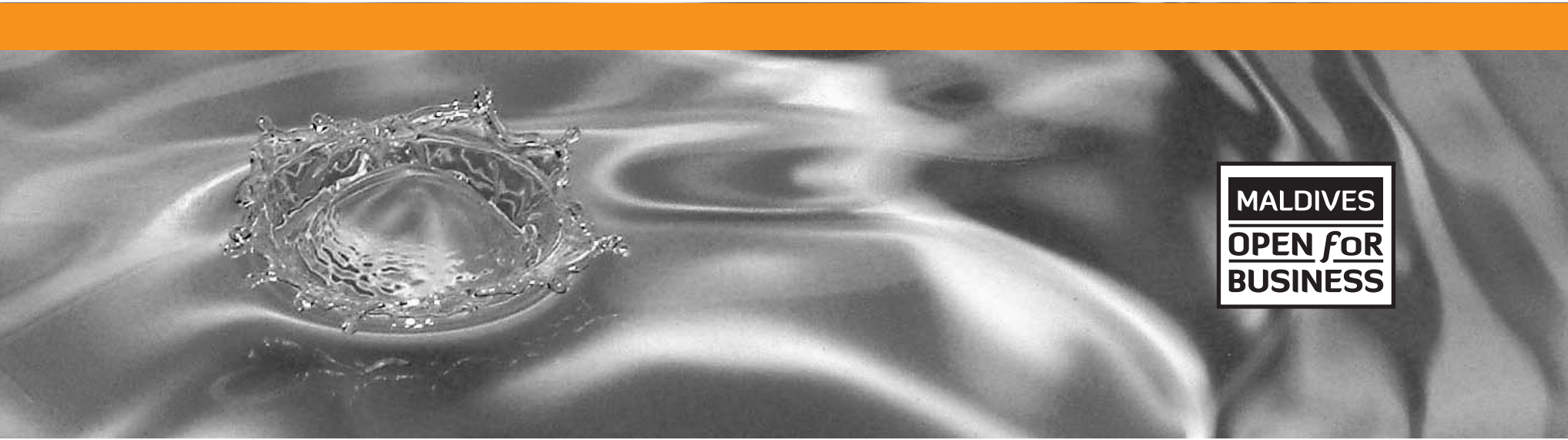


INVESTMENT OPPORTUNITIES

Utilities Sector



MALDIVES
OPEN *for*
BUSINESS







ELECTRICITY SECTOR

Introduction

Electricity is provided in the islands of the Maldives through small diesel generators. The country has been limited in that it has no conventional energy resources that it can utilize to meet its energy needs.

Although the country is expected to continue to rely on imported fuels for most of its energy needs, renewable energy (RE) resources such as solar, wind, biomass and biogas are recognized as potential energy alternatives.



Several renewable energy related activities have been initiated in the last few years to promote the use of renewable energy technology in the country. These include RE resource assessment, energy policy formulation including incentives for RE and development of pilot systems on solar-diesel hybrid for electrification.

A few islands have seen renewable energy hybrid projects implemented as pilot projects.

These include the solar-diesel hybrid system at A.Dh. Mandhoo, and solar-wind-diesel hybrid systems at R. Fainu and B. Goidhoo. In addition to these, solar-wind-diesel hybrid system have been installed in H.A. Uligum, M. Raimandhoo and G.A. Kondey by Maldive Gas Private Limited.



Background

Each island of the Maldives has a separate electricity generation and distribution system providing services to its residents. The electricity generation is based on diesel fuel engines and is distributed by underground cables. Each of the customers has a dedicated service cable with consumption meters at the customer's residence.

In general, the power supply systems in most of the islands have been developed on an adhoc basis by the island communities. These have resulted in an unreliable supply, low efficiency, and high costs. In most islands the powerhouse is also situated in the middle of the island just a few meters away from residential areas causing discomfort and exposing the island communities to major health risks.

In addition to these issues, the lack of power system management skills, specialized utility financial management and professional engineering skills for planning, design, construction supervision, and operation and maintenance have been one of the major obstacles to developing sustainable power supply systems in the islands.

Electricity is provided by through four different sources. These are the State Electric Company (STELCO), Non Government Organizations (NGOs), Island Development Committees (IDCs) and private individuals. STELCO is presently providing electricity to some 28 island out of 199 inhabited islands in the country. This includes the Male' urban region and other islands based on geographic region. Most inhabited islands have their own IDCs or private individuals to provide electricity to the local community from fuel-driven generators. Most of these are 24-hour operations while others supply electricity only for limited hours at night.

Upper North Region (HA, HDh & Sh)

Figure 1 below shows installed capacity, operational capacity, maximum demand and minimum demand for each island. The scale for installed and operational capacities is limited to 1,000 kW.

- Total number of inhabited islands : 44 (All islands have 24 hour Electricity)
- Total population : 58,906
- Total installed capacity : 12,516 kW
- Total number of Customers: 10,597
- Source of electricity generation: Diesel Generators
- Islands with renewable energy: HA. Uligamu (solar-wind-hybrid system, 96kW)
- Islands with STELCO power house: 6
- Islands with IDC power house: 34
- Islands with private / NGO power house: 4

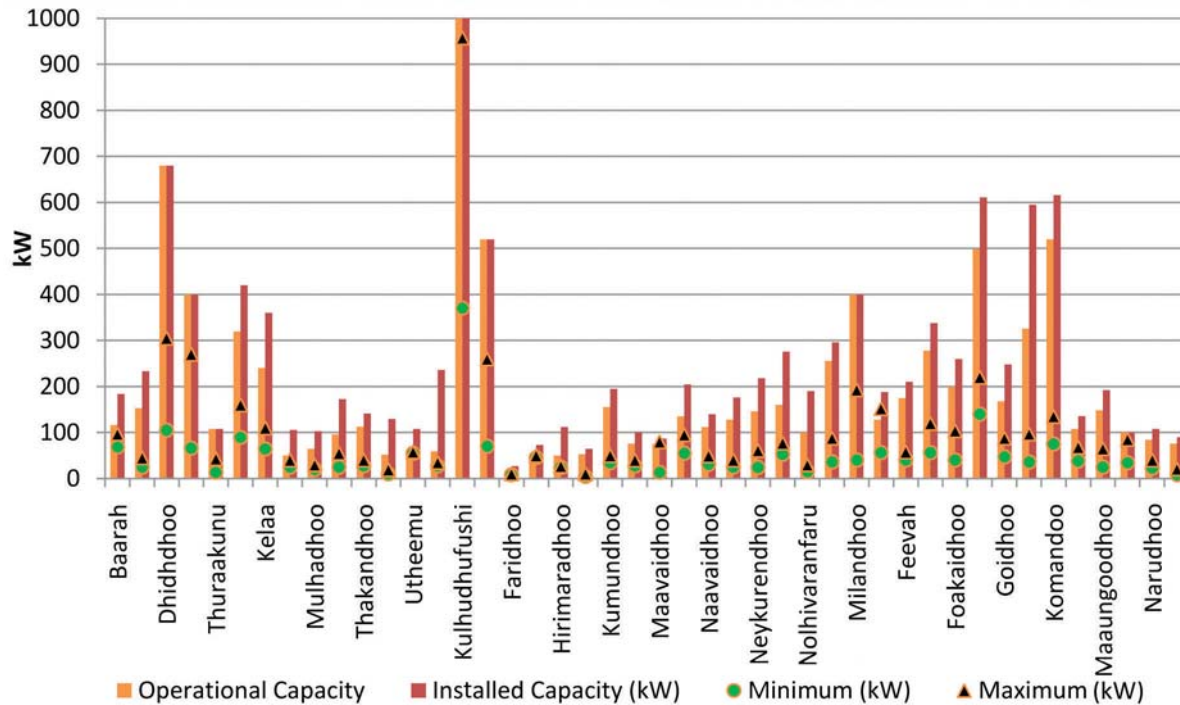


Figure 1: Operational and Installed Capacity at each Island of the region with Maximum and Minimum Demand.

North (N, R, B & Lh)

Figure 2 below shows installed capacity, operational capacity, maximum and minimum demand for each island.

- Total number of inhabited islands : 46 (All islands have 24 hour Electricity)
- Total population : 58557
- Total installed capacity : 14502 kW
- Total number of Customers: 10363
- Source of electricity generation: Diesel Generators
- Islands with renewable energy: R.Fainu & B.Goidhoo (Solar-Wind-Diesel hybrid systems, 17 kW)
- Islands with STELCO Power house: 6
- Islands with IDC power house: 37
- Islands with private / NGO power house: 3

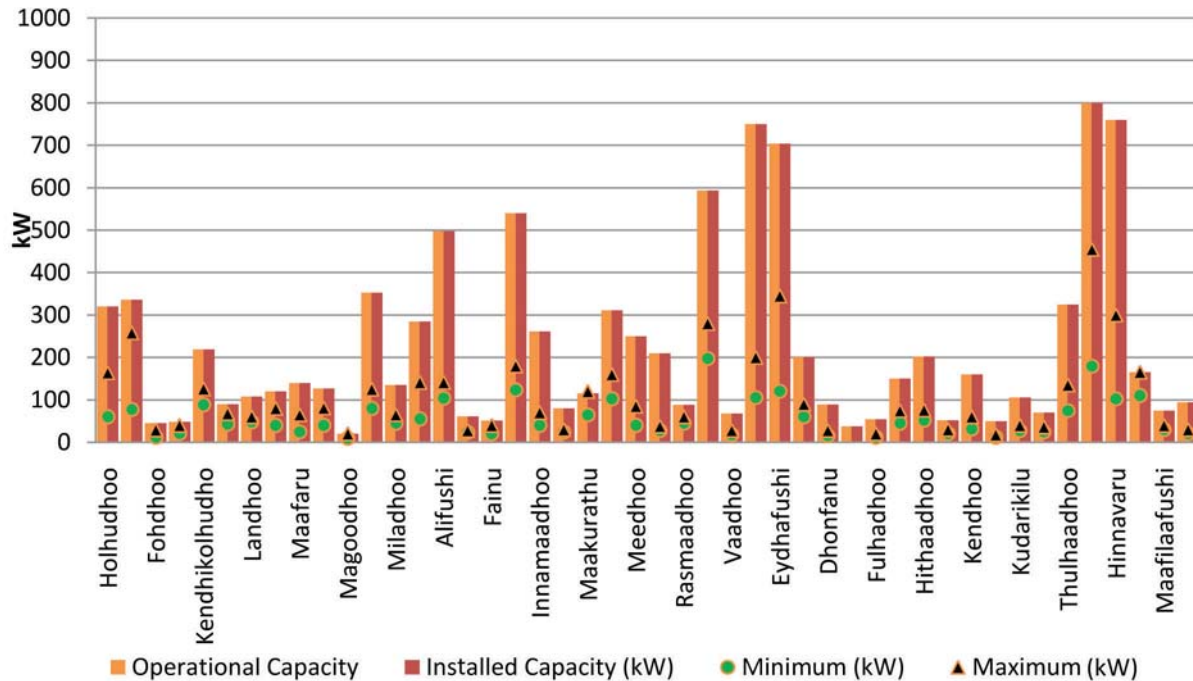


Figure 2: Operational and Installed Capacity at each Island of the region with Maximum and Minimum Demand.

North Central (K, AA, ADh, V)

Figure 3 below shows installed capacity, operational capacity, maximum and minimum demand for each island of the region. The scale for installed and operational capacities is limited to 1,000 kW.

- Total number of inhabited islands : 35 (All islands have 24 hour Electricity)
- Total population : 152477
- Total installed capacity : 54666.7 kW
- Total number of Customers: 32062
- Source of electricity generation: Diesel Generators
- Islands with renewable energy: ADh. Mandhoo (Solar-Diesel hybrid system, 12 kW)
- Islands with STELCO Power house: 9
- Islands with IDC power house: 24
- Islands with private / NGO power house: 2

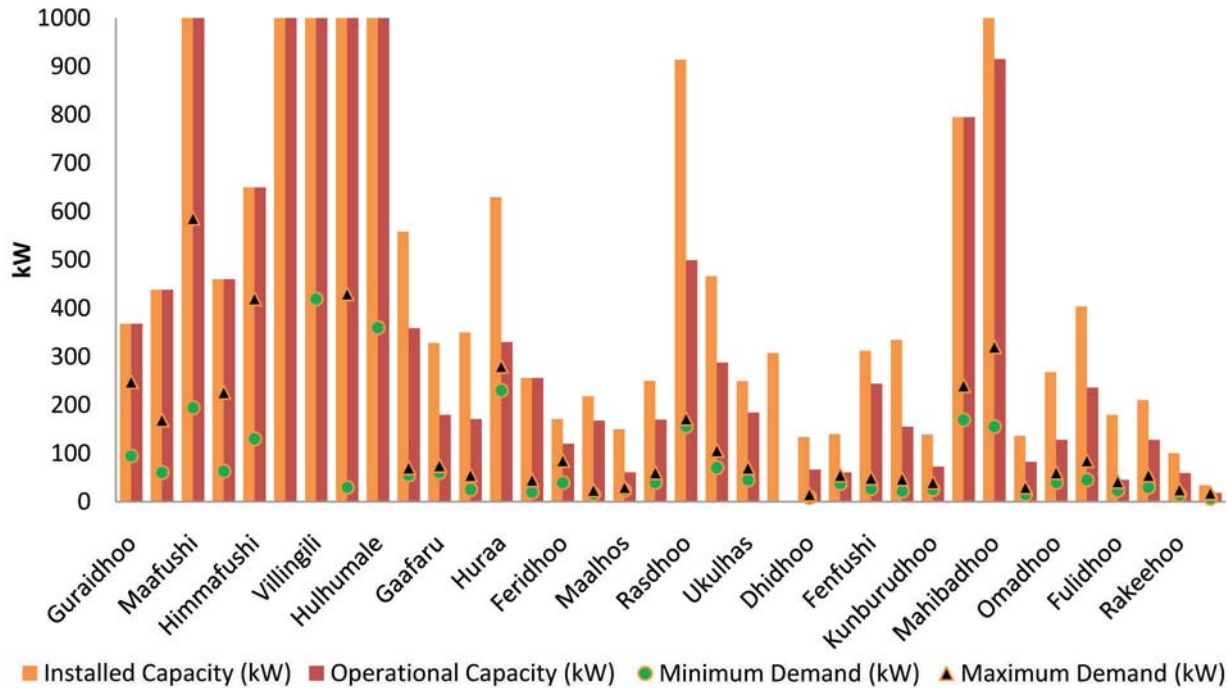


Figure 3:
Operational and Installed Capacity at each Island of the region with Maximum and Minimum Demand

Central (M, F, Dh)

Figure 4 below shows Installed capacity, operational capacity, maximum and minimum demand for each island of the region.

- Total number of inhabited islands : 20 (All islands have 24 hour Electricity)
- Total population : 18257
- Total installed capacity : 6107.8 kW
- Total number of Customers: 3518
- Source of electricity generation: Diesel Generators
- Islands with renewable energy: M. Raimandhoo (Solar-Wind-Diesel hybrid system, 96 k)
- Islands with STELCO Power house: 1
- Islands with IDC power house: 19
- Islands with private / NGO power house: N/A

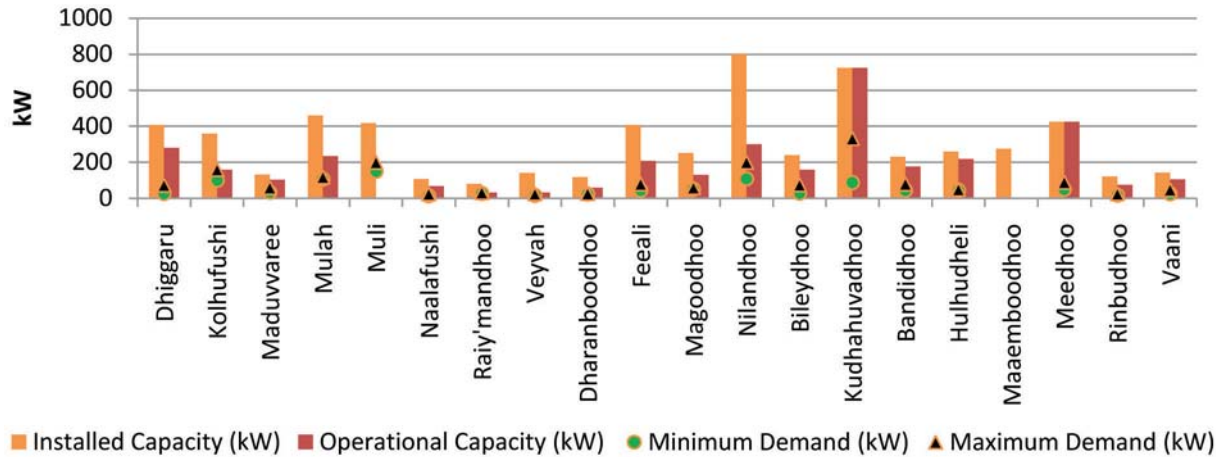


Figure 4: Operational and Installed Capacity at each Island of the region with Maximum and Minimum Demand

South Central (Th, L)

Figure 5 below shows Installed capacity, operational capacity, maximum and minimum demand for each island of the region. The scale for installed and operational capacities is limited to 1,000 kW.

- Total number of inhabited islands : 25 (All islands have 24 hour Electricity)
- Total population : 29245
- Total installed capacity : 7477.2 kW
- Total number of Customers: 4664
- Source of electricity generation: Diesel Generators
- Islands with renewable energy: N/A
- Islands with STELCO Power house: N/A
- Islands with IDC power house: 25
- Islands with private / NGO power house: N/A

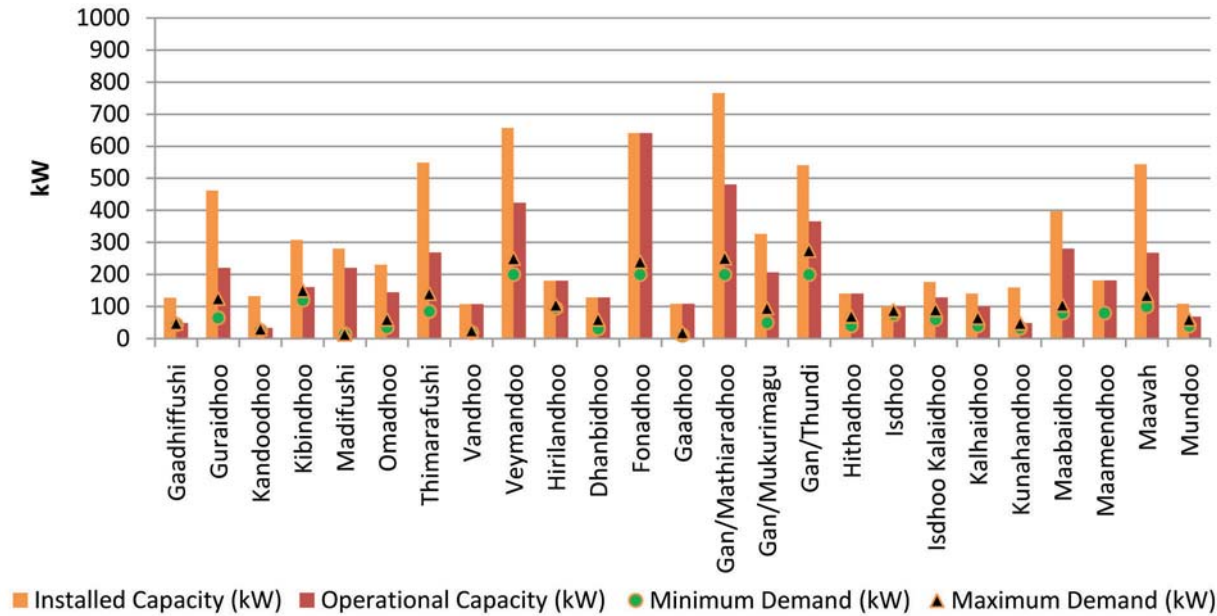


Figure 5:
Operational and Installed Capacity
at each Island of the region with
Maximum and Minimum Demand

Upper South (GA, GDh)

Figure 6 shows installed and operational capacity with the maximum and the minimum demand at each island of the region. The scale for installed and operational capacities is limited to 1,000 kW.

- Total number of inhabited islands : 19 (All islands have 24 hour Electricity)
- Total population : 31417
- Total installed capacity : 7109.3 kW
- Total number of Customers: 4968
- Source of electricity generation: Diesel Generators
- Islands with renewable energy: N/A
- Islands with STELCO Power house: 3
- Islands with IDC power house: 16
- Islands with private / NGO power house: N/A

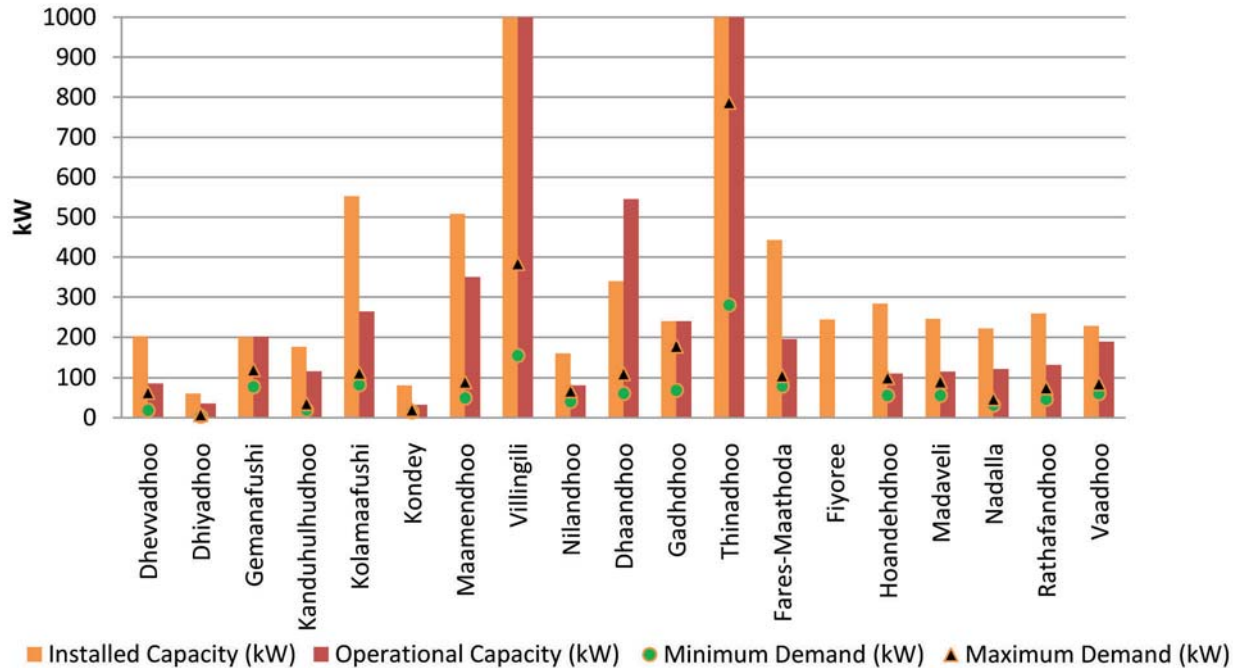


Figure 6:
Operational and Installed Capacity
at each Island of the region with
Maximum and Minimum Demand

South (S, Gn)

Figure 7 shows installed and operational capacity with the maximum and the minimum demand at each island of the region.

- Total number of inhabited islands : 7 (All islands have 24 hour Electricity)
- Total population : 40927
- Total installed capacity : 6925 kW
- Total number of Customers: 6801
- Source of electricity generation: Diesel Generators
- Islands with renewable energy: N/A
- Islands with STELCO Power house: 3
- Islands with IDC power house: N/A
- Islands with private / NGO power house: N/A

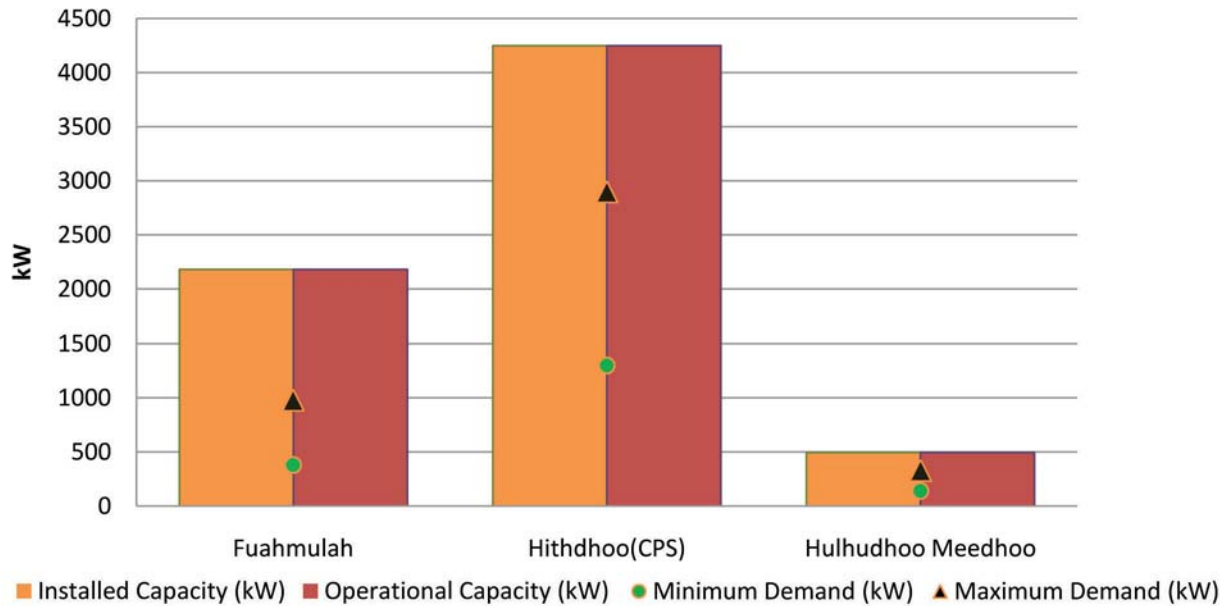


Figure 7:
Operational and Installed Capacity at each Island of the region with Maximum and Minimum Demand

Population, Expected Demand, and Expected Annual Sales

Municipal Zone	Population	Expected Demand (MW)	Expected Annual Sales (MWh)
Upper North Province	58279	100	400,000
North	53846	100	400,000
Male' (North Central)	26076	250	1,300,000
Central	20720	120	525,000
South Central	28059	N/A	N/A
South	31643	110	450,000
Upper South	35230	150	700,000
National Total	253853	830	3,775,000





WATER AND SEWERAGE SERVICES IN THE MALDIVES

The majority of island communities depend on rainwater as their primary potable water supply and the groundwater from individual or communal wells for non-potable purposes.

Dealing with wastewater is, in most cases, the responsibility of house owners by using onsite septic tanks that discharge into the underlying ground water. Basic, municipal, small-bore piped collection systems have been constructed on a number of islands, these dispose of untreated wastewater via multiple outfalls to the surrounding near shore marine environment.

Male', the urban centre, has full coverage of a piped water supply and sewerage systems. Male', some of the major atoll islands and all the resort islands rely to a major extent on a stand-alone desalination plant.



Bottled water is widely used in the resorts and is readily available. There are three bottled water factories now operating in the Central Region of Maldives.

The Male' Water Supply and Sewerage Company (MWSC), a joint venture company established in 1995 between the Government of Maldives and two Danish parties, is the only private water supply and sewerage service provider. It has a license that covers the whole of Male' and a few other islands in the region. The inhabited outer islands and the resorts manage their own water supply and sanitation.

There are a number of on-going projects, installing island-wide sewerage to around 30 inhabited islands. A 35 year design horizon and the most appropriate sewerage treatment and

disposal technology is to be implemented.

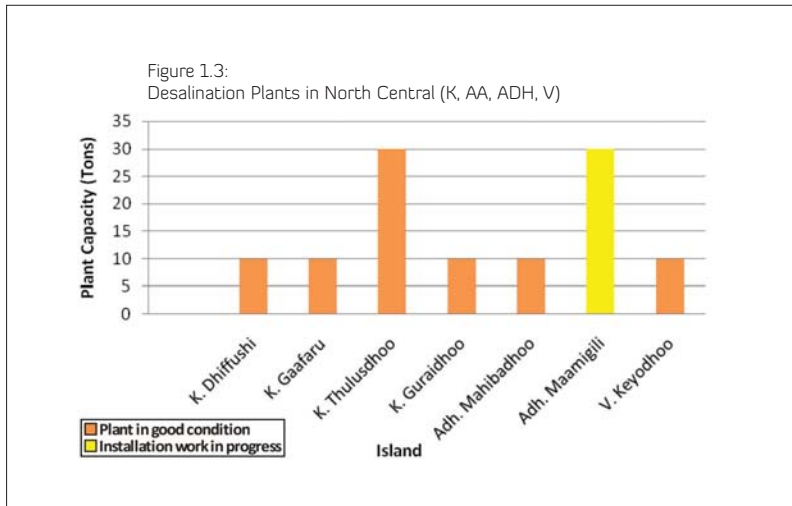
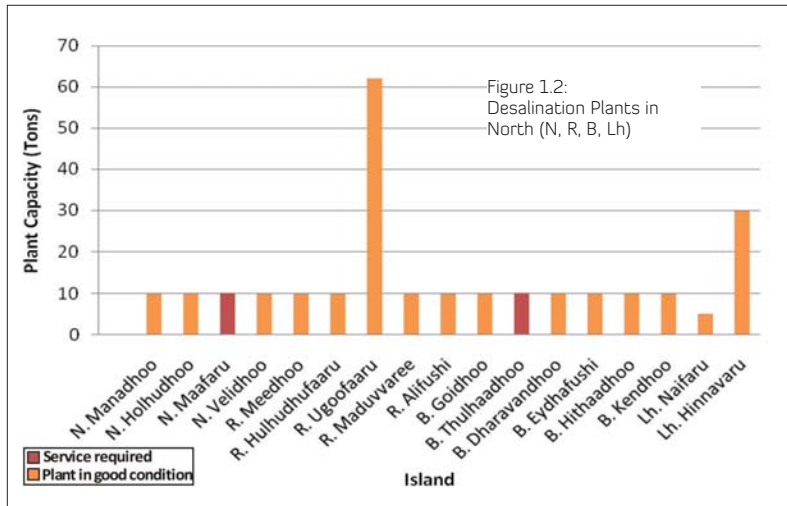
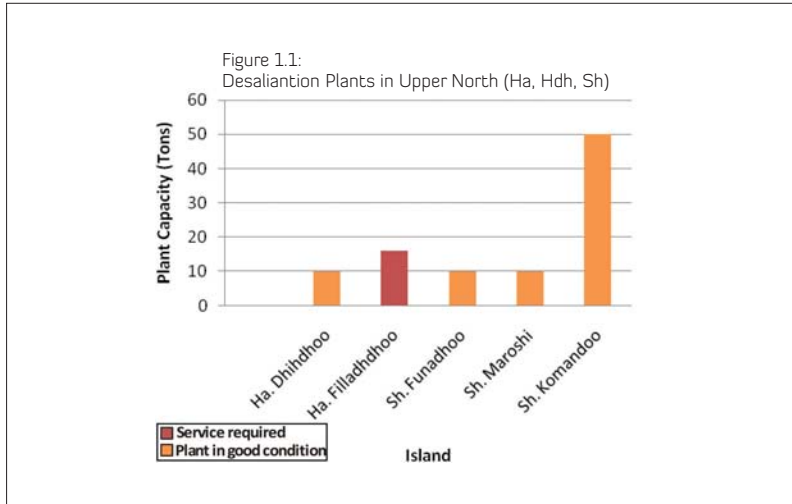
Over forty desalination plants have been provided to islands where groundwater contamination is an issue. Additionally, each household is provided with a rainwater collection tank to store rainwater. Over the years, the Maldivians have become very aware of the value of good water and the environment, and understand that it is no longer a freely available resource.

There has been significant progress in the area of water supply and wastewater, and a solid base has been built from which to move forward with solutions to the challenges of the future.



Water Supply

In response to the water scarcity faced by the island communities due to the tsunami, over 40 desalination plants have been provided to the islands. The following figures show the islands with desalination plants from all the provinces along with its capacity and the status of the plant.



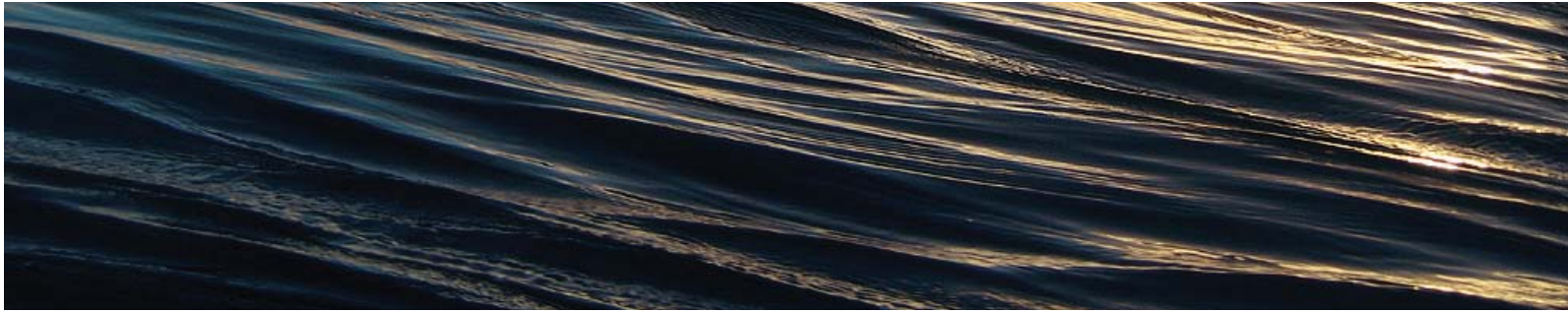


Figure 1.4:
Desalination Plants in Central (M, F, DH)

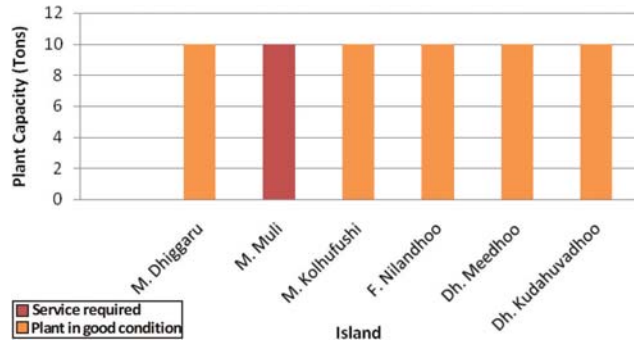


Figure 1.5:
Desalination Plants in Central South (Th, L)

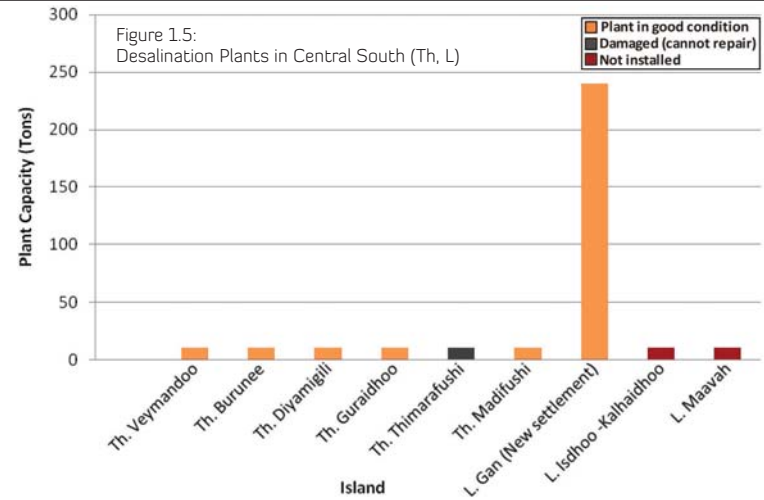


Figure 1.6:
Desalination Plants in Upper South (GA, GDH)

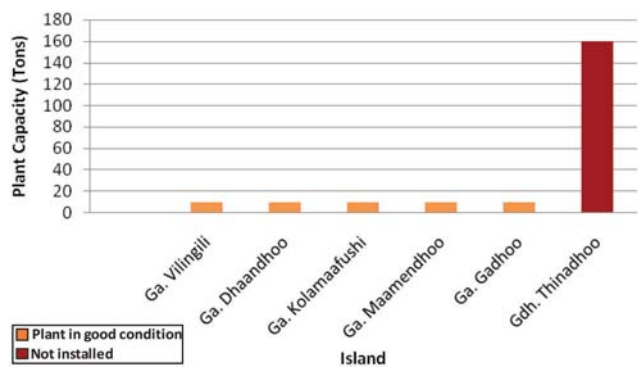
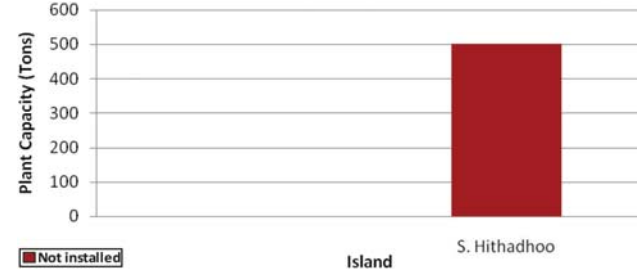


Figure 1.7:
Desalination Plants in South (GN, S)



Sanitation

Prior to tsunami of December 2004, only a few islands had island-wide sewerage networks. The vast majority of islands had only private septic tanks. Since the construction, operation and maintenance of these tanks were not regulated, these tanks posed serious health risks to the island communities. Following the Tsunami several donor agencies proposed to invest in the sanitation sector. There are at present number of projects ongoing installing island-wide, environmentally sound sewerage systems. The following tables provide details of current sewerage projects.

Table 1.1: Sewerage Systems in Upper North (HA, HDH, SH)

#	Island	Design /Construction		Type
		Status	Cost (USD)	
1	Ha. Utheem	Design & EIA - Work in progress (for both sewerage and water system)	4,015,625.00	
		For Construction Works	4,646,500.00	
2	Ha. Hoarafushi	Detail design and Tender documents completed		
		For Construction Works	2,168,054.47	
3	Ha. Dhindhoo	Construction 98% completed	1,526,638.00	Simplified
4	Ha. Filladhdhoo	-		
5	Ha. Ihavandhoo	Detail design and Tender documents completed		
		For Construction Works	1,397,354.09	
6	Hdh. Kulhudhuffushi	Construction work in progress	7,805,771.00	Simplified
7	Hdh. Nolvivaranfaru	Detail design and Tender documents completed		
		For Construction Works	1,411,443.58	
8	Sh. Funadhoo	Detail Design Completed, Construction to be commenced in April		Simplified
		For Construction Works	1,277,097.00	
9	Sh. Milandhoo	Detail design and Tender documents completed		
		For Construction Works	2,162,540.86	

Table 1.2: Sewerage Systems in North (N, R, B, LH)

#	Island	Design/ Construction		Type
		Status	Cost (USD)	
1	N. Manadhoo	Construction 98% completed	1,198,750.00	Vacuum
2	N. Holhudhoo	At design stage		
		For Construction Works	2,305,876.97	
3	N. Velidhoo	At design stage		
		For Construction Works	3,359,960.00	
4	R. Ugoofaaru	Construction 98% completed	1,198,750.00	Vacuum
5	R. Alifushi	Detail design and Tender documents completed		
		For Construction Works	1,517,579.77	
6	B. Goidhoo	Detail design and Tender documents completed		
		For Construction Works	1,428,968.87	
7	B. Eydhafushi	Detail Design Completed, Construction to be commenced in April		Simplified
		For Construction Works	1,277,097.00	
8	Lh. Naifaru	Design ongoing		
9	Lh. Hinnavaru	Detail Design Completed, Tendered out for construction work		Simplified
		For Construction Works	2,201,520.54	
10	R. Dhuvaafaru	Construction Work completed	2,100,000.00	Small bore

Table 1.3: Sewerage Systems in North Central (K, AA, ADH, V)

#	Island	Design / Construction		Type
		Status	Cost (USD)	
1	K. Maafushi	Main sewer lines completed. Installation of septic tanks in progress		Small bore
		For Construction Works	1,200,000.00	
2	K. Thulusdhoo	Detail design and Tender documents completed		
		For Construction Works	1,860,571.98	
3	K. Guraidhoo	Main sewer lines completed. Installation of septic tanks in progress	1,200,000.00	Small bore
4	Adh. Mahibadhoo	Design ongoing		
5	Aa. Rasdhoo	construction 98% completed	511,935.61	Simplified
6	Adh. Maamigili	Detail design and Tender documents completed		
		For Construction Works	2,158,575.88	
7	V. Felidhoo	construction 98% completed	328,593.54	Simplified

Table 1.4: Sewerage Systems in Central (M, F, DH)

#	Island	Design / Construction		Type
		Status	Cost (USD)	
1	M. Muli	Detail Design Completed, Construction to be commenced in April	1,277,097.00	Simplified
2	F. Nilandhoo	Construction 98% completed	1,198,750.00	Vacuum
3	Dh. Meedhoo	Construction 98% completed	1,198,750.00	Vacuum
4	Dh. Rinbidhoo	Construction completed		Small bore
5	Dh. Kudahuvadhoo	Main sewer lines completed. Installation of septic tanks in progress	1,800,000.00	Small bore

Table 1.5: Sewerage Systems in South Central (Th, L)

#	Island	Design / Construction		Type
		Status	Cost (USD)	
1	Th. Veymandoo	Detail Design Completed	30,913.00	
		For Construction Works	1,462,596.47	
2	Th. Guraidhoo	Construction completed	1,902,040.00	Small bore
3	Th. Thimarafushi	Detail Design Completed, Tendered out to find contractors for construction work	2,201,520.54	Simplified
4	L. Fonadhoo	Design ongoing		
5	L. Gan (New settlement)	Pipe lines to the outfall station repaired, Work suspended due to conflicts in the region	1,800,000.00	Small bore
6	L. Gan (Old settlement)	At design stage (AFD loan for design and construction)	7,953,541.00	
7	L. Isdhoo -Kalhaidhoo	Construction completed		Small bore
8	L. Dhanbidhoo	Construction 98% completed	1,152,506.77	Simplified
9	Th. Vilufushi	Installation of sewere lines in progress		Simplified

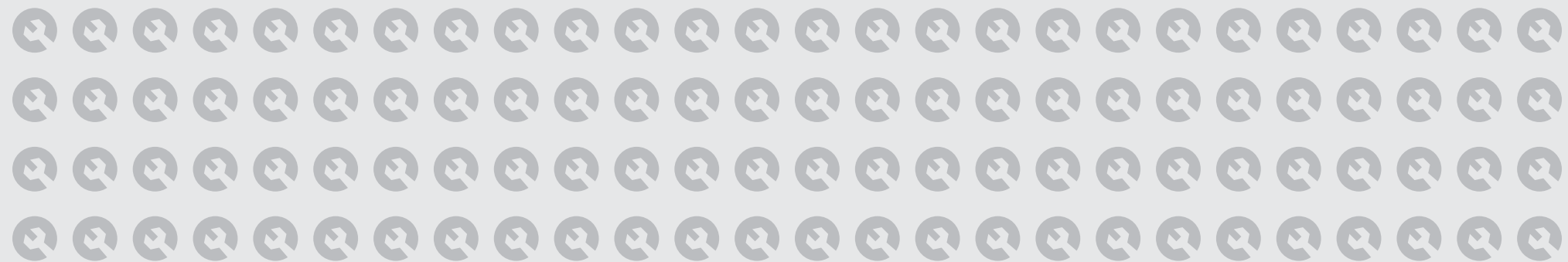
Table 1.6: Sewerage Systems in Upper – South (GA, GDH)

#	Island	Design / Construction		Type
		Status	Cost (USD)	
1	Ga. Vilingili	Construction ongoing	4,640,000.00	small bore
2	Ga. Dhaandhoo	Construction ongoing	2,890,000.00	small bore
3	Ga. Kolamaafushi	Design completed.		
		For Construction Works	1,715,700.39	
4	Ga. Gemanafushi	Detail design and Tender documents completed		
		For Construction Works	1,173,206.23	
5	Ga. Gadho	Detail Design and Tender documents completed (American red cross grant for design work)		
		For Construction Works	5,142,308.00	
6	Gdh. Thinadhoo	At design stage (AFD loan for design and construction)	7,953,541.00	

Table 1.7: Sewerage Systems in South (GN, S)

#	Island	Design/ Construction		Type
		Status	Cost (USD)	
1	Gn. Fuvahmulah	Design & EIA - Work in progress (for both sewerage and water system)	4,015,625.00	
		Construction	4,646,500.00	
2	S. Hithadhoo	Consultants to design selected.	1,969,027.14	
3	S. Maradhoo	For Construction Works	14,964,523.00	
4	S. Feydhoo			
5	S. Maradhoo - Feydhoo			





INVEST MALDIVES

Ministry of Economic Development
H. Maizan, 1st Floor, Sosun Magu
Male' 20-067
Republic of Maldives

Phone: +960 3324767

Fax: +960 3322528

Website: www.investmaldives.org

Email: info@investmaldives.org