Independent power producer ipp engineering essay

Engineering



A National Grid system is an interconnected network of a country where there are delivering of electricity from a producer (public or private firm) to consumers. This may result by a system thereby the connexion and supplier can be on High-voltage or Low-voltage network.

Independent Power Producer (IPP)

An Independent Power Producer is not a public electric service. They have their own installations and technologies to generate effectively electricity and to sell it to the government's buyer (CEB). The Central Electricity Board (CEB) has contractual engagements with seven Independent Power producers, mainly with sugar manufacturers, to allow them to export electricity on the network of the CEB. It includes some specific conditions resulting to the benefits of those IPPs and prosperity of the Mauritius economy. Thus the contract is known as the ''Power Purchase Agreement'' (PPA).

Independent Power Producers across the island :

Compagnie Thermique de Belle Vue- Terragen Ltd ; PPA signed on the June of 1988 and commissioned on June 2000Omnicane- Compagnie Thermique du Sud (CTDS) : Union St Aubin ; PPA signed on the October 2003 and Commissioned on September 2005Omnicane- Compagnie Thermique de Savannah ; PPA signed on the February 2005 and Commissioned on August 2007Consolidated Energy Limited (CEL); PPA signed on the August 1997 and Commissioned on April 1998Steam and Power Generation Company Limited-Flacq United Estate Limited- (F. U. E. L); PPA signed on August 1997Sotravic Ltd; PPA signed on July 2011

Emerging power producer :

7) CT Power Ltd; PPA signed on the December 2008

Compagnie Thermique de Belle Vue

The thermal power plant is situated in the North of the Island, precisely at Belle-Vue, Mapou. The plant has a installation of 2 x 35 MW thermal power plant which are owned and managed by the Terragen Ltd. They produce yearly approximately 350 GWh of electricity from bagasse and coal. Thus, 15% is then contributed to the national electricity consumption.

Moreover, electricity is produced from bagasse during the cane harvest season, July to December, and coal mainly during the intercrop season.

The plant has been commissioned in 2000 through the Power Purchase Agreement(PPA) signed with the local utility company, the Central Electricity bord, for a period of 25 years.

Omnicane

Omnicane has two power plants; namely

Compagnie Thermique de Savannah (CTSav) and Compagnie Thermique du Sud situated respectively near L'Escalier and St-Aubin.

Compagnie Thermique Savannah

CTSAV power station has a total installed capacity of 2x45 MW. It became operational in 2007 and use bagasse and coal respectively during harvest and intercrop seasons. It is known that the plant is to be one of the largest coal/bagasse cogeneration in the world. On the national grid, they export 65. 5 MW from bagasse burning and 74 MW from coal burning.

Compagnie Thermique du Sud

CTDS power started to operate in 2005 and work exclusively with coal. It has an installation capacity of 34. 5 MW and produces effectively about 30 MW. CTSAV export 18. 95% of electricity on the grid, giving itself the entire majority on the other IPPs in terms of production of electricity on the island, along with CTDS which contribute to 9. 36% giving a total of 28. 31%.

Sotravic Ltd

Unique in Mauritius, where gas collected from natural and simply processes is converted into energy by means of electrical generators. The Landfill Gas is situated at Mare Chicose, and produce approximately 50% of Methane gas and which obviously means an important source and clean energy. Sotravic actually can generate about 2 MW from the methane collected, and may increase his producing to 3 MW according to the availability of landfill gas and the company has plan to generate about 110 million KWh for the next five years. This may result to less dependency on import fossil fuels from abroad and concerning the environment, it reduces the cost to encounter the release of methane onto the environment.

Consolidated Energy Co. Limited (CEL)

In the east of the island near the sugar mill of Deep River-Beau Champ, is found the power plant of Consolidated Energy Co. Ltd (CEL). It operates with a capacity of 25MW where its production of electricity is exported to the grid. The biomass that they used as fuel are mainly from bagasse during harvest period and coal that when are burnt through the year may result to a generation of 160 GWh of electricity, and where 50 GWh may goes for the factory processing demand and the remaining 110 GWh are for the national grid.

Steam and Power Generation Company Limited (FSPG)

F. U. E. L ; Power Generation Company Limited (FSPG) produces yearly about 224. 5 GWh where 165. 5 GWh are exported to our local grid and 29. 5GWh are supplied to the FUEL refinery. It generates over a year about 55. 7 GWh from bagasse and 109. 5 GWh form coal energy which was exported to the national grid.

Overview :

Power plants of Belle-Vue (CTBV), Beau Champ (CEL), FUEL (FSPG), Omnicane (CTSAV& CTDS) and Landfill gas station:

Power Plant

Installed capacity(MW)

Effective capacity(MW)

Compagnie Thermique de Savannah90. 090. 0Compagnie Thermique deBelle-vue71. 262. 0F. U. E. L36. 733. 0Compagnie Thermique duSud32. 530. 0Consolidated EnergyLimited28. 425. 5The bagasse which is normally known as waste that caused pollution is recognised as a source of energy that can be converted now into electricity and in the other hand, the low steam pressure which is produced power plants, are being sent to the factory for its requirement for sugar manufacturing process. They produce electricity throughout the year: during harvest season, bagasse are use during harvest season and coal in fact are burnt during the intercrop period. For over 20 years, those power plants have in a permanent way invested widely in order to maximising the use of residual bagasse from a more performance technology.

The table below shows the contribution of Bagasse to our country as an important source of energy

Energy from Bagasse on

the Grid

Year

2002200320042005200620072008200920102011

MW

171. 1176. 2191. 0185. 0182. 6302. 8346. 7313. 6308. 0332. 0

%

8. 88. 58. 88. 17. 812. 313. 612. 211. 512. 2

Percentage share electricity of Mauritius Island

The existing bagasse/coal power plants export electricity to the CEB network

and contribute up to 60% of national electricity needs.

Page 7

Power

Producer

Year

- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011

CEB %

50. 854. 556. 653. 247. 140. 736. 841. 840. 941. 4

IPP %

49. 245. 543. 446. 652. 959. 363. 258. 259. 158. 6

Page 8

Generation of electrity of Mauritius

Power producer

Year

2002

2003

2004

2005

2006

2007

2008

2009

2010

2011

CEB(GWh)968. 41110. 911198. 11179. 51079. 5972. 39111045. 51066. 71096. 4IPPexport to CEB(GWh)746. 7729. 4725. 1835. 41015. 71226. 71365. 11228. 61309. 41336. 7C: Userse5420Desktopstatsmauritius. gov. mu-English-StatsbySubj-Pages-DigestEnergy. pdf. jpegThose figures above show how IPPs have enhanced their activities in terms of production of electricity on our national grid compared to CEB production. It is obvious that IPP with time have contributed widely efficiently for the country mainly by ; Contributing to our economic growthReducing our dependency on import energy sources (Diesel, Kerosene& Fuel Oil)Meet the energy demand of different sectors of the Island (Tourism, Textile etc...)

CT Power Ltd

The Power Purchase Agreement has engaged CEB and the company CT Power Ltd to a project that will support the country's economic development and provide energy security. The CEB will share 26% in this project of 2015/2016. This will in order meet the growing demand of energy, a proposal was made to the Government of Mauritius to build and operate a coal power station of 3 X 50 MW to be located at Point-aux- Caves, Albion. But considering some facts, the CEB's has now opted to a installation capacity of 2×55 MW. The power plant shall be having an economic life of about 40 years based on the class of equipment technology that is being specified the guiding principles of this plan are that it will be of ''competitive benefits for the organization of the country and electricity will be obtained at the lowest cost as possible''.

Share of electricity from mix energy sources

Fuel Source

2010201520202025

Bagasse

16%13%14%17%

cCoal

43%45%44%40%

Advantage of IPP throughout the Island

Economically and socially; Are cost effective in meeting local or

regionalelectric system reinforcement requirements as they well spread

https://assignbuster.com/independent-power-producer-ipp-engineeringessay/ around the island , they effectively supply to different sectors in the islandProvide sufficient social and environmentalbenefits; that is creating job facilities and reducing considerably the cost on pollution mitigation. Diversification prospects; that is reducing massively the island depency on non-renewable fuel which are imported

Small-scale distributed generation (SSDG)

The project has been launched in the December 2010, where Small Independent Power Producers (SIPPs) are given the chance to generate their own electricity and export any surplus to the grid. Renewable sources that are used: PhotovoltaicWindHydroThe SSDG Project started with an opening of a total capacity of 2 MW which is about 200 small power producers, and is mainly connected on the CEB Low Voltage Network (LV). But the total capacity has been extended to 3 MW in December 2011 as number of applicants have been increases and energy demand also. SSDG can be classified in three categories ; Micro-producer; Up to 2. 5 kWMini-producer; 2. 5 kW to 10 kWSmall-producer; 10 kW to 50kW

Medium-Scale Distributed Generation (MSDG)

Some interest have been shown by larger electricity consumers and promoters to be involved in renewable energy producing of a capacity higher than 50 kW but below the 4 MW. Thus, it will be mainly connected on the Medium Voltage (MV) level. Example of a MSDG producer ; is the Mauritius Commercial Bank (MCB) building at Trianon, using photovoltaic technology.

SSDG & MSDG Grid Code:

There is a Grid code, thereby SSDG and MSDG have to abide imperatively before they were connected to the national grid. A grid code allows for the integration of renewable energy generating technologies on the low voltage (230/410V) and medium voltage grid. It is a set of rules and it often determines the amount of electricity that is sent to connect to a power grid. For safety issues, it prevents potential outages and surges, and safe intervention on the CEB Network. It also controls the fluctuation on the networks as sometimes they may produce low or high current depending on the availability of the energy sources. The premise behind a grid code is to establish restrictions on how, when and where electricity gets distributed and it also implement the tariffs of production which are exported to the CEB network.

Purpose of SSDG and MSDG:

The implementation of SSDG and MSDG is to cope with energy demand and promote the use of green technology. It also involved the reduction of dependency on fossil fuels and by the same way mitigating our release of pollutants in the environment. Furthermore, this lead to democratization of Power Grid system.