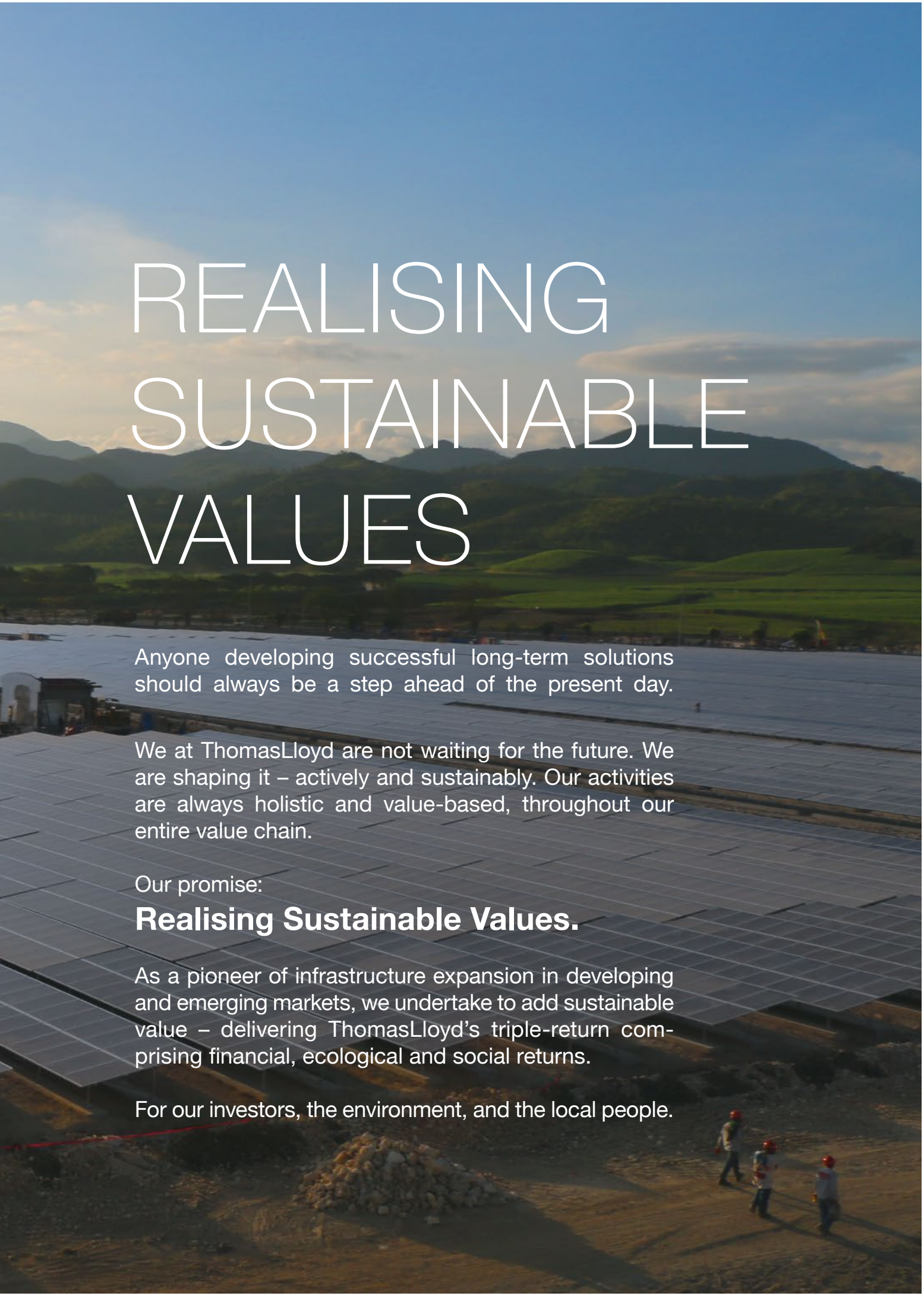
THOMASLLOYD

THOMASLLOYD IMPACT REPORT | 2018

PHILIPPINES



REALISING SUSTAINABLE VALUES

Anyone developing successful long-term solutions should always be a step ahead of the present day.

We at ThomasLloyd are not waiting for the future. We are shaping it – actively and sustainably. Our activities are always holistic and value-based, throughout our entire value chain.

Our promise:

Realising Sustainable Values.

As a pioneer of infrastructure expansion in developing and emerging markets, we undertake to add sustainable value – delivering ThomasLloyd's triple-return comprising financial, ecological and social returns.

For our investors, the environment, and the local people.

FOREWORD

We are delighted to present this Impact Report which quantifies the social, economic and environmental impact of our investments in renewable energy on the island of Negros in the Philippines.

ThomasLloyd has been a pioneer in this field. We raise money directly from investors, co-partner with international development agencies such as the World Bank's International Finance Corporation and work alongside national and regional governments in Asia to advance sustainable social development through direct investment in physical infrastructure.

ThomasLloyd finances, creates and develops real assets, playing a crucial role in shaping the physical and social environment of the region. Unlike traditional institutional or retail investment managers who continue to invest in a global universe of stocks and bonds – screened nowadays for negative externalities and painted a fashionable shade of green – we fund and develop large-scale greenfield infrastructure projects; involved as principal or advisor in all stages of the capital structure and offering our investors the widest possible range of investment horizons, risk-return profiles and currency denominations.

But this Impact Report is not about the return on capital, nor indeed the return of capital. We have an established and fully-audited track record of market-driven returns which our investments have delivered and we are rightly proud of our financial performance. We deliver the investment returns expected and demanded of us.

This report is something totally different: a ground-breaking attempt to evidence and quantify the socio-economic impact that our investment in renewable energy has made. Just as ThomasLloyd has been a pioneer investor, so too this is a pioneer research project. There is no template for an Impact Report. No off–the-shelf document where we simply fill in the blank spaces and no spreadsheet where we just enter numbers and tick boxes. The work presented here is original both in concept and execution. It sets a high standard in a new field.

ThomasLloyd's involvement on the island of Negros has a long and very rewarding history. Together with our local development partners, Bronzeoak Philippines Inc, we have built deep relationships with political leaders, opinion formers, business owners and multiple stakeholders in the public and private sectors. We have a real understanding of the island's culture and history and are making a significant contribution to its future development. We know the people and are proud to work alongside them.

Our commitment to the island's economic and environmental welfare is well recognised by its civic and business leaders. They, in turn, have given us unprecedented access to planning departments, city development officers, budget departments and a vast range of data and documents which in many cases have never previously been requested or accessed. As developers of real physical assets, we also have a wide range of proprietary data on employment, salaries, and associated spending. Commercial confidentiality limits the numbers we publish here but we know and can account for almost every dollar, cent and peso of project expenditure from before the first shovel hit the ground to the day our renewable energy plants were connected to the grid and provided electricity to power the island.

Our position as developer, owner and trusted partner gives us a unique insight. We have always known that our investment would make a real difference to the quality of life; indeed, it is what underpins the ThomasLloyd philosophy. For the first time now, we are able to evidence and quantify it.

The Regional Governor, City Mayors and Barangay leaders have all been generous with their time and insights; meeting with us, giving access to their support staff, discussing their respective financial and social environments and sharing their vision for the sustainable future economic development of Negros. We are indebted to their co-operation and support and thank them wholeheartedly.

This Impact Report has been enormously satisfying to produce. We trust it is equally fascinating to read.

NICK PARSONS
HEAD OF RESEARCH AND STRATEGY

INTRODUCTION

The ThomasLloyd Group ("TLG") is a global investment and advisory firm, solely dedicated to the infrastructure sector in Asia.

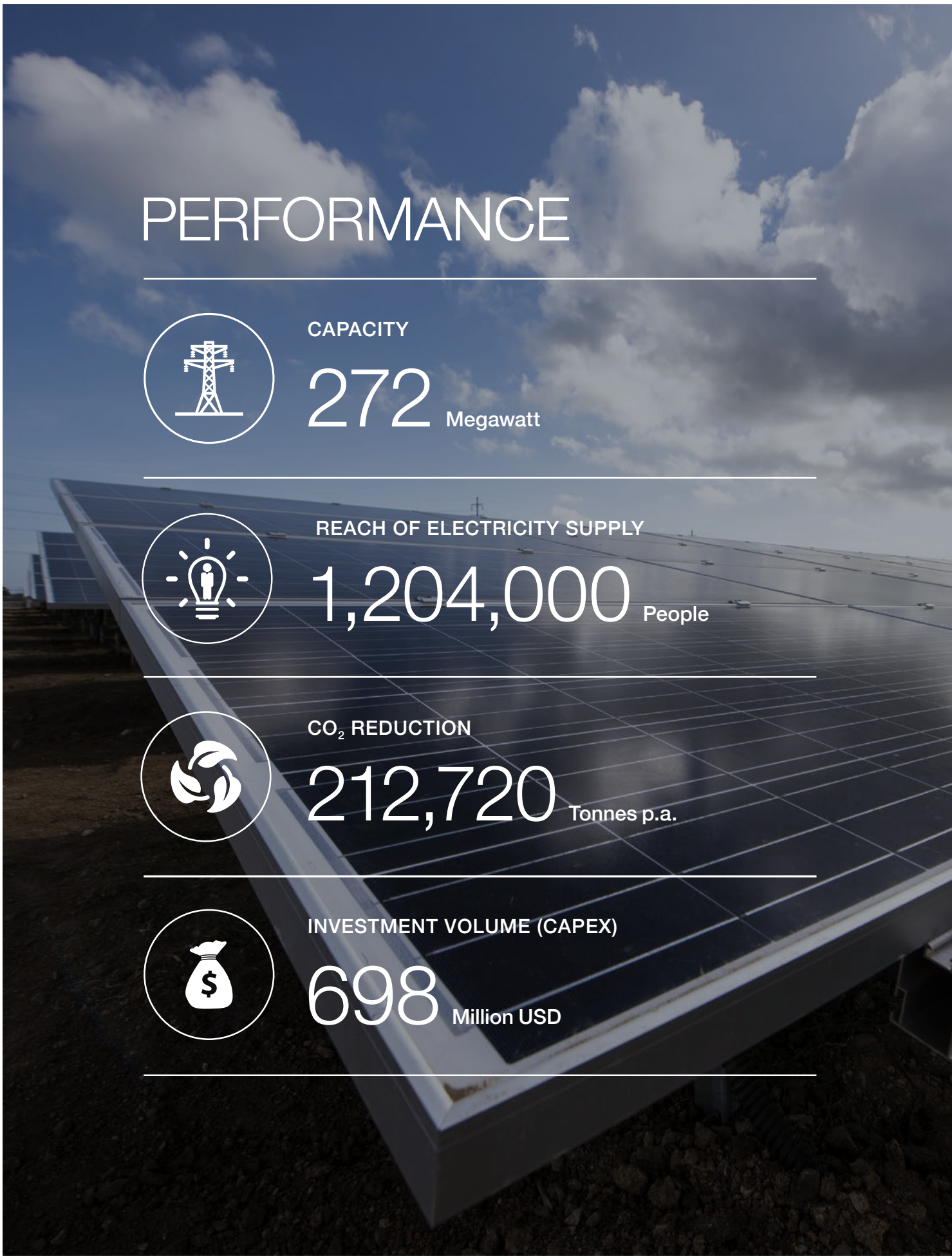
Over the past five years it has financed, co-developed, constructed and subsequently grid-connected five solar power plants on the island of Negros, Philippines. Two of them are located in the cities of San Carlos, the others at La Carlota City and Bais City and the municipality of Manapla. TLG currently has three biomass plants under construction, each one adjacent to a solar site. These state of the art power generators burn the waste product from the sugarcane harvest, which is available in abundance on the island.

This report analyses the direct and indirect impacts of ThomasLloyd's investments in renewable energy, and how they have helped contribute to economic growth on Negros, more specifically in the province of Negros Occidental where the solar and biomass plants are located. From our conversations with City Mayors, the Provincial Government, elected representatives, planning and development offices and private sector businesses, we paint a picture which places energy supply and security, together with the associated uplift in federal and local tax revenues at the heart of economic and social transformation.

Negros Occidental has a mission to become the food basket of the Philippines and the organic capital of South East Asia. To do this requires not only the skill and commitment of its visionary civic and provincial leaders, but a secure, reliable and sustainable source of green energy. The right kind of economic growth – building safe and secure communities, enhancing human capital, growing businesses whilst preserving traditional values – requires the right kind of energy: renewable, sustainable and local. TLG has directly invested more than $600 million into the local economy and the solar and biomass plants it has financed and developed form an integral part of the new Negros story.

MORE INFORMATION

Infrastructure. Indispensable. Sustainable. Profitable.



PERFORMANCE

CAPACITY

272 Megawatt

REACH OF ELECTRICITY SUPPLY

1,204,000 People

CO_2 REDUCTION

212,720 Tonnes p.a.

INVESTMENT VOLUME (CAPEX)

698 Million USD

NEGROS

10° 3′ 28″ N, 123° 0′ 52″ E

GEOGRAPHY AND DEMOGRAPHICS

Negros is the fourth largest island of the Philippines, with a land area of 13,309.60 km^2. For an international comparison, it is bigger than Jamaica but smaller than Kuwait and has a landmass roughly equivalent to the Bahamas. Placing it in a European context, it is roughly the size of Schleswig-Holstein in Germany, the three counties which historically comprised Yorkshire in the UK or the French region of Ile-de-France.

As of 2015, Negros' total population was 4,414,131 people; around 4 % of the total population of the Philippines. It is slightly less populous than New Zealand but greater than Croatia.

NEGROS ISLAND REGION

Total Population: 4.4 million

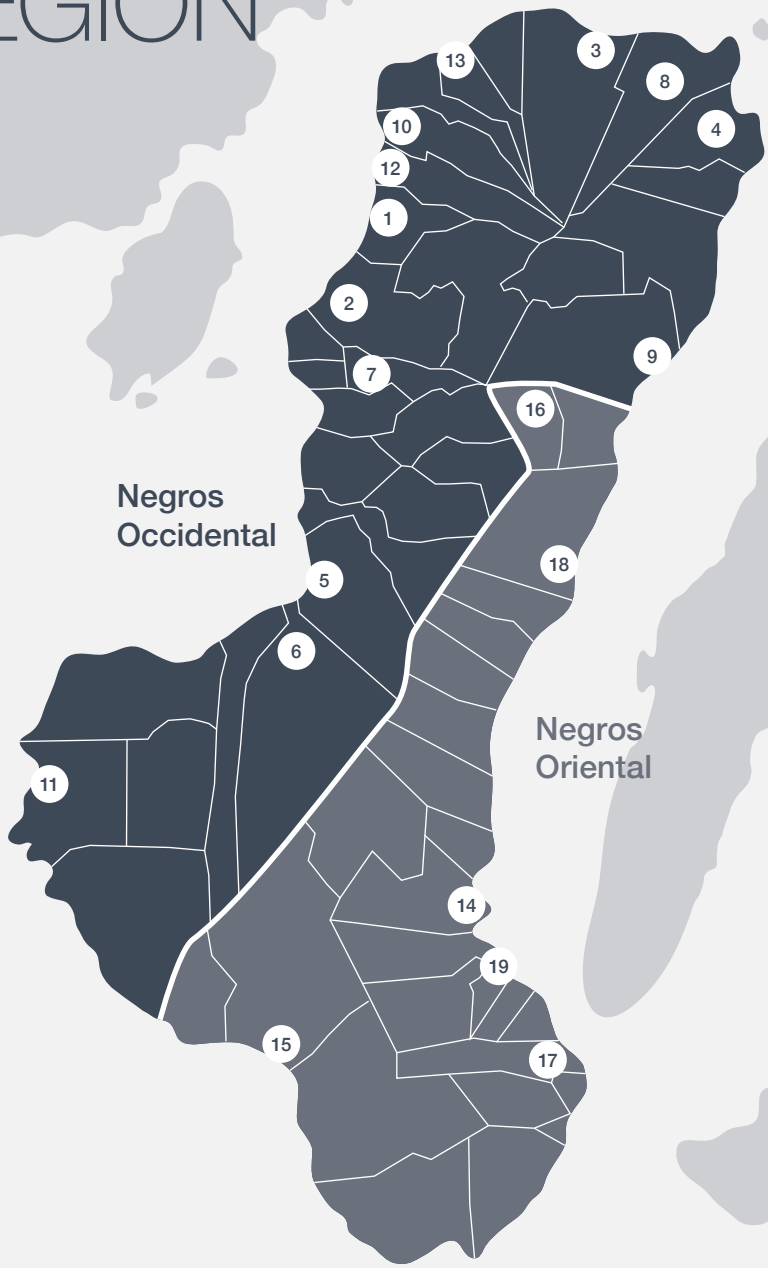
Provinces: **2** Districts: **10**
Cities: **19** Municipalities: **38**

Negros Occidental: 3.05 million

1. Bacolod:	561,875
2. Bago:	170,981
3. Cadiz:	154,723
4. Escalante:	94,070
5. Himamaylan:	106,880
6. Kabankalan:	181,977
7. La Carlota:	64,469
8. Sagay:	146,264
9. San Carlos:	132,536
10. Silay:	126,930
11. Spalay:	70,070
12. Talisay:	102,214
13. Victorias:	87,933

Negros Oriental: 1.35 million

14. Bais:	170,981
15. Bayawan:	117,900
16. Canlaon:	54,509
17. Dumaguete:	94,070
18. Guihulngan:	95,969
19. Tanjay:	80,532



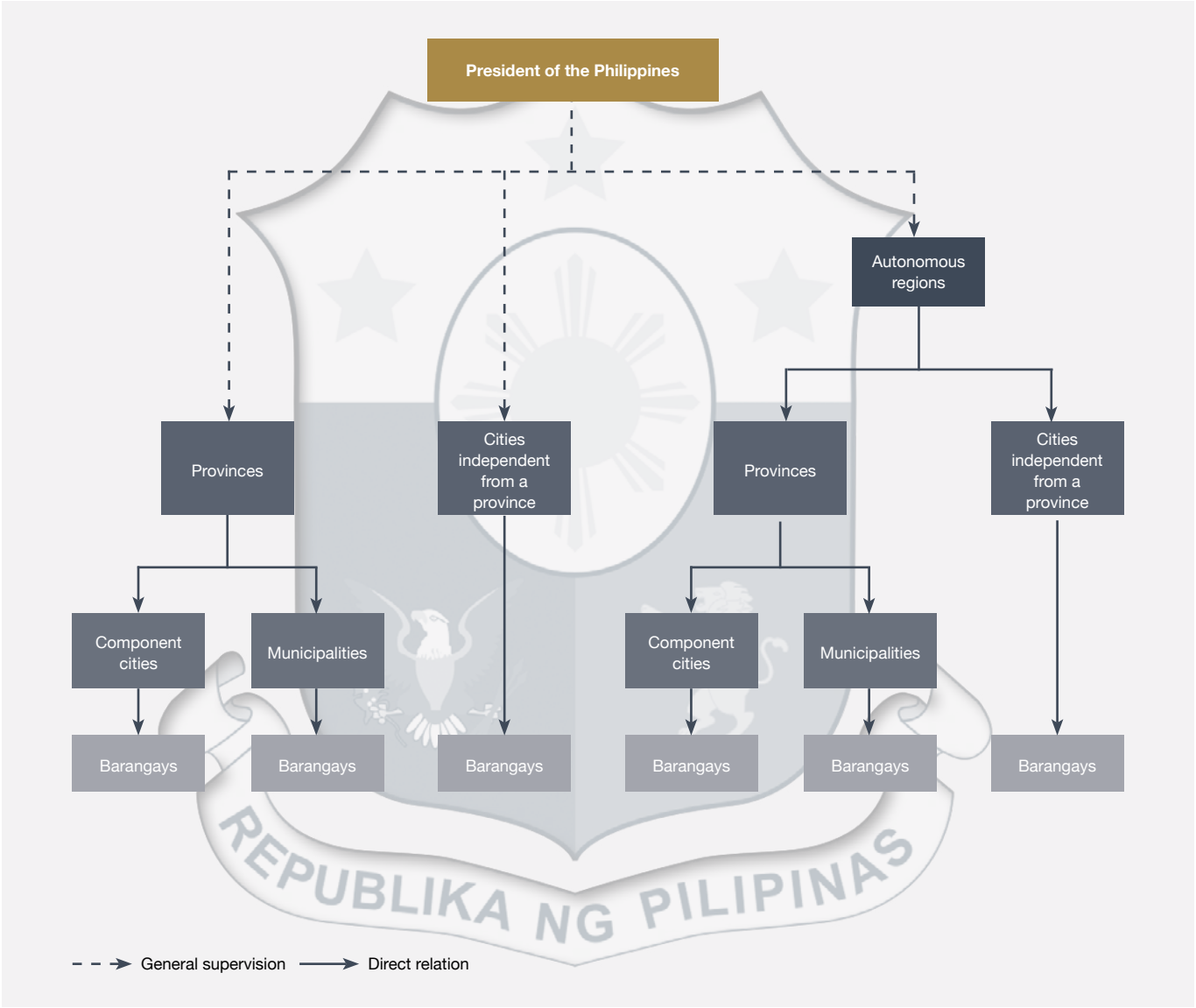
Source: Provincial Government of Negros Occidental

ADMINISTRATION

From May 2015 to August 2017, the whole island was governed as a separate administrative region officially named the Negros Island Region. This comprised the highly urbanized city of Bacolod and the provinces of Negros Occidental and Negros Oriental, along with its outlying islands. It was created by virtue of Executive Order No. 183 issued by Benigno Aquino III, who was President in 2015 but on August 9, 2017, new President Rodrigo Duterte signed Executive Order No. 38 which dissolved the Negros Island Region due to a lack of funds to fully establish it.

As of today, therefore, Negros is again divided into two provinces: Negros Occidental (designated as part of Western Visayas) and Negros Oriental (designated as part of Central Visayas). They are the only provinces in the Philippines situated in the same island but which belong to two different administrative regions with regional offices located in neighbouring Panay and Cebu. The island is composed of 1 highly urbanized city, 18 component cities, 38 municipalities and 1,219 barangays, the native Filipino term for a village, district or ward – which are the smallest administrative divisions or Local Government Units (LGU's) in the country.

PHILIPPINES' LOCAL GOVERNMENT HIERARCHY



NEGROS OCCIDENTAL

Negros Occidental is located on the western side of the island. It has a total land area of 792,607 hectares or 7,926.06 km², representing 59.3 % of the island's total. The province is approximately 375 kilometres long from north to south. It is bounded by the Visayan Sea in the north, Panay Gulf on the west, Tanon Strait and Negros Oriental province on the east and Sulu Sea on the south.

Negros Occidental has the most chartered cities amongst all the provinces in the Philippines. It comprises 13 cities and 19 municipalities, which are further subdivided into 601 barangays. Although Bacolod serves as the capital, it is governed independently from its corresponding province as a highly urbanized city.

Negros Occidental is the 8th most populous province in the country. The total population in the 2015 census was 2.49 m (excluding Bacalod City with 0.56m). The average annual growth in population from 2000 – 15 was 1.03 % for the province and 1.78 % for Bacolod City. This is the most populous city on the island and the centre of the Bacolod Metropolitan Area (which also contains the cities of Talisay and Silay), as well as being the 19th most populous city of the whole Philippines.

GEOGRAPHY

Region:	**Western Visayas**
Capital:	**Bacolod City**
Population density:	**320 / km²**
Total land area:	**7,926.06 km²**

STRUCTURE

Cities:	**13**
Municipalities:	**19**
Barangays:	**601**

NEGROS ORIENTAL

Negros Oriental occupies the south-eastern half of the island. It has a total land area of 5,385.53 km² and comprises 6 cities and 19 municipalities, with 557 barangays. Dumaguete City is the provincial capital and seat of government. It is also the province's most populous city, despite having the smallest land area among all component cities and municipalities of Negros Oriental.

The population of Negros Oriental in the 2015 census was 1,354,995 people. 34.5% of the population are concentrated in the six most populous component cities of Dumaguete, Bayawan, Guihulngan, Tanjay, Bais and Canlaon. Population growth per year is about 0.99% over the period of 2010-2015, lower than the national average of 1.72%.

GEOGRAPHY

Region:	**Central Visayas**
Capital:	**Dumaguete City**
Population density:	**252 / km²**
Total land area:	**5,385.53 km²**

STRUCTURE

Cities:	**6**
Municipalities:	**19**
Barangays:	**557**

ECONOMY


OMING
COLOD

PHILIPPINES

The Philippine economy is the 34th largest in the world, with an estimated 2017 gross domestic product of $348.5 billion. Over the past ten years (a period which includes the GFC in 2008–09), the average annual growth of GDP in the Philippines was 5.6 %; one of the best performances in the whole of Asia. Indeed, for each of the last six years, growth has never fallen below 6.1 % and the 6.6 % seen in 2017 was amongst the highest in the continent.

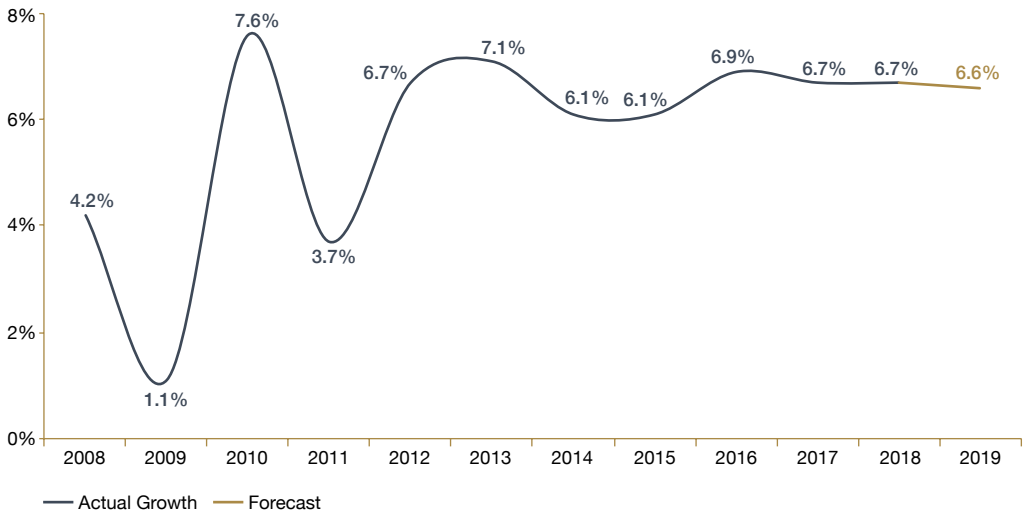
Due to its very high and very youthful population, GDP per capita is only around $8,230; a figure which sees its world ranking just 118th, but still above India which the International Monetary Fund lists in 122nd place with $7,174. According to the Philippine Statistics Authority, in January 2018 the total population aged 15 years and over was estimated at 70.9 million and the number of persons who were in the labour force was reported at 44.1 million. The total number of employed persons was estimated at 41.8 million whilst the proportion of employed persons to total labour force was 94.7 %. The agricultural sector employs around 26 % of the workforce, industry around 18 % and services 56 %.

GDP Growth in selected Asian countries (annual %)

	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21	'22
China	11.3	12.7	14.2	9.6	9.2	10.6	9.5	7.9	7.8	7.3	6.9	6.7	6.8	6.5	6.3	6.2	6.0	5.8
India	9.3	9.3	9.8	3.9	8.5	10.3	6.6	5.5	6.4	7.5	8.0	7.1	6.7	7.4	7.8	7.9	8.1	8.2
Indonesia	5.7	5.5	6.3	7.4	4.7	6.4	6.2	6.0	5.6	4.0	4.9	5.0	5.2	5.3	5.5	5.5	5.5	5.5
Thailand	5.2	5.0	5.4	1.7	-0.7	7.5	0.8	7.2	2.7	0.9	2.9	3.2	3.7	3.5	3.4	3.1	3.0	3.0
Philippines	4.8	5.2	6.6	4.1	1.1	7.6	3.7	6.7	7.1	6.1	6.1	6.9	6.6	6.7	6.8	6.8	6.8	6.8
Malaysia	5.0	5.6	6.3	4.8	-1.5	7.5	5.3	5.5	4.7	6.0	5.0	4.2	5.4	4.8	4.8	4.9	4.9	4.9
Pakistan	6.3	6.9	6.5	5.5	5.3	6.0	6.4	6.3	6.0	6.3	6.8	7.2	7.1	7.0	7.0	7.0	7.0	7.0
Bangladesh	7.5	7.0	7.1	5.7	1.7	-0.7	7.5	0.8	7.2	2.7	0.9	2.9	3.7	3.5	3.4	3.1	3.0	3.0
Vietnam	7.5	7.0	7.1	5.7	5.4	6.4	6.2	5.2	5.4	6.0	6.7	6.2	6.3	6.3	6.2	6.2	6.2	6.2
Sri Lanka	6.2	7.7	6.8	5.9	3.5	8.0	8.4	9.1	3.4	5.0	4.8	4.4	4.7	4.8	4.9	5.0	5.1	5.3

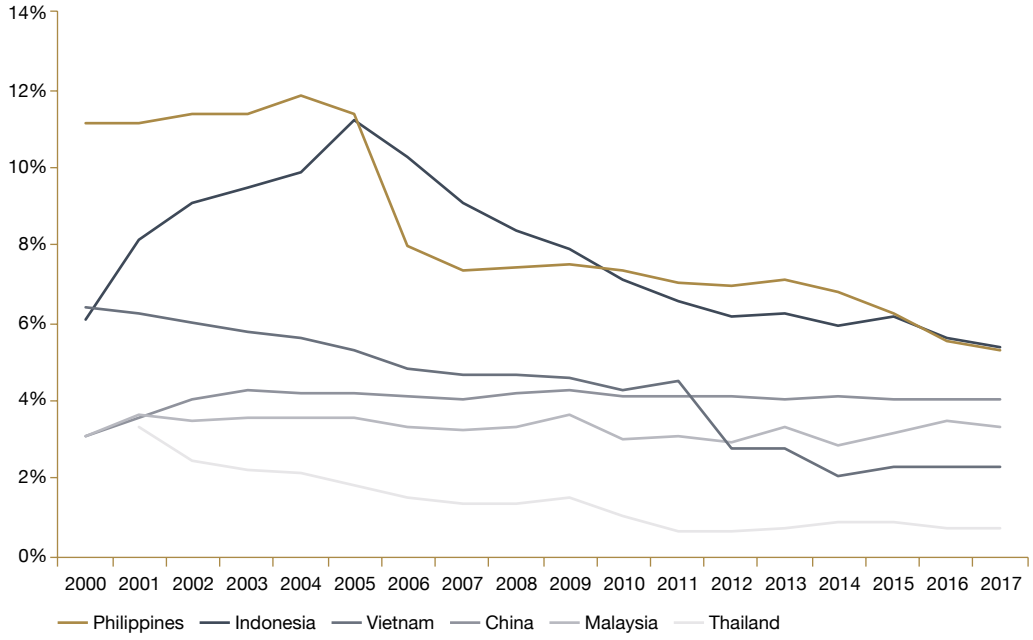
Source: Philippine Statistics Authority, World Bank forecasts 2019 onwards

Philippines GDP Growth (annual % change)



Source: PSA, World Bank staff estimates

Unemployment in Selected Asian countries (%)



Source: International Monetary Fund, World Economic Outlook Database, October 2017

Whilst unemployment has fallen considerably from its double-digit rate in the entire period 2000–05, the end–2017 rate of 5.3 % was still the highest amongst major economies in the region, albeit India does not publish labour force statistics. Indonesia stood at 5.4 % and Malaysia at 3.3 % whilst the jobless rate in Vietnam is just 2.3 % and is less than 1 % in Thailand.

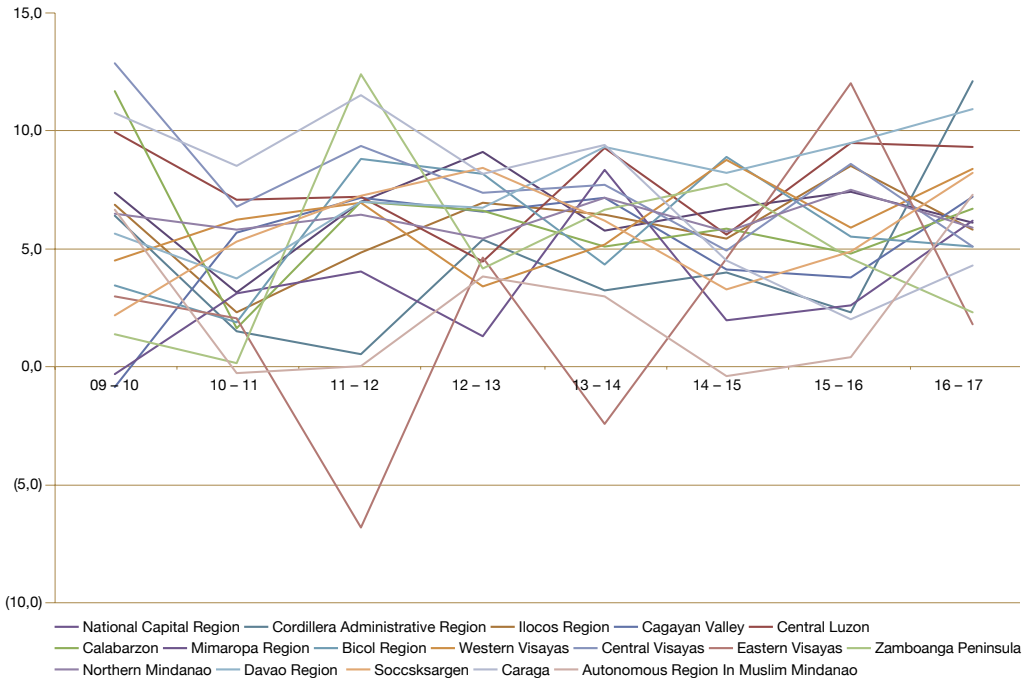
MORE INFORMATION

Country Report
Philippines

REGIONAL ECONOMIES

The Philippine Statistics Authority (PSA) disaggregates macroeconomic data across the country's 17 different Administrative Regions. Whilst national GDP growth has been strong and stable within a 6.1 % – 7.1 % range for each of the last six years, there is a high degree of regional variation within this total and the figures are very volatile from year-to-year. This huge volatility is clearly shown on a simple line graph. Our immediate task is to extract the most relevant data from this apparently random picture.

GDP Growth across the Philippines' 17 Administrative Regions (annual %)

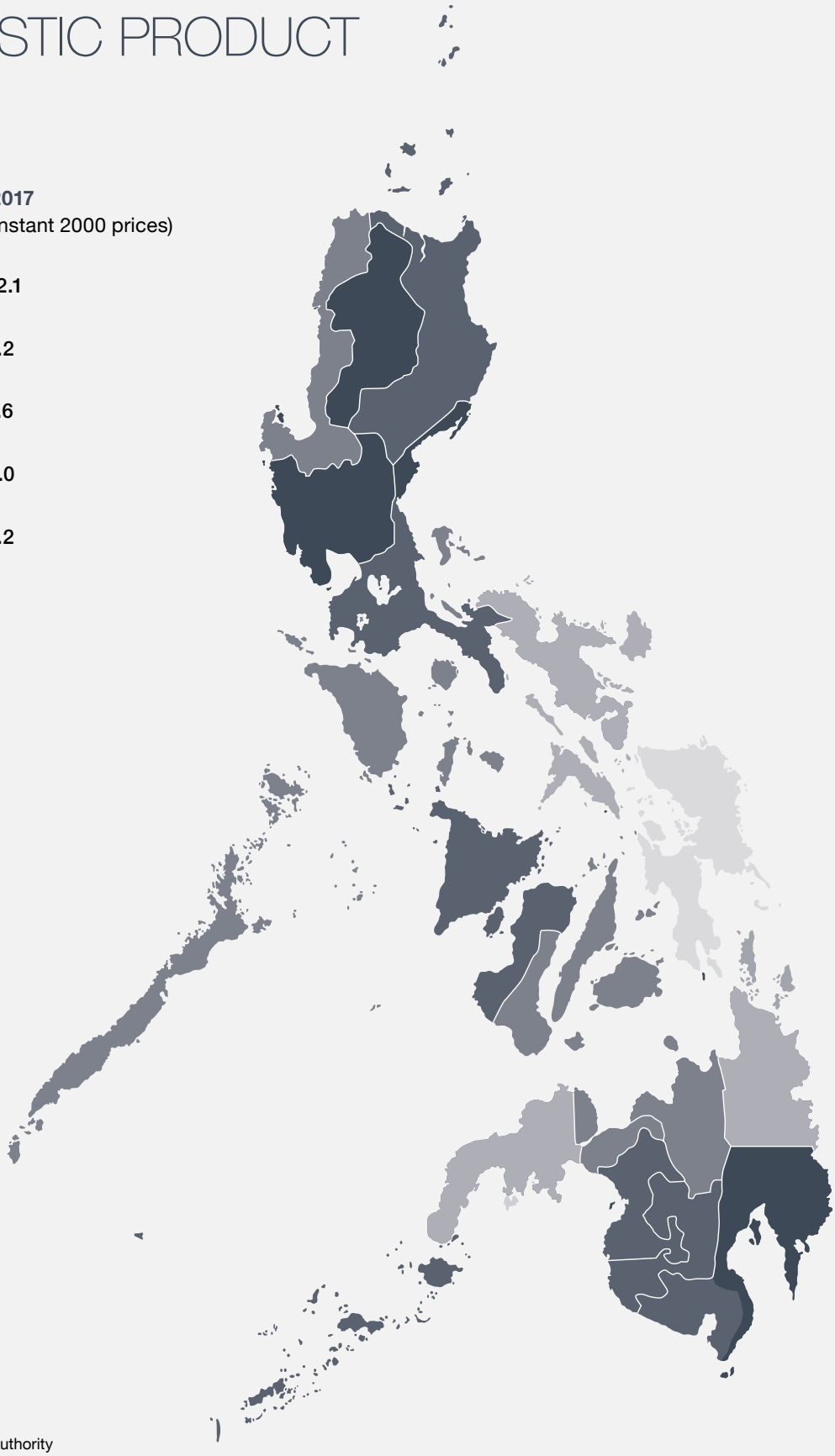


Source: Philippine Statistics Authority

GROSS REGIONAL DOMESTIC PRODUCT

Growth Rates 2017
(in percent at constant 2000 prices)

- 9.3 – 12.1
- 6.7 – 9.2
- 5.1 – 6.6
- 2.3 – 5.0
- 1.8 – 2.2



Source: Philippine Statistics Authority

WESTERN VISAYAS AND THE ISLAND OF NEGROS

Apart from the brief period when Negros was designated a separate autonomous Administrative Region, its GDP has been reported by Western and Central Visayas respectively.

Our conversations with the local representative of the Philippine Statistics Agency in Bacolod City confirm that Negros Occidental accounts for approximately 40 % of the total economic output of Western Visayas; Region VI of the seventeen Administrative Regions reported separately by the PSA.

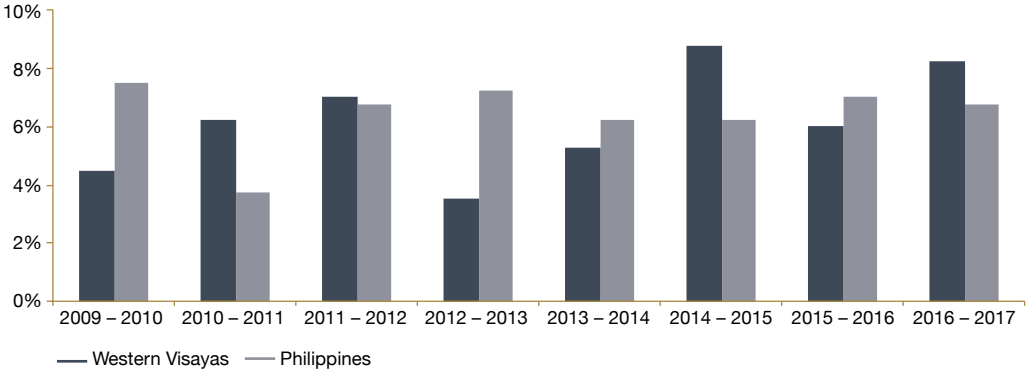
In the last three years, economic growth in Western Visayas has outperformed the Philippines overall by a cumulative 3.4 %. GDP has increased 23.1 % compared to 19.7 % nationally.

Gross Regional Domestic Product Distribution by Industrial Origin (at Constant 2000 Prices)

Industry/Year	GRDP Percent Distribution			
	2012	2013	2014	2015
I. Agriculture, Hunting, Forestry & Fishing	**25,2**	**23,5**	**21,9**	**20,0**
a. Agriculture and Forestry	19,7	18,4	17,2	15,9
b. Fishing	5,5	5,1	4,6	4,1
II. Industry	**17,8**	**18,8**	**20,3**	**22,9**
a. Mining and Quarrying	2,1	1,9	2,3	2,1
b. Manufacturing	7,4	7,9	8,3	7,9
c. Construction	7,3	8,0	8,7	11,8
d. Electricity, Gas and Water Supply	1,0	1,0	1,1	1,0
III. Services	**57,0**	**57,6**	**57,8**	**57,1**
a. Transport, Storage & Communication	11,0	11,2	11,6	11,5
b. Trade and Repair of Motor Vehicles, Motorcycles, Personaland Household Goods	13,4	13,7	13,6	13,3
c. Financial Intermediation	6,6	7,3	7,4	7,1
d. Real Estate, Renting & Business Activities	8,4	7,8	7,6	7,3
e. Public Administration & Defense; Compulsory Social Security	4,3	4,3	4,4	4,2
f. Other Services	13,4	13,2	13,3	13,7
Gross Regional Domestic Product	**100,0**	**100,0**	**100,0**	**100,0**

Source: Philippine Statistics Authority

Economic Growth in Western Visayas and the Philippines



Source: Philippine Statistics Authority

When compared with all 17 Administrative Regions, from 2009 – 13, economic growth in Western Visayas was generally in the lower half of that recorded by its peers. Indeed, in 2013, it ranked 16th out of 17 regions nationally. In the last three years, by contrast, Western Visayas has been in 2nd, 8th and 4th positions in the regional economic growth table.

The provincial government of Negros Occidental inaugurated and launched the Provincial Economic Development and Investment Centre (PEDIC) in July 2014. PEDIC is established under the Local Investments and Incentives Code of 2014, whose main function is to pursue green economic development by creating an environment encouraging local and foreign businesses to invest in the province. The PEDIC also aims to bring about sustainable and inclusive socio-economic development for the Negrense.

The Negros First Negosyo Centre was established with the assistance of the Department of Trade and Industry (DTI) and the Provincial Small and Medium Enterprise Development Council (PSMEDC). The centre seeks to complement economic development and investment promotion initiatives of the Province under the Local Government Support Programme for Local Economic Development (LGSP-LED).

Annual Per Capita Poverty Threshold and Poverty Incidence Negros Occidental

	2006	2009	2012	2015
Among Families				
Annual Per Capita Poverty Threshold (in Pesos)	11.826	14.921	17.243	20.464
Poverty Incidence among Families (%)	21,6 %	22,9 %	24,9 %	21,9 %
Magnitude of Poor Families	125.256	141.585	164.827	145.182
Among Population				
Annual Per Capita Poverty Threshold (in Pesos)	11.826	14.921	17.243	20.464
Poverty Incidence among Population (%)	28,2 %	30,4 %	32,3 %	29,0 %
Magnitude of Poor Population	776.097	884.100	961.694	867.141

Source: Philippine Statistics Authority

Both the PEDIC and Negosyo are based in Bacolod, the centre of commerce and finance in Negros Occidental. In 2017 it was chosen as top Philippine Model City by The Manila Times in “The Philippine Model Cities” search for the most liveable urban centres in the country. In 2018, the Department of Trade & Industry ranked it in 8th place on its list of most competitive urbanised cities based on economic dynamism, government efficiency, infrastructure and resilience. It has a skilled and English-proficient workforce, a favourable business environment and good quality digital infrastructure, which are key requirements of the fast-growing Business Process Outsourcing (BPO) industry.

ELECTRICITY PROVISION IN NEGROS

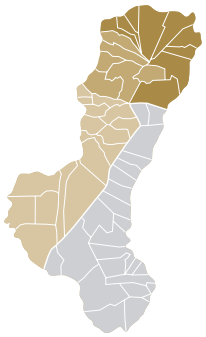
Negros Occidental has three electric cooperatives; the Central Negros Electric Cooperative (CENECO), Northern Negros Electric Cooperative (NONECO) and Negros Occidental Electric Cooperative (NOCECO). Electricity consumption in Negros Occidental reached 1,115,574,684 kilowatts in 2016, a 4.7 % increase from the previous year. 51 % of this figure is attributed to residential use, 32 % to industrial use, 13 % to commercial use, and the final 4 % is used for street lights, irrigation and other connections. 32 municipalities and cities, as well as all 662 barangays in the province have electricity provided by CENECO, NONECO or NOCECO. In 2016, 537,160 houses had electric connections.

Of the three co-operatives, CENECO has the largest peak demand as it covers the provincial capital, Bacolod City, along with the cities/municipalities of Silay, Talisay, Bago, Murcia, and Salvador Benedicto. As well as having the largest residential electricity sales, CENECO has the largest industrial electricity sales, with industries likewise being concentrated in its franchise area; and the largest commercial electricity sales, with the rise of business establishments in the cities of Bacolod, Talisay and Silay.

NONECO and NOCECO have comparable electricity sales, both are however lower than that of CENECO even if their franchise areas are larger. The service area coverage of NONECO includes the cities of Cadiz, Victorias, Sagay, Escalante and San Carlos, as well as several large towns and municipalities such as Manapla. NOCECO's franchise, by contrast, covers the largest area and encompasses the cities of La Carlota, Himamaylan, Kabankalan, Sipalay and many other large towns.

All three distribution companies purchase the bulk of their electricity supply from coal-fired power plants owned by Kepco-Salcon Power Corp and Palm Concepcion Power Corp. They also source electricity from Green Core Geothermal and Energreen Diesel Power. Peaking requirements are provided by the diesel plant of SPC Island Power Corp, while supply also comes from San Carlos Bioenergy, Inc. Additional requirements beyond the contracted capacity are sourced from the Wholesale Electricity Spot Market (WESM) which is the off-taker of the electricity generated by the enrolled renewable energy power plants. Before other participating energy plants in the WESM are dispatched, the Feed-in-Tariff (FIT) enrolled plants have first priority.

Electricity Cooperatives



Distribution Utility	Demand Peak (MW)	Franchise Area (sq km)	Franchise Population	Circuit-km
NONECO	33.74	2,841	184,905	1,444
CENECO	132.52	1,417	212,015	1,187
NOCECO	41.30	4,186	1,079,280	2,197

Customer Classification	CENECO		NONECO		NOCECO	
	Captive Customer Connection	Sales (MWh)	Captive Customer Connection	Sales (MWh)	Captive Customer Connection	Sales (MWh)
Residential	154,675	299,812	114,309	88,089	133,645	116,181
Commercial	10,878	173,649	3,444	29,890	4,563	29,387
Industrial	141	168,080	103	34,815	21	6,224
Others	580	8,134	2,002	14,929	2,801	43,465
Total	**166,274**	**649,675**	**119,858**	**167,723**	**141,030**	**195,257**

Source: Bronzeoak Philippines Inc

AGRICULTURE, FISHERIES & LIVESTOCK

The Provincial Government of Negros Occidental places a high priority on the protection, preservation and rehabilitation of the environment. The current Administration of Governor Alfredo G. Maranon Jr. sustains programmes for conservation and has allocated funds to support its various programmes in upland, lowland and coastal areas in close co-ordination with other Local Government Units, national agencies and other non-government organisations. The conscious effort of the provincial government results in a development vision which balances resource utilisation with protection of the environment.

Eighty percent of all arable land on Negros is cultivated and 54 % of its 531,016 hectares of agricultural land is sugarcane-based. Nationally, just over half of all sugar production is from Negros, with Mindanao accounting for around 20 % and Luzon almost 17 %.

Negros Occidental is becoming known as the organic agriculture capital of the Philippines, with production expanding at an annual pace around 20 % over recent years. It has at least 16,000 hectares of agricultural land – around 3 % of the total – devoted to organic farming, with an estimated 17,000 organic producers. The Organik na Negros Organic Producers and Retailers Association (ONOPRA) is composed of more than 100 groups and organisations and posts annual gross sales of more than PHP1 billion. The island's vision is to become "The Organic Food Bowl of Asia".

The livestock and poultry industry is vital to food security and economic prosperity. Its development has been vigorously pursued by the Provincial Government under the 'Negros First Development Agenda', and it has been certified free from foot & mouth disease. Under a government-led, backyard-dominated live-

IMPORTANT TO KNOW

"Sugarcane Island"

Eighty percent of all arable land on Negros is cultivated and 54 % of its 531,016 hectares of agricultural land is sugarcane-based. Nationally, just over half of all sugar production is from Negros, with Mindanao accounting for around 20 % and Luzon almost 17 %.

The principal sugar-growing region is located in the north and west of the island, stretching along the coasts of the Visayan Sea and Guimaras Strait. It has 11 mill districts and 5 sugar refineries. After sugar, the main produce is rice and the island reached a rice sufficiency level of 94.35 % in 2016. Negros also produces corn, cassava, coffee, coconuts, and fruits such as bananas, mangoes, and pineapples.

stock and poultry industry, the province has become the leading meat producer in the Philippines. Based on figures from the Philippine Statistics Authority, Negros Occidental ranks first amongst the provinces of the country in terms of backyard swine, producing 463,014 pigs in 2016 and 459,960 in 2017. It is also the number one native chicken producer with 5,240,936 birds and is in second place

for both goat (217,291 heads) and carabao (103,946 heads). Overall, the province runs a surplus in pork, chicken and carabeef, with deficits currently in both beef and eggs.

Negros Occidental has 483.3 kilometres of coastline, with a population of 604,533 people across its 181 coastal barangays. Twenty five out of thirty two local government units (LGU's) in the province are located in coastal areas. The consolidated municipal/city fisheries profile in 2017 shows there are 3,650 fish farmers in the province as well as 31,819 municipal fishermen and women and 2,305 commercial fishers. There are also 2,461 fish processors and 6,294 fish vendors. Aquaculture production includes prawn, shrimp and blue shell crab as well as snapper, tilapia and catfish.

Production of Major Crops in Negros Occidental

Major Crops	Production (kg)					
	2011	2012	2013	2014	2015	2016
Sugar	1,176,819	1,136,461	1,290,960	1,345,248	1,255,020	1,190,174
Coconut (nuts)	110,464	110,802	111,718	113,598	116,341	124,436
Banana	85,527	87,187	85,353	85,111	85,356	84,187
Cassava	27,017	27,429	27,251	27,719	27,673	27,594
Mango	10,643	10,353	10,324	10,481	11,631	11,309
Camote	18,140	18,352	18,133	18,348	18,258	18,242
Eggplant	2,868	2,907	2,926	2,991	3,001	3,048
Papaya	2,002	1,974	1,849	1,818	1,806	1,771
Pineapple	4,309	4,438	4,303	4,359	4,160	3,954
Coffee	696	646	677	643	662	700
Watermelon	645	511	534	544	541	460
Lanzones	294	406	412	434	453	427
Ginger	482	506	511	532	527	542
Gourd	1,671	1,543	1,543	1,577	1,568	1,562
Gabi	866	891	903	929	890	848
Mongo	279	278	279	274	276	275
Ampalaya	689	671	660	678	678	681
Peanut	366	366	363	376	384	390
Durian	47	166	148	155	140	142
Tomato	290	292	289	301	300	299
Cabbage	160	152	137	137	135	130
Ubi	198	206	210	215	212	200
Chayote	166	166	166	174	170	169
Okra	419	431	426	438	440	449
Calamansi	52	53	52	50	50	43
Abaca	4	5	5	14	61	60
Rambutan	44	69	74	74	79	78
Habitchuelas	46	47	48	50	48	48
Cacao	10	9	8	8	8	7
Tobacco	17	18	18			
Carrots	52	52	50	52	50	63

Source: Philippine Statistics Authority

INVESTMENTS

SOLAR PLANTS ON NEGROS

San Carlos Solar Energy (SaCaSol)

Located in the San Carlos Ecozone in the Province of Negros Occidental, SaCaSol was developed in four stages and is a 45 MWp DC ground-mounted solar plant, which has been operational since July 2015.

Features:
- Size of project site: 660,661 m^2
- Electricity supplied to: 103,000 people
- Annual CO_2 savings: 30,282 tonnes
- Investment volume: 95 Mio. USD

Negros Island Solar Power (ISLASOL I)

Located in La Carlota City in the Province of Negros Occidental, ISLASOL I is an 32 MWp DC ground-mounted solar plant, which has been operational since March 2016. IslaSol I was developed in two stages.

Features:
- Size of project site: 447,300 m^2
- Electricity supplied to: 73,000 people
- Annual CO_2 savings: 21,534 tonnes
- Investment volume: 67 Mio. USD

Negros Island Solar Power (ISLASOL II)

Located in the Municipality of Manapla in the Province of Negros Occidental, ISLASOL II is a 48 MWp DC ground-mounted solar plant, which has been operational since March 2016.

Features:
- Size of project site: 638,000 m^2
- Electricity supplied to: 100,000 people
- Annual CO_2 savings: 32,300 tonnes
- Investment volume: 95 Mio. USD

MONTESOL

Located in Bais City in the Province of Negros Oriental, MONTESOL is a 18 MWp DC ground-mounted solar plant, which has been operational since February 2016.

Features:
- Size of project site: 213,292 m^2
- Electricity supplied to: 41,000 people
- Annual CO_2 savings: 14,838 tonnes
- Investment volume: 29 Mio. USD

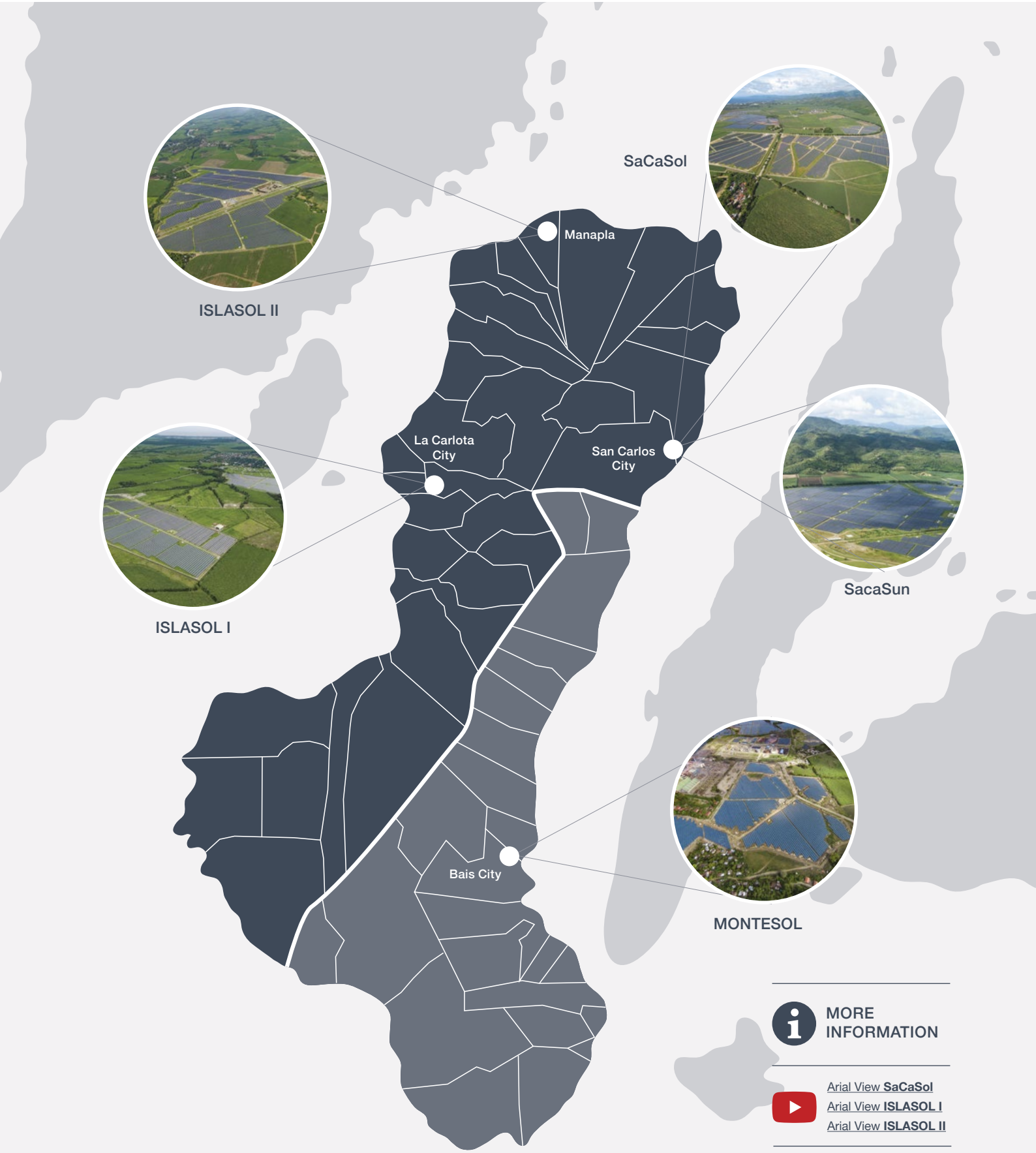
The project was sold by ThomasLloyd before realization.

SacaSun

Located in San Carlos City in the Province of Negros Occidental, SacaSun is a 59 MWp DC ground-mounted solar plant, which has been operational since July 2015.

Features:
- Size of project site: 750,000 m^2
- Electricity supplied to: 135,000 people
- Annual CO_2 savings: 44,000 tonnes
- Investment volume: 109 Mio. USD

The project was sold by ThomasLloyd before realization.



MORE INFORMATION

Arial View **SaCaSol**
Arial View **ISLASOL I**
Arial View **ISLASOL II**

Case Study **SaCaSol**
Case Study **ISLASOL**

A SOUTH-EAST-ASIA SUCCESS STORY

ThomasLloyd, together with its local partner Bronzeoak Philippines Inc, began the construction of the Philippines' first utility scale solar farm in September of 2013. San Carlos Solar Energy (SaCaSol) is a greenfield, stand-alone solar farm that supplies daytime peak power to the local grid throughout the entire year. It has a total gross capacity of 45 MWp, developed in four phases: Phase A with 13 MWp, Phase B with 9 MWp and Phase C & D at 13 and 10 MWp, respectively. The project sites are on a collective almost 70 hectare property within the San Carlos Ecozone, San Carlos City, on the eastern coast of the province of Negros Occidental.

On May 15th 2014, President Benigno Aquino III inaugurated SaCaSol. The President explained that this project "serves as a shining example of the collective steps we are taking to minimize climate risk – the fruit of our efforts to ensure that future generations will not be subject to the same vulnerabilities as we are now." He also hailed the project as a successful partnership between the public and private sector, at a time where the country was experiencing continuous power problems and rising electricity bills. After the inauguration of SaCaSol, President Aquino III said "the Philippines is now closer to the goal of having a more diverse energy mix that is able to meet the country's needs."

Since its commissioning, SaCaSol received significant accolades throughout the industry. SaCaSol paved the way for solar energy in the Philippines and elsewhere in South-east Asia. Most immediately, the success of SaCaSol led to the joint development by ThomasLloyd and Bronzeoak Philippines Inc. of two more solar power plants in Negros Occidental – ISLASOL I in La Carlota and ISLASOL II in Manapla.

IMPORTANT TO KNOW

SaCaSol / San Carlos Solar Energy Inc. received significant accolades throughout the industry.

- Solar Power Project of the Year | Charlton Media Group
- Sustainable Energy Finance Award 2014 | IFC
- Philippines Solar Photovoltaic System Integrator of the Year | Frost & Sullivan
- Green Company of the Year | Asia CEO Forum

SPECIAL FEATURES

SaCaSol

First and largest solar power plant, first bank facility for a solar project, first M&A transaction in the Philippines renewable energy sector

ISLASOL I / II

Largest M&A transaction in the solar sector in South East Asia

Today, we are not just inaugurating a power plant; we are also making history: The San Carlos Solar Energy, Inc. is the first large-scale commercially-financed and commissioned solar power plant in the Philippines under our administration.

Benigno Aquino III
Former President of the Philippines
Inauguration of SaCaSol

BIOMASS PLANTS ON NEGROS

San Carlos BioPower (SCBP)

Located in San Carlos City in the Province of Negros Occidental, SCBP is a 19.99 MW biomass plant, which will be operational in Q1 2019.

Features:
- Size of project site: 210,000 m^2
- Electricity supplied to: 212,00 people
- Annual CO_2 savings: 16,480 tonnes
- Investment volume: 95 Mio. USD

The feedstock used is primarily sugarcane trash, with the potential also to use some grassy and woody energy crop plants. 170,000 tonnes of feedstock per year will be required to run the plant. There is an estimated 1.1 million tonnes per year of sugarcane trash available within a 40 km radius of the plant.

In the construction phase, at least 80% of the more than 1,000 workers on site lived locally. Once it is fully operational, around 600 jobs will be created in the plant and almost 1,000 will be employed across the province in the Fuel Supply Division to provide the necessary cane trash raw material.

South Negros BioPower (SNBP)

Located in La Carlota City in the Province of Negros Occidental, SNBP is a 24.99 MW biomass plant which will be operational in Q4 2019.

Features:
- Size of project site: 300,000 m^2
- Electricity supplied to: 265,000 people
- Annual CO_2 savings: 20,600 tonnes
- Investment volume: 105 Mio. USD

The feedstock used is primarily sugarcane trash, with the potential also to use some grassy and woody energy crop plants. 220,000 tonnes of feedstock per year will be required to run the plant. There is an estimated 1.4 million tonnes per year of sugarcane trash available within a 50 km radius of the plant.

In the construction phase, at least 80% of the more than 1,000 workers on site lived locally. Once it is fully operational, around 675 jobs will be created in the plant and almost 1,000 will be employed across the province in the Fuel Supply Division to provide the necessary cane trash raw material.

North Negros BioPower (NNBP)

Located in the Municipality of Manapla in the Province of Negros Occidental, NNBP is a 24.99 MW biomass plant which will be operational in Q4 2019.

Features:
- Size of project site: 252,900 m^2
- Electricity supplied to: 265,000 people
- Annual CO_2 savings: 20,600 tonnes
- Investment volume: 105 Mio. USD

The feedstock used is primarily sugarcane trash, with the potential also to use some grassy and woody energy crop plants. 220,000 tonnes of feedstock per year will be required to run the plant. There is an estimated 2.1 million tonnes per year of sugarcane trash available within a 50 km radius of the plant.

TLG has invested around USD 105 million to build this plant. In the construction phase, at least 80% of the more than 1,000 workers on site lived locally. Once it is fully operational, around 675 jobs will be created in the plant and almost 1,000 will be employed across the province in the Fuel Supply Division to provide the necessary cane trash raw material.

North Negros
BioPower

Manapla

La Carlota
City

San Carlos
City

South Negros
BioPower

San Carlos
BioPower

MORE
INFORMATION

Current
Projects


SCBP

BIOMASS ON NEGROS

ThomasLloyd and its local partner Bronzeoak Philippines Inc. are currently developing three renewable energy biomass plants on Negros island, each one adjacent to an existing solar plant. The plants are known as San Carlos BioPower (SCBP), South Negros BioPower (SNBP) and North Negros BioPower (NNBP); the latter of which is on land next to ISLASOL II in Manapla. NNBP will be the last of the three to be completed, grid-connected and energised but work is well in progress under the engineering, procurement and construction (EPC) contract awarded to a company already extensively involved in the first two plants.

The Negros Biomass projects have already secured a long-term refinancing agreement with the International Finance Corporation (IFC), a division of the World Bank Group, which said in 2016 that it would provide $ 161 million to the three biomass power plants that are expected to generate c.70 megawatts (MW) of electricity under the feed-in-tariff system being offered by the government under the 2008 Renewable Energy Act. The


SNBP

Manapla and La Carlota plants will each generate 24.99 MW whilst San Carlos plant's target capacity is 19.99 MW.

Operational Overview

The biomass project converts agricultural waste to generate reliable base-load power. This is very important for future economic development on Negros as, by definition, solar power is only produced and available during daylight hours. So-called 'base-power' is available 24/7 and is provided by technologies which either have long starting-time requirements or need constant and uninterrupted fuel supply. Output from base-load power stations, such as fossil fuel or biomass boilers and steam turbines, cannot be varied quickly, nor can they be run at very low capacity. In the absence of proven and inexpensive large-scale battery storage which still seems at least several years away, the provision of sufficient base power to meet current and future industrial and commercial demand around the clock is absolutely vital.

A biomass plant is a wholly different proposition, however, and the ThomasLloyd/Bronzeoak choice of proven technology involves converting sugarcane waste to electricity at SCB using a low carbon-emitting process called a "circulating fluidised bed boiler" and at the other two plants using water-cooled, vibrating plate boilers.

Optimal choice of technology for Negros

The boilers were chosen for this project specifically for the purpose of being able to use as a fuel biomass that is not considered suitable in more traditional (moving grate) type boilers and are designed to accommodate a wide range of chlorides and alkalis in the fuel. The key advantages of this strategy are less restriction on the potential sources of fuel for the plant and the ability to utilise fuels which are unsuitable for other low-pressure bagasse-burning boilers elsewhere on Negros.

Trash comprises only around 10 – 15 % of bagasse-burning plants, because higher proportions than this lead to boiler fouling problems. It is thus a low or no-value waste product which – prior to technological innovation in biomass power generation – was simply burned in the fields, thus contributing to worsening air pollution and environmental degradation.

IMPORTANT TO KNOW

IFC

The Negros Biomass projects have already secured a long-term refinancing agreement with the International Finance Corporation (IFC), a division of the World Bank Group, which said in 2016 that it would provide $161 million to the three biomass power plants that are expected to generate c.70 megawatts (MW) of electricity under the feed-in-tariff system being offered by the government under the 2008 Renewable Energy Act.


NNBP

The logistics of a solar plant are relatively straightforward – a 'plug and play' operation with a single source of fuel, albeit 140 million kilometres away. Across South-East Asia, the raw material is available approximately 12 hours per day throughout the year with variations due only to prevailing meteorological conditions and localised cloud cover.

BIOMASS BY THOMASLLOYD – A GREEN LIFECYCLE

1 FUEL TYPE

Sugar cane leaves/stalks (waste, which is not used to make sugar and is left in the fields)

Bagasse (fibrous residue that is left over as a waste product when the juice has been pressed out of the sugar cane)

2 FUEL PRODUCTION

Agricultural byproduct is laid out to dry in swathes in the fields

Collection of byproduct from the fields and transport to the transloading station

3 POWER GENERATION

Fuel is prepared for combustion

Fuel is burnt in a high-pressure condensing boiler

Byproducts from other areas of local agriculture that are left when the crop has been harvested. This includes, e.g. coconut shells, rice hulls and straw, as well as plants specially grown for power production, which are not suitable for use as food.

Bagasse is moved on a conveyor belt to the baler

Finished bales are transported for interim storage

Bales are loaded and transported to the power plant

Power is generated by piping steam through the steam turbine generator unit

The power generated is fed into the electricity grid

Combustion residue (ash) is provided to farmers to fertilise their fields

Environmental costs of trash burning

Field burning is in contravention of the Clean Air Act 2009 of the Philippines which recognises that it is the right of every citizen to breathe clean air. However, the waste material from a sugarcane crop is too voluminous – around 25 tons per hectare – to plough back into the field and it prevents the growth of new shoots – known as rattoons – from near the root or crown of the sugar plant. Moreover, leaving a blanket of trash often leads to rodent infestation which can damage or destroy the new rattoon crop. Farmers globally, not just in the Philippines, have therefore traditionally resorted to burning the waste as what they perceived as the least bad option.

Academic research from Mendoza and Samson in 2000, published in the Journal of Environmental Science and Management, estimated the total area burned in the Philippines at 236,800 hectares of the total area planted of 370,000 hectares (or 64 %) from crop year 1998-99. Using the same burning coefficient, the estimated amount of trash burned for the 420,000 hectares of sugarcane harvested for CY2013–14 was about 1.94 Mt trash (0.64 ×7.12t/ha ×420,000ha).

Health hazards of trash burning

On the health side, Mendoza noted in a 2015 study, “Enhancing Crop Residues Recycling in the Philippine Landscape”, that sugarcane workers have been observed to have significantly high rates of mortality due to illnesses attributed to burning canes. A case-control study in the United States suggests that people engaged in sugarcane farm-related occupations have significantly higher rates of lung cancer (Mulvey and Rothschild 1983). According to the US Occupational Health Department (1999) sugarcane workers have an increased risk of lung cancer and this may be related to the practice of burning foliage at the time of cane cutting.

Unique fuel supply operation for the Biomass plants

The biomass plants currently under construction in Negros will not only have a direct positive impact on employment during both the construction and operational phases, but also create a significant number of jobs in the Fuel Supply Division which supplies the sugarcane trash to the power plant. The provision of a steady, reliable and uninterrupted source of raw material is a huge and very impressive logistical feat along every part of the supply chain from field to furnace.

A very efficient mechanical collection system is utilized to collect cane trash. This system was selected from a number of options that were all field trialled on Negros Island, as part of the project developer’s extensive research and development program over a ten year period. Although there is the potential to collect manually, it is not efficient and would in any case require a labour force that is increasingly disinclined to work in the fields. Indeed, sugarcane farmers themselves report difficulties in finding sufficient labour for harvesting and the additional workload of manual trash collection is even less appealing.

The mechanical systems trialled have proven to be very capable and efficient, thus mitigating the problem of rising labour costs. Although they have been used successfully in other parts of the world, they are new to the Philippines and are highly capital intensive. This has led to the vertical integration strategy of the project allowing the developer to invest in and operate its own feedstock supply chain.

Proprietary network of cane trash transloading stations

The process of mechanical collection involves the use of a number of specialised farm tractor-pulled implements which enter the sugarcane fields immediately or soon after harvest of the sugarcane. An initial raking operation to windrow the cane trash followed by the collection implement allows rapid entry and extraction of the material with negligible disturbance to farmer's typical operations. Farmers normally allow 3 to 5 days from the time the field is harvested before burning and the mechanical collection operates within that same window of time.

The sugarcane trash is transported by road to a dedicated 'transloading' station where mechanical separating and baling technology is used to produce bales of raw fuel material which is either stored on-site or transported directly to the power plant. With a daily requirement of 25 tons of cane trash per hour, more than 90,000 tons of baled trash will be stored onsite at any one time; a considerable 5-month buffer to guard against any potential supply disruptions outside the control of project operations.

Significant investment in logistics and infrastructure

In total, three transloading stations have thus far been constructed on Negros and a further 8 or 9 are planned to keep all the project's power plants fully supplied. Equipment is directed day-to-day based on information received about cane harvesting activities, rainfall-affected soil conditions and field accessibility to try to maximise the productivity of the collection equipment across the entire collection area. A machine workshop is being established to develop basic vehicle maintenance capabilities in the vicinity of the power plant whilst a fleet of new equipment for the majority of applications should allow for vehicle operating and maintenance efficiencies to be secured.

Detailed computerised data to optimise harvesting

At the level of the farm, a GPS-based survey of existing cane crops in the collection area has been inputted to a real-time information system. The system shows for each field, ownership and farmer contact details, the hectarage, the nature of the land, equipment access information, cane varieties planted, time of harvest etc. This information is used to target day to day collection sites and optimise fleet utilisation.

It has been important to demonstrate to the sugarcane farmers that the combination of equipment selected and the use of wide, high flotation balloon tyres on that equipment will not damage the new cane rattoon crop. Pictures and videos were made available to demonstrate both the equipment selected and the trash collection process. Farmer support for the collection method is evidenced by their willing and widespread agreement to allow our operators onto their fields to collect their trash in return for payment to them.

Significant support from sugarcane farmers

Numerous benefits accrue to the farmer from the mechanical collection including potential fines from burning, income from sale of cane trash, improved rattoon crop by not burning, and soil nutrition improvement from mulch of the remaining uncollected trash. Payment for sugarcane trash can equate to an increase in farmers' current net annual income of up to 5-15% without any effort or investment required on their part: effectively a second crop off the land. Little wonder that farmers supported the biomass power proposals after their attendance at trash collection demonstrations held in various sugarcane co-operatives across the island. They, too, can see that converting agricultural waste to biomass power is a sustainable way of creating economic value and boosting local employment and incomes whilst improving the environment.

Employment and skills training

Whereas the employment impact of solar power plants is substantially weighted towards the construction rather than the operational phase, the manpower requirements of a biomass plant are both significant and ongoing. The construction phase of NNBP is directly creating around 675 full-time jobs, more than 80% of which are locally-based employees.

IMPORTANT TO KNOW

Schedule

Farmers normally allow 3 to 5 days from the time the field is harvested before burning and the mechanical collection operates within that same window of time.

Tons & tons

With a daily requirement of 25 tons of cane trash per hour, more than 90,000 tons of baled trash will be stored onsite at any one time; a considerable 5-month buffer to guard against any potential supply disruptions outside the control of project operations.

The plant will operate virtually round the clock, 365 days per year with several shifts per day to meet the more labour-intensive demands of the biomass power station.

Locally hired workers will be provided with tailored in-house training to help address the skills shortage which is developing as the local economy expands; a phenomenon not confined just to the island of Negros, but to the Philippines more generally. Enhanced skills, higher local wages and greater employee retention will also help ease the so-called 'brain drain' and mitigate cost competition for existing qualified engineers elsewhere in the Philippines.

Workers' housing and welfare

To help consolidate its position as an employer of choice and high reputation within the local community, the biomass plant's owners are further demonstrating their commitment to sustainability by providing on-site housing for some of the workers and their families. 45 one-bedroom family houses are being constructed; each with its own sanitation, plumbing, bathroom, electricity and separate septic tank for waste disposal. Families will be able to decorate and extend the homes to their own taste and specifications and will be granted also a 100m^2 plot of land on which to cultivate their own vegetables.

On-site medical facilities at the Manapla biomass plant will not only be used in the event of workplace sickness and injury, but will be staffed and equipped to deliver preventative healthcare programmes and provide lifestyle advice to workers and their families. These arrangements replicate those already in place at SNBP in La Carlota, which are making a substantial contribution to health and welfare amongst local residents.

Education, welfare and community engagement will extend also to the provision of meals at the plant. As at SNBP, appropriately selected external local caterers are to be invited to supply hot and cold meals and liquid refreshments to workers; thereby ensuring a clear and rapid income multiplier effect into the surrounding barangay and municipality areas.

IMPACT OF PHILIPPINES' SOLAR AND BIOMASS ON THE REST OF ASIA

Difficult as it is to overstate the importance of renewable energy to the economy of Negros and to the broader Philippine economy, so too we cannot ignore its catalytic role for infrastructure investment elsewhere in South and South-East Asia.

According to the International Renewable Energy Agency, solar capacity in South-East Asia in 2011 stood around 100 MW, rising to 1.1 GW in 2016. IRENA notes in its 2018 report on renewable energy markets in the region that, "a country with well-defined institutions and energy regulatory structures such the Philippines… is able to create a dynamic and competitive energy market, attracting renewable energy investment from the private sector". With an initial Feed-In Tariff (FiT) of USD cents 23/kWh over a 20-year term, the development of SaCaSol saw Philippine solar capacity jump to 62 megawatts (MW) in 2014. Tariffs were revised to USD cents 19.58/kWh that year and installed capacity reached 108 MW by 2015. Overall, the Philippines' solar capacity grew from 22 MW in 2014 to about 800 MW by the end of 2016.

Multi-award winning SaCaSol solar plant

After its commissioning in 2014, the SaCaSol solar plant in San Carlos City received significant accolades throughout the industry. It was named Green Company of the Year at the Asia CEO Awards for 2014 and Solar Power Project of the Year at the Asian Power Awards 2014. IRENA must surely have had SacaSol in mind when it commented that, "FiTs were high due to the extra risk for investors resulting from the Philippines' unique "first come, first served" scheme which stipulated that a project would only learn of its Energy Regulatory Commission award when the project reached commissioning stage. The unique approach discouraged lenders and placed extra risk upon project developers."

As a previously sceptical corporate finance community saw the success of SaCaSol and replicated or adapted its business model in other countries such as Vietnam, so the solar energy market began to develop rapidly. As IRENA now forecasts, "With a significant pipeline of projects approved or under development and new rounds of auctions scheduled in some markets along with policy calibration in others, solar capacity is expected to continue to grow in the coming years."

ThomasLloyd participation in Philippine-China trade and diplomatic mission

In October 2016, senior representatives of ThomasLloyd participated in the historic Philippine Presidential trade and diplomatic mission to China. The diplomatic summit and ceremonial signing of important trade and cooperation agreements in Beijing took place between Xi Jinping, President of the People's Republic of China, and Rodrigo Duterte, President of the Republic of the Philippines, in the presence of senior politicians and up to 400 businessmen.

Both sides affirmed their partnership and declared a shared ambition to achieve sustainable development and inclusive growth that will benefit the people of both countries in the years ahead. Together, they committed to enhance economic relations in several priority sectors, such as infrastructure and energy, through the promotion of trade, investment and economic cooperation under the Memorandum of Understanding on Strengthening Bilateral Trade, Investment and Economic Cooperation. Within the framework of the summit, eleven MoUs were signed, including one between ThomasLloyd and its Philippine and Chinese stakeholders in the biomass sector, for a total of USD 7.9 billion of commitments, which would create up to two million jobs in the Philippines. China is the second biggest trade partner of the Philippines, its 4th biggest export market, and largest supplier of imports. These agreements created extensive mutual market access and provided the basis for closer cooperation in the political and economic field.

T.U. Michael Sieg, Chairman and Group CEO of the ThomasLloyd Group sees the Group's invitation to and participation in the Beijing visit "as special recognition of the previous successes of ThomasLloyd Group and its Chinese and Philippine partners. The results of the summit, and the many meetings which took place around it, will form the basis for faster growth and development of Philippine infrastructure."

IMPORTANT TO KNOW

Blueprint

As a previously sceptical corporate finance community saw the success of SaCaSol and replicated or adapted its business model in other countries such as Vietnam, so the solar energy market began to develop rapidly.

Signing of business Agreement, Bejing 2016

"My state visit to China signalled a turning point in our shared history and showed that both countries are fully capable of working together for mutual beneficial cooperation even as we remain committed to settle disputes peacefully in full adherence of international law," President Duterte said.

MORE INFORMATION

Performance Report 2017

IMPACT RESULTS

METHODOLOGY

To keep the scope of this Impact Report manageable, we will focus initially on one location, though the conclusions to be drawn are both replicable and scalable. Different city mayors have different priorities for economic and social development, and the implementation of their future vision varies accordingly. Whilst the mayor of San Carlos City, for example, places education at front and centre of his plans, the mayor of La Carlota emphasises rural inclusivity, transport links and connectivity to advance the collective municipal good.

To provide the most comprehensive picture of social and economic impact, our main focus will be on the municipality of Manapla which, according to the 2015 census, has a population of 54,845 people; an increase of almost exactly 10 % compared to the start of the new millennium.

Manapla is almost an hour's drive north-east from Bacalod City. Its eastern and southern boundaries are defined by Cadiz City and Victorias City respectively. The Guimaras Strait in the western and northern portion separates the town from the island of Panay. Manapla is politically subdivided into 12 barangays, of which the home to both ISLASOL II and North Negros BioPower is Barangay Santa Teresa which had a population in the 2015 census of just 2,533. This was an increase of 232 people from the previous total of 2,301 in 2010 but was marginally lower than the 2,581 recorded in the 2000 census. Santa Teresa is situated at approximately 10.9513 N, 123.1625 E, on the island of Negros. Elevation at these coordinates is estimated at 12.6 meters or 41.3 feet above mean sea level.

Inauguration ISLASOL II

SOCIO-ECONOMIC IMPACT

Tax Revenues and Development

A municipality such as Manapla has various sources of revenue, the largest of which is generally the Internal Revenue Allotment (IRA); its' share of revenues from the Philippine national government. The allotment is largely based upon the type of government they are, and Section 284 of the Local Government Code of the Philippines (RA 7160) formulates its distribution. In general, the IRA can account for up to 90% of municipal revenues, with local taxes on property making up the balance.

Under the local government code of 1991, municipalities can enact local policies and laws, enforce them, and govern their jurisdictions. They can enter into contracts and other transactions through their elected and appointed officials and can levy taxes. They are tasked with enforcing all laws, whether local or national. The municipal mayor is the chief executive officer of the municipal government who determines guidelines on local policies and directs formulation of development plans.

According to the Commission on Audit, "the LGU is mandated to actively participate in the implementation of national programmes and projects to enhance their capabilities. It is responsible for managing and maintaining ecological balance within their territorial jurisdiction. The Municipality is allowed to group itself with other LGU's, consolidate and co-ordinate its efforts, services and resources for purposes that are commonly beneficial to them in accordance with the law. It is also mandated to establish an accountable, efficient and dynamic organisational structure and operating mechanisms that meet the priority needs and service requirements of the community."

Our analysis of publicly available audited Budget reports for Manapla shows a substantial increase in revenues over the most recent period. The Consolidated Statements of Financial Performance show a 10.2 % increase in IRA payments from PHP98.7 million in 2015 to PHP 108.8 million in 2016. Over the same period, however, local tax revenues increased a whopping 73.9 % from PHP 13.9 million to PHP 24.2 million. Notes to the Statements reveal that in addition to a more than doubling of 'Other Taxes' from PHP 4.0 million to PHP 9.9 million, there was a 54.8 % increase in gross Real Property Tax (RPT) from PHP 2.8 million to 4.4 million. Net of a discount applied to the headline total, RPT rose from PHP 2.3 million to PHP 3.2 million.

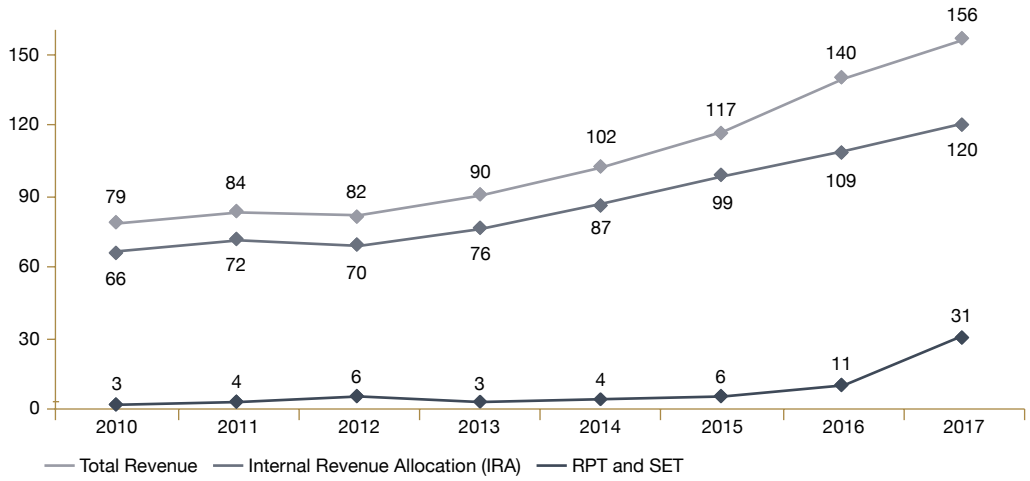
Municipality of Manapla – Consolidated Statement of Financial Performance

	2010	2011	2012	2013	2014	2015	2016	2017
Community Tax				3,105,909	3,538,770	393,255	425,282	465,962
Real Property Tax – Basic	2,552,573	1,457,544	2,509,821	3,157,150	4,222,852	2,871,170	4,445,216	14,047,210
Discount on Real Property Tax – Basic						-569,572	-1,189,191	-4,831,102
Special Education Tax		2,092,327	3,370,518	44,100		3,271,951	6,406,727	17,444,685
Discount on Special Education Tax – Basic						-565,638	-1,191,981	-4,825,596
Business Tax	1,551,845	2,275,908	1,838,812	354,987	460,517	2,642,779	2,938,956	3,596,862
Tax on Sand, Gravel and Other Quarry Products						124,407	150,482	170,352
Tax on Delivery Trucks and Vans					900	600		
Other Taxes	8,646,255	6,233,836	4,251,204	1,925,574	2,179,832	4,011,942	9,932,391	810,874
Tax Revenue – Fines and Penalties – Property Taxes				1,882,436	1,660,855	1,146,551	2,258,929	2,106,175
Tax Revenue – Fines and Penalties – Other Taxes						603,699	47,666	113,828
Tax Revenue	**12,750,672**	**12,059,616**	**11,970,356**	**10,470,156**	**12,063,726**	**13,931,146**	**24,224,478**	**29,099,250**
Share from Internal Revenue Collections – IRA	66,178,867	71,617,663	69,558,294	76,402,540	86,549,866	98,715,689	108,798,257	120,178,453
Service and Business Income				2,880,986	3,410,821	4,130,632	5,924,754	5,242,232
Shares, Grants and Donations				31,563	52,017	14,463	577,658	1,416,667
Other Income				512,363	347,176	120,000	351,894	519,403
Total Revenue	**78,929,539**	**83,677,279**	**81,528,650**	**90,297,608**	**102,423,606**	**116,911,930**	**139,877,041**	**156,456,005**

Source: Philippine Commission on Audit (COA)

By 2017, local tax revenues showed a further increase. After 2016's 73.9 % annual rise, there was a 20 % jump from PHP 24.2 million to PHP 29.1 million even taking account of a more than 90 % drop in 'Other Taxes' from almost PHP 10 million to less than PHP 1 million. The standout reason for the increase was a more than trebling in Real Property Tax (RPT) to a gross amount of PHP 14.0 million; almost PHP 10 million greater than in 2016. Net of discount, RPT receipts totalled PHP 9.2 million; almost treble the corresponding figure the previous year and four times greater than in 2015.

Evolution of Manapla's Revenue (PHP mn)

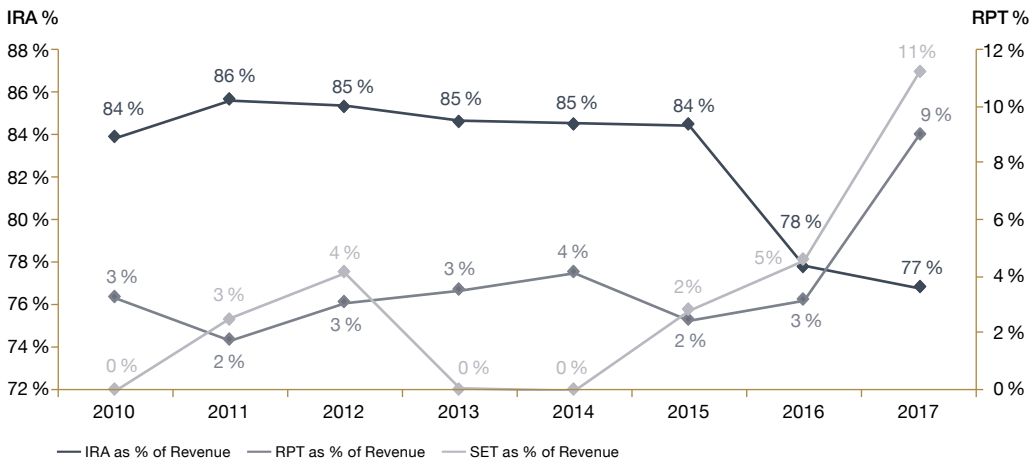


Source: Philippine Commission on Audit

Putting these figures in context, the previous five years of audited Financial Statements show a far more modest increase in local taxes, with RPT growing from PHP 2.5 million in 2010 to PHP 4.2 million in 2014. The average annual growth rate of 13 % over that period is, in fact, only marginally higher than nominal GDP growth.

Another way of looking at this is the total IRA payments as a percentage of total municipal income. We were told by the City Mayor in La Carlota that five years ago, IRA payments accounted for more than 90 % of total income, but this was projected around 60 % for 2018 and was expected to be less than 50 % of the total in 5 years' time. The comparable figures for Manapla show a fall from 84 % as recently as 2015 to 77 % in 2017.

Evolution of IRA and RPT as % of Total Revenue



Source: Philippine Commission on Audit

IMPORTANT TO KNOW

Award

In June 2016 the municipality of Manapla was awarded the "Seal of Good Environmental Governance". In November 2016 it was conferred the "Seal of Good Governance" award for passing the criteria set by the Department of Interior and Local Government and was given a certificate of recognition for Highest Collection Efficiency for Local Revenue and Local Treasury Operations. Indeed, figures certified correct and provided by the Provincial Treasurer, Nilda V. Generoso, show that of all the municipalities in Negros Occidental, Manapla was in 2016 and 2017 in #1 position for actual versus target collection of Real Property Tax.

In addition to the RPT and SET taxes, the solar plant also makes quarterly payments both to the host municipality and barangay. For the municipality this is computed as 45 % of 40 % of 1 % of the gross profit of Negros Island Solar Power Inc (ISLASOL) and for the barangay it is a slightly lower figure of 35 % of 40 % of 1 %. These payments are in compliance with Implementing Rules and Regulations (IRR) of the Renewable Energy Act 9513 per DOE Circular No DC2009-05-0008. The IRR states that the benefits/incentives shall be allocated as follows:

1. Eighty percent (80 %) of the local government share from the RE projects and activities shall be used directly to subsidize the electricity consumption of end-users in the RE host communities/LGU's whose monthly consumption does not exceed one hundred kilowatt-hours.

2. The subsidy may be in the form of rebates, refunds and/or any other form as may be determined by the DOE, DOF and ERC, in coordination with the NREB.

3. Twenty percent (20 %) of the local government share shall be utilized to finance local government and livelihood projects

Real Property Tax Collection Efficiency

Municipalities	2015 Real Property Tax			2016 Real Property Tax			2017 Real Property Tax		
	Target	Actual	%	Target	Actual	%	Target	Actual	%
Manapla	19,153,633	18,407,975	96 %	26,781,833	27,759,288	104 %	72,689,831	74,273,808	102 %
D.S. Benedicto	7,063,882	3,793,236	54 %	13,111,164	5,257,666	40 %	14,279,915	5,137,861	36 %
Valladolid	14,362,876	10,074,463	70 %	20,991,067	12,713,892	61 %	23,253,940	11,547,667	50 %
Hinigaran	29,797,763	27,962,240	94 %	38,611,858	30,945,917	80 %	45,087,361	33,893,071	75 %
Binalbagan	45,388,776	45,446,090	100 %	53,016,967	49,960,571	94 %	62,066,930	54,247,220	87 %
Toboso	15,019,147	12,423,095	83 %	22,647,337	13,333,913	59 %	25,478,992	12,988,864	51 %
La Castellana	12,300,245	15,373,280	125 %	19,928,436	16,425,642	82 %	38,296,851	14,148,398	37 %
Pulupandan	15,776,117	13,613,188	86 %	21,404,308	14,541,517	68 %	32,485,986	14,294,374	44 %
Hinoba-an	9,344,343	6,936,789	74 %	16,972,534	7,408,408	44 %	26,584,448	7,938,640	30 %
Pontevedra	18,417,710	14,417,991	78 %	26,045,900	15,258,165	59 %	28,871,953	15,571,899	54 %
E.B. Magalona	29,799,194	25,000,498	84 %	37,427,385	26,265,293	70 %	42,523,814	23,421,497	55 %
Cauayan	16,108,147	10,191,394	63 %	19,922,242	10,544,780	53 %	34,004,568	12,697,571	37 %
Calatrava	19,144,970	16,628,765	87 %	26,773,161	17,029,899	64 %	39,415,009	15,304,651	39 %
Isabela	19,556,734	17,816,817	91 %	27,184,925	17,672,633	65 %	30,353,677	19,048,251	63 %
Candoni	3,821,884	1,960,364	51 %	10,357,118	1,944,148	19 %	12,425,869	1,969,887	16 %
Moises Padilla	11,595,161	10,865,242	94 %	19,223,351	10,529,211	55 %	21,392,103	10,562,792	49 %
San Enrique	9,297,068	6,775,584	73 %	14,599,116	6,542,041	45 %	15,128,786	7,458,195	49 %
Murcia	34,764,239	48,583,152	140 %	50,020,621	46,476,185	93 %	57,020,621	47,851,389	84 %
Ilog	13,673,725	16,207,785	119 %	24,301,916	10,975,515	45 %	47,660,958	15,174,443	32 %
Total	**344,385,615**	**322,477,946**	**94 %**	**489,321,238**	**341,584,686**	**70 %**	**669,021,613**	**397,530,478**	**59 %**

Source: Philippine Statistics Authority

Employment breakdown during construction (ISLASOL – Manapla)

	2015		2016				2017			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Job Type										
Technical	12	26	38	28	20	10	17	16	17	10
Office Staffs	10	31	63	20	17	3	13	8	13	3
General Labor	47	96	747	472	123	83	92	81	96	83
Employment										
Direct Hires	6	6	6	3	3	1	1	1	1	1
Hired by Contractors	63	147	842	517	157	95	121	104	125	95
Total Employees										
Locals	69	153	848	520	160	96	122	105	126	96

Source: Bronzeoak Philippines Inc.

Of course, the substantial uplift in local tax receipts did not occur spontaneously or without cause. The Executive Summary of the 2016 Auditor's Report notes, "the solar power plant which was constructed in Manapla was scheduled to start operations in CY 2017 with the real property classification converted from agricultural to industrial thus an addition to real property tax collection and ultimately generating a much bigger tax revenue in CY 2017."

The construction phase of a solar plant is very labour-intensive with groundworks, foundations, perimeter-securing and an exhaustive list of installation and pre-connection safety checks to be carried out. The workers hired directly at Manapla were all locals – though some contractors had expats in supervisory roles – and at the peak of activity in 2016, three eight-hour shifts per day were timetabled in a round-the-clock operation. Free transportation to and from the site was laid on, with meals provided by local caterers. The employment profile shows clearly the ramp in hiring in H1 2016 and at the very peak of activity there were almost 2,000 workers at the plant.

Public Sector Socio-Economic Impact

On October 18th 2018, we met with Ms. Lourdes Escalante, the elected mayor of Manapla to discuss the social and economic impact of the solar power plant in the municipality. A meeting was also held with Santa Teresa Barangay Captain Ms Olavia to learn about its impact at the most local LGU level. Ms Escalante reported that the significant uplift in the Real Property Tax (RPT) collected by LGU's on or before the 31st January each year has been accompanied by a big increase in revenues for the Special Education Fund. Local governments are given a special facility to finance education - known as the Special Education Fund Tax (SET) – which is collected simultaneously with RPT and consists of an additional 1 % levy on the assessed value of real properties. It can be applied to all forms of real property such as land, buildings, improvements and machinery. From a zero base as recently as 2014, the SET raised PHP 3.3 million in 2015, PHP 6.4 million in 2016 and PHP 17.4 million in financial year 2017.

SET revenues have been directed to the local school board. In previous years, the school board funds had often been depleted, but since the construction of the solar plant there has always been a surplus. One school had been given PHP 1 million and other schools received PHP 750,000 to help pay for repairs and the construction of a new classroom. This investment in physical infrastructure and involvement in three municipal high schools has helped attract people from neighbouring cities; a clear positive feedback loop.

Annexes to audited and publicly available municipal budget documents show a series of infrastructure projects, which are planned, underway or already completed in Manapla. In 2017 alone, some 18 projects were undertaken at a total cost of almost PHP41 million. These comprised not only general improvement works to develop the existing infrastructure in roads, footpaths, water supply and flood control, but specific new investments in the construction of a womens' crisis centre, a rural health unit, a youth development centre, school clinic and school library.

IMPACT RESULTS

TAX REVENUES

Total tax revenues more than doubled between 2015 and 2017, while Real Property Tax boomed by 390 % in the same time.

Real Property Tax (RPT) almost quadrupled between 2015 and 2017 due to a converted classification from agricultural to industrial since starting operations in CY 2017.

As well as funding new investment in physical infrastructure, the municipality of Manapla also makes direct payments to its poorest citizens, many of whom are workers in the sugarcane industry who survive only on daily wages. Poverty is measured and eligibility determined using electricity consumption as a proxy for household incomes, and the additional payments to the poorest of the poor are a way of injecting greater spending power in to the local economy. The high multiplier effect of this demand boost is a significant social as well as economic benefit.

Direct spending and income supplements are not the only way in which the municipality seeks to improve the quality of life for local residents. Through education and community programmes, citizens are encouraged to plant and grow vegetables to aid self-sufficiency and food security. In upland areas, students in school are taught to sow, nurture and harvest. Crops are watered in the morning and weeding is carried out at the end of the school day. Mayor Escalante estimated that household incomes could be boosted by around PHP 60-70,000 per annum through the sale of home-grown produce. Moreover, education was purposed to boost the product range of crops, develop and improve small-scale irrigation systems and thereby increase transferrable life-skills.

Beyond agriculture, the municipality aims to control and develop the local fishing industry. It does this by clamping down and policing illegal fishing activity and by providing direct assistance in the form of boats and nets to local fishermen to improve their livelihoods. The coastal area around Manapla is known for its blue crabs as well as abundant fish stocks and by targeting an increase in productivity and household incomes for those involved in this industry, it is hoped that more young

Schedule of Projects Implemented during CY 2017, Manapla

Programs / Projects / Activities	Location	Project Cost (PHP)	Source of Fund	Contract Cost	Contract Period	Period of Implementation		Status of Project as of Dec 31st
						Start	End	
Establishment of School Clinic	Tortosa Elementary School	1.200.000	LGSF BUB	1.191.286	120 Calendar Days	08.05.17	05.09.17	Completed
Establishment of School Library	Charmery Elementary School	1.200.000	LGSF BUB	1.190.467	120 Calendar Days	25.04.17	18.08.17	Completed
Construction of Faculty Room	Manapla Elementary School	1.200.000	LGSF BUB	1.186.188	120 Calendar Days	08.05.17	25.08.17	Completed
Construction / Rehabilitation of Farm to Market Road	Quinaruyan Ext. – Sicaba	3.000.000	20 % MDF	2.975.000	150 Calendar Days	08.05.17	20.07.17	Completed
Flood Control Project	Brgy. I-A	600.000	LGSF BUB	594.000	120 Calendar Days	01.05.17	06.06.17	Completed
Construction of Youth Development Centre	Brgy. I-A	1.500.000	20 % MDF	1.489.285	90 Calendar Days	17.07.17	09.10.17	Completed
Construction of Road (Cabayao-Lauron Road)	Brgy. San Pablo	3.880.850	BUB Fund	3.877.715	90 Calendar Days	10.04.17	15.08.17	
Construction of Day Care Centre	Sicaba Monte, Brgy. San Pablo	850.000	20 % MDF	846.850	90 Calendar Days	03.07.17	02.10.17	
Construction of Footbridge	Sicaba Monte, Brgy. San Pablo	1.580.000	General Fund	1.565.020	120 Calendar Days	03.07.17	27.10.17	
Water Supply System Program (Level 1)	Had. Lauron, Brgy. San Pablo	400.000	20 % MDF	399.835	Admin.	13.03.17	18.10.17	
Public Market Improvement	Public Market, Brgy. II	1.000.000	20 % MDF	979.950	Admin.	14.08.17	04.11.17	
Repair of Footwalk	Sto. Bangkiling	200.000	20 % MDF	199.040	Admin.	06.11.17	28.11.17	
Rehabilitation of Multi-purpose Centre	Covered Court, Brgy. I-A	1.280.000	General Fund	1.265.000	120 Calendar Days	29.08.17		
Construction of Women's Crisis Centre	Bliss Project, Brgy. I-A	2.000.000	20 % MDF	1.983.995	120 Calendar Days	29.08.17		
Construction of Rural Health Unit	Health Centre, Brgy. I-A	4.200.000	20 % MDF	4.183.707	180 Calendar Days	29.08.17		
Core Local Access Road	Brgy, Pta. Mesa-Tortosa Road	10.000.000	Assistance	9.979.245	180 Calendar Days	30.10.17		
Core Local Access Road	Had. Yning-Cabayao Road	5.388.000	Assistance	5.375.788	120 Calendar Days	30.10.17		
Facility Upgrading System	Brgy. I-A	1.700.000	BUB Fund	1.684.481	180 Calendar Days	-		
TOTAL				**40.966.852**				

Source: Philippine Commission on Audit

family members will be able to stay longer in formal education and thus improve their own skills and employment prospects.

With greater access and connectivity from more remote upland areas to the markets in urban conurbations, the municipality works together with the 12 local barangay captains to co-ordinate development initiatives and educational programmes for maximum mutual impact.

Our meeting with Santa Teresa Barangay Captain Olavia was held in her offices next to the elementary school which had very recently been refurbished. As well as fresh paint, water storage and roofing upgrades, there is a new sanitation block which means that children no longer have to resort to open defecation and can wash hygienically after toilet use.

Ms Olavia explained that prior to 2016, the Barangay received annual RPT income not greater than PHP400,000. Since the reclassification of land at the solar power plant from agricultural to commercial use, RPT revenues have risen to approximately PHP6 million. During calendar year 2017, four quarterly payments were made to Barangay Santa Teresa by ISLASOL in the amounts of PHP336,791, PHP1,781,134, PHP2,797,360 and PHP1,494,080.

In addition to the refurbishment of the school, these funds have been used to improve street lighting, construct a fence around the barangay hall, build a BDRRMC office (Barangay Disaster Risk Reduction and Management Committee), refurbish the health and day care centres, construct a TANOD (police officer) outpost and purchase IT equipment and furniture.

A levy on the gross margin of the solar power plant paid directly to the barangay enables subsistence payments to be made to almost 200 households in the community, thus providing a direct boost to household incomes, which were then spent locally with high multiplier effect. Publicly available documents signed jointly by barangay Treasurer, Shery Rose A Peduque, and each individual recipient show that 197 such households are each in receipt of a net amount of PHP417.86. In 2017, funds were also spent on education and training with a specific emphasis on enhancing life skills. Consistent with the Western Visayas Sustainable Livelihood Programme (SLP), a Womens' Livelihood initiative has been put in place in the barangay, which involved the purchase of two sewing machines in a programme to develop employability and self-esteem, as well as to increase incomes and personal welfare.

As previously explained, macroeconomic analysis of the island economy is complicated both by the aggregation of provincial data into other Administrative Regions' overall reported numbers, and by resource constraints at the Philippine Statistics Authority. Fortunately, this does not mean there are no reliable data on key inputs into the socio-economic framework.

An excellent report entitled 'Negros Occidental Socio-Economic Profile and Trends' (NOSEPT) is produced annually but the entire data collection, reporting and publication task is the responsibility of just one person based in Bacolod City. The very latest version of NOSEPT covers data only up to the end of 2016 and is only thus far available in hard copy format.

Notwithstanding these difficulties, reported figures show a clear increase in the provision of education and health services across the province. The number of doctors rose 18 % in the four years to 2016, with a near 80 % increase in the number of nurses. By the end of 2016, the total number of healthcare professionals hit four-digits for the first time in the history of the province. In education, meantime, a further 136 elementary schools were built between 2012 and 2016 with 14 additional secondary schools opened.

Concurrent with the increase in teaching and healthcare professionals has been a very welcome decline in reported crime. Extrapolation from a relatively small time series is always to be treated with care, but a longer run of data is not available due to methodological changes in reporting. The numbers which are published, however, show that reported numbers for every major category of crime are down, with a near 50 % drop in the number of robberies and a 60 % decline in theft. As the mayor of San Carlos, Mr. Gerardo P. Valmayor Jr. told us, "When 1,800 labourers were onsite at the ThomasLloyd plant, the crime rate virtually fell to zero. Everyone was busy at work".

IMPACT RESULTS

PUBLIC SPENDINGS

Special Education Fund Tax (SET)

Local governments are given a special facility to finance education - known as the Special Education Fund Tax (SET) – which consists of an 1 % levy on the assessed value of real properties. From a zero base as recently as 2014, SET raised to more than PHP17 million in 2017.

Infrastructure spending

In 2017 alone, some 18 projects were undertaken at a total cost of almost PHP41 million. These comprised not only general improvement works, but specific new investments in the construction of a womens' crisis centre, a rural health unit, a youth development centre, school clinic and school library.

Direct spending

Direct spendings to the poorest of the poor are a way of injecting greater spending power in to the local economy.

Educational spending

The increased municipal budget finances employment training programmes and directly supports industries such as fishing, leading to a better skilled and more productive labour force.

HEALTH AND SCHOOLS

Medical personnel

The number of doctors rose 18 % in the four years to 2016, with a near 80 % increase in the number of nurses.

Schools

In education, meantime, a further 136 elementary schools were built between 2012 and 2016 with 14 additional secondary schools opened.

CRIME

Overall criminality fell by 48 % from 2014 to 2016. Reported numbers for every major category of crime are down, with a near 50 % drop in the number of robberies and a 60 % decline in theft.

Private Sector Socio-Economic Impact

As well as the meetings with municipal and barangay leaders, we were keen also to get a private sector perspective on the importance of stable and secure energy supply for local economic development. We were introduced to Blue Star Foods, a Manapla-based business run by General Manager Daniel Sison and Consultant Willard C. Gallo whose freshly-canned high quality crabmeat is sold 100 % on the export market.

Processed crab meat is the 4th largest seafood export in the Philippines. In 2015, 3.5 – 3.8 million kg of fresh crabs were caught in Negros according to the Philippine Association of Crab Processors Inc. (PACPI). The industry employs 400 – 500 in the peak season from August – October and around 100 – 150 through the rest of the year.

The Fishery Improvement Project (FIP) operates via a collaborative alliance of buyers, suppliers and producers with the aim of improving a fishery by reducing problems such as illegal fishing, bycatch and habitat impacts. PACPI has assumed responsibility for the implementation of this project in the Philippines and included in its objective is improving the Philippine blue swimming crab fishery. To meet the objectives, PACPI has focussed on stock enhancement (i.e. installing spawning cages which allow crabs to release their eggs before being processed), working with LGUs towards strict banning of the collection of juvenile crabs, information and education campaigns as well as supporting data collection for stock assessment.

The crab industry on Negros is a fascinating blend of decentralised independence and highly organised processing. It has both benefitted from and is dependent upon a stable and secure source of electricity, not just in canning and refrigeration at the factory but also at the very local level of 'picking stations' which require electricity for cooling and illumination to extend working hours beyond those of natural daylight.

Crabs are caught by local fishermen and the upscaling of the industry has seen the cost of primary inputs – live crab – rise from PHP30 per kilo a decade ago to around PHP230 today. Crabs for Blue Star are transferred to six picking stations, almost exclusively run by local women who sort and separate the crabmeat from shell and inedible waste. Previously, these stations might have been powered by expensive and polluting diesel generators but small businesses such as these now

IMPORTANT TO KNOW

Crab-picking station in Manapla

The crab industry on Negros is a fascinating blend of decentralised independence and highly organised processing. It has both benefitted from and is dependent upon a stable and secure source of electricity, not just in canning and refrigeration at the factory but also at the very local level of 'picking stations' which require electricity for cooling and illumination to extend working hours beyond those of natural daylight.

have access to stable and less costly electricity provided by local solar renewable energy. This has led to a significant increase in productivity as well as quality; thereby directly increasing incomes in a female-led industry.

Higher incomes at the smallest and most local level have many positive indirect effects too. We learned of a fall in crime rates (a phenomenon explicitly called out by the San Carlos City Mayor) and the beacon effect of encouraging other small-scale start-ups and the discipline of work itself. Growing businesses and incomes help break a previous cycle of destructive competition whilst the increase in economic activity has led to a fall in unemployment, most notably for the female population. At the processing plant, 95-98% of the employees are female and their salaries are set according to an agreed output-based formulation.

Diversification away from traditional sugarcane-based industries is a key part of the Negros Economic Development Plan. The example of Blue Star shows the importance of secure and stable electricity supply in a vertically-integrated industry which covers the entire supply chain. It benefits women, families and communities in an ecologically-sustainable manner and brings wider macro-economic gains in the form of export earnings and a smaller external balance of payments deficit.

Put together, the revenue and expenditure measures evidenced here paint a compelling picture of the social and economic impact of ThomasLloyd's investment in renewable energy in Negros Occidental. The impact is seen in both the public and private sectors, amongst men and women, and across all socio-economic groups. No-one has been excluded from the increases in welfare, prosperity and security.

IMPACT RESULTS

The importance of secure and stable electricity supply

The example of Blue Star shows the importance of secure and stable electricity supply in a vertically-integrated industry which covers the entire supply chain. It benefits women, families and communities in an ecologically-sustainable manner and brings wider macro-economic gains in the form of export earnings and a smaller external balance of payments deficit.

ECONOMIC IMPACT

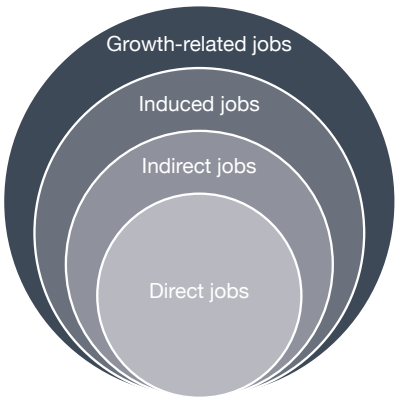
It is clear from all our conversations, meetings, investigations and follow-up correspondence that the island of Negros is in an exciting phase of economic transition. It is on the verge of a self-sustaining upturn fuelled in no small part by the investments which ThomasLloyd has made in the provision of renewable energy.

The evidence is unequivocal and the improvements are tangible. From a situation a little over five years ago when fragile power infrastructure left it vulnerable to frequent 'brownouts' and disruptions to energy supply, the island has become a net exporter of electricity around the midday solar peak.

The impact of investment in Manapla has been transformational at every level. From the poorest family in Barangay Santa Teresa to an export-focussed manufacturing plant at the heart of the town, the provision of reliable renewable energy and the subsequent increase in tax revenue has improved the quality of life and allowed companies and families to make plans for a better future.

The OECD/DAC (Organisation for Economic Co-operation and Development/Development Assistance Committee) defines impact as, "The positive and negative changes produced by a development intervention, directly or indirectly, intended or unintended. This involves the main impacts and effects resulting from the activity on the local social, economic, environmental and other development indicators".

The growth-related job effects on infrastructure investments are the largest and affect the overall economy



Source: http://siteresources.worldbank.org/CFPEXT/Resources/299947-1364681190360/IFC_Jobs_Report_Summary.pdf

Impact on direct and indirect employment

The evidence presented here shows an average of more than 400 local jobs were directly created in the construction phase of the solar plant in Manapla, the vast majority of which were labourers in the municipality and surrounding areas. Of course, the total project costs include imported raw materials: the solar panels, mounting systems, inverters, cables, wires etc. which all came from overseas manufacturers. This still leaves a significant amount paid directly in wages and employment taxes, however, and it is this which multiplies as it is spent in the local economy.

The World Bank's International Finance Corporation (IFC) notes there are two main categories of jobs created through infrastructure investments: Jobs associated with construction and maintenance and jobs associated with improved services and lower costs. Jobs in the first category can be direct, indirect, or induced. Construction and maintenance activities generate employment not only for those workers directly involved (direct effect), but also for the corresponding suppliers and distributors (indirect effect), and for the providers of goods and services that are consumed by the direct and indirect workers (induced effect). A study of a power transmission line that IFC financed in India, for example, showed that many more indirect and induced jobs were created than direct jobs.

In the second category of jobs, the IFC observes, "a reliable infrastructure has an even greater effect on employment, and this is often overlooked in studies and policy analyses. Access to power, information, and communications technologies, or improved transportation, can add significantly to job growth by allowing businesses to increase their output and hence create more jobs. This growth effect can be substantial. The IFC has estimated that electricity provided by the new power transmission lines in India generated a total of about 75,000 jobs from 2006 – 12, a much larger number than the direct creation of about 2,000 jobs associated with construction and maintenance of the lines".

The Regional Development Plan (RDP) for Western Visayas prioritises "supporting biomass power generation where marginal lands for feedstock and fuel wood production will

IMPACT RESULTS

IMPACT ON NEGROS' GDP

In 2017, Western Visayas' annual GDP stood at PHP658,002,816, of which an estimated 40 % or PHP263.2bn came from Negros Occidental. An RPT and SET tax-driven boost in aggregate demand of PHP750m per year plus a mid-range estimate of around 12,000 new jobs suggest the total impact of the ThomasLloyd investment in renewable energy could be to boost GDP in Negros Occidental by almost a full percentage point.

be optimised providing additional income to local communities and fueling the rural economy". For the biomass plant currently being built in Manapla, the employment impacts will be even more substantial than those in solar. Whilst the construction phase of the project creates up to 1,500 jobs, the operational requirement will be for around 165 employees in the plant and support functions and many hundreds more employed in the Fuel Supply Division (FSD) to provide the raw material around the clock and without interruption for the CFB boiler.

Even on a conservative estimate – significantly less than the evidence from the IFC survey – it is plausible to assume a five to ten-fold increase in local employment from all four types of jobs (direct, indirect, induced and growth-related) over the next five years in the Manapla region alone. Using approximate numbers, 90 operations staff in the biomass plant, 20 at the solar plant plus 35 in accounting/purchasing/HR and admin functions and one-third of 60 operations and management staff across the three Negros sites plus one-third of the 1,000 people in FSD gives a total of almost 500 direct jobs. Applying a multiplier of just five would give a total boost to employment in the region of more than 2,500 jobs when a 10 times multiplier would yield twice this amount.

Impact on municipal tax revenues

In addition to these jobs, we must also consider the impact of higher tax revenues on city and municipal spending programmes. Budgets have increased substantially in the last two years as a result of the huge jump in Real Property Tax and Special Education Tax which are directly and automatically linked to the reclassification of land at the power plants. Further payments to the barangay and municipality come from a direct levy on gross operating margins. For the first time ever, the proposed City Budget for San Carlos in financial year 2019 is over one billion pesos, albeit not all its RPT uplift comes from TLG plants. In La Carlota, the proportion of local compared to federal tax revenues is rising inexorably and on track to be greater than 50 % in five years' time. As we have shown in Manapla, RPT receipts in 2017 totalled PHP9,216,108; almost treble the corresponding figure the previous year and four times greater than in 2015. Indeed, RPT and SET revenues combined in 2017 totalled PHP31million; a 25 million peso increase on the figure just two years' earlier.

Audited Financial Statements from Manapla show projects initiated in 2017 at a total cost just over PHP40 million. Three quarters of the entire cost of these new infrastructure developments was covered by the increase in RPT and SET directly attributable to the solar power station. When the biomass plant is completed and grid-connected, these revenues are set to double to an annual amount in excess of PHP60 million. As the Mayor of La Carlota, Luis Jalandoni III, said, "The income stream from taxes provides certainty for future growth projects".

Even before the application of a local multiplier to reflect the second and third round effects of municipal infrastructure spending, PHP25 million per plant, per year represents a substantial boost to the local economy. As Blue Star Foods has stressed, the provision of secure and reliable renewable energy to the region in so many ways encourages business investment, boosts income, provides a safe and well-lit environment, empowers women and offers sustainable development for the local fishing industry. The solar and biomass plants together will bring annual tax revenue of PHP50 million into the municipality. As the whole of this is re-invested in infrastructure projects which require local labour, a five-times multiplier would suggest a total demand injection around PHP250 million.

Of course, Manapla represents only one-third of ThomasLloyd's investment in renewable energy in Negros. The direct and indirect boosts to employment, spending and household incomes should be mapped straight across to the other two areas in the group's project portfolio. On the most conservative estimates, more than 7,500 new jobs in total will have been created, whilst a higher multiplier could double this total, with substantial numbers of other jobs supported and sustained. Together with a boost to demand in the three locations amounting to more than PHP750 million per annum once city and municipal tax-driven spending projects multiply and spread through the local economies, the investment-driven boost is an ongoing legacy of the renewable energy projects.

IMPACT RESULTS

DIRECT EMPLOYMENT

Manapla biomass plant

- Construction phase **1,500 jobs**
- Operational phase **165 jobs**

Manapla solar plant

- Construction phase **400 jobs**

INDIRECT EMPLOYMENT

all biomass plants

- More than **7,500 jobs**

ENVIRONMENTAL IMPACT

As for the environmental impact of the solar and biomass power plants, there is widespread recognition across South East Asia of the need for action to reduce greenhouse gas (GHG) emissions. The Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) reports that in the last 60 years, the maximum daytime and minimum night time temperatures have increased by 0.4 and 1.0 degree respectively. PAGASA analysis also shows that in the Visayas areas, the tropical cyclone passage increased slightly during the 1971 to 2000 period compared with the 1951 – 80 and 1960 – 90 periods.

The Philippines is vulnerable to climate change, given the heavy economic reliance on agriculture and natural resources. It already faces climate extremes every year, particularly floods and tropical cyclones, climatic impacts which can severely threaten the livelihoods of poor people living in rural areas with limited adaptive capacity.

The electricity produced by the five Thomas-Lloyd solar plants already reaches 462,000 people, with an overall CO_2 reduction of 155,040 tonnes per annum. The electricity produced by the three biomass plants will reach 742,000 people, with an overall CO_2 reduction of 57,680 tonnes per annum. According to the US Environmental Protection Agency (EPA), this total CO_2 reduction is roughly equivalent to the amount sequestered by 250,355 acres of mature forest or 3,517,370 tree seedlings grown for 10 years.

CO_2 PRODUCTION, MITIGATION AND OFFSET

Carbon sequestered by

3,517,370
tree seedlings grown for 10 years

250,355
acres of forests in one year

1,726
acres of forests preserved from conversion to cropland in one year

Greenhouse gas emissions from

45,163
passenger vehicles driven for one year

520,097,800
miles driven by an average passenger vehicle

74,196
tons of waste recycled instead of landfilled

CO_2 emissions from

23,936,086
gallons of gasoline consumed

232,551,021
pounds of coal burned

2,816
tanker trucks´ worth of gasoline

Source: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS AND ACTIONS TAKEN BY THOMASLLOYD

Seventeen Sustainable Development Goals (SDGs) were introduced at the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012. The objective was to produce a set of universal goals that met the urgent environmental, political and economic challenges facing the world.

The SDGs replace the Millennium Development Goals (MDGs), which catalysed a global effort in 2000 to tackle the indignity of poverty. The MDGs established measurable, universally-agreed objectives for tackling extreme poverty and hunger, preventing deadly diseases, and expanding primary education to all children, among other development priorities.

- At least 80 % of workers on site are locals.
- Taxes paid by TLG help local cities and poorest workers (measured by power usage).
- TLG buys trash from farmers, providing them with further revenue streams.
- TLG Charitable Foundation provided remote areas with access to electricity.

- Encouraging farmers / students to plant new crops. Cities are providing aid with RPT revenue received.
- Unemployment decreased in Manapla, San Carlos and La Carlota due to jobs created by TLG.
- Reliable energy is essential for the agriculture industry.

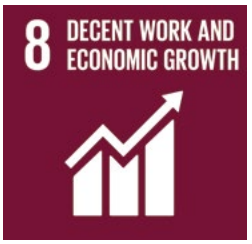
- TLG are building 45 houses for workers in Manapla with all amenities.
- 24 hour clinic on biomass project sites.
- Governor Maranon said 40 % of their budget is now invested in the health program.
- The plants provide residents with clean energy, reducing air pollution.

- Schools / roads / sanitation facilities built and improved with revenue received from RPT & SET, allowing more children access to education.
- Increased number of scholarships made available to students from elementary to university level, partly through revenue received from TLG.

- In all its operations globally and locally in the Philippines, TLG ensures that women have the same access to leadership positions as men.
- At the Blue Star processing factory, 98% of the employees are women, whilst the independent crab-pickers provide female employment and empowerment.

Barangay Santa Teresa: Improved sanitation by setting up toilets which were non-existent before TLG's arrival.

- TLG produces clean, renewable energy.
- Number of households with access to electricity increased substantially since the arrival of TLG.
- Taxes paid by TLG provide poorest households with power.



- At peak times, 1,800 employees on each biomass site.
- San Carlos 2019 budget is circa PHP 1 billion, partly due to an increase in RPT.
- In 5 years' time, La Carlotta will no longer be majority-dependent on national government for its income.

The UN describes the 17 Goals as “a bold commitment to finish what we started, and tackle some of the more pressing challenges facing the world today”. The Global Impact Investing Network (GIIN) 2017 survey reported that 60% of impact investors actively track or plan to track the performance of their investments with respect to the SGD’s and MSCI’s investor survey notes that SGD’s are clearly emerging as the dominant framework around which to invest for impact. We highlight below how ThomasLloyd’s investments in renewable energy map across to the UN’s development agenda.

- There was a rise in the overall power in the Philippines from 22MW in 2014 to 800MW in 2016.
- Negros has been identified as the biofuel centre of the Philippines.

- Proceeds from TLG used to build up / connect furthest Barangays – improve lives of all residents.
- More opportunities available for women – i.e. blue crab industry.
- Jobs in the biomass plants are advertised all over Negros Island, providing all residents with the same opportunities.

- Biomass plants will contribute to the island becoming sustainable in terms of electricity.
- RPT revenue has allowed cities to grow, increasing their urban populations.

- Our motivation is to combine ecology and economy in every project, in every investment product and more generally as the basis of our business.

- Our renewable energy plants offer the island an alternative to coal fired power stations.
- The extra power provided enables the island to deal more efficiently with the consequences of natural disasters.

- Thanks to RPT revenues, municipalities are giving fishermen boats, nets etc. to improve their livelihoods.
- Increasing investment in the Blue Crab industry and the implementation / enforcement of the Fishery Improvement Project.
- All TLG power plants lead to a substantial CO_2 reduction, minimising the effects on oceans.

- TLG buys and collects sugarcane trash from farmers, preventing this from being burned which can create pollution related problems (it is currently illegal to burn trash).
- Sustainable energy is crucial for ecosystems.

The drastic increase in employment (in biomass plants) has resulted in record low crime rates, specifically in San Carlos.

- ThomasLloyd is a member of the United Nations Environment Program Finance Initiative, a signatory of the United Nations Global Compact and is GIIN member.

Camaniangan Elementary School

THOMASLLOYD FOUNDATION

As well as its considerable direct investments on the island of Negros which make it one of the biggest overseas providers of capital, ThomasLloyd has further increased its corporate and social responsibility activities under the banner of the ThomasLloyd Foundation. This is a charitable venture which is active in two areas which best correspond to local requirements – electrification of social infrastructure and emergency relief activities.

The foundation is dedicated to the initiation and realisation of concrete “off-grid solutions” in remote and underdeveloped districts, which are not likely to be connected to the electricity grid in the foreseeable future, and which without the off-grid solution would therefore be permanently cut off from the benefits of social institutions dependent on electricity (e.g. health centres, clinics and modern educational establishments).

The foundation is committed to emergency relief activities, which may include providing direct funding and suitable materials or equipment quickly and without ‘red tape’ in areas hit by natural disasters, as well as continuous support for regional aid organisations and projects that are dedicated to providing assistance to particular social groups

Camaniangan Elementary School

One example of a charitable project is the Camaniangan Elementary School, situated in the highlands near the SaCaSol solar power plant and the biomass power plant in San Carlos. The school had no electricity supply and teaching without light was particularly difficult on cloudy and dark days during the rainy period. A decentralised solar system was constructed, so as to supply dependable power in an environmentally friendly way.

ThomasLloyd began the project by organising a donation of solar modules from Conergy, the supplier of the modules for its solar power plants. As it progressed, ThomasLloyd provided capital for all the other construction material and technical components, the engineering know-how and the necessary labour. After just a few months it was officially inaugurated by the mayor, the vice-governor and high-ranking representatives of the education ministry.

The new electricity supply enables the school to make use of modern teaching equipment. Teachers apply the pedagogical benefits of computers in lessons and big batteries give pupils the opportunity to charge specially provided lamps or mobile phones during class time and take the fully charged devices home with them when school has finished for the day. The villagers are willing to pay a small contribution for the service, which is used to maintain the new technical equipment.

IMPORTANT TO KNOW

Helping hands

“For us, holistic conduct is about assuming responsibility. And that includes responsibility for the people who make it possible for us to realise our infrastructure projects in the first place – as our employees, suppliers for our biomass power plants, and partners. We therefore provide assistance wherever a helping hand is needed.”

T.U. Michael Sieg
Chairman, CEO & Founder

Health Center of Sitio Bais

Health Center of Sitio Bais

Another example of the off-grid electrification projects run by the ThomasLloyd Foundation is the Health Centre in Sitio Bais. The remote village is situated in the district of Yubo, around 18 kilometres from La Carlota City – the site of the ThomasLloyd biomass power plant South Negros BioPower that is currently under construction. During the rainy season, this can only be reached by heavy four-wheel drive vehicles. Most of the inhabitants work in agriculture, primarily farming bananas and making charcoal. The average income is below the poverty line, so children and teenagers are also called on to work in the fields, which means they do not get an adequate school education.

The existing local health centre responsible for 150 families had no electricity and no regularly present medical staff. With no access to refrigerated medicines, vaccines or diagnostic devices, the people of the village had to embark on an arduous journey by foot across mountainous tropical terrain to La Carlota City, 18 kilometres away, to visit the doctor.

ThomasLloyd set itself the goal of bringing electricity to this off-grid health centre and in April 2018 it reopened with new solar power sourced from a photovoltaic system installed by the Foundation and featuring a capacity of 6 kilowatts. That is sufficient both to power operations at the health centre and to charge the smartphones and battery-powered lights which ThomasLloyd has provided to the village's residents, who don't have electricity – or light – at home.

The planned electrification of the health centre also catalysed the involvement of the provincial government and the Philippine Department of Health, who are now providing the staff who are regularly on shift at the centre.

This project demonstrates ThomasLloyd's commitment to assisting with the establishment of elementary living conditions and to support lasting social progress above and beyond its infrastructure projects. The health centre showcases the ThomasLloyd Foundation's strategy of furthering social and ecological progress with off-grid solutions in remote and underdeveloped districts close to its infrastructure projects, where there is little likelihood of being connected to the commercial electricity grid in the foreseeable future.

MORE INFORMATION

Energy for Learning

Health Center of Sitio Bais

CONCLUSION

Negros Occidental has a mission to become the food basket of the Philippines and the organic capital of South East Asia.

To do this requires not only the skill and commitment of its visionary civic and provincial leaders, but a secure, reliable and sustainable source of green energy.

Reliance on fossil fuels or expensive, imported oil-based raw materials is a policy of the past and incompatible with the island's stated future ambitions.

The right kind of economic growth – building safe and secure communities, enhancing human capital, growing businesses whilst preserving traditional values – requires the right kind of energy:

Renewable, sustainable and local.

The solar and biomass plants financed and developed by ThomasLloyd form an integral part of the new Negros story.

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Memberships and
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