

# Social Impact Assessment of a 10MW Diesel-Fired Power Plant in the Village of Simora, Palapag, Northern Samar, Philippines

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## Abstract

The research case study used a standardized survey focusing on socio-economic demographic characteristics of respondents. This objectives are: i) identified the potential social positive and negative impacts of the 10 MW Power Diesel plant's construction, operation and decommissioning phase; ii) developed attainable mitigation measures to enhance positive impacts and reduce negative impacts; and iii) developed management and monitoring measures to be implemented throughout the life of the project.

The development of the proposed 10MW diesel-fired power plant will create rural employment and business opportunities for locals during and after the construction phase. It will employ approximately 200 workers. A Community Trust Fund shall be created and funded through the revenue stream generated from the sale of energy from the proposed power generation development project. This will create an opportunity to support local economic development in the area.

**Key words:** social impact, community awareness, environmental management, independent power producer

## 1.0 Introduction

Northern Samar is one of the three provinces of Samar created in June 1965 and one of the six provinces of Region VIII (Eastern Visayas). It is bounded on the north by the San Bernardino Strait, on the west by Samar Sea, on the south by the Province of Eastern Samar and Western Samar, and on the east by the Philippine Sea.

The position of Northern Samar is strategic just as it serves as entryway to Visayas and Mindanao from Luzon. To get to the province, it is 743 kilometers south of Manila and can easily be reached by forty-five minutes plane ride to Catarman, the capital and economic hub of the province. Alternatively, a 14 hours land travel by air-conditioned buses through Maharlika Highway passing through Bicol region, traversing San Bernardino Strait through ferry boat to the primary ports of Allen and San Isidro, from Matnog, Sorsogon.

The proposed 10MW diesel-fired power plant is within the political domain of the local government of Palapag, Northern Samar. The power generation development project site is located in Village (*Barangay*) Simora, a rural/agricultural area of the western cluster of the municipality. The location is approximately 30 km west of Palapag, 18 km from the municipality of Catubig and 43 km from Catarman.

Palapag serves as a general agricultural and fishery service center of the province of Northern Samar.

## 1.1 Project Description

The proposed project will involve the establishment of 10MW diesel-fired power plant by the Datem Energy Corporation in partnership with Doosan Engine, Inc. of Korea with a total capital investment of PhP355.23 Million. The project location is in Bgy. Simora, Palapag, Northern Samar. The intent of the project is to have the Northern Samar Electric Cooperative (NORSAMELCO) as the off-taker of the generated power to meet its base-load requirement, with the excess energy sold to the Wholesale Electricity Spot Market (WESM).

The power plant can also serve the peaking requirement for NORSAMELCO but with excess energy contracted with other electric cooperatives, the National Grid Corporation of the Philippines (NGCP) and WESM.

Datem Energy Corporation pushes for a hybrid technology of diesel and solar system integration to be implemented for future plant expansion. This hybrid system will provide considerable reduction in fuel, logistics and operation and maintenance (O&M) costs; reduce carbon dioxide emissions; and ensure grid stability. The project is therefore an Independent Power Producer (IPP) project.

The total footprint that will be taken up by the diesel power plant facility is 2.7 hectares and solar power farm facility 2.7 hectares. The whole facility will have a total land area of 5.3244 hectares.

An Initial Environmental Examination (IEE) Checklist by the Philippine Department of Environment and Natural Resources (DENR) was already prepared by Datem Energy Corporation based on an initial generating capacity of 6MW. The increase in generation capacity to 9,875 kW (or less than 10MW) would mean that only an IEE would be required. Aside from complying with the IEE, a social impact assessment (SIA) is also required by the Philippine Department of Energy (DOE) for the project to be approved, hence, this study.

## 2.0 Objectives and Approach of the Study

### 2.1 Methodology

The approach and methodology that was employed during the social impact assessment included review and gathering of relevant reports and documentation pertaining to the project and its area of influence that included the municipal profile of Palapag, Northern Samar, and qualitative and quantitative fieldwork data collection. Socio-economic fieldwork comprised undertaking a standardized survey focusing on household characteristics, income, expenditure and savings, land use and agriculture, housing and infrastructure, education and health, perception and expectations, and social integration and cohesion.

The socioeconomic profiling included those who will benefit from the employment and other economic opportunities generated by the project. The survey was carried out to see that in the host area enough land, income earning opportunities and other resources exist to sustain additional population from the affected area, and that this influx does not put pressure on local resources that the host population may resent.

Random sampling was used to select the  $n$  individuals out of the  $N$  such that everyone in the influenced areas has the equal chance of being selected. A sample of 50 the respondents were selected at points entirely at random within the population in which they were homogenous.

### 2.2 Survey of Stakeholder Participation

As part of the study, a focus group discussion (FGD) was conducted among local officials and residents in the vicinity of the influence area. In some cases it was felt that considerable effort was placed in public consultation both by the study team and developer. However, it was also expressed that the public participation was made a more genuine consultative process and the client/owner was given much responsibility for this important element. The consultation allowed more time for interactions, asking of questions and providing responses have been more effective.

There were expression of gratification in the level of community participation and interactions with the residents. There were indications of awareness that public consultations were held. As such, the best course was to focus on the most significant social impacts, giving high priority to impacts identified by the people themselves. It is well known that some groups low in power do not usually participate in project preparation stage, the survey ensured that their concerns were fully addressed.

The survey research, including public consultation/meetings conducted during the study period April 22 to May 29, 2015 was used to gauge the public opinion on the proposed project and secure public input into its planning. Concerns focused on health risks resulting from noise, air and water pollution, including hazards to the environment resulting from power plant operation. Representation by senior level management of Datem Energy Corporation was requested to ensure that the views of the general population would be heard and acted upon. The Company was generally viewed as a responsible corporate citizen and bound to maintain that image. They recognize the need to protect the environment and public health; committed to develop and appropriate “environmental management system” which will be incorporated into its overall management activities to address issues as they arise and also to plan for mitigation of environmental and health impacts. Furthermore, Datem Energy

Corporation plans to underscore its activities to maintain environmental sustainability (including social and community awareness) while delivering superior energy services.

The study utilized descriptive–case analysis research design. To validate and substantiate data, triangulation was utilized: survey, secondary data/information, and observation by the researchers. Data were analysed using frequency counts, percentages, and mean.

### 2.3 Method and Level of Integration

The power generation project of the 10 MW Diesel-Fired Power plant in the village of Simora will have associated health risk and environmental impacts due to air, noise and water pollution, and the interaction of the construction and operation of the facility with the environment. Hence, from inception, health and environmental considerations should be integrated comprehensively based on the result of the IEE, including the SIA. The impact on the health of residents can be a result of direct exposure to the air emissions associated with the operation of the power plant through contact with the receiving environment. Of significance is the fact that manifestations of associated health conditions can be both elusive and long-term. Hence, it is important that the relevant health and environment sectors with the specific knowledge and capacity to identify, determine, monitor, and recommend mitigation actions are engaged from inception and are collaborated with to allow full input.

The key aims and objectives of this study included:

- to identify the potential social positive and negative impacts of the 10 MW Power Diesel plant's construction, operations and decommissioning phases of the proposed project;
- to develop attainable mitigation measures to enhance positive impacts and reduce or avoid negative impacts; and
- to develop management and monitoring measures to be implemented throughout the life of the project.

The approach to the SIA study is based on the local and international best practice. The key activities in the SIA process include:

- describing and obtaining an understanding of the proposed intervention (10MW diesel-fired power plant and location), the community likely to be affected by the proposed project;
- harvesting/collecting baseline data on the current social and economic environment;
- identifying the key potential social issues associated with the proposed project. A site visit to the area and consultation with affected individuals and community. As part of the process a proposal of the SIA was prepared and made available to Datem Energy Corporation for approval. The aim of the document was to inform the client of the nature and activities associated with the construction and operation of the proposed development so as to enable them to better understand and comment on the potential social issues and impacts; and
- assessing and documenting the significance of social impacts associated with the proposed intervention
- identifying alternatives and mitigation measures.

In this regard the study involved:

- review of socio-economic demographic data for 2015 through household sampling survey;
- review of relevant municipal profile and policy framework for the area;
- site specific information collected during the site visit to the area and interviews with respondent and affected parties;
- review of information from similar studies, including the SIAs undertaken for other energy projects facility; and
- identification and assessment of the social issues associated with the proposed project.

This report presents the SIA as part of the requirements for the proposed Project. This report has been prepared by the researcher on behalf of Datem Energy Corporation as requirements of the DOE.

The identification of potential social issues associated with proposed facility is based on direct observations during the project site visit, review of relevant documentation, experience with similar projects and the area.

## 2.4 Scope and Delimitations

The study was limited to the social impact of the project that will bear on the community. The information on household income was not accurate and hardly derived because the respondents were unable to decide quickly or, at the very least, reluctant to provide the information. They think that if they tell a much higher income they cannot avail of or will not be given priority for assistance, if any, from government or other agencies. Other perceived reason is that they think that the information might have something to do with taxes (i.e. Philippine Bureau of Internal Revenue (BIR)). During the interview, respondents were mostly wives/mothers since the husband were out doing farm works. Thus, the information is mainly from the perspective of the wives.

## 2.5 Definition of social impacts

Social Impacts is defined by Vanclay (2002), as “the consequences to human populations of any public or private actions (these include policies, programs, plans and/or projects) that alter the ways in which people live, work, play, relate to one another, organize to meet their needs and generally live and cope as members of society. Vanclay wrote “these impacts are felt at various levels, including individual level, family or household level, community, organization or society level”.

“When considering social impacts it is important to recognize that social change is a natural and on-going process”, wrote Burdge (1995). However, Burdge indicated “it is also important to recognize and understand that policies, plans, programs, and/or projects implemented by government departments and/or private institutions have the potential to influence and alter both the rate and direction of social change”. Vanclay (2002) asserted many social impacts are not in themselves “impacts” but change process that may lead to social impacts. For example, he cited the influx of temporary construction workers who will work for the proposed project is in itself not a social impact. However, their presence can result in a range of social impacts, such as increase in antisocial behaviour. “It is therefore critical to think through the complex causal mechanisms that produce social impacts. By following impact pathways, or causal chains, and specifically, by thinking about interactions that are likely to be caused, the full range of impacts can be identified” (Vanclay, 2002).

The SIA should therefore enable the authorities, project proponents, individuals, communities, and organizations to understand and be in a position to identify and anticipate the potential social consequences of the implementation of a proposed project, program and plan. The SIA process should alert communities and individuals to the proposed project and possible social impacts, while at the same time allowing them to assess the implications and identify potential alternatives. The assessment processes should also alert proponent and planners to the likelihood and nature of social impacts and enable them to anticipate and predict these impacts in advance so that the findings and recommendations of the assessment are incorporated into and inform the planning and decision-making process.

## 2.6 Timing of social impacts

Social impacts vary in both time and space. In terms of timing, the proposed project goes through a series of phases, usually starting with initial planning, followed by implementation (construction), operation, and finally closure (decommissioning). The activities and the type and duration of the social impacts associated with each of these phases are likely to differ.

# 3.0 Results and Discussion

## 3.1 Assumptions and Limitations

### 3.1.1 Assumptions

#### **Strategic importance of the project and no-go option**

There are enabling policies that support the strategic importance of promoting energy development, including solar energy, by the national and local governments units.

**Technical suitability**

The proposed site of the 10 MW diesel-fired power plant identified by Datem Energy Corporation represents a technically suitable site for the establishment of the power generation development project.

**Fit with planning and policy requirements**

The legislative and policy context of the local government of Palapag as the host municipality therefore plays an important role in identifying and assessing the potential social impacts associated with the proposed power generation development project. The key component of the SIA process is to assess the proposed development in terms of its fit with key planning and policy documents. As such, if the findings of the study indicate that the proposed development in its current format does not conform to the spatial principles and guidelines contained in the relevant legislation and planning documents with the host municipality and there are no significant or unique opportunities created by the development, the development cannot be supported.

However, the study recognizes the strategic importance of energy and the technical and spatial constraints required for such facility to address the unstable, intermittent and unreliable power supply provided by NORSAMELCO in the province of Northern Samar.

**3.2 Socio-Demographic data**

The demographic data used in the study is largely based on the 2015 interview with sample respondents. While this data provides valuable information on the demographic profile of the affected area, the data have been treated with care. Where possible, reference is made to the municipal profile to crosscheck or validate results of data collected/harvested from the interview.

## 4.0 Policy and Planning of Environmental/Situational Analysis

This section provides an overview of the policy and planning environment affecting the proposed 10 MW diesel power plant. For the purposes of meeting the objectives of the SIA the following policy and planning documents were reviewed, namely:

- feasibility study on the 10 MW Diesel Power Plant; and
- Palapag Municipal Profile (2013).

**4.1 Municipal Profile (MP)**

The Municipal profile (2013) provides a good source of basic information that outlines the political, environmental, economic and social landscape, as well as the judicial and public service systems of the municipality. It will aid in determining the current level of services to its constituents and the presence of available resources in the communities. This also determines the environmental factors which will affect policies and to which policy is expected to bring social and economic changes.

Thus far the municipality has a keen interest to support initiatives on the power energy development as an overarching strategic goal for the sustainable long-term management. All information found in the document should be the basis in determining what particular development the municipality would like to address

The findings of the review of the relevant documents pertaining to the power energy sector therefore indicate that diesel power plant and the establishment of solar power thermal plant are supported at a national, provincial, and local level. It is therefore the opinion of the authors that the establishment of a 10MW diesel-fired power plant is supported by national, provincial and local policies and planning guidelines.

## 5.0 Overview of the Study Area

**5.1 Topography**

Palapag is located in the mainland of Samar Island situated on the northeast part of the province of Northern Samar with the rural settlements distribution by peripheral direction/expansion

The topographic situation of the municipality of Palapag shows that the huge area of northern and northwest side is relatively plain while the rest is decorated with mountains and hills, especially in the northeastern, eastern, southeastern, Southern, and Southwestern sides.

Most of the settlement can be found in the low-lying and flat areas.

Most of the mountains can be found in the riverside region, particularly in Barangays Sangay, Capacujan, Baganay, and Osmeña while there are also mountains that extend in Barangays Matambag, Nagbobtac, Jangtud, and part of Magsaysay.

The rural barangays with similar topography with the urban center have a relatively plain areas are Barangays Nipa, Mapno, Paysud, Talolora, Monbon, Manajao, and Sinalaran.

## 5.2 Demographic Characteristics of Study Area

### 5.2.1 Population of Barangay Simora and Outlying Barangays

The municipality of Palapag is categorized into three clusters, namely Woodland Region, Riverside Region, East Seaside Region and West Seaside Region. Simora falls under the West Seaside Region. Table 1 shows the total household population of Simora is 131, accounting for 6.12% of the total population of West Seaside. Barangay Tinampo has a population of 551 (25.7%), followed by Pang Pang 454 (29.2%) and Monbon 261 (12.2%), bringing an aggregate population of 2,142 for West Side Region.

The population of Simora accounted for 6.6% (11,450) of the total population of West Seaside Region and 1.9% (37,872) of the whole population of the municipality of Palapag.

**Table 1. Household Population of Simora, Palapag, 2015**

Barangay	Number of households
Tinampo	551
Pang pang	454
Monbon	261
Manajao	254
Sumoroy	213
Sinalanan	153
Natawo	125
Simora	131
<b>Total</b>	<b>2,142</b>

### 5.2.2 Sources of family Income

Data produced for 2015 on family income and expenditures show that there are various sources that the population derived from. Fifty per cent (50%) of respondents in Simora had their income derived from traditional sources such as farming mainly coconut and rice, followed by 26% from state poverty fund or 4Ps under the auspices of the Philippine Department of Social Welfare and Development (DSWD). A poverty reduction strategy 4Ps provides grants to extremely poor households. This is intended to improve their health, nutrition and education, particularly of children aged 0-14. Beneficiaries of poor families under this program are provided incentives to invest in their future by ensuring that mothers and children can avail of the free healthcare, as well as the free education for children. While 18% derive income through wage salary. other source include wood and wood products, assistance from relatives, and rental of farm equipment such as hand tractor, thresher and other common farm facility (Table 2).

**Table 2. Income, Expenditures and Savings of Respondents, Simora, Palapag, 2015**

Sources of Family Income	Frequency*	Percent
Farming	36	50
State Poverty Fund (4Ps)	18	26
Wage/Salary	13	18
Wood and Wood Products	1	1
Assistance from Relatives	3	4
Rental of farm equipment	1	1
Total	72	100%

\*Multiple responses

### 5.2.3 Annual income of household

The income of household is a measure of the profitability of a farmer business for a particular period of time, usually one year or every harvest of his/her products. The level of income is the sum of all receipts from the sale of his crops, livestock, as well as all forms of direct payments from the government such as beneficiaries of 4Ps. For rice and coconut farmers they derive gross cash income from the sale of their rice or copra less all cash expenses such as for seed, fertilizer, pesticides, payment on debt, wages to hired labor or rent to non-operator landowners.

The majority of respondents (62%) had an annual income ranging from PhP30,000 to PhP45,000, behind is 18% of their income ranged from PhP10,000 PhP25,000 per annum. To a distinct degree only 0.02% had reported an annual average income of more than PhP100,000, suggesting that the respondent has other sources of income apart from rice and coconut farming (Table 3).

The survey further showed that 0.05% of respondents considered themselves as very poor, 0.45% put themselves as poor, 0.42% considered themselves with lower income, and 0.16% as middle income earners.

**Table 3. Average Annual Income of Household, Simora, Palapag, 2015**

Category	Frequency	Percent
10,000-25,000 below	9	0.18
30,000-45,000	31	0.62
50,000-60,000	4	0.06
70,000-80,000	5	0.10
90,000-100,000 above	1	0.02
<b>Total</b>	<b>50</b>	<b>100</b>

### 5.2.4 Landholdings of farmers

Farm size is a significant indicator of concentration of ownership. Approximately 90% of farms in 2015 were within two to five hectares. These small farms made up the bulk of the total farm area in Simora (Table 4). On the other hand, only about 0.04% of farms were over ten hectares, yet they covered approximately 25 percent of the farm area. Farms also varied in size based on crops cultivated. Rice farms tended to be smaller; only a small portion of rice land was on farms as large as five to ten hectares. Coconut farms tended to be somewhat larger; approximately 28 percent of the land planted with coconuts was on farms larger than ten hectares.

**Table 4. Size of Landholding of Respondents, Simora, Palapag, 2015**

Category	Frequency	Percent
2.0-5.0 has.	45	0.90
0.50-1.0 has.	4	0.08
10-20 has.	2	0.04
<b>Total</b>	<b>50</b>	<b>100</b>

### 5.3.5 Main Crops

Given that Simora is predominantly rural community, it has been placed into or assigned to serve as a general agricultural service center in the province of Northern Samar. Dominating the farm landscape are rice fields and coconut (*Cocos nucifera*) which are processed into coconut meat or copra as source of various grades of oil (Table 5). Traditionally, the farming systems practices of farmers in the study area are rice (53%) and copra production (47%) as the primary crops that are grown. This is an opportunity for local officials to introduce and implement a number of agricultural technologies such as crop diversification and timing of production to move farmers' crops to market and make them aware of their critical role in the value chain.

Other land-based livelihoods linked to market that are socially and culturally acceptable and technically feasible should be promoted to diversify farming systems and thus reduce vulnerability of farmers to extreme weather events.

**Table 5. Primary Crops Grown by Respondents, Simora, Palapag, 2015**

Type of Crop	Frequency*	Percent
Rice	50	53
Coconut	45	47
Total	95	100%

\*Multiple responses

### 5.2.6 Product utilization

With the current farming systems and practices of respondents, it should be understood that farmers' efforts are primarily directed at producing for food security (50%) or subsistence and surplus products are brought to the market (50%) for profit. Traditionally, it is the surplus products that are sold to the market (Table 6). Farmers need to produce their crops at bigger volumes to satisfy their profit objectives and provide the supply chain.

Smallholder farmers with the aid of government technicians need to diversify the crops planted, i.e., rice (*Oryza sativa*) and coconut (*Cocos nucifera*), particularly using the organic system and to establish small-scale irrigation schemes. Alongside with this is the need to conduct more capacity enhancement trainings regarding technologies, including organic farming because it is an effective way of enabling farmers to be more aware of the organic agriculture (OA) benefits.

**Table 6. Usage of Crops of Respondents, Simora, Palapag, 2015**

Category	Frequency*	Percent
For subsistence	50	50
For market/selling	50	50
Total	100	100%

\*Multiple responses

### 5.2.7 Livestock

Apart from traditional crops, i.e. rice and coconut production, Table 7 shows some farmers are into livestock raising such as swine production (48%), free range native chicken (34%) and draft animal (18%).

As can be seen in the table, the most common range of livestock in the community is carabao, pigs and poultry. Smallholder backyard raisers tend to focus on small animals for meat or for sale, and keep carabao mainly for draft. Otherwise, carabaos are relatively expensive that the loss of a single animal may risk the viability of the whole farm enterprise.

For the most part, famers traditionally graze their carabao by tethering; the animals are roped and transferred to places where sufficient native vegetation is available.

**Table 7. Number of Animals (Livestock/Chicken), Simora, Palapag, 2015**

Category	Frequency	Percent
Swine	16	48
Chicken	11	34
Carabao	6	18
Total	33	100%

### 5.2.8 Education of Respondents' Children

On the basis of the 2015 data gathered from the survey, Simora has an estimated 63 children (69%) ages 6 and 16 years old (the primary age group) attending school in 2014–2015 while 31% of the children in the primary age group were not in school in 2014 and 2015 (Table 8).

The reasons for not attending school in elementary age group children could be attributed to: (i) too young to go to school, (ii) not admitted in school, and (iii) lack of documents such as birth certificate. The Philippine Department of Education (DepEd) authorities should address these major reasons cited by a number of respondents.

**Table 8. Education of Children, Simora, Palapag, 2015**

Category	Frequency	Percent
Children in school 6-15 y.o	63	69
Children not in school 6-15 y.o	28	31
<b>Total</b>	<b>91</b>	<b>100%</b>

### 5.2.9 Health of Respondents

Based on the interview, 47 or 94% of the respondents has indicated that there is no chronic health problem of their household members, while small proportion, 3 or 4% had chronic health problem such as lower respiratory diseases (Table 9). The majority who are marginally the low income households prefer to seek treatment in a government facility if a family member needs treatment or confinement. They prefer to bring household members to nearby municipalities in Laong, Catubig, or Catarman. Affordability is the main reason for going to a government medical facility, while “good service” is the main reason for going to a private medical facility (Department of Health, 2010).

**Table 9. Health Status of Respondents, Simora, Palapag, 2015**

Category	Frequency	Percent
No chronic health problem	47	0.94
With chronic health	3	0.06
<b>Total</b>	<b>50</b>	<b>100</b>

The data in Table 10 shows that 32% of the respondents had no idea of the benefits that will accrue to the community of this proposed project. They did not consider in any way that the development of the 10 MW diesel power plant will create rural employment and business opportunities for locals during both the construction and operational phase of the project. Twenty eight percent (28%) considered the project to generate employment while another half (28%) indicated accessing reliable and uninterrupted power supply (Table 10).

It can be said that the operation of the power generation development project represents a significant social benefit to the area where there are limited economic opportunities

The proposed project also represents the challenges created by frequent power outages by the local power energy corporation, NORSAMELCO, which will bring about a positive social benefit for the province of North Samar, in particular, and the society as a whole.

**Table 10. Perception and Expectation of Respondents, Simora, Palapag, 2015**

Perceive Benefits of the Project	Frequency	Percent*
No idea	16	32
Employment generation	14	28
Reliable supply of energy	14	28
Local tax	6	12
<b>Total</b>	50	100%

\*Multiple responses

### 5.2.10 Perceived negative impact of power plant

The operation of the 10MW diesel-fired power plant can affect the surrounding environment by its construction and its operation. These effects can be either temporary or permanent. The power plant and its auxiliary components (e.g. water intakes and discharge, new transmission lines and waste disposal sites of lube oil) take up space on the ground and in the air, use water resources, and, in most cases, emit pollutants into the air. The plant’s footprint on the ground eliminates opportunities for others to purchase or use the surrounding rice fields. Since the power plant sits on a “greenfield” and undeveloped parcel of lands with mostly natural vegetation, there would be impacts on land use on the site.

During the interview, respondents raised concern over their perceived expectations on the project (Table 11). Thirty two (32%) per cent of the respondents indicated that the diesel-fired power plant will burn fuel thus creates exhaust gases and other by-products, resulting in air pollution, followed by 22% who argued that noise pollution is a concern that may harm or disturb nearby farm families, schools and day-care centre. Respondents said that the source of outdoor noise will be mainly caused by the power plant while another 16% averred they are concerned with water pollution and damage to rice fields. According to them, water must be discharged properly from the plant after it has been used for cooling. The amount of used water discharged is factor to be considered and that a variety of solid wastes can be produced, and these must be handled well so as not to affect nearby farms.

There are other possible agriculture impacts that could occur. Waste disposal of excess lube oil (14%) from the power plant could likely affect the yield or quality of nearby rice fields.

**Table 11. Perception and Expectation of Respondents, Simora, Palapag, 2015**

Perceive Negative Impact of the Project	Frequency*	Percent
Air pollution	16	32
Noise pollution	11	22
Water pollution	8	16
Damage to rice fields	8	16
Waste disposal of excess lube oil	7	14
<b>Total</b>	50	100%

\*Multiple responses

Water not properly cooled before discharged to a water body affects the water temperature and will have negative ecological impact. Even an increase of 1 C to the water surface temperature can cause adverse effect to the normal biological band breeding cycle of aquatic organisms especially fish species.

## 6.0 Key Findings and Recommendations

### 6.1 Assessment of the Key Social Issues

This section identifies the key social issues identified during the SIA study. The identification of social issues was based on:

- review of project related information, including other related studies; and
- interviews with key interested and affected parties.

In identifying the key issues the following assumption is made:

- the area identified for the proposed power plant meets the technical criteria required for such facilities.

## 6.2 Identification of Key Social Issues

The key social issues identified during the SIA can be divided into:

- The planning related issues
- Local, site-specific issues

The local site-specific issues can in turn be divided into construction and operational related issues. These issues are discussed and assessed below. The potential impacts associated with the infrastructure.

## 7.0 Social Impact Associated with the Construction Phase

The key social issues associated with the construction phase include:

### 7.1 Potential positive impacts

- Creation of employment and business opportunities, and the opportunity for skills development and on-site training for locals.

The construction phase is expected to extend over a period of 2 years and create approximately two hundred (200) employment opportunities. Of this, seventy percent (70%) will be available to low construction labourers, security staff, etc.), twenty percent (20%) to semi-skilled workers (equipment operators, etc.) and 10 percent (10%) to skilled personnel (engineers, land surveyors, project manager etc.). The majority of low-skilled employment opportunities associated with the project are likely to benefit members from the local community. In this regard the majority of the beneficiaries are likely to be historically disadvantaged (HD) members of the community. The low education and skills levels in the area may however hamper potential opportunities for local communities. The majority of the skilled and semi-skilled opportunities are likely to be associated with the contractors appointed to construct the proposed 10MW Diesel Power Plant and the associated infrastructure. In this regard Datem Energy Corporation, a developer/contractor company, will tend to use their own manpower and this may limit the potential for direct employment opportunities for locals during the construction phase. In terms of training, the contractor is likely to provide on-site training and skills development opportunities. However, the majority of benefits are likely to accrue to personnel employed by the contractor. In the absence of specific commitments from the developer to employ local workers the potential for meaningful skills development and training for members from the local communities are likely to be limited.

### 7.2 Potential negative impacts<sup>1</sup>

- Influx of construction workers employed on the project;
- Increased risk of theft, poaching and damage to farm infrastructure associated with construction workers;
- Impact of heavy vehicles, including damage to dirt roads, safety, noise and dust;
- Loss of agricultural land associated with construction related activities.

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<sup>1</sup> This section, particularly the social impact assessment borrows heavily from the study of Tony Barbour, et.al, Social Impact Assessment for Proposed Valleydora Photovoltaic Power Plant Free State Province.

The significance of the majority of potential negative impacts with mitigation was assessed to be of Low significance. The majority of the potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. However, the impact on individuals who are directly impacted on by construction workers and or job seekers was assessed to be of Medium-High negative significance. At a community level the potential risk posed by construction workers and or job seekers was found to be low. This is due to the relatively small size of the construction force (150 ) and the likelihood that 70% could be sourced locally. The potential risk to local family structures and social networks is therefore likely to be low. Table 12 shows the significance of the impacts associated with the construction phase.

**Table 12. Social impact during construction and operation phase**

IMPACT	SIGNIFICANCE NO MITIGATION	SIGNIFICANCE WITH MITIGATION
<b>Creation of employment and business opportunities</b>	Low (Positive impact)	Low (Positive impact)
<b>Presence of construction worker and potential impacts on family structures and social networks</b>	Low (Negative impact for community as a whole) Medium-High (Negative impact of individual)	Low (Negative impact for community as a whole) Medium-High (Negative impact of individual)
<b>Risk of theft, poaching and damage to farmlands</b>	Medium (Negative impact)	Medium (Negative impact)
<b>Impact of heavy equipment and construction activities</b>	Low (Negative impact)	Low (Negative impact)
<b>Loss of farmland</b>	High (Negative impact)	Low (Negative impact)
High (H) – actions should be implemented in the short-term Medium (M) – actions should be implemented in the long-term Low (L) – actions should be implemented only as funding becomes available		

### 7.3 Presence of construction workers in the area and increased risk of theft, poaching and damage to farm properties

The influx and presence of construction workers on the construction site increases the potential risk of theft and poaching. The movement of construction workers on and off the site also poses a potential threat.

With the proposed project, all of the local farmers interviewed said that theft would likely be a problem as the presence of construction workers in the area increase the risk of theft to animals such as chicken and pigs. These circumstances should and must be dealt with by Datem Energy Corporation through compensation to pay for any losses incurred if there is sufficient evidence.

The presence of construction workers poses a potential risk to family structures and social networks in the area. In addition there are a number of potentially vulnerable activities, such as rice farming and copra production. The potential threat to farming activities is discussed below.

While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on the local community. In this regard the most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to the potential behaviour of male construction workers, including:

- an increase in alcohol use;
- an increase in crime levels;
- the loss of girlfriends and or wives to construction workers;
- an increase in teenage and unwanted pregnancies; and
- an increase in prostitution.

Given the relatively small labour force during the initial construction phase, of which approximately 70% can be sourced from the local area, the potential risk to local family structures and social networks is regarded as low (Table 13).

Employing members from the local community to fill the low-skilled job categories will assist to reduce the risk and mitigate the potential impacts on the local community. These workers will be from the local community and form part of the local family and social network and, as such, the potential impact will be low. The use of local residents to fill the low-skilled job categories will also reduce the demand placed on local services (housing, etc.) by construction workers. However, due to the potential mismatch of skills and low education levels, the potential employment opportunities for the members from within and the nearby local communities, if any, may be low.

**Table 13. Assessment of impact of theft and damage to farm infrastructure**

Nature: Potential loss of livestock, poaching and damage to farm infrastructure associated with the presence of construction workers on site		
	Without Mitigation	With Mitigation
<b>Extent</b>	Local (4) (Rated as 4 due to potential severity of impact on local farmers)	Local (2)
<b>Duration</b>	Short term (2)	Short term (2)
<b>Magnitude</b>	Moderate (6) (Due to reliance on agriculture for maintaining livelihoods)	Low (4)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	Medium (36)	Low (24)
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	Yes, compensation paid for stock losses, etc	Yes, compensation paid for stock losses
<b>Irreplaceable loss of resources</b>	No	No
<b>Can impact be mitigated?</b>	Yes	Yes

#### 7.4 Assessment of No-Go option

There is no impact as it maintains the current status quo. The potential positive impacts on the rural economy associated with the additional spending by construction workers in the local economy will also increase.

#### 7.5 Recommended mitigation measures

The potential risks associated with construction workers can be mitigated. The aspects that should be covered include:

- Where possible and where necessary, Datem Energy Corporation should make it a requirement for its workers to implement a ‘locals first’ policy for construction jobs, specifically semi and low-skilled job categories. This will reduce the potential impact that this category of worker could have on local family and social networks.
- Establishment of a Monitoring Forum (MF) for the construction phase which should be established before the construction phase commences and should include key stakeholders, including representatives from the local community, local councillors, farmers, and the contractor. The role of the MF would be to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should also be briefed on the potential risks to the local community associated with construction workers.
- Regular consultation with representatives from the MF, develop a Code of conduct for the construction phase. The code should identify what types of behaviour and activities by construction workers are not permitted. Construction workers that breach the code of good conduct should be dismissed. All dismissals must comply with the government’s labour laws.
- The movement of construction workers on and off the site should be closely managed and monitored by the MF. The MF should make the necessary arrangements for allowing workers from outside the community during the construction phase. This would reduce the risk posed by construction workers to local family structures and social networks.
- It is recommended that no construction workers where possible with the exception of security personnel, should be permitted to stay overnight on the site. This will make it possible to manage the potential impacts effectively.

#### 7.6 Heavy equipment and construction activities

The activities associated with the construction phase have the potential to damage nearby farmlands where construction equipment will pass through, and may result in damage to land available for rice farming or grazing.

The significance of the impacts is to some extent mitigated by the fact that the farming activities on the nearby farms are confined to rice production. Smallholders whose farm will be affected by the frequent passage of heavy equipment should be addressed appropriately. The unlikely disruption to productive farming activities would therefore be offset by such mutual agreement between the affected landowner and Datem Energy Corporation. The total size of the farmlands surrounding the construction site that will likely be affected should be determined. Finally, the final disturbance footprint can also be reduced by careful site design, placement and passage of construction equipment and facilities. The impact on farmland associated with the construction phase (and operational phase) can therefore be mitigated by minimizing the footprint of the construction related activities and ensuring that disturbed areas are fully rehabilitated on completion of the construction phase.

The movement of heavy construction vehicles and equipment during the construction phase has the potential to damage existing farm to market road (FMR) and create noise, dust, and safety impacts on the local community in the influence area, particularly children. The findings of the SIA indicate that the social impacts associated with the movement of construction-related vehicles are therefore likely to be high (Table 14).

**Table 14. Assessment of the impacts associated with construction vehicle**

Nature: Potential noise, dust and safety impacts associated with movement of construction related traffic to and from the site		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Local (2)	Local (1)
<b>Duration</b>	Short term (2)	Short term (2)
<b>Magnitude</b>	Low (4)	Minor (2)
<b>Probability</b>	Probable (3)	Minor (2)
<b>Status</b>	Negative	Negative
<b>Reversible</b>	Yes	
<b>Irreplaceable loss of resources</b>	No	No
<b>Can impact be mitigated?</b>	Yes	
Cumulative impacts: If damage to roads is not repaired then this will affect the farming activities in the area and result in higher transportation costs of local farmers and other road users. The costs will be borne by farmers/road users who were no responsible for the damage.		

### 7.6.1 Assessment of No-Go option

There is no impact as it maintains the current status quo.

### 7.6.2 Recommended mitigation measures

Datem Energy Corporation should find ways to work with the affected landowners and the barangay council (*Sangguniang Barangay*) whereby the company will compensate for damages, if any. This includes losses associated with damage to existing internal farm roads, usually dirt road that will be affected by the project. In addition, the potential impacts associated with heavy vehicles and dust can be effectively mitigated. If damage to farm to market roads is not repaired then this will affect the farming activities in the area. The costs will be borne by Datem Energy Corporation who is responsible for the damage.

The aspects that should be covered include:

- Ensure that damage caused to farm to market roads by the construction-related activities, including heavy vehicles, is repaired before the completion of the construction phase. The costs associated with the repair must be borne by the company.
- Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.
- All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues.

### 7.6.3 Assessment of No-Go option

There is no impact as it maintains the current status quo.

#### 7.6.4 Recommended mitigation measures

The potential impacts associated with damage to and loss of farmland can be effectively mitigated. The aspects that should be covered include:

- The footprint associated with the construction-related activities (farm roads, construction platforms, workshop, etc.) should be minimized;
- An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase.
- All areas disturbed by construction-related activities, such as farm or dirt roads on the site, construction platforms, workshop area, etc. should be rehabilitated at the end of the construction phase.
- The implementation of a rehabilitation program should be included in the program of work by Datem Energy Corporation. The specifications for the rehabilitation program should be drawn up by the Environmental Consultant contracted to conduct IEE.
- The implementation of the Rehabilitation Program should be monitored by the ECO.

### 8.0 Social Impact Associated with the Operation Phase

The key social issues affecting the operational phase include:

#### 8.1 Potential positive impacts

- Creation of employment and business opportunities. The operational phase will also create opportunities for skills development and training.
- Benefits associated with the establishment of a community trust.
- The establishment of power infrastructure.
- The services of the Health Center that the Plant will establish.
- Recreational activities of the Plant that the children/youth in the community can avail.
- Potable water system of the Plant that can supply the local community.

#### 8.2 Potential negative impacts

- The visual impacts or aesthetics and associated impact on sense of place;
- Potential impact on tourism.

#### 8.3 Creation of employment and business opportunities

Based on information from Datem Energy Corporation, the power generation development project is likely to employ approximately 200 workers (labourers, casuals and permanent employees). Out of this, 20 personnel will be full-time employees in 1 year, 40 in the 2<sup>nd</sup> year and 80 by the 3<sup>rd</sup> year up to 25 years. Approximately 140 of the positions will be low-skilled, 40 semi-skilled and 10 skilled. Due to the low education and skills levels in the area the potential employment opportunities for members from the community are likely to be limited to the low and semi-skilled positions. However, it will be possible to increase the number of local employment opportunities through the implementation of a skills development and training program linked to the operational phase (Table 15). Such a program would support the strategic goals of promoting local employment and skills development of the government through the Department of Labor and Employment (DOLE) Public Employment Service Office (PESO).

**Table 15. Impact assessment of the employment and business creation activities**

Nature: Creation of employment and business opportunities associated with the operational phase		
	Without Mitigation	With Mitigation
<b>Extent</b>	Local and regional (2)	Local and regional (3)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Low (4)	Low (4)

<b>Probability</b>	Probable (3)	Probable (3)
<b>Status</b>	Positive	Positive
<b>Significance</b>	Medium (30)	Medium (33)
<b>Irreplaceable loss of resources</b>	No	No
<b>Can impact be mitigated?</b>	Yes	
Cumulative impacts: Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities.		

Given the location of the proposed facility the majority of permanent staff (i.e. operator) is likely to reside in Simora. In terms of accommodation options, a percentage of the permanent employees may rent a house in barangay Simora. Both options would represent a positive economic benefit for the barangay. In addition, a percentage of the monthly wage bill earned by permanent staff would be spent in the local economy, which will benefit local small general (i.e. *sari sari*) stores in the barangay. The benefits to the rural economy will extend over the operational life of the project.

**8.3.1 Assessment of No-Go option**

There is no impact as it maintains the current status quo. However, the potential opportunity costs in terms of the loss of employment and skills and development training would be lost which would also represent a negative impact.

**8.3.2 Recommended enhancement measures**

The enhancement measures listed, i.e. to enhance local employment and business opportunities during the construction phase, also apply to the operational phase. In addition, Datem Energy Corporation should implement a training and skills development program for locals during the first 5 years of the operational phase. The aim of the program should be to maximize the number of locals employed during the operational phase of the project.

**8.3.3 Benefits associated with the establishment of a community trust**

The proposed power development project of Datem Energy Corporation will provide benefits that will accrue to the host community. As mandated by law and DOE policy, 0.0025 centavos/kilowatt of electricity bill generated by the power plant will be the share of the host LGU. The total share will be divided among the LGU of Palapag and Bgy. Simora where the plant is located. Aside from this, 25% of ½ of 1 centavo will be set aside for livelihood /economic development project of the LGU. This can be achieved by establishing a Community Trust similar to the Energy Development Corporation-operated Tongonan Geothermal Plant in Kananga, Leyte, Philippines which is funded by revenue stream generated from the sale for energy. In the case of the EDC, they set up the Technical Vocational school known as KeiTech—Technical Educations and Skills Development Authority (TESDA) accredited—as the Corporate Social Responsibility (CRS). KeiTech gives priority to OSYs in Kananga but accepts other OSYs from nearby municipalities, including East Samar for technical vocational training. This CSR scheme is also being practiced in MacBan (Maguiling-Banahaw) Geothermal Power Plant where a portion of the income from sale of energy is given to the Provincial Government of Laguna for development projects.

Datem Energy Corporation should signify that it is committed to establish a Community Trust. Community Trust provides an opportunity to generate a steady revenue stream that is guaranteed for a 25-year period. This revenue can be used to fund development initiatives in the area and support the local community. The long term duration of the revenue stream also allows the municipality of Palapag and communities to undertake long term planning for the area. The revenue from the proposed 10 MW diesel power plant can be used to support a number of social and economic initiatives in the community, including:

- education;
- school feeding schemes;
- training and skills development; and
- support to local development.

In addition, the establishment of a 10MW diesel-fired power plant is not likely to have a significant impact on the current agricultural land uses that underpin the local economic activities in the area. The loss of this relatively small area, i.e. 5.3244 hectares rice land will not impact on the current and future farming. Experience has however also shown that Community Trust can be mismanaged. This issue will need to be addressed in order to maximize the potential benefits associated with the establishment of a Community Trust (Table 16).

**Table 16. Assessment of benefits associated with establishment of community trust**

Nature: Establishment of a community trust funded by revenue generated from the sale of energy. The revenue can be used to fund local community development		
	<b>With Mitigation</b>	<b>With Enhancement</b>
<b>Extent</b>	Local (2)	Local and regional (4)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Probability</b>	Probable (3)	Moderate (4)
<b>Significance</b>	Medium (30)	High (70)
<b>Status</b>	Positive	Positive
<b>Reversibility</b>	N/A	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impact be enhanced?</b>	Yes	
Cumulative impacts: Promotion of social and economic development and improvement in the overall well-being of the community		

### 8.3.4 Recommended enhancement measures

In order to maximize the benefits and minimize the potential for corruption and misappropriation of funds the following measures should be implemented:

- Set out criteria for identifying and funding community projects and initiatives in the area. The criteria should be aimed at optimizing the benefits for the community as a whole and not individuals within the community.
- Adherence to strict financial management controls, including annual audits should be instituted to manage the funds generated for the community trust from the Diesel Power plant.

### 8.4 Decommissioning phase

The relatively small number of people affected by the social impacts associated with the decommissioning of the facility are likely to be low. In addition, the potential impacts can be effectively managed with the implementation of a retrenchment and downsizing program. With mitigation, the impacts are assessed to be Low (negative).

Datem Energy Corporation, however, should also investigate and explore the option of establishing an Environmental Rehabilitation Trust Fund (ERTF) to cover the costs of decommissioning and rehabilitation of disturbed areas. The Trust Fund should be funded by a percentage of the revenue stream generated from the sale of energy to the national grid over the 25-year operational life of the facility. The rationale for the establishment of ERTF is linked to the experiences with other power infrastructure facilities to allocate sufficient funds during the operational phase to cover the costs, if need be, of rehabilitation of the affected surrounding farmlands in the area and closure.

## 9.0 Assessment of No-Development Option

Northern Samar currently relies on NORSAMELCO-powered energy to meet more than 100% of its energy needs.

The No-Development option would represent a lost opportunity for DATEM Energy Corporation to contribute to current energy needs with clean, renewable energy. Given the province position as experiencing unreliable and intermittent brown-

outs, this would represent a negative social cost. However, as indicated above, the overall contribution of the proposed 10MW diesel power plant to Northern Samar’s total energy requirements will still be relatively small. The potential contribution of the proposed power project should therefore be regarded as valuable, but should not be overestimated (Table 17).

**Table 17. Assessment of no-development option**

Nature: Establishment of a community trust funded by revenue generated from the sale of energy. The revenue can be used to fund local community development		
	<b>With Mitigation</b>	<b>With Enhancement</b>
<b>Extent</b>	Local and regional (2)	Local and regional (4)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Medium (6)	Medium (6)
<b>Probability</b>	Probable (3)	Highly probable (4)
<b>Significance</b>	Medium (36)	High (56)
<b>Status</b>	Negative	Positive
<b>Reversibility</b>	Yes	
<b>Irreplaceable loss of resources?</b>	Yes, impact of climate change to ecosystem	
<b>Can impact be enhanced?</b>	Yes	

## 10. Evaluation of Additional Mitigation Measures

Mechanisms for tracking progress of the 10MW diesel-fired power plant will involve working with DENR officials to determine a method for tracking the emissions reductions, proper discharge of excess lube oil and waste water. This will be achieved through the implementation of the Mitigation Measures.

## 11. Conclusion and Recommendations

The findings of the SIA indicate that the development of the proposed 10MW diesel-fired power plant will create rural employment and business opportunities for locals during both the construction and operational phases of the project. The establishment of a Community Trust funded by revenue stream generated from the sale of energy from the proposed energy generation development project also creates an opportunity to support local economic development in the area. This represents a significant social benefit for an area where there are limited economic opportunities.

The proposed development also represents an investment energy infrastructure, which, given the challenges created by NORSAMELCO where frequent outages occur, represents a positive social benefit for the province of Northern Samar in particular and the society as a whole. The establishment of the proposed 10MW diesel power plant is therefore supported by the findings of the SIA.

It is therefore recommended that the facility, as proposed, be supported, subject to the implementation of the recommended mitigation measures and management actions contained in this report.

**Appendix A****METHODOLOGY FOR THE ASSESSMENT OF POTENTIAL IMPACTS**

*Adopted from Tony Barbour 2012*

Direct, indirect and cumulative impacts of the above issues, as well as all other issues identified will be assessed in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, where it will be indicated whether the impact will be local (limited to the immediate area or site of development), provincial, regional and national. A score between 1 and 5 will be assigned as appropriate (with a score of 1 being low and a score of 5 being high).
- The **duration**, where it will be indicated whether:
  - \* the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - \* the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - \* medium-term (5–15 years) – assigned a score of 3;
  - \* long term (> 15 years) - assigned a score of 4; or permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - \* 0 is small and will have no effect on the environment;
  - \* 2 is minor and will not result in an impact on processes;
  - \* 4 is low and will cause a slight impact on processes;
  - \* 6 is moderate and will result in processes continuing but in a modified way;
  - \* 8 is high (processes are altered to the extent that they temporarily cease); and
  - \* 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale, and a score assigned:
  - \* Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
  - \* Assigned a score of 2 is improbable (some possibility, but low likelihood);
  - \* Assigned a score of 3 is probable (distinct possibility);
  - \* Assigned a score of 4 is highly probable (most likely); and
  - \* Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- The **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- The status, which will be described as either positive, negative or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The degree to which the impact can be mitigated.

The significance is determined by combining the criteria in the following formula:

$S = (E+D+M) P$ ; where

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),

- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

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