the included and excluded issues, as this was my least frequent means of extracting data during the thesis.

3. I would like to conduct an actual test using the DSM tool, following the FDA methodology for an ongoing wind project. I believe this process would provide invaluable information regarding the functional abilities of these results. This could either prove their worth, or reveal significant aspects that could be improved upon in subsequent versions.

4. It would also be interesting to construct a “sister” DSM for use in other countries. I believe the first three major categories (Site Selection, Local Dynamics, and Participatory Planning) would be largely relevant across borders; but the last two (Ownership Structures and Financial and Economic Issues) are primarily country specific. These last two categories could also be refined much further, to the state or regional level. This would provide an interesting, and probably even more applicable result for developers working primarily within one particular area.

Ultimately, in this thesis, I have investigated a topic that carries great interest to me. I began with the goal of producing something that I could actually use after my time as a student; and, for the most part, I feel that I have achieved this goal. There are certainly limitations to the constructed tool’s applicability and usefulness; however, the issues that I wanted to consider have been considered; and in the end, I have produced a tool that I believe will be helpful to me as a future wind power developer.

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