OMAN POWER AND WATER PROCUREMENT CO. (SAOC)

OPWP'S 7 YEAR STATEMENT

2013 - 2019 | ISSUE 7

His Majesty Sultan Qaboos bin Said

OPWP's 7-YEAR STATEMENT

(2013 – 2019)

APPROVED BY
THE AUTHORITY FOR ELECTRICITY REGULATION, OMAN

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GLOSSARY

AER	Authority for Electricity Regulation, Oman
BTU/scf	British thermal units per standard cubic foot
CCGT	Combined-cycle gas turbine
DGW	Directorate General of Water (in the Office of the Minister of State and Governor of Dhofar)
DPC	Dhofar Power Company (SAOC)
GJ	Gigajoule(s)
GPDC	Al Ghubrah Power and Desalination Company (SAOC)
HHV	Higher Heating Value
IPP	Independent power project
IWP	Independent water project
IWPP	Independent water and power project
kWh	Kilowatt hour(s)
LOLH	Loss of load hours
m^3	Cubic metre(s)
m^3/d	Cubic metres per day
MEDC	Muscat Electricity Distribution Company (SAOC)
MIGD	Million imperial gallons per day
MIS	Main Interconnected System
MISC	Majis Industrial Services Company (SAOC)
MJEC	Majan Electricity Company (SAOC)
MOG	Ministry of Oil and Gas
MSF	Multi-stage flash (desalination technology)
MW	Megawatt(s)
MZEC	Mazoon Electricity Company (SAOC)
OCGT	Open-cycle gas turbine
OETC	Oman Electricity Transmission Company (SAOC)
OPWP	Oman Power and Water Procurement Company (SAOC)
PAEW	Public Authority for Electricity and Water
PDO	Petroleum Development Oman (LLC)
PPA	Power purchase agreement
PWPA	Power and water purchase agreement
RAEC	Rural Areas Electricity Company (SAOC)
RO	Reverse osmosis (desalination technology)
Sm^3	Standard cubic metre(s)
Sm^3/d	Standard cubic metres per day
TWh	Terawatt hour(s) = billion (10^9) kWh

OVERVIEW

This Statement provides a 7-year outlook for power and desalinated water supply in the two main systems of Oman - the Main Interconnected System (MIS) and the Salalah System. OPWP prepares the 7-Year Statement annually in accordance with Condition 5 of its license. This is Issue 7, for the period 2013 to 2019; previous issues and additional information are available on the OPWP website at www.omanpwp.com.

Demand for Electricity

In the MIS, peak demand is expected to grow at 9.5% per year, from 4293 MW in 2012 to 8106 MW in 2019. This exceeds the previous forecast, with implications for capacity procurement and fuel requirements. Two additional demand scenarios are considered: the Low Case projects 8% annual growth and peak demand at 7190 MW in 2019, about 900 MW below Expected Demand. The High Case projects 11% annual growth and peak demand at 9133 MW in 2019, exceeding Expected Demand by about 1000 MW.

In Salalah, peak demand is expected to grow at 12% per year, from 389 MW in 2012 to 848 MW in 2019. The Low Case considers 7% growth, reaching 625 MW by 2019, more than 200 MW below Expected Demand. The High Case considers somewhat higher growth across all economic sectors, with peak demand increasing at 13% per year to 936 MW in 2019, exceeding Expected Demand by about 90 MW.

Power Generation Requirements

In the MIS, the major expected developments through 2019 include: (1) completion of the Barka Phase III, Sohar Phase II, and Sur plants, providing 3490 MW by 2014; (2) addition of about 200 MW of solar power, subject to final Government approval; (3) expiration of contracts at existing plants summing to 1517 MW; and (4) requirements for one or more new power plants in 2017/2018 with aggregate capacity in the range of 2250 to 3000 MW. The capacity requirement will depend partly on the strategy adopted for expiring contracts.

In Salalah, the Raysut NPS is planned for privatization in 2014, and the Salalah 2 IPP will be developed for service in 2017 on a power-only basis with capacity in the range of 300 to 400 MW.

Desalinated Water Requirements

Water demand in the northern region (the Interconnected Zone, Sur Zone, and Ad Duqm Zone) is projected to increase by 6% per year, from 218 million m^3 in 2012 to 316 million m^3 (i.e., 866,000 m3/d) in 2019.

In the Interconnected Zone, the principal developments include: (1) addition of 45,000 m^3/d (10 MIGD) at Barka I in 2013; (2) addition by MISC of a desalination plant that will meet its water supply needs from 2013 onwards; (3) addition of the Ghubrah IWP at 191,000 m^3/d (42 MIGD) in 2014; (4) addition of a new desalination plant at Qurayyat at 180,000 m^3/d

(40 MIGD), which may be developed in two phases beginning in 2016; (5) addition of a new desalination plant at As Suwayq at up to 225,000 m^3/d (50 MIGD) in 2018; and (6) expiration of PWPAs at Barka I and remaining units at the Ghubrah desalination plant in 2018. OPWP will also consider the potential for contract extension of the Barka I desalination plant at this time (136,200 m^3/d, or 30 MIGD).

For the Sur Zone, demand has grown more rapidly than anticipated in recent forecasts, such that additional desalination capacity is required by 2015 in the range of 40,000 m^3/d (9 MIGD).

For the Ad Duqm Zone, PAEW has developed a strategy to meet rising demand in the near term, including extension of the existing RAEC desalination plant and placement of two temporary plants. A new desalination plant is planned for 2018 with capacity of 30,000 m^3/d (7 MIGD).

In Salalah, DGW projects water demand to grow at 6%, and peak water demand to increase from 61,000 m^3/d in 2012 to 88,000 m^3/d in 2019. On this basis, the Salalah IWPP, with capacity 68,190 m^3/d (15 MIGD), is expected to meet demand requirements for several years. DGW plans to defer a commitment to additional desalination capacity until demand out-turns in the coming years confirming the growth trend in demand.

Procurement Activities

For the MIS region, OPWP expects the completion of several critical studies in 2013 to inform future procurement activities, including (1) Ad Duqm study, (2) Coastal Study for evaluation of prospective plant sites, (3) strategic study for management of expiring PPAs and PWPAs, and (4) Resource Options study. These studies will guide the siting of future MIS power stations, the handling of contract expirations, consideration of future energy resource options, and power and water development needs for Ad Duqm.

In 2013, OPWP expects to contract for an additional 40,000 m^3/d (9 MIGD) desalination capacity at Sur, to initiate procurement of a new 180,000 m^3/d (40 MIGD) desalination plant at Qurayyat, and to conclude the procurement of a 100 MW power plant in Musandam. Following the completion of the Coastal Study in 2013, OPWP expects to commence procurement activities for one or more new IPPs in the MIS with aggregate capacity in the range of 2250-3000 MW for tender issue in 2014. Preparatory activities for the As Suwayq IWP have also started, with tender issue expected in 2014.

For Salalah, OPWP plans to issue a tender in 2013 for the Salalah 2 IPP, with a capacity range of 300-400 MW. OPWP plans to monitor water consumption out-turns closely in the coming years toward planning the next addition to desalination capacity.

Fuel Requirements

In the MIS, efficiency improvements in the generation fleet are expected to limit growth in fuel requirements to 6% per year through 2019, despite nearly 10% growth in electricity production. Total gas consumption by the main power and desalination plants is projected to increase from 6.7 billion Sm^3 in 2012 to 9.8 billion Sm^3 in 2019. Nevertheless, this represents a substantial increase over previous forecasts.

In Salalah, gas requirements are projected to increase at 7%, reaching 1.1 billion Sm^3 by 2019 as power requirements grow rapidly and water requirements are met increasingly by new desalination capacity.

OPWP projects that the medium-term committed gas allocation for power generation (and associated water production) will cover requirements through 2016 under the Low Case, but only through 2014 under the Expected Demand and High Case scenarios. Additional quantities are subject to confirmation by MOG. Should further gas allocations be unavailable, OPWP would likely bring forward plans to procure new generation capacity using other fuels, or consider other options. However, non-gas fuel options are expected to require at least 7 years to develop, and are not recommended for the new capacity identified for service in 2017/2018.

SECTION-1 MAIN INTERCONNECTED SYSTEM

The Main Interconnected System (MIS) covers the Governorate of Muscat, the Governorate of Buraymi and most of the Al Batinah North, Al Batinah South, Ad Dakhiliyah, Ash Sharqiyah North, Ash Sharqiyah South and Ad Dhahirah Governorates, serving around 600,000 electricity customers.

It comprises a number of power generation facilities, owned and operated by various companies; a single 220/132 kV transmission grid, owned and operated by Oman Electricity Transmission Co. (OETC); and three distribution networks, owned and operated by Muscat Electricity Distribution Co. (MEDC), Mazoon Electricity Co. (MZEC) and Majan Electricity Co. (MJEC). The three distribution network operators also act as "licensed electricity suppliers", supplying existing and new electricity customers in their respective service areas. The MIS is presently interconnected with the power systems of Petroleum Development Oman (PDO) and the Emirate of Abu Dhabi.

Several of the power generation facilities connected to the MIS produce desalinated water in conjunction with electricity, to meet the regional requirements of "water departments" responsible for supplying water to customers (including the Public Authority for Electricity and Water (PAEW) and Majis Industrial Services Co. (MISC)).

OPWP's role is to aggregate the power and desalinated water requirements of licensed electricity suppliers and water departments, and to economically procure the required power and desalinated water in bulk from generation/production facilities connected to the MIS and interconnected systems. OPWP is required to ensure that sufficient power generation resources are available to meet licensed electricity suppliers' demands; and wherever beneficial, to co-procure desalinated water to meet the needs of water departments in joint power-water facilities. OPWP also procures stand-alone desalinated water facilities upon the direction of PAEW in accordance with article 78 of the Sector Law.

1.1 DEMAND FOR ELECTRICITY

OPWP evaluates electricity demand at the system level, including transmission and distribution system losses with consumer-level loads. This equates with the output of power generation plants at the delivery point(s) to the power system, excluding the internal power consumption of auxiliary systems.[1] OPWP follows a similar approach with respect to estimating water demand, the output of desalinated water plants, and the consumption of auxiliary systems of combined power and water plants.

1 *This approach assures equivalence toward planning the generation supply required to meet consumer demand. However, from the perspective of power system operations, electricity demand and output are monitored at available metering points located at substations and power plants. The system "gross demand" at any point in time is the sum of the metered output at all power generators, although a portion of that generator output must be consumed by plant auxiliary systems. System peak demand is considered as net of plant auxiliaries and any exports to other power systems. The hourly consumption of plant auxiliary systems is not measured directly at some plants and in these cases must be estimated. Consequently, there may be differences in peak demand reports, depending on how auxiliary consumption at each plant is estimated.*

Historical Demand

In 2012, electricity demand growth was again robust, following strong growth in 2011. Peak demand increased by nearly 12% to 4293 MW, whilst average demand increased by 14% to 2461 MW (corresponding to 21.6 TWh of energy). This followed growth in average demand of 12% in 2011, 7% in 2010, and 12-13% per year in 2008 and 2009.

Looking back over the last 6 years, peak electricity demands in the MIS grew at an average rate of about 9% per year from 2544 MW in 2006 to 4293 in 2012. Energy consumption (or average demand) has grown more rapidly than peak demand during this period. This is thought to reflect the relatively rapid growth of non-residential customers, such as commercial, industrial, government and infrastructure facilities. Average demand (energy) increased by nearly 11% per year during this period.

Demand Projections

OPWP's 7-year electricity demand projections for the MIS have been developed on the basis of: (1) consultations with MEDC, MZEC, MJEC and other relevant entities; (2) consideration of historical average growth rates and their distribution; and (3) assessment of past forecasts against out-turns.

The projections cover both average demand (i.e. energy) and peak demand. The latter is most relevant for purposes of assessing capacity requirements. This accords with the basis on which OPWP transacts with power and desalination plants. Energy projections are necessary towards securing the fuel requirement for power generation.

The projected demands are based on an assumption of "normal" weather, considering a baseline developed from historical patterns of the past 5-10 years. Variations in weather in any particular year can have a significant impact on electricity demand, and particularly on peak demand – as was seen in 2010. The impact of weather in future years is an inherent uncertainty in the projections. However, potential weather impacts are considered in the development of low case and high case demand scenarios.

The projections are built up from separate analyses of distribution system demands, which are assessed on a "macro" basis by region, and certain bulk loads that are connected directly to the transmission system and which are assessed on a specific load-wise basis.

Distribution system demand is comprised mainly of residential, service sector (including government and commercial buildings, tourism facilities), and small to medium scale industrial demands in all regions. The principal growth drivers include population growth, household formation, general economic development and infrastructure expansion.

The growth in demand from grid-connected loads (generally large industries and infrastructure projects) comprises expansion at existing industrial plants and new projects. Industrial projects are focused mainly around the Sohar Industrial Port, and to a lesser extent at Sur. Infrastructure projects include, for example, the stand-alone desalination plants.

The projections are presented as a range bounded by Low Case and High Case scenarios, and a central, Expected Demand forecast. They are summarized in Figure 1 below.

Under the Expected Demand forecast, average demand is expected to grow from 2461 MW (corresponding to 22 TWh) in 2012 to 4722 MW (41 TWh) in 2019, an increase of around 10% per year. Peak demand is also expected to grow at about 9.5% per year, from 4293 MW in 2012 to 8106 MW in 2019. Increasing personal income, capital investment and housing starts are major contributors to continued high growth in electricity demand. The forecast is consistent with the average growth rates of peak and average demand over the period from 2006 to 2012.

It is important to note that this forecast exceeds earlier projections. This has implications for both new capacity needs and fuel requirements, and OPWP has considered this change with care. The forecast reflects the rapid growth experienced over the preceding 5-7 years. High average growth rates (double-digit energy growth in four of the past five years) have prevailed through a major global economic downturn, and through significant weather events that affected single-year results. While large industries have made an important contribution to recent growth, and may continue to do so in future, by far the largest contribution comes from small to medium sized consumers: housing, government buildings, commercial buildings, and smaller industry. The projection is grounded in the growth of this underlying demand, upon study of recent trends. Current government commitments to job creation and infrastructure development provide the foundation for this growth to continue, at least through the next three years of the government's National 5-Year Development Plan. We also consider that the intention of the government's infrastructure investments is to lay a foundation that will spur future economic growth.

The High Case scenario reflects the possibility of a stronger than expected economic backdrop. In this case, we expect more private sector projects to reach their growth targets, for example, in all sectors. Average and peak demands are projected to increase at average annual rates of about 12% and 11% respectively in the High Case. These growth rates are in accord with an upper-end assessment of historical growth rates: for example, the average growth rate of the last five years.

The Low Case scenario is constructed as a mirror image of the High Case around the Expected Case forecast, with respect to the growth rate of distribution system loads. This scenario generally reflects the possibility of a weaker than expected economic backdrop. For comparison, the 8% annual growth rate under this scenario is roughly equivalent to the long-term average growth rate over the past ten or more years.

Over the forecast period, aggregate demand growth is greatest under the High Case and least under the Low Case, but in some individual years one may observe a change in the growth pattern against the overall trend, or relatively higher growth in one scenario than another. This is due primarily to assumptions about grid-connected loads which differ among the demand scenarios. In the High Case, grid-connected loads are assumed to develop at or near the pace and extent of customer forecasts. The Expected Demand and Low Case assume successively lower levels of demand realization from these projects, as has been commonly observed due to project schedule delays, downsizing or delayed realization of demand, and project cancellations. These differing schedules may result in apparent anomalies, such as when several projects cause a load increase in the Low Case that is absent in the High Case in the same year; this may occur because the same projects are realized in an earlier year in the more optimistic demand scenario.

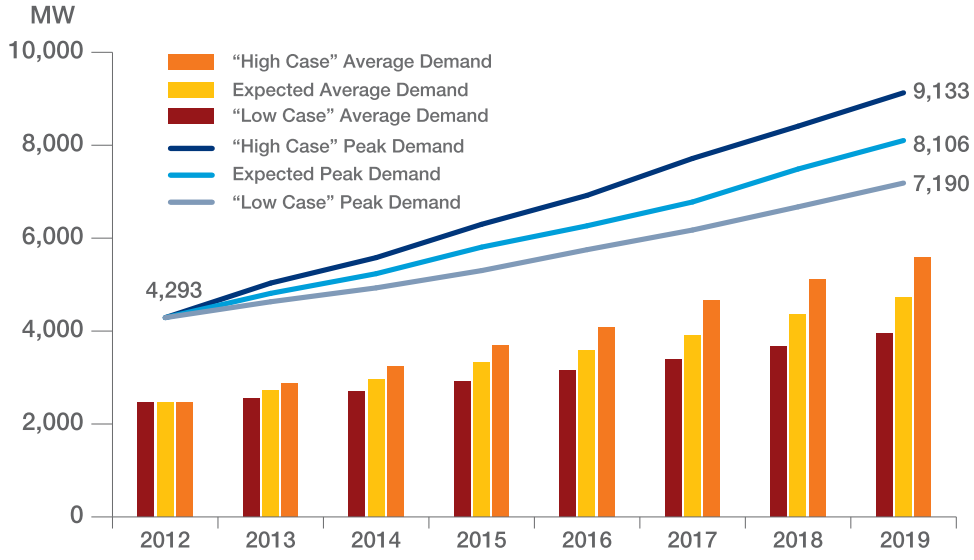
Whilst considered much less likely than the expected demand scenario, the Low Case and High Case scenarios are intended to represent the range of reasonably credible future demand paths around the expected demand projection, against which the requirements for generation resources need to be assessed and an appropriate generation procurement strategy developed. In particular, OPWP has to balance the need to have a feasible plan to meet High Case demands at reasonable cost should these arise (taking into account the lead times associated with procuring capacity), whilst at the same time minimizing the risks of finding itself over-committed to costly generation capacity in the event of demand following the Low Case path.

Connection of MIS with Ad Duqm

The town of Ad Duqm and surrounding areas in the Al Wusta Governorate are currently not connected with the MIS. Electricity supply is provided by a 67 MW diesel-fuel fired power plant operated by RAEC. The Government of Oman plans to promote the development of a major industrial and economic city around the new seaport at Ad Duqm. In consequence, demand for electricity is expected to grow rapidly in the coming years. RAEC has provided projections that show peak demands increasing to around 100-150 MW by 2019.

OPWP is currently performing a comparative evaluation of several strategic options involving the development of a power generation plant at Ad Duqm, with or without an interconnection with the MIS (and/or other power systems in the vicinity, such as the PDO power system). This study also investigates the feasibility of incorporating outlying localities, such as towns along the eastern coast from Shiwaimia to Mahoot and Haima, into the network to be supplied by the Al Duqm power generation plant. This evaluation is expected to be completed after the publication of this 7-Year Statement, and hence, as it is uncertain whether the demands of Ad Duqm will become MIS demands, the prospective Ad Duqm demands have been excluded from the MIS demand projections in this 7-Year Statement.

Figure 1 Electricity Demand Projections – MIS



	Actual 2012	2013	2014	2015	2016	2017	2018	2019	Ave.% Growth
Expected Demand									
Average Demand (MW)	2,461	2,716	2,956	3,317	3,576	3,898	4,348	4,722	9.8%
Distribution Loads	2,227	2,428	2,661	2,917	3,189	3,507	3,847	4,221	9.6%
Directly-Connected Loads	234	289	295	400	386	391	501	501	11.5%
Annual Energy (TWh)	**21.6**	**23.8**	**25.9**	**29.1**	**31.4**	**34.1**	**38.1**	**41.4**	**9.7%**
Peak Demand (MW)	**4,293**	**4,816**	**5,239**	**5,811**	**6,270**	**6,783**	**7,492**	**8,106**	**9.5%**
Change from 2012-2018 Statement (MW)	77	221	232	437	510	632	911	n/a	
Low Case Demand									
Average Demand (MW)	2,461	2,550	2,712	2,915	3,145	3,387	3,679	3,959	7.0%
Distribution Loads	2,227	2,304	2,461	2,638	2,837	3,074	3,328	3,608	7.1%
Directly-Connected Loads	234	246	252	276	308	313	351	351	5.9%
Annual Energy (TWh)	**21.6**	**22.3**	**23.8**	**25.5**	**27.6**	**29.7**	**32.2**	**34.7**	**7.0%**
Peak Demand (MW)	**4,293**	**4,635**	**4,934**	**5,306**	**5,756**	**6,179**	**6,678**	**7,190**	**7.6%**
Change from 2012-2018 Statement (MW)	178	239	258	359	529	678	887	n/a	
High Case Demand									
Average Demand (MW)	2,461	2,876	3,230	3,698	4,087	4,651	5,118	5,596	12.5%
Distribution Loads	2,227	2,563	2,867	3,198	3,548	3,952	4,385	4,863	11.8%
Directly-Connected Loads	234	313	364	500	539	699	733	733	17.7%
Annual Energy (TWh)	**21.6**	**25.2**	**28.3**	**32.4**	**35.9**	**40.7**	**44.8**	**49.0**	**12.4%**
Peak Demand (MW)	**4,293**	**5,037**	**5,585**	**6,302**	**6,925**	**7,720**	**8,414**	**9,133**	**11.4%**
Change from 2012-2018 Statement (MW)	-27	210	259	128	17	262	354	n/a	

In the event that a connection of the MIS with Ad Duqm is completed within the 7-year horizon, then the Ad Duqm demands would be additional to the MIS demands presented above, commencing in the year of connection. However, based on the projections provided by RAEC, the addition of these demands would have a relatively minor impact on the overall level of MIS demand.

Exports to Interconnected Systems

The MIS is interconnected with the PDO power system at Nizwa through a 132 kV link, and with the power system of the Emirate of Abu Dhabi through a 220 kV link.

These interconnections provide reliability benefits through the sharing of generation reserves, and currently there are no arrangements for commercial export or import of power with those systems. Hence, the current MIS demand projections (presented above) include the native demands of the MIS only. However, these interconnects provide the opportunity for commercial power transactions in the future, which could then have implications for the expected demand to be served by generation resources in the MIS.

1.2 POWER GENERATION RESOURCES

Sources of Power

In order to meet demand for electricity in the MIS, OPWP purchases power from a number of sources via power purchase agreements (PPAs), power and water purchase agreements (PWPAs) and other similar agreements. The contractual arrangements for power delivery under these agreements may be differentiated as firm capacity, reserve-sharing, non-firm capacity, and energy-only, as these terms are relevant for generation planning purposes.

All of the main power (and desalination) plants in the MIS are contractually committed to provide a specific generation capacity (in MW) upon demand, to be dispatched by the OETC, and to maintain specific availability levels. These are firm capacity contracts, also termed **"contracted capacity"**. Temporary generation also belongs with this group.

OPWP also purchases power from a number of sources where the contractual arrangements do not provide sufficient reliability for resource adequacy plans. These may be termed collectively as **"non-firm resources"**. They currently include reserve-sharing arrangements with other power systems via interconnection agreements, and capacity exchanges or energy purchases from industries with captive power generation facilities used mainly for self-supply. In these cases no specific capacity is committed to OPWP, and the availability of capacity for use by OPWP at any particular time will generally be subject to the other party's first use. These resources provide reliability benefits to the MIS, in that capacity is generally available according to pre-arranged schedules (though not committed as dispatch-able capacity). Importantly, some of these resources may represent prospective contractual opportunities for firm, dispatch-able capacity (such as the interconnects) in the future.

In addition to these resources currently under contract, there are **"prospective resources"** that are under consideration by OPWP. For example, certain power generation units among the currently contracted plants will fall out of contract during this seven-year period, and OPWP must consider whether to allow these units to retire, to extend the term of the contract, or to contract for refurbishment or performance-related modifications of the units. This category also includes resources that are under evaluation or for which the tendering process has begun but is not complete.

Contracted Capacity

OPWP's present portfolio of contracted capacity in the MIS comprises eleven P(W)PAs. Eight of these relate to existing operational power (and desalination) plants, whilst three relate to plants currently under construction. Details of these P(W)PAs are shown in Table 1 below.

Table 1 Details of P(W)PAs – MIS

Plant	Contracted Capacity[a]	Contract Type	Plant Owner	Plant Status	Plant Type	Contract Expiry[b]
Ghubrah	475MW 167,000 m^3/d	PWPA	Al Ghubrah Power and Desalination Co. (SAOC)	Operational	OCGT/Steam MSF Desalination Natural gas fired (Fuel oil as back-up)	2018
Rusail	687 MW	PPA	Rusail Power Co. (SAOC)	Operational	OCGT Natural gas fired (Fuel oil as back-up)	2022
Wadi Jizzi	325 MW	PPA	Wadi Al-Jizzi Power Co. (SAOC)	Operational	OCGT Natural gas fired (Fuel oil as back-up)	2020
Manah	273 MW	PPA	United Power Co. (SAOG)	Operational	OCGT Natural gas fired (Fuel oil as back-up)	2020
Al Kamil	282 MW	PPA	Al Kamil Power Co. (SAOG)	Operational	OCGT Natural gas fired (Fuel oil as back-up)	2017
Barka I	435 MW 91,000 m^3/d	PWPA	ACWA Power Barka (SAOG)	Operational	CCGT MSF Desalination Natural gas fired (Fuel oil as back-up)	2018
Sohar I	590 MW 150,000 m^3/d	PWPA	Sohar Power Co. (SAOG)	Operational	CCGT MSF Desalination Natural gas fired (Fuel oil as back-up)	2022
Barka II	679 MW 120,000 m^3/d	PWPA	SMN Barka Power Co. (SAOC)	Operational	CCGT RO Desalination Natural gas fired (Fuel oil as back-up)	2024
Sohar II	745 MW	PPA	Al Batinah Power Co. (SAOC)	Under Construction	CCGT Natural gas fired (Fuel oil as secondary fuel and back-up)	2028
Barka III	745 MW	PPA	Al Suwadi Power Co. (SAOC)	Under Construction	CCGT Natural gas fired (Fuel oil as secondary fuel and back-up)	2028
Sur	2000 MW	PPA	Phoenix Power Co. (SAOC)	Under Construction	CCGT Natural gas fired (Fuel oil as back-up)	2029

[a] *Contracted capacities are shown as of 2013.*
[b] *In all cases the contracts expire prior to the summer period of the year indicated.*

A summary of the generation capacity that is expected to be provided under these P(W)PAs over the 2013-2019 period is set out in Figure 2 below. This shows total contracted capacity of 5669 MW in 2013, rising to a maximum of 6910 MW in 2014, before falling back to 5844 MW by 2019. The main developments over the 7-year period are:

- The Sohar II and Barka III plants currently under construction are scheduled to be fully commissioned by April 2013 for a total addition of 1490 MW;

- The Sur Power Plant currently under construction is scheduled to be commissioned on a phased basis in 2013 and 2014 – phase one (early power), comprising two gas turbines operating in open cycle mode, adds 433 MW in 2013, and phase two, comprising the remaining three gas turbines and two steam turbines, will add a further 1567 MW in 2014, for a total addition of 2000 MW;

- A number of the older generation units at Ghubrah are scheduled to fall out of contract after summer 2013, resulting in total reductions of 240 MW. The plant owner, GPDC, has advised OPWP that given their age and condition it intends to de-commission these units permanently at such time. The remaining units at Ghubrah will fall out of contract prior to the summer of 2018, resulting in a further reduction of 235 MW if the contract is not renewed.

- Several of the older generation units at Wadi Jizzi are scheduled to fall out of contract after the summer of 2014; in the absence of any further contract extension(s), this will result in a reduction of 88 MW in 2015.

- The PPA for the Al Kamil plant is due to expire prior to the summer of 2017. If not renewed, this will result in a reduction of 282 MW of capacity in 2017.

- The PPA for the Barka I plant is due to expire prior to the summer of 2018. If not renewed, this will result in a reduction of 427 MW of capacity in 2018.

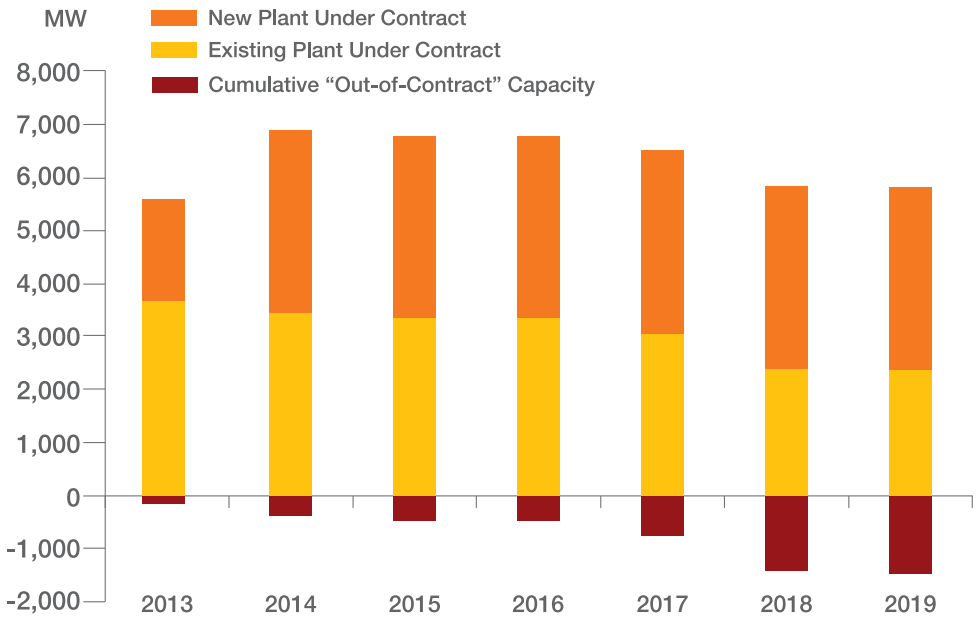
Non-Firm Resources under Contract

In addition to the contracted capacity described above, OPWP has contracts with a number of other sources of power for the MIS, although these contracts are not for firm capacity commitments. These include:

- the 220 kV interconnect with the Abu Dhabi power system at Al Wasit;
- the 132 kV interconnect with the PDO power system at Nizwa; and
- the surplus generation of industries (and other parties) with captive power generation facilities used mainly for self-supply.

A 220 kV interconnection between the MIS and the Abu Dhabi power system was commissioned in 2011 and has been commercially operational since May 2012. This double circuit link currently supports transfers of up to 200 MW. The main purpose of this interconnect as currently envisioned is for emergency support and for reserve sharing, subject to the availability of surplus generation in either system. The link is being utilized actively to provide emergency reserves support to the benefit of Oman, the UAE, and other GCCIA member countries. It is expected that this link will be upgraded to 440 kV, doubling the transfer capability to 400 MW.

Figure 2 Contracted Generation Capacity – MIS



	2013	2014	2015	2016	2017	2018	2019
Current Contracted Capacity			Net MW [a]				
Ghubrah	475	235	235	235	235	-	-
Rusail	687	687	687	687	687	687	687
Wadi Al Jizzi	245	245	157	157	157	157	126
Manah	273	273	273	273	273	273	273
Al Kamil	282	282	282	282	-	-	-
Barka I	435	435	435	435	435	-	-
Sohar I	590	590	590	590	590	590	590
Barka II	679	679	678	678	678	678	678
Sohar II	745	742	740	739	738	738	738
Barka III	745	742	740	739	738	738	738
Sur	433	2000	1992	1988	1985	1983	1983
TOTAL	**5589**	**6910**	**6809**	**6803**	**6516**	**5844**	**5813**
Additions	933	1567	-	-	-	-	-
Reductions (out-of-contract)	151	246	101	6	287	672	31

[a] *All capacities are rated on a net basis (i.e. after allowing for auxiliary consumption inside the plants) at 45°C ambient temperature*

The MIS is connected with the power system of PDO at Nizwa via a single 132 kV link with a nominal transfer capacity of around 60 MW. The main purpose of this interconnect is to support reserve sharing between the MIS and the PDO system, providing improved reliability in both systems by allowing each system access to unused reserve in the other system in contingency scenarios. Thus, subject to the availability of surplus generation in the PDO system at the time required, up to around 60 MW of support can be provided to the MIS to help manage contingencies.

In addition to support for reserve-sharing arrangements, both the PDO and the Abu Dhabi interconnections could potentially support "commercial" imports in the future – based on the relative costs of generation in the respective systems.

Several industries with captive power plants are connected with the MIS and have surplus power that is purchased by OPWP. Chief among these is OPWP's agreement with Sohar Aluminium Co. (LLC), whereby Sohar Aluminium exports up to 300 MW to the MIS during the summer, and imports a like amount of energy from OPWP during the winter on an annually determined schedule. The schedule and operations are managed to assure that energy exports balance with energy imports. This arrangement benefits both parties: Sohar Aluminium is better able to schedule the maintenance of its generating units and gains reliability of supply, while OPWP gains an efficient generating resource during the summer and improves the system Load Factor.

Agreements with other industries range from economic purchases of surplus generation as available to scheduled purchases of surplus peaking capacity (when available). These agreements have generally been for short terms (one to three years) and are considered renewable so long as the surplus capacity remains available, and both economic and operational terms are agreeable.

Most of the current agreements for surplus capacity from industries expired in 2012. Renewal of the agreements with Sohar Aluminium (300 MW) and Oman Mining Co. (20 MW) are expected to be finalized by early 2013. OPWP has economic purchase arrangements with Oman Cement Co. (SAOG), Oman India Fertilizer Co. (SAOC) and the Ministry of Defense, which are expected to be available for renewal annually. These latter three agreements are considered as energy purchases (at tariffs beneficial to the system) with no capacity benefit.

Access to the captive power generation resources is useful in two respects. Firstly, the Sohar Aluminium and Oman Mining Co. contracts provide a source of contingency reserve for the MIS, over and above the reserve margin provided by OPWP's portfolio of contracted capacity. And secondly, they provide an economical source of energy – by providing low cost energy to the MIS in place of higher cost energy from contracted generation capacity, the overall cost of energy for the MIS can be reduced. The agreements in place with the respective parties are specifically designed to allow both of these benefits to be obtained.

Prospective Resources

Toward considering how to meet generation capacity requirements as projected power demand overtakes contracted capacity, OPWP assesses various prospective resources. These resources include the following:

- Contract extensions, such as for generation units that are scheduled to fall out of contract
- New contracted capacity
- Temporary generation
- Capacity purchases from interconnected power systems or industrial self-generation

Prospective contract extensions correspond to capacity that is scheduled to fall out of contract, but that may be offered to OPWP by the plant owner for extension of the contract term (subject to satisfaction of relevant regulatory requirements and commercial terms being agreed). These resources represent prospective contracted capacity, and OPWP will consider such options alongside options to contract for new capacity.

The prospective contract extensions comprise the capacity at Wadi Jizzi, Al Kamil and Barka I that falls out of contract over the coming years. Preliminary discussions with the owners

of these plants have indicated that they would anticipate offering the relevant capacity to OPWP after the expiry of the current contracted period. In addition, a strategic study is underway to study the economical options to handle these contracts. By the end of this study a conclusion should be drawn whether these contracts will be renewed or new capacity to be built to replace them. These resources are summarized in Table 2.

OPWP has previously contracted for additional capacity at several power plants, up to 15 MW in some cases, which they may achieve via additional equipment (such as evaporative coolers) or via certain enhanced operational regimes. This additional capacity is also considered as a contingent reserve, at somewhat higher cost, and subject to coordination of plant operations with OETC.

Table 2 Prospective Contract Extensions

	2013	2014	2015	2016	2017	2018	2019
				Net MW [a]			
Wadi Al Jizzi	80	80	168	168	168	168	199
Al Kamil	-	-	-	-	282	282	282
Barka I	-	-	-	-	-	435	435
Al Kamil Upgrade[b]	15	15	15	15	15	15	15
TOTAL	**95**	**95**	**183**	**183**	**465**	**900**	**931**

[a] *All capacities are rated on a net basis (i.e. after allowing for auxiliary consumption inside the plants) at 45°C ambient temperature.*

[b] *A 15 MW increment is available on a year-to-year basis at Al Kamil as a performance enhancement provided by evaporative cooling, requiring also an operating regime at base load.*

OPWP is considering several options for new contracted capacity. A coastal study will be completed in 2013 to identify potential sites for the next major power generation plants after Sur. As described further in Sections 1.3 and 1.6 below, OPWP expects to procure a major new power plant for the MIS for operation in 2017/2018.

A Government initiative to promote the development of grid-connected solar power projects represents another prospective contract. Subject to the Government providing a final go-ahead, OPWP expects to procure around 200 MW of solar generation capacity for the MIS, potentially to be in service by 2017. OPWP is currently collecting data from two instrumentation stations to support this endeavor. Whilst this capacity is expected to be committed to OPWP via a PPA, the inherent intermittency risk associated with solar generation (unless mitigated with energy storage) may lead to the "effective capacity" of the plants – for resource adequacy purposes – being somewhat less than the nominal capacity. Until proven as peak capacity, we show this resource in the category of contingency reserves.

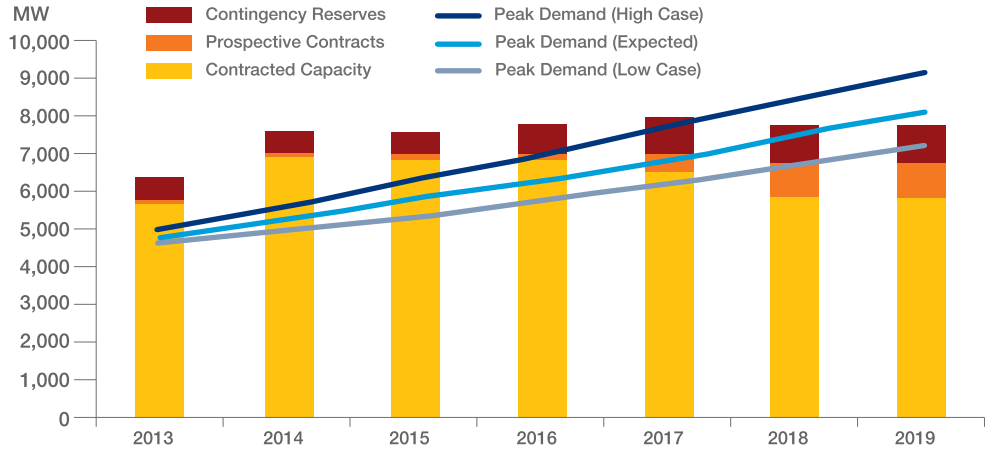
In October 2012, OPWP and the AER considered the risk of a potential delay in final commissioning of Barka III or Sohar II, and the early power units at Sur, with the result that OPWP issued a competitive tender for temporary generation capacity for use during the 2013 summer period. In February 2013, OPWP confirmed that the Barka III and Sohar II plants were on schedule for commercial operation in April, and that temporary generation would not be needed to assure adequate contracted capacity. The AER agreed that temporary generation was not necessary for this purpose, but advised OPWP to proceed with procurement of 101 MW of temporary generation in response to a request from OETC that these rental units were needed for voltage support in the Al Sharqiyah region in 2013.

As discussed above, OPWP plans to extend agreements to purchase industrial surplus generation, to the extent that these resources remain available. These and the reserve-sharing arrangements with neighboring systems (PDO and Abu Dhabi) represent prospective contingency reserves.

Summary

Figure 3 below provides a summary of all the generation resources that OPWP expects to have available for the MIS for the period 2013 to 2019, including both contracted capacity and prospective resources. Prospective resources are differentiated further as contracted capacity (contract extensions, temporary generation and planned plants) versus non-firm resources. The non-firm resources are considered as contingency reserves. They provide an indication of the potential extent of additional reserves that may be made available in contingency situations during the forecast period.

Figure 3 Total Power Generation Resources – MIS



	2013	2014	2015	2016	2017	2018	2019
			Net MW				
Contracted Capacity							
Currently Contracted Capacity (Details in Figure 2)	5589	6910	6809	6803	6516	5844	5813
Prospective Contracted Capacity							
Prospective Contract Extensions (Details in Table 2)	95	95	183	183	465	900	931
Temporary Diesel	101	-	-	-	-	-	-
Total – Contracted + Prospective	**5785**	**7005**	**6992**	**6986**	**6981**	**6744**	**6744**
Contingency Reserves							
Solar Project(s)	-	-	-	-	200	200	200
Reserve-Sharing Agreements							
PDO Interconnection	60	60	60	60	60	60	60
Abu Dhabi Interconnection[a]	200	200	200	400	400	400	400
Surplus Generation Agreements[b]							
Sohar Aluminium Co.	300	300	300	300	300	300	300
Oman Mining Co.	20	20	20	20	20	20	20
Total Contingency Reserves	**580**	**580**	**580**	**780**	**980**	**980**	**980**
ALL RESOURCES	**6365**	**7585**	**7572**	**7766**	**7961**	**7724**	**7724**

[a] *The capacity upgrade of the Abu Dhabi Interconnection to 400 MW is currently not committed, but is expected to occur around the indicated period. At current capacity, the interconnection will transfer 400 MW but not on a guaranteed basis until the upgrade is complete.*

[b] *The existing agreements for surplus generation have been recently renewed and will expire again at the end of 2015. The respective firms have indicated the possibility of further contract extension, although the indicated capacities are illustrative as contract terms may be modified.*

1.3 ADDITIONAL POWER GENERATION REQUIREMENTS

Statutory and Regulatory Requirements

OPWP is required by the Sector Law and its license to ensure the adequacy of generation resources to meet future power demands. The Sector Law establishes OPWP's general responsibility to secure sufficient generation resources to meet the aggregated demands of licensed electricity suppliers. Further to this, the license issued to OPWP by the Authority for Electricity Regulation, Oman (AER) stipulates a specific generation security standard for the MIS that OPWP must comply with.

The generation security standard stipulated by the AER sets a maximum duration of power outage for the system, termed Loss-of-Load Hours ("LOLH"). OPWP must enter into agreements for enough *contracted capacity* to ensure that expected demand does not exceed available contracted capacity for more than 24 hours in any year. This LOLH measure considers relevant uncertainties such as the reliability of generation units. On a short-term basis, OPWP must demonstrate to the AER that such agreements are in place.

On a long-term basis, OPWP must demonstrate that it has credible plans to put such agreements in place (via the procurement of new capacity or otherwise).

It is important to note that for purposes of the 24-hour LOLH standard, only contracted capacity is considered. Other resources, such as the surplus generation of industries and reserve sharing arrangements with interconnected systems, provide a degree of reserve margin and will generally contribute to reliability of supply. However, they are not considered for purposes of meeting the 24-hour LOLH standard and are viewed instead as providing security against contingencies.

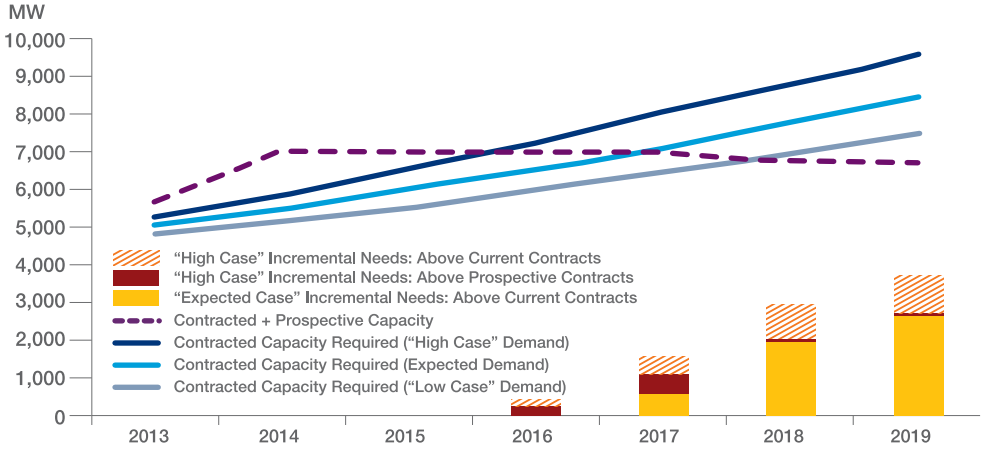
2013 Capacity Requirement

OPWP and the AER determined that contracted capacity in 2013 is sufficient to secure the MIS to the 24-hour LOLH standard, considering the expected start of commercial operation at the Barka III and Sohar II plants in April. However, in response to a request from OETC, the AER authorized OPWP to procure 101 MW of temporary generation to provide voltage support in the Al Sharqiyah region during the summer of 2013.

Future Capacity Requirements

OPWP has estimated the requirement for contracted capacity in order to comply with the 24-hour LOLH standard in each year during the 2013-2019 period. They are provided in Figure 4 below for each of the three demand projections described in section 1.1 above. Figure 4 also shows the requirements for additional capacity relative to current contracts, and relative to the prospective contracted capacity identified in Figure 3 above.

Figure 4 Future Power Generation Capacity Requirements – MIS



	2013	2014	2015	2016	2017	2018	2019
				Net MW			
Expected Demand Scenario							
Peak Demand	4816	5239	5811	6270	6783	7492	8106
Contracted Capacity Required	5030	5480	6070	6550	7090	7830	8470
Incremental Capacity Needed:							
Above Current Contracts	-	-	-	-	574	1986	2657
Above Prospective Contracts	-	-	-	-	**109**	**1086**	**1726**
Low Case Demand Scenario							
Peak Demand	4635	4934	5306	5756	6179	6678	7190
Total Contracted Capacity Required	4840	5160	5540	6020	6460	6980	7510
Incremental Capacity Needed:							
Above Current Contracts	-	-	-	-	-	1136	1697
Above Prospective Contracts	-	-	-	-	-	**236**	**766**
High Case Demand Scenario							
Peak Demand	5037	5585	6302	6925	7720	8414	9133
Total Contracted Capacity Required	5260	5840	6590	7240	8070	8790	9540
Incremental Capacity Needed:							
Above Current Contracts	-	-	-	437	1554	2946	3727
Above Prospective Contracts	-	-	-	**254**	**1089**	**2046**	**2796**

It can be seen that the capacity additions at Sur, Barka III and Sohar II are likely to be sufficient to meet requirements until around 2017 except in the High Case scenario. In 2017, incremental capacity needs emerge under the Expected Demand scenario relative to current contracts. There are prospective contracts for capacity that would meet most of this requirement, including the potential contract extensions at Al Kamil and Wadi Jizzi. The remaining 109 MW may be met by new contracted capacity or temporary diesel generators. However, a major new plant is certainly required under the Expected Demand scenario by 2018: neither contract extensions nor temporary generation can match the level of incremental capacity needs.

The High Case scenario poses more urgent requirements, and although it represents an upper bound on demand development, plans must address this scenario's implications. Firstly, this scenario projects a deficit of 437 MW in 2016, which falls to 254 MW if expiring contract are extended (primarily at Wadi Jizzi). This deficit, should it arise, would be met by temporary generation. Secondly, nearly 1100 MW may be required in 2017 under the High Case, assuming that the contract extensions are executed. This capacity requirement may be met by advancing the start of the new MIS plant to 2017, by building several plants at different sites,or by planning a two-phase development with early power in 2017 and

full power in 2018. It is expected that at least 700MW of new capacity will be added in 2017, leaving a balance to be provided from other sources in that year. These may include a combination of temporary generation and firm capacity contracted via the Abu Dhabi Interconnect or industrial plants[2].

OPWP plans to review these options over the next few months, prior to issuing the tender for the new power station(s) in 2014. The High Case scenario also imlies an upper bound on capacity needs to the end of the forecast period in 2019, at nearly 2800 MW after contract extensions. This presents one option for the upper bound on new capacity to be in service in 2018. Alternatively this requirement could be met by another plant for service in 2019, while other considerations include making provision for the possibility that not all expiring contracts may be available for extension on favorable terms.

The scheduled contract expirations at Al Kamil in 2017 and Barka I in 2018 contribute significantly to the supply deficit. These plants will have considerable useful life remaining (at least 10 years), although they are less efficient and less reliable than new plants would be. OPWP is evaluating the strategic options for extending these PPAs alongside options to contract for new capacity. OPWP expects that, at minimum, short-term extensions through 2018 will be beneficial to the system toward assuring generation adequacy until the next addition of capacity is commercially operational.

1.4 DESALINATED WATER REQUIREMENTS

Demand for Water

In the northern region of the Sultanate, OPWP provides desalinated water to two "water departments": PAEW and MISC. Their respective service areas and requirements for desalinated water are defined as follows:

- PAEW – in respect of the demand for potable water in the Governorates of Muscat and Al Buraymi, and most of the Al Batinah North, Al Batinah South, Ad Dakhiliyah, Ad Dhahirah, Ash Sharqiyah North, Ash Sharqiyah South and Al Wusta Governorates[3]; and
- MISC – in respect of the process water demand for industrial use in the Sohar Industrial Port area.

PAEW and MISC provide the water demand projections in respect of the following geographic zones:

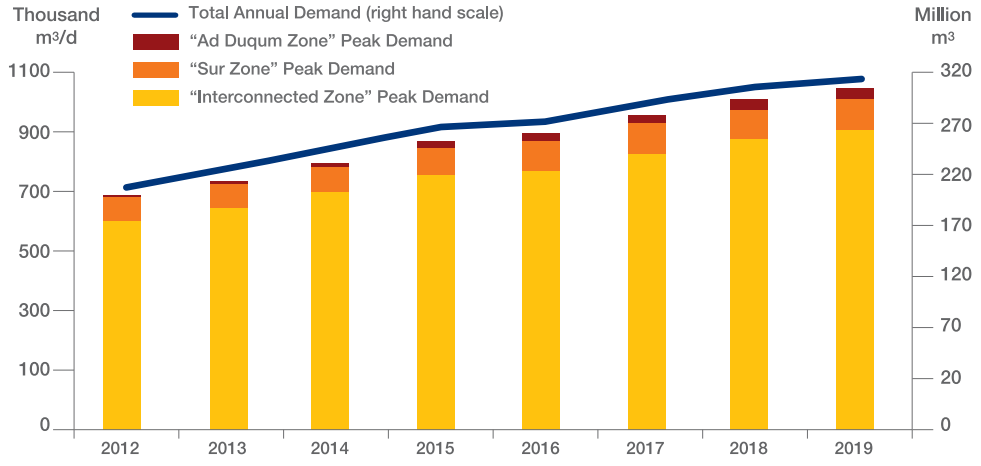
2 *Existing grid connections can now support up to 400 MW of temporary generation. This level could potentially be increased with sufficient lead time. There currently is no agreement in place for commercial power exchanges over the Abu Dhabi Interconnect. However, surplus capacity is planned to be available from the Abu Dhabi system as well as from other Member States of the GCCIA, such that there is the prospect of firm capacity imports subject to agreement on commercial terms.*

3 *The projections provided by PAEW exclude (i) the Governorate of Musandam, the wilayat of Qurayyat in the Governorate of Muscat (until 2015), and the wilayat of Masirah in the Ash Sharqiyah South Governorate, which are expected to be served by PAEW from local supply sources; and (ii) the Governorate of Dhofar, which is the responsibility of the Directorate General of Water in the Office of the Minister of State and Governor of Dhofar, and is addressed in section 2.4. However, when the Wadi Dayqah project becomes operational in 2015, the wilayat of Qurayyat will also become connected to the Interconnected Zone. Hence from 2015 onwards, water demand of the wilayat of Qurayyat is included in the demand projections.*

- The **"Interconnected Zone"** includes the potable water demands of the Governorates of Muscat, Al Batinah North, Al Batinah South, Buraymi, Ad Dakhiliyah, and Ad Dhahirah,[4] and the process water demand for the Sohar Industrial Port area that is served by MISC.[5] The principal sources of water for this zone are the Ghubrah Power and Desalination Plant, Barka I and Barka II Power and Desalination Plants, and Sohar I Power and Desalination Plant.
- The **"Sur Zone"** includes the potable water demands of the Ash Sharqiyah North and Ash Sharqiyah South Governorates excluding Masirah wilayat. The principal source of water for this zone is the Sur Desalination Plant.
- The **"Ad Duqm Zone"** includes the potable water demands of the Al Wusta Governorate. This zone is served by a small desalination plant in Ad Duqm and a number of local water sources.

The projected peak water demands[6] for these three zones are shown in Figure 5 below. Peak demand represents the average daily demand (inclusive of network losses), during the week of the peak demand of the year, and is the basis for assessing resource capacity requirements. Based on the average demand figures,OPWP has estimated total annual demands and these are also shown in Figure 5.

Figure 5 Water Demand Projections – Main Supply Zones (excluding Dhofar)



4 *PAEW plans to extend its network to include Ad Dhahirah in 2017. From then onwards, 50% of Dhahirah water demand is considered to be supplied from the interconnected Zone, the balance to be supplied by the retained groundwater wells.*

5 *MISC has provided OPWP with a demand projection through 2019, but has specified that only the 2013 demand is to be met by OPWP supply. MISC expects that its own RO desalination plant will be commissioned in June 2013, and that from 2014 to 2019 this RO plant will meet MISC's water capacity requirements, with OPWP supply as backup only.*

6 *The demand projections comprise PAEW's base case scenario for the Interconnected Zone, Sur Zone, and Ad Duqm zone for the entire 2013-2019 period, and MISC's demand projection for the Sohar Industrial Port area for 2013 only (through June 2013). After June 2013, MISC water demand will be met by its own RO plant.*

	Est. 2012	2013	2014	2015	2016	2017	2018	2019	Ave.% Growth
Peak Water Demand					Thousand m^3/d				
«Interconnected Zone»[a]	647	685	735	788	802	856	898	926	5%
«Sur Zone»	73	77	79	85	89	91	93	98	4%
«Ad Duqm Zone»	3	8	13	18	23	25	30	32	44%
Total - All Zones	**722**	**769**	**827**	**891**	**914**	**973**	**1021**	**1056**	**6%**
Change from 2012-2018 Statement	5	43	65	79	69	101	119	n/a	
Total Annual Demand					million m^3				
All Zones	**218**	**236**	**254**	**271**	**278**	**294**	**307**	**316**	**5%**
Change from 2012-2018 Statement	9	21	27	29	26	34	38	n/a	

[a] *Peak water demand for the "Interconnected Zone" comprises data provided by PAEW and MISC.*

In overall terms, water peak demand is expected to increase at an average rate of around 6% per year over the seven year horizon – driven by increasing population, economic development and the build-out of water supply networks, but moderated to some extent by a major effort to reduce network losses. The highest growth rate is expected in the Al Duqm Zone, due to an accelerating level of economic activity.

The total water demands shown in Figure 5 indicate an increase in growth rate relative to the projections in OPWP's previous 7-Year Statement. PAEW reports recent sharp increases in the number of customers connected to the network, and significant increases in the water consumption per customer. More than 220,000 new customers are expected to be added by 2019. These factors contribute to a 10% increase in water demand relative to last year's forecast for the Interconnected Zone, and a 25% increase for the Sur Zone. PAEW also considers the possibility of a continuing trend of rising per-capita water consumption in an alternative scenario, which could increase demand by a further 10% by 2019 relative to the projection shown in Figure 5.

Desalination Capacity Requirement – "Interconnected Zone"

The water capacity requirement includes a reserve margin in excess of normal demand, to provide the additional water capacity necessary to recover the transmission and distribution networks in the event of a failure of the networks or a failure of supply from a desalination plant.[7] This represents a system security measure that is analogous to the generation security standard used to assess power generation capacity requirements. After an emergency, the water volumes in the PAEW reservoirs may be at a low level and will need to be replenished. Therefore, the capacity available to be drawn from desalination plants must be higher than normal demand, to allow for reservoir replenishment in the event of an emergency.

7 *This security measure was introduced by PAEW in 2011, referenced also as "headroom".*

The recommended security standard is that the 24-hour peak demand on the system should be available for supply within a 21-hour period. This means that a reserve margin of 14.3% over peak demand should be considered as a capacity requirement for both water supply sources and the water transmission system.[8]

PAEW has advised that it has several sources of water available in the Interconnected Zone that offset the water capacity requirement to be provided by OPWP. These include existing wells (after reducing the drawdown to assure maintenance of aquifer capacity), the Wadi Dayqah project (surface water reservoir), and a contract for surplus water capacity available from the MISC RO plant starting in 2013. The capacity requirement for desalinated water is the total water capacity requirement less the peak yield of these PAEW sources.

The principal sources of desalinated water for the "Interconnected Zone" include the following:

- Ghubrah Power and Desalination Plant, owned by GPDC and operated under a PWPA with OPWP. The Ghubrah Desalination Plant comprises six MSF units with a current capacity of approximately 167,000 m^3/d (37 MIGD). A temporary RO plant with capacity of 23,000 m^3/d (5 MIGD), owned by PAEW, is currently in operation at the Ghubrah site and expected to remain there through 2014.
- Barka I Power and Desalination Plants, owned by ACWA Power Barka and operated under a PWPA with OPWP. The Barka I plant has a desalination capacity of 91,200 m^3/d (20 MIGD) using MSF units, will be supplemented in 2013 by the addition of an RO plant having capacity of 45,000 m^3/d (10 MIGD).
- Barka II Power and Desalination Plant, owned by SMN Power Barka and operated under a PWPA with OPWP. The Barka II plant has a capacity of 120,000 m^3/d (26 MIGD), using RO technology.
- Sohar I Power and Desalination Plant owned by Sohar Power Company and operated under a PWPA with OPWP. The Sohar I plant has a desalination capacity of 150,000 m^3/d (33 MIGD), using MSF units.

A summary of the desalination capacity that is expected to be provided under these PWPAs over the 2013 – 2019 period is set out in Figure 6 on the following page. Current contracts provide for 551,000 m^3/d (121 MIGD) of desalination capacity in 2013, and 506,000 m^3/d (111 MIGD) in 2019, considering both new capacity additions and contract expirations during this period.

The main developments over the 7-year period are:

- At Ghubrah, the PWPA provides that desalinated unit 2 will drop out of contract in 2013. However, OPWP plans to extend the contract period by 2 years until the Ghubrah IWP (see below) comes into service. All remaining units at the existing Ghubrah plant will fall out of contract by March 2018.

8 The 24-hour peak capacity requirement available in a 21-hour period corresponds to (24/21) x peak demand = 1.143 x peak demand, hence a 14.3% reserve margin.

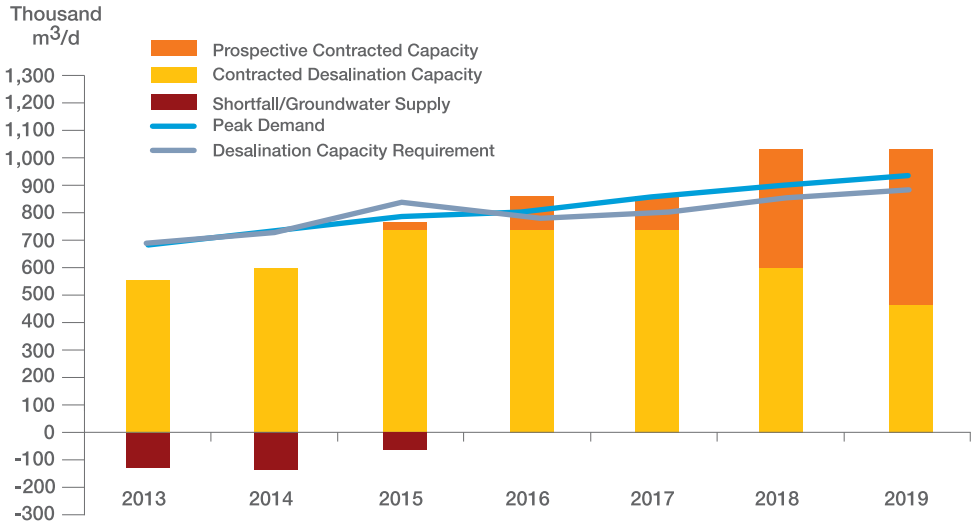
- MISC is developing a desalination plant utilizing RO technology, with capacity of 20,000 m^3/d (4 MIGD), to be commissioned in June 2013. MISC projects that this plant will meet all of its water demand from 2013 to 2019, and that MISC will require only backup water supply from OPWP during this period in case of shutdown of their RO plant.
- A new RO plant is under construction by ACWA Power Barka, adding 45,000 m^3/d (10 MIGD) at the Barka I site, to be available from October 2013.
- A new plant, the Ghubrah IWP, is under construction by OPWP at a site adjacent to the existing Ghubrah Power and Desalination Plant. The Ghubrah IWP will use RO desalination technology, and will be contracted to provide 191,000 m^3/d (42 MIGD) upon commissioning in October 2014.
- The Ghubrah desalination capacity is currently supplemented by a temporary RO plant, which provides water directly to PAEW, with a capacity of 23,000 m^3/d (5 MIGD). PAEW has indicated that it expects this plant to remain in place at Ghubrah until 2014, once the new IWP is fully operational. This temporary RO plant is then planned for relocation to Ad Duqm.
- The PWPA for Barka I will expire in April 2018. This would reduce contracted desalination capacity by 136,200 m^3/d (30 MIGD), including the new RO plant. OPWP is considering options for contract extension, as it is expected that the plant will have considerable remaining service life upon contract expiration.

In addition to these developments at the existing plant sites, OPWP is planning for two major additions of desalination capacity at new locations: Qurayyat and As Suwayq. The Qurayyat plant is considered at about 180,000 m^3/d (40 MIGD), which may be developed for 2016, or as two phases of 90,000 m^3/d (20 MIGD) each for service in 2016 and 2018 respectively. The Suwayq plant is planned to have capacity of up to 225,000 m^3/d (50 MIGD) potentially to be in service in 2018. Both plants would utilize RO technology.

OPWP has also received a preliminary, unsolicited proposal from SMN Barka Power Company regarding the potential production of additional water capacity. The proposal is to produce around 30,000 m^3/day (6 MIGD) from RO units fed by beach wells to be located near the existing Barka II plant site. As of this writing, this recently received proposal is still under consideration.

Figure 6 below provides a summary of the demand/supply balance in the Interconnected Zone over the 2013- 2019 period. Considering the recent developments in demand, significant capacity shortfalls are now expected from 2013 to 2015, despite the addition of the Ghubrah IWP in October 2014. The Qurayyat plant will resolve the supply constraint in 2016, and then provide sufficient supply margin for the timely addition of the As Suwayq plant in 2018.

Figure 6 Desalination Capacity Reserve/Shortfall – "Interconnected Zone"



	2013	2014	2015	2016	2017	2018	2019
Interconnected Zone				Thousand m³/d			
Peak Water Demand	685	735	788	802	856	898	926
Water Capacity Requirement	791	837	890	928	975	1,022	1,056
Less: Peak Yield of PAEW Sources	103	103	55	145	175	175	175
Desalination Capacity Requirement	**688**	**734**	**835**	**783**	**800**	**847**	**881**
Contracted Desalination Capacity							
Ghubrah Power and Desalination Plant	167	167	140	140	140	-	-
Temporary Units at Ghubrah	23	23	-	-	-	-	-
Barka I Power and Desalination Plant	91	91	91	91	91	91	-
Barka II Power and Desalination Plant	120	120	120	120	120	120	120
Sohar I Power and Desalination Plant	150	150	150	150	150	150	150
Ghubrah Desalination Plant IWP	-	-	191	191	191	191	191
Barka I Capacity Addition	-	45	45	45	45	45	-
Total Contracted Desalination Capacity	**551**	**596**	**737**	**737**	**737**	**597**	**461**
Reserve or (Shortfall/Groundwater Supply Required)	**(137)**	**(138)**	**(98)**	**(46)**	**(63)**	**(250)**	**(420)**
Prospective Contracted Capacity							
New Qurayyat Desalination Plant	-	-	-	90	90	180	180
Barka I Contract Extension	-	-	-	-	-	-	136
New As Suwayq Desalination Plant	-	-	-	-	-	225	225
Barka II Capacity Addition	-	-	30	30	30	30	30
Total Prospective Contracted Capacity	**-**	**-**	**30**	**120**	**120**	**435**	**571**
Reserve or (Shortfall/Groundwater Supply Required)	**(137)**	**(138)**	**(68)**	**74**	**57**	**185**	**151**

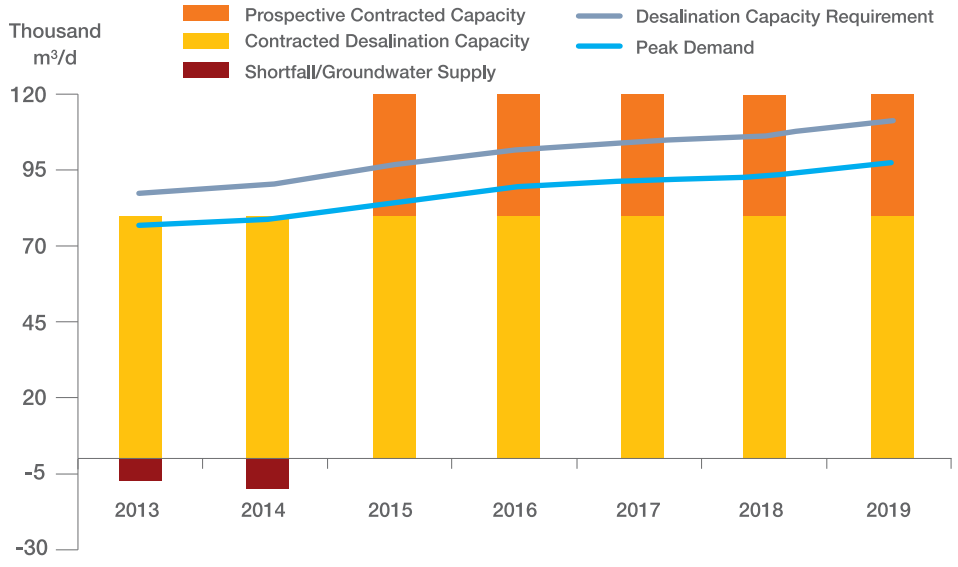
Desalination Capacity Requirement – "Sur Zone"

In the Sur Zone, water peak demand has recently accelerated, and the current PAEW forecast is 25% higher than the projection last year. This increase is due primarily to expansion of the network and a sharp increase in per-capita consumption, particularly as consumers shift from tanker supply to network supply.

The principal source of water for the "Sur Zone" is the Sur Desalination Plant, owned by Sharqiyah Desalination Company and operated under a water purchase agreement with PAEW. The Sur plant has a capacity of approximately 80,000 m^3/d (18 MIGD), using RO technology.

Figure 7 below provides a summary of the demand/supply balance in the Sur Zone during the 2013-2019 period. This indicates that the Sur Desalination Plant capacity at can no longer meet projected demands. The near-term shortfall will be met by reactivating strategic well fields, while OPWP plans to initiate procurement in 2013 of 40,000 m^3/d (9 MIGD) of additional capacity, to be in service by the end of 2015.

Figure 7 Desalination Capacity Reserve/Shortfall – "Sur Zone"



	2013	2014	2015	2016	2017	2018	2019
Sur Zone				Thousand m^3/d			
Peak Water Demand	77	79	85	89	91	93	98
Water Capacity Requirement	87	90	96	102	104	106	111
Contracted Desalination Capacity							
Sur Desalination Plant	80	80	80	80	80	80	80
Reserve or (Shortfall/Groundwater Supply Required)	(7)	(10)	(16)	(22)	(24)	(26)	(31)
Prospective Contracted Capacity							
Capacity Addition			40	40	40	40	40
Reserve or (Shortfall/Groundwater Supply Required)	(7)	(10)	24	18	16	14	9

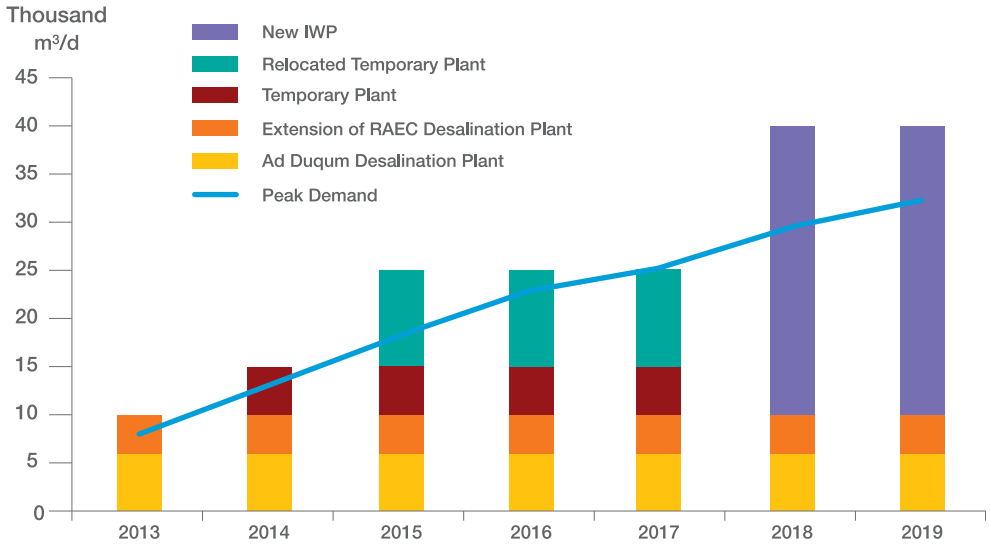
Desalination Capacity Requirement – Ad Duqm Zone

The Ad Duqm Zone is currently served by a 6,000 m^3/d (1 MIGD) desalination plant owned by RAEC in Ad Duqm town, and a number of local water sources. Demand in this area is expected to increase rapidly in the coming years as a result of the Government's development plans. In order to minimize dependence on groundwater supplies, the following measures for additional desalination capacity are planned by PAEW:

- an extension of the RAEC Desalination Plant by 4,000 m^3/d (1 MIGD) in 2013;
- addition of a temporary plant with capacity 5,000 m^3/d (1 MIGD) in 2014;
- addition of another temporary plant with capacity 10,000 m^3/d (2 MIGD) in 2015 (to be relocated from the Ghubrah site); and
- a new IWP of 30,000 m^3/d (7 MIGD) capacity in 2018.

Figure 8 below provides the demand/supply balance during the forecast period.

Figure 8 Desalination Capacity Reserve/Shortfall – "Ad Duqm Zone"



	2013	2014	2015	2016	2017	2018	2019
"Ad Duqm Zone"				Thousand m³/d			
Peak Water Demand	8	13	18	23	25	30	32
Contracted Desalination Capacity							
Ad Duqm Desalination Plant	6	6	6	6	6	6	6
Reserve or (Shortfall/Groundwater Supply Required)	(2)	(7)	(12)	(17)	(19)	(24)	(26)
Prospective Contracted Capacity							
Extension of RAECo Desalination Plant	4	4	4	4	4	4	4
Temporary Plant	0	5	5	5	5	0	0
Relocated Temporary Plant	0	0	10	10	10	0	0
New IWP	0	0	0	0	0	30	30
Total – Contracted + Prospective	10	15	25	25	25	40	40
Reserve or (Shortfall/Groundwater Supply Required)	2	2	7	2	0	10	8

1.5 COMBINING POWER GENERATION AND WATER DESALINATION

Introduction

In developing its plans for procuring power generation resources, OPWP is required to consider the opportunity for combining power generation with water desalination so as to benefit from economies of co-location and co-procurement. Most recently in the MIS, the Barka II Power and Desalination Plant involved the combined development of new power and desalination capacity.

Potential for Future Combined Power Generation and Desalination

As discussed in Section 1.4 above, two large desalination plants are planned during the 7-year planning period, at Qurayyat and As Suwayq, with service dates in 2016 and 2018. Of these two locations, the Qurayyat site is considered a relatively poor choice for power. It is relatively distant from the gas transmission network and electricity transmission grid, and the mountainous terrain between the site and such facilities would make the necessary connection lines quite costly. However, the As Suwayq site is situated quite near to power and gas transmission lines between Barka and Sohar. Hence of the two sites, As Suwayq is more amenable to a co-located power and water facility.

OPWP plans to move ahead with the next water desalination plant at Qurayyat for a 2016 start, on a water-only basis (IWP). OPWP will conduct further study regarding the feasibility of a co-located power and water plant (IWPP) at As Suwayq for operation in 2017/2018, as both power and water are required in this timeframe. Although the As Suwayq site will be evaluated for co-location of power and water, the desalination technology is planned to be Reverse Osmosis (RO), which allows independent operation from the power plant. OPWP will consider the potential economic advantages of shared infrastructure and a shared procurement process, as well as potential timing constraints on infrastructure requirements.

The plans for potential combined power and water development are also being evaluated in OPWP's Ad Duqm study, which is expected to be completed in 2013.

1.6 PROCUREMENT ACTIVITIES

OPWP's current procurement activities for the MIS include preparations for 2013 tenders for additional water desalination capacity at Sur, the new water desalination plant at Qurayyat, and conclusion of negotiation and contract execution for a 100 MW IPP in Musandam Governorate (which is not connected to the MIS). Also in 2013, OPWP will complete several studies to support future procurement activities, including a coastal study to identify the potential sites for the next major power generation plants after Sur, a strategic study of options regarding the expiring PPA and PWPA contracts, and the Ad Duqm Study. This year, OPWP also takes over from PAEW the data collection stations intended to support future procurement of solar power plants.

Future Procurement

From 2014 to 2019, OPWP anticipates the following procurement actions:

- One or more new power generation facilities with aggregate capacity in the range of 2250-3000 MW for commercial operation in 2017/2018, at a site to be determined, and expected to be tendered in 2014. At least 700 MW is to be in service by summer 2017 and the balance in 2018;
- A new water desalination plant with capacity of up to 225,000 m^3/d (50 MIGD) for commercial operation in 2018, to be located at As Suwayq, and expected to be tendered in 2014;
- One or more solar plants with capacity up to 200 MW, subject to government approval, and expected to be tendered in 2014 for 2017 operation;
- Potential contract extensions for generation capacity at Wadi Jizzi in 2015 and Al Kamil in 2017, and for generation and desalination capacity at Barka I in 2018. OPWP's strategic study of these expiring contracts is currently exploring a variety of contract mechanisms including competitive market options. An action plan is expected by early 2014 after a series of public workshops and consultative sessions on the strategic options. OPWP anticipates that, subject to regulatory approval, some of these contracts may be extended for a transitional period of a few years after which further extensions may be made available under new contract forms.
- A new water desalination plant with capacity of about 30,000 m^3/d (6 MIGD) at Ad Duqm, for commercial operation in 2018, and a new power generation plant also at Ad Duqm for service in about the same time frame. The generation capacity of the power plant, specific timing, and prospect for co-location with the water desalination plant are expected to be specified after the completion of OPWP's ongoing Ad Duqm Study, for completion in 2013. Procurement activities may begin in 2014.

In addition to these specific projects, OPWP expects that by around 2017, procurement activities will begin for another major power station for commercial operation in about 2021, and for additional desalination capacity which is currently expected to be a second phase development at Qurayyat in 2020 or 2021. These projects will be defined further in time, particularly depending on developments in demand growth and system requirements.

Long-Term Considerations

OPWP works closely with the Government toward developing a coordinated long-term strategy for electricity and water supply. A number of studies are planned or in progress in 2013 which will bear on OPWP's long-term plans. They include the following, considered below on an issue by issue basis:

- Fuel Security and Diversity of Supply: although all power generation plants under contract to OPWP are fueled by natural gas, other fuels are considered for the future. OPWP plans

to update an earlier study of resource options to consider technology developments and current expectations of long-term fuel prices and plant costs. PAEW plans to launch a strategic study in 2013 to consider national fuel policy, in association with other critical government stakeholders. OPWP also coordinates closely with MOG regarding the availability and requirements of natural gas supply for future power generation plants;

- Energy Efficiency and Demand Side Management: PAEW will complete a Master Plan for Energy Conservation in 2013, and OPWP expects to cooperate with all the sector companies as measures are selected for implementation over the coming years. Such measures would likely affect forecasts of long-term demand growth and influence generation expansion planning, and OPWP may have a role in associated pricing programs; and
- Regional Interconnects: the MIS transmission grid is now interconnected with Abu Dhabi and the Gulf Cooperation Council Interconnection Agency (GCCIA), which presents opportunities for energy trading in the future as well as providing security of supply. OPWP participates in the Planning and Operations Committees of the GCCIA, and will evaluate the potential advantages of commercial arrangements for energy trade in the coming years.
- Transmission System Developments: OPWP coordinates with OETC regarding the operation and economic dispatch of the power system, and regarding plans for development of new power generation plants and their demands on the transmission grid. OETC has initiated a Master Plan for Transmission System Development in 2013, and OPWP will coordinate with this effort, in particular in consideration of siting options for new power generation.

The aim of this work will be to establish a basis for the planning and procurement of future power generation (and associated water), consistent with the Government's broader economic strategy and policy objectives.

1.7 FUEL REQUIREMENTS

2012 Fuel Usage

The primary fuel resource for power generation and associated water production in the MIS is currently natural gas, supplied to power and desalination plants by the Ministry of Oil & Gas (MOG). Total gas consumption at the main power and desalination plants in 2012 was about 6.7 billion Sm^3 (equivalent to 18.4 million Sm^3/d), an increase of around 13% over 2011.[9] The peak daily gas consumption during 2012 was 24.7 million Sm3, also an increase of 13% from 2011.

A relatively small amount (about 2.4 million litres in total) of diesel fuel was used by temporary generation facilities connected to the MIS during the summer of 2012 for peaking purposes. In energy-equivalent terms, this represented only 0.04% of the total MIS fuel consumption.

9 This total excludes gas consumed by industries and other parties.

Projected Fuel Requirements

OPWP has prepared indicative projections for the fuel requirements of the MIS over the 2013-2019 period, under the Expected, Low Case and High Case demand scenarios.

These projections are based on a number of key assumptions, including:

- all generation is assumed to be gas-fueled other than the prospective solar plant(s) and the planned diesel-fueled temporary generation;
- solar plant(s) are assumed to provide around 50 MW on average over the daily cycle (representing about 1-2% of total MIS energy) from 2017 onwards; and
- new gas-fueled generation is assumed to have a similar fuel efficiency to the Sur plant.

The projections are shown in Figure 9 below.

Overall fuel consumption is expected to increase at an average rate of about 6% per year – lower than the expected growth rate of electricity demand of about 10% per year. Under the Low Case demand scenario, fuel consumption increases at an average of 3% per year, whilst in the High Case demand scenario, it grows at an average rate of 8% per year – in both cases below the rate of growth of electricity demand.

The projected growth rate is higher than in previous 7-Year Statements, and OPWP has considered this change carefully. The Sultanate has seen double-digit growth in electricity consumption in four of the past five years, as even the one year of single-digit growth was weather-induced (Cyclone Phet in 2010). This has occurred despite the backdrop of the most severe global economic downturn in decades. During this period, the government has invested heavily in infrastructure projects intended to promote future economic growth.
The infrastructure development commitments are committed to continue at least through the end of the current 5-Year planning period to 2015. The government is also committed to jobs growth in both public and private sectors. These factors lie behind the current forecast, which projects underlying growth in the residential, commercial, governmental and small- to medium-scale industrial sectors to match the average growth rates of the past 5-7 years. Regarding large industrial developments, this forecast considers a somewhat lower growth rate than seen recently, considering the potential impact of recent initiatives to increase prices of gas and electricity for the largest customers toward cost-reflective levels.

The growth rate in fuel requirements by the power sector will be slowed by continuing improvements in the efficiency of power supply. The full commissioning of the Sohar II and Barka III plants in 2013 and the Sur IPP in 2014 is expected to result in a significant improvement in overall gas utilization efficiency, based on these plants using newer, more fuel-efficient technology than existing plants. Indeed, it can be seen that the addition of these plants is expected to reduce total fuel consumption in 2013, compared to the 2012 level, under all but the High Case demand scenario. The expected addition of the solar plant(s) in 2017 substitutes about 1-2% of MIS energy that would otherwise be generated using gas.

Gas Availability

OPWP consults with MOG on a regular basis, in order to confirm the future availability of gas for power generation (and associated water production) and to co-ordinate planning.

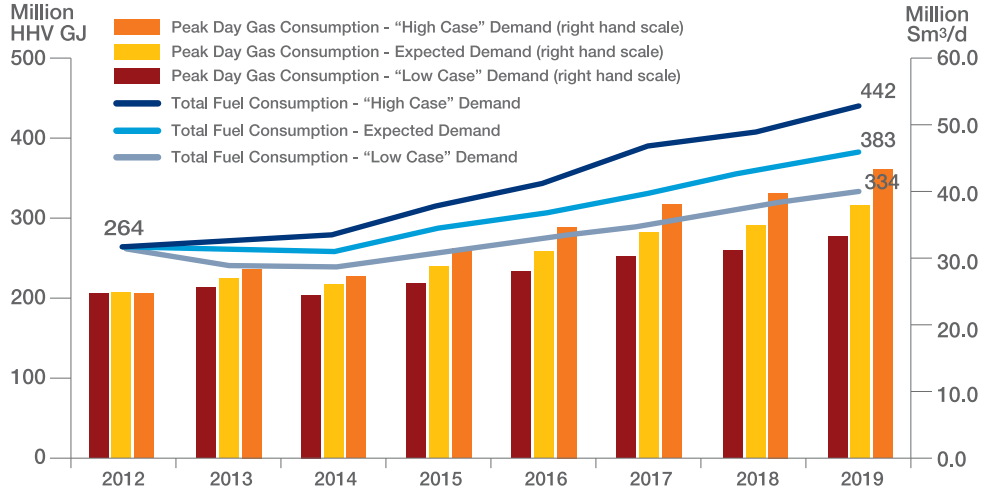
MOG has provided OPWP with an overall medium-term committed gas allocation for power generation (and associated water production) that is expected to be sufficient to cover the projected requirements through 2016 under the Low Case scenario, and through 2014 under the Expected Demand and High Case scenarios.[10] Additional overall quantities, and supplies to new projects, remain subject to future MOG confirmation, though MOG has indicated that the power and water sector is, as a matter of Government policy, to be given a high priority in future gas allocations.

However, should further required gas allocations not be available to the power and water sector, then (in addition to pursuing fuel-efficiency improvement options) OPWP would likely need to:

- make use of optional arrangements included in the Barka III and Sohar II PPAs for dispatch on liquid fuel instead of gas;
- discuss with the Government the feasibility of importing gas specifically for use in power generation (and associated water production); and/or
- bring forward plans to procure new generation capacity based on a fuel other than gas.

OPWP will continue to consult closely with MOG with regard to all of these matters.

Figure 9 Projected Fuel Requirements – MIS



10 This overall reservation relates to the combined gas requirements of the MIS and the Salalah System.

	Actual 2012	2013	2014	2015	2016	2017	2018	2019	Ave.% Growth
Expected Demand									
Gas Consumption (million Sm^3/d)									
Annual Average	18.4	18.0	18.2	20.2	21.5	23.3	25.2	26.9	6%
Peak Day	24.7	26.8	26.1	28.8	31.0	33.8	34.9	37.8	6%
Diesel Fuel Consumption (million litres)	2.8	-	-	-	-	0.0	-	-	n/a
Total Fuel Consumption (million HHV GJ)[a]	**264**	**256**	**259**	**288**	**308**	**332**	**359**	**383**	**6%**
Gas	263	256	259	288	308	332	359	383	6%
Diesel Fuel	0.1	-	-	-	-	0.0	-	-	n/a
Low Case Demand									
Gas Consumption (million Sm^3/d)									
Annual Average	18.4	17.0	16.9	18.1	19.3	20.6	22.2	23.4	3%
Peak Day	24.7	25.7	24.6	26.2	28.0	30.3	31.2	33.4	4%
Diesel Fuel Consumption (million litres)	2.8	-	-	-	-	-	-	-	n/a
Total Fuel Consumption (million HHV GJ)[a]	**264**	**242**	**241**	**257**	**275**	**293**	**316**	**334**	**3%**
Gas	263	242	241	257	275	293	316	334	3%
Diesel Fuel	0.1	-	-	-	-	-	-	-	n/a
High Case Demand									
Gas Consumption (million Sm^3/d)									
Annual Average	18.4	19.0	19.6	22.2	24.2	27.2	28.7	31.0	8%
Peak Day	24.7	28.3	27.4	31.2	34.7	38.0	39.7	43.4	8%
Diesel Fuel Consumption (million litres)	2.8	-	-	-	0.3	26.9	-	1.8	n/a
Total Fuel Consumption (million HHV GJ)[a]	**264**	**271**	**280**	**316**	**346**	**389**	**409**	**442**	**8%**
Gas	263	271	280	316	346	388	409	442	8%
Diesel Fuel	0.1	-	-	-	0.0	1.0	-	0.1	n/a

[a] *Based on natural gas HHV of 1050 BTU/scf*

SECTION 2 SALALAH SYSTEM

The Salalah System covers the city of Salalah and surrounding areas in the Governorate of Dhofar, serving around 70,000 electricity customers.

It currently comprises an integrated generation, transmission and distribution system, owned and operated by Dhofar Power Co. (DPC) pursuant to a Concession Agreement signed with the Government in 2001 and a new independent power generation and water desalination facility (the Salalah IWPP). DPC acts as the sole electricity supplier within the service area covered by the system, supplying existing and new electricity customers.

The Salalah System is interconnected with the power system of Petroleum Development Oman (PDO) via a 132 kV link between Thumrait and Harweel. This interconnection provides important reliability benefits through the sharing of generation reserves.

OPWP's role in the Salalah System is twofold. Firstly, it acts as counter-party to the Concession Agreement in place of the Government. And secondly, it performs a similar role as in the MIS, economically procuring the required power and desalinated water in bulk from generation/production facilities connected to the Salalah System and PDO interconnected system. OPWP is required to ensure that sufficient power generation resources are available to meet DPCs' demands and, wherever beneficial, to co-procure desalinated water to meet the needs of the water department in the Governorate of Dhofar.

A process is underway to restructure DPC and the delivery of power in the Salalah System to align with the regulatory structure that governs the MIS. As this proceeds, OPWP will ultimately have the same role in the Salalah System as it has in the MIS.

2.1 DEMAND FOR ELECTRICITY

Historical Demand

Electricity demand growth in 2012 tracked closely to expectations of the last 7-Year Statement. Average demand increased by 12% to 256 MW (corresponding to 2.25 TWh). The peak demand was 389 MW[11], an increase of 12% over the 2011 peak demand.

The average annual growth rate in peak demand over the past 5-7 years has been between 9% and 10%, while single-year growth has reached as high as 15%. The ten-year average growth rate is also about 9%. This rapid development rate has been shared among all principal consumer sectors.

11 DPC reported the peak demand for the Salalah System as 389 MW at 11:31 pm on Monday, June 4th, 2012.

Demand Projections

OPWP's 7-year electricity demand projections for the Salalah System have been developed after consultation with DPC and representatives of the industrial sector. The projections have been developed in a similar manner as for the MIS: (1) the projected demands represent the "net system demand", in that they are inclusive of assumed transmission and distribution system losses but exclude the internal auxiliary consumption of power and desalination plants; (2) they are based on an assumption of "normal" weather; (3) they are built up from separate analyses of underlying demand, and certain bulk loads – comprising mainly industrial demands – that are assessed on a specific load-wise basis[12]; and (4) they are presented as a range with a Low Case, High Case and central, Expected Demand forecast.

The projections are summarized in Figure 10 below.

Under the Expected forecast, average demand in the Salalah System is expected to grow from 256 MW (corresponding to 2.25 TWh) in 2012 to 606 MW (5.31 TWh) in 2019, an average increase of around 13% per year. Similarly, peak demand is expected to grow at an average rate of about 12% per year, from 389 MW in 2011 to 848 MW in 2019.

The demand drivers in the Salalah system include population-driven residential growth, construction of commercial and government buildings, infrastructure development, new tourism projects, and industrial growth in designated economic zones. In the near term, committed industrial projects are expected to have a strong impact, although all sectors are growing rapidly. The growth rate of non-industrial sectors – "Underlying Demand" – is estimated at 9% over the forecast period. They account for the majority of growth in peak demand and nearly the same share of energy growth as large industrial loads.

Over the 7-year horizon, this Expected Demand scenario has a higher growth rate than in OPWP's previous 7-Year Statement. The current Expected Demand forecast is grounded in historical trends and projects assessed as committed in the short term. The Expected Demand forecast takes the average growth of Underlying Demand over the past five years, which is about the middle of the range of average growth rates considering the past 5-10 years. Growth in Bulk Loads – primarily industrial projects – is limited to committed projects in the near term and a conservative assessment of likely realization of identified, prospective projects. This year's forecast shows an increase in part because selected industrial projects that were earlier considered somewhat speculative, and considered only in the High Case demand scenario, are now considered as committed and included in Expected Demand.

The High Case scenario assumes a somewhat higher growth rate for Underlying Demand, based on the average growth rate of these loads over the past 7 years. Bulk Loads are assumed to have a somewhat higher realization rate than in the Expected Demand scenario. This scenario provides for 14% growth in average demand and 13% growth in peak demand.

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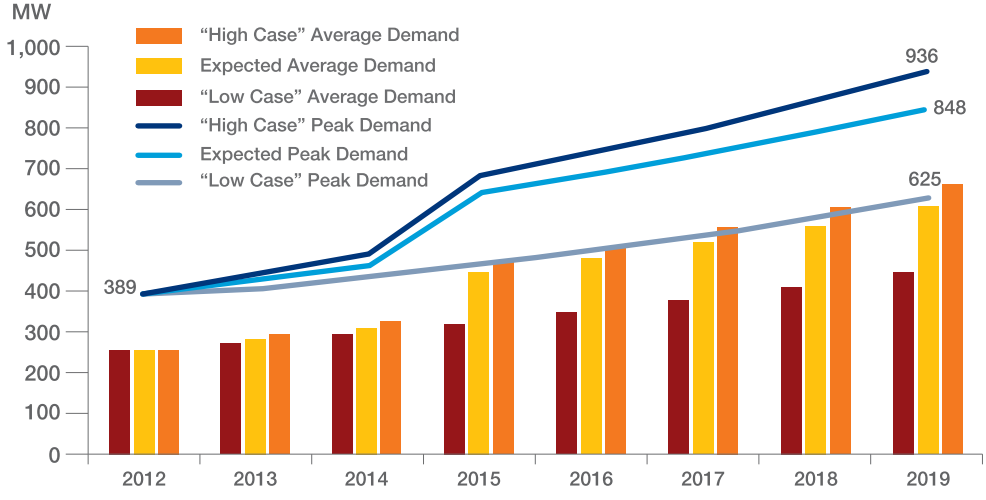
12 For the Salalah System, individual loads connected (or expected to be connected) to the transmission and distribution system at 33 kV or above are regarded as bulk loads for purposes of the projections.

The Low Case scenario considers lower growth in Underlying Demand, at 8% annual growth in average demand. This scenario also takes a more cautious outlook on Bulk Loads, considering the possibility that even some committed projects may not materialize due to unanticipated difficulties. These assumptions result in an aggregate growth rate of 8% in average demand and 7% in peak demand.

As in the case of the MIS, the Low Case and High Case scenarios are intended to represent the range of reasonably credible future demand paths around the expected demand projection, against which the requirements for generation resources need to be assessed and an appropriate generation procurement strategy developed.

Figure 10 Electricity Demand Projections – Salalah System



	Actual 2012	2013	2014	2015	2016	2017	2018	2019	Ave.% Growth
Expected Demand									
Average Demand (MW)	256	282	310	448	481	520	561	606	13%
Underlying Demand	189	203	220	240	262	288	315	347	9%
Bulk Loads	67	79	90	208	219	232	245	259	21%
Annual Energy (TWh)	**2.25**	**2.47**	**2.71**	**3.92**	**4.23**	**4.55**	**4.91**	**5.31**	**13%**
Peak Demand (MW)	**389**	**424**	**462**	**641**	**686**	**736**	**789**	**848**	**12%**
Change from 2012-2018 Statement (MW)	-5	-9	-18	110	103	99	101	n/a	
Low Case Demand									
Average Demand (MW)	256	271	293	318	345	377	411	448	8%
Underlying Demand	189	194	210	229	245	267	290	315	8%
Bulk Loads	67	78	84	89	100	110	121	133	10%
Annual Energy (TWh)	**2.25**	**2.38**	**2.57**	**2.79**	**3.03**	**3.30**	**3.60**	**3.92**	**8%**
Peak Demand (MW)	**389**	**404**	**431**	**463**	**498**	**536**	**579**	**625**	**7%**
Change from 2012-2018 Statement (MW)	31	13	4	0	-4	0	8	n/a	
High Case Demand									
Average Demand (MW)	256	292	326	471	510	556	605	659	14%
Underlying Demand	189	209	228	251	277	309	344	383	11%
Bulk Loads	67	83	98	220	233	247	261	276	22%
Annual Energy (TWh)	**2.25**	**2.56**	**2.86**	**4.12**	**4.48**	**4.87**	**5.30**	**5.77**	**14%**
Peak Demand (MW)	**389**	**443**	**492**	**682**	**738**	**798**	**864**	**936**	**13%**
Change from 2012-2018 Statement (MW)	-29	-51	-124	-119	-141	-161	-177	n/a	

2.2 POWER GENERATION RESOURCES

Sources of Power

The Salalah System has two sources of contracted generation capacity and one source of contingency reserves. OPWP plans to issue a tender in 2013 for a third generation plant to begin operation in 2017, which corresponds to prospective capacity.

Contracted Capacity

The Salalah System is comprised of the following power generation resources which are contracted capacity:

- New Power Station (NPS), operated by DPC pursuant to the Concession Agreement. The NPS is located in Raysut and comprises eight OCGT units with a total net capacity of 276 MW.[13]

13 The net capacity of the Raysut NPS plant has been shown as 256 MW in previous 7-Year Statements. OPWP has updated the net capacity to 276 MW on the basis of recent performance tests.

- Salalah IWPP, operated under a PWPA with OPWP. The Salalah IWPP is a CCGT plant comprising five gas turbines and two steam turbines with combined net capacity of 445 MW. It is located in Taqa and began full-scale operation in 2012.

Prospective Contracts

OPWP plans to issue a tender for a second IPP (Salalah 2 IPP) with minimum capacity of 300 MW, located in Raysut at a site adjacent to the NPS. The tender is expected to be issued in May 2013 with a projected commercial operation date of January 2017.

Renewable resources have also been considered for the Salalah generation portfolio, although no prospective contract has been identified as yet. A 2011 generation expansion study identified potential for development of wind farms at Thumrait. PAEW plans to install instrumentation for collection of wind data in order to support further evaluation of this potential resource.

Contingency Reserves

An interconnection with the PDO Power System (via a 132 kV link between Thumrait and Harweel) was completed in 2012. Its purpose is to support reserve-sharing between the two systems, providing improved reliability by allowing each system access to unused reserve in contingency scenarios.

In addition to supporting reserve-sharing arrangements, the interconnection potentially supports "commercial" imports or exports between the two systems – based on their relative costs of generation. For much of the year, the Salalah System has surplus capacity available from highly efficient, combined cycle plant, providing opportunity for export to PDO for a net reduction in the gas required for power generation. The prospect of such commercial transfers using the interconnect is under consideration.

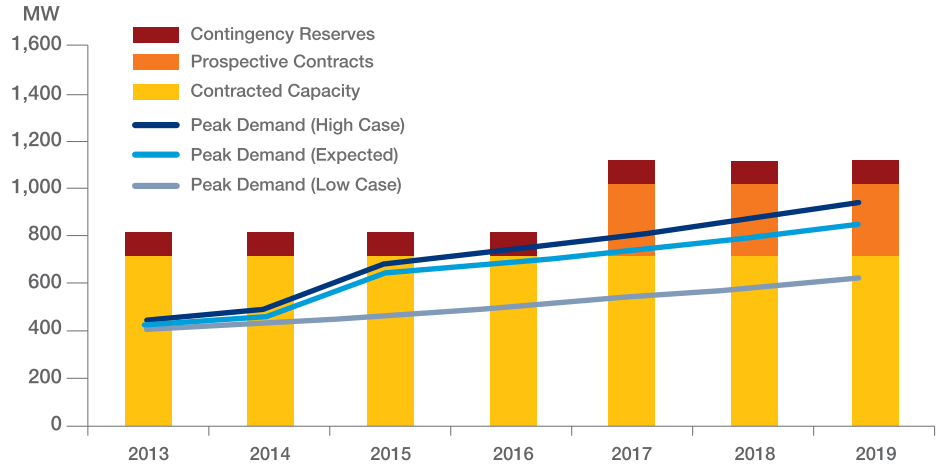
The nominal transfer capacity of the interconnection is around 150 MW, but the availability of import power is subject to transmission constraints in the PDO system. These factors will be reviewed in consultation with PDO on a year to year basis. Currently, it is expected that up to around 100 MW of import capability is available to the Salalah System.

Whilst expected to provide valuable contingency support and a potential source of economical energy in the short-term, the import capability of the interconnection is not considered to represent contracted capacity for resource adequacy purposes (such as LOLH calculations), but rather as contingency reserves.

Summary

Figure 11 below provides a summary of the currently contracted capacity and prospective contracted capacity, that OPWP expects to have access to for the Salalah System.

Figure 11 Total Power Generation Resources – Salalah System



	2013	2014	2015	2016	2017	2018	2019
				Net MW [a]			
Contracted Capacity							
Raysut New Power Station (DGC)	273	273	273	273	273	273	273
Salalah IWPP	445	445	445	445	445	445	445
Total – Contracted Capacity	**718**	**718**	**718**	**718**	**718**	**718**	**718**
Prospective Capacity Contracts							
Salalah 2 IPP [b]	-	-	-	-	300	300	300
Total – Contracted + Prospective Capacity	**718**	**718**	**718**	**718**	**1018**	**1018**	**1018**
Contingency Reserves							
PDO Interconnect [c]	100	100	100	100	100	100	100
TOTAL ALL RESOURCES	**818**	**818**	**818**	**818**	**1118**	**1118**	**1118**

[a] *All capacities are rated on a net basis (i.e. after allowing for auxiliary consumption inside the plants) at 35°C ambient temperature.*

[b] *The Salalah 2 IPP is shown at its minimum capacity level of 300 MW, although the project may be contracted at up to 400 MW.*

[c] *Provisional import capability*

2.3 ADDITIONAL POWER GENERATION REQUIREMENTS

Statutory and Regulatory Requirements

With the acquisition by the Electricity Holding Company during 2011 of substantially all of the shares in the Dhofar Power Company (DPC), and the delisting of DPC from the Muscat Securities Market, a process is underway to restructure DPC and the delivery of power in the Salalah System. A Ministerial Committee comprising representatives from the PAEW and the AER has been formed to oversee this restructure. During 2013 it is expected that the Salalah Concession Agreement between DPC and OPWP will be terminated and replaced by a power purchase agreement in respect of the NPS as a part of the DPC restructuring proposals. This process will ultimately bring the management of electricity in the Salalah System into line with the regulatory structure that governs the MIS.

As in relation to the MIS, OPWP is required by the Sector Law and its license to ensure the adequacy of generation resources in the Salalah System to meet future power demands. The Sector Law establishes OPWP's general responsibility to secure sufficient generation resources to meet demand. Although the OPWP license does not stipulate a specific generation security standard for the Salalah System, as it does for the MIS, it requires OPWP to ensure that electricity customers in the Salalah System receive a service generally of equivalent quality to that received by customers in the MIS.

This latter requirement implies compliance with the MIS standard of 24 hours LOLH, as a minimum. However, given the more limited level of contingency support available to the Salalah System relative to the MIS, OPWP has in practice applied a more stringent standard, to ensure the required service quality.

Future Capacity Requirements

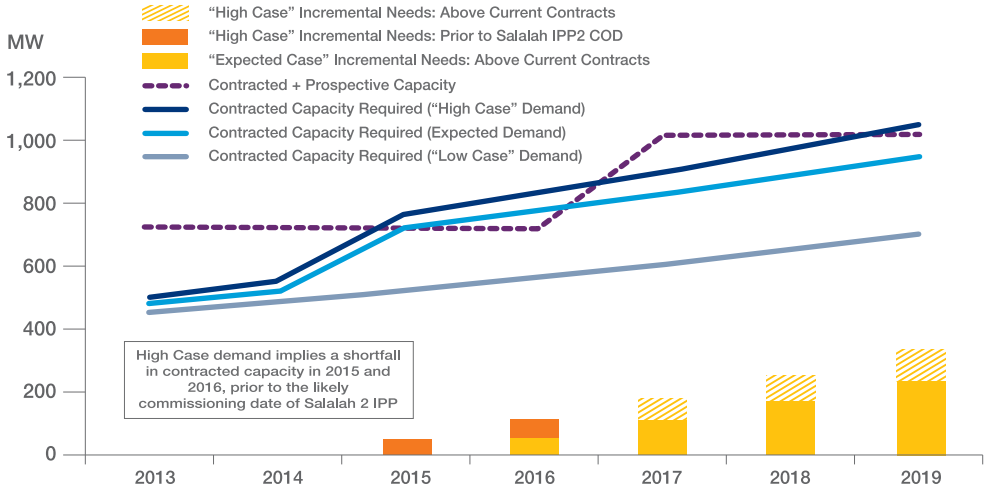
OPWP has determined the contracted capacity needed to comply with the security standard in each year during the 2013-2019 period, for each of the three demand scenarios. They are shown in Figure 12 below.

In the Expected Demand scenario, additional capacity is required as early as 2016. This date is too soon for the requirement to be met by the planned Salalah 2 IPP (COD 2017), but could be met by temporary generation. The amount of capacity required is modest, at 51 MW, and OPWP considers this can be met most effectively with rental generation units, considering that this capacity would be needed for a short period of time to cover summer peaks.

The High Case scenario would require additional capacity in both 2015 and 2016, whereas under the Low Case, currently contracted capacity provides a surplus through 2019. The maximum capacity need under the High Case is 108 MW in 2016, which is also considered best-addressed with temporary generation if required.

The High Case also shows a capacity need emerging potentially in 2019, at a modest level of 30 MW. If the Salalah 2 IPP is awarded at the upper end of the range to be included in the tender, at about 400 MW, then no additional capacity would be required by 2019 even in the High Case. Nevertheless, OPWP expects that the following capacity addition to this system, the Salalah 3 I(W)PP, may be required in the time frame of 2019-2021, depending on demand growth and the capacity of Salalah 2 IPP.

Figure 12 Future Power Generation Capacity Requirements – Salalah System



	2013	2014	2015	2016	2017	2018	2019
				Net MW			
Expected Demand							
Peak Demand	424	462	641	686	736	789	848
Contracted Capacity Required	474	517	718	769	824	884	950
Incremental Capacity Needed:							
Above Currently Contracts	-	-	-	**51**	**106**	**166**	**232**
Above Prospective Contracts (Salalah 2 IPP @ 300 MW)	-	-	-	**51**	-	-	-
Low Case Demand							
Peak Demand	404	431	463	498	536	579	625
Contracted Capacity Required	453	483	518	557	601	648	700
Incremental Capacity Needed:							
Above Current Contracts	-	-	-	-	-	-	-
Above Prospective Contracts (Salalah 2 IPP @ 300 MW)	-	-	-	-	-	-	-
High Case Demand							
Peak Demand	443	492	682	738	798	864	936
Contracted Capacity Required	496	551	764	826	894	968	1048
Incremental Capacity Needed:							
Above Currently Contracts	-	-	**46**	**108**	**176**	**250**	**330**
Above Prospective Contracts (Salalah 2 IPP @ 300 MW)	-	-	**46**	**108**	-	-	**30**

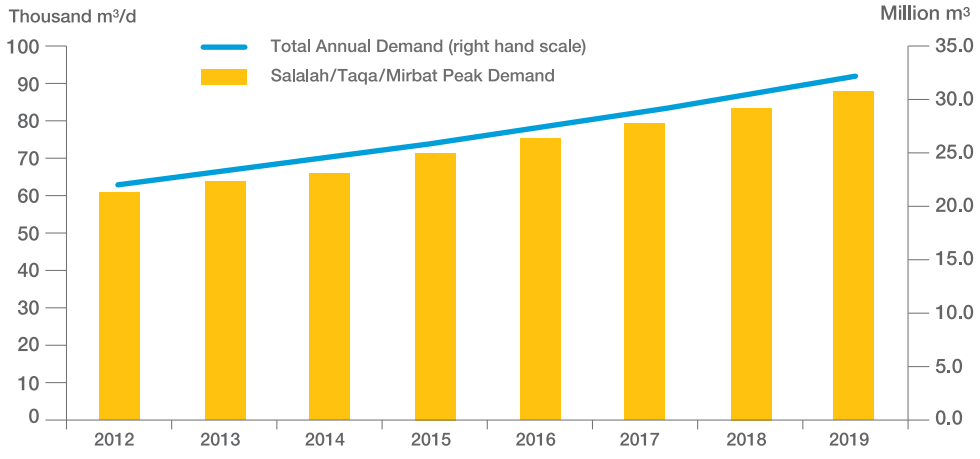
2.4 DESALINATED WATER REQUIREMENTS

Demand for Water

Water demand projections for the Governorate of Dhofar have been provided to OPWP by the Directorate General of Water in the Office of the Minister of State and Governor of Dhofar (DGW). Desalinated water is expected to supply the aggregated potable water demands of the Salalah, Taqa and Mirbat wilayats.[14] DGW has provided projections of these water demands for 2013 to 2019 in terms of peak demand and average daily demand, as shown in Figure 13 below.

Over the 7-year horizon, water demand in the Salalah/Taqa/Mirbat area is expected to increase at an average rate of nearly 6% per year. The main growth drivers are increasing population and economic development.

Figure 13 Water Demand Projections – Dhofar (Salalah/Taqa/Mirbat)



	Estimated 2012	2013	2014	2015	2016	2017	2018	2019	Ave.% Growth
Peak Water Demand				Thousand m³/d					
Total Salalah/Taqa/Mirbat	61	64	66	71	75	79	84	88	5.5%
Change from 2012-2018 Statement	-5	-6	-8	-8	-9	-10	-11	n/a	
Total Annual Demand				Million m³					
Total Salalah/Taqa/Mirbat	22	23	25	26	28	29	31	32	5.5%
Change from 2012-2018 Statement	-2	-2	-2	-3	-3	-4	-4	n/a	

14 *According to DGW, other demands in the Governorate of Dhofar are expected to be served from local supply sources.*

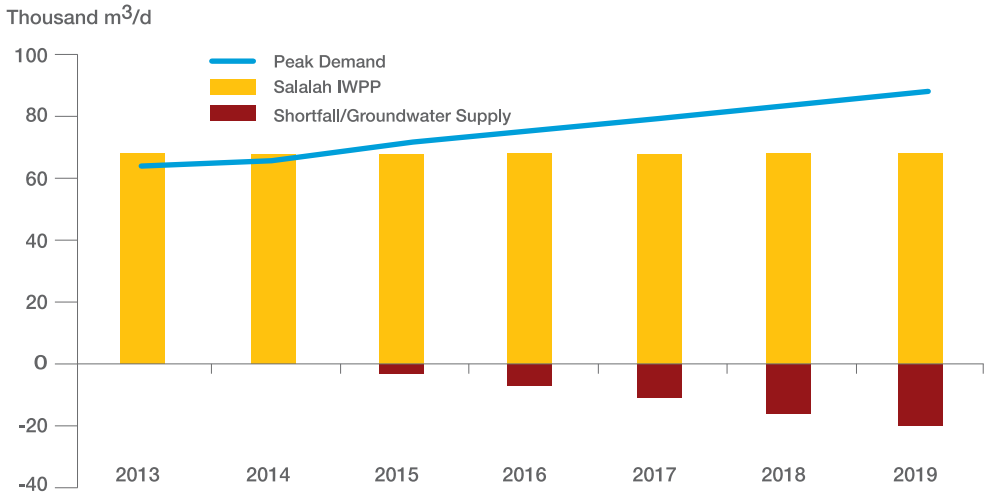
The current projections show a reduction of around 10% from those included in OPWP's previous 7-Year Statement. DGW has confirmed this reduction as the result of a revision to historical out-turns. It is acknowledged however that there remains an element of uncertainty in both groundwater production and consumer consumption, such that the basis for establishing the demand growth is not entirely firm. For this reason, the current forecast is considered indicative and future out-turns, in particular production from the Salalah IWPP, will be examined carefully toward establishing demand development.

Desalination Capacity Requirement

Demands for potable water in the Salalah/Taqa/Mirbat area have been met exclusively from groundwater resources before the introduction of the Salalah IWPP. The water desalination plant at the Salalah IWPP achieved full commercial operation in March 2012, with contracted capacity of 68,190 m^3/d (15 MIGD), using RO technology.

Figure 14 below provides a summary of the demand/supply balance. This demonstrates that the Salalah IWPP has sufficient capacity to meet water requirements initially, but that groundwater sources may be required to supplement this capacity during the peak period as early as 2015.

Figure 14 Desalination Capacity Reserve/Shortfall – Dhofar (Salalah/Taqa/Mirbat)



	2013	2014	2015	2016	2017	2018	2019
			Thousand m³/d				
Peak Water Demand	64	66	71	75	79	84	88
Desalination Capacity							
Salalah IWPP	68	68	68	68	68	68	68
Reserve or (Shortfall/Groundwater Supply Required)	4	2	(3)	(7)	(11)	(16)	(20)

DGW has advised OPWP that its medium-term objective is to minimize the use of groundwater under normal circumstances and reserve groundwater resources for contingency purposes. This would indicate additional water desalination capacity is needed in the near future. By 2019, up to 20,000 m³/d (4 MIGD) of additional desalination capacity may be required. If DGW were to implement a similar system security standard as PAEW, then the requirement for additional capacity may be as much as 33,000 m³/d (7 MIGD) by 2019, unless groundwater sources are maintained for security contingency. Nevertheless, such conclusions depend upon the demand forecast. DGW has advised OPWP that no commitment should be made to additional desalination capacity until the demand forecast is confirmed by observation of out-turns over the next few years.

2.5 COMBINING POWER GENERATION AND WATER DESALINATION

As in the MIS, OPWP is required to consider the opportunity for combining power generation with water desalination in the Salalah System, so as to benefit from economies of co-location and co-procurement. An assessment of these potential benefits led to the decision by OPWP to proceed with the Salalah IWPP – the first combined power and desalination plant to be developed in the Salalah System.

OPWP considered the Salalah 2 IPP tender as a potential opportunity for combining power generation and water desalination at one site. However, on advice from DGW as noted above, it will proceed as a power-only project because uncertainty in water demand growth implies that it is too soon to commit to additional desalination capacity by the 2013 tender date.

As needs for additional water desalination and power generation capacity are confirmed, OPWP will continue to assess the potential for economic benefit that may result from co-location and co-procurement.

2.6 PROCUREMENT ACTIVITIES

Current Projects

OPWP plans to issue a tender in May 2013 for the Salalah 2 IPP at Raysut with minimum capacity of 300 MW and maximum capacity of about 400 MW. This tender for new capacity will also include the sale of the existing NPS (273 MW), such that respondents will submit a combined bid for ownership of both plants. It is expected that, upon award in 2014, the successful bidder will take over ownership of the NPS (from DPC) under a PPA with OPWP, taking over the plant's operation, whilst also commencing construction of the new plant. The COD of the Salalah 2 IPP is projected as January 2017, at which time the combined capacity of the two plants is expected to be in the range of 556 MW to 656 MW.

Future Procurement

Three potential procurement activities may be anticipated over the subsequent period from 2014 to 2019:

- Temporary Generation. The demand forecast suggests that relatively modest electricity supply deficits may emerge before the Salalah 2 IPP achieves commercial operation. In the Expected Demand case, additional capacity in the range of 50 MW may be required in 2016. In the High Case, additional capacity in both 2015 (about 50 MW) and 2016 (about 110 MW). Temporary generation units are feasible at these levels.
- Additional Desalination Capacity. As presented above, once the rate of demand growth is confirmed, OPWP expects a need for additional water capacity at some point in this time horizon. This may be procured with a lead time of around three years on a water-only basis (IWP) if required. There is space available at Taqa near the existing IWPP for such a plant, as well as capacity in the water transmission pipeline to Salalah. Other sites may also be considered.

- Power Generation Capacity. The Salalah 2 IPP is expected to provide sufficient capacity to meet the generation security standard until around 2020 or 2021. Procurement activities to meet the next plant, nominally the Salalah 3 IPP (or potentially IWPP), are expected to begin around 2016, subject to demand requirements.

As noted in Section 2.2 above, there is a prospect of wind power generation in Dhofar, and PAEW plans to evaluate this resource potential. As yet, there is no government policy established with targets for renewable energy development. However, this could emerge as another procurement activity during the 2014 to 2019 period.

2.7 FUEL REQUIREMENTS

2012 Fuel Usage

Both power generation plants in the Salalah System use natural gas. Total gas consumption in 2012 was about 0.73 billion Sm^3 (equivalent to 2 million Sm^3/d), an increase of around 12% over 2011. The peak daily gas consumption increased by 14% to 2.4 million Sm3 in 2012 relative to 2011. The increase reflects the 12% growth in average demand during this period as well as displacement of diesel-fired generation used in 2011, by the Salalah IWPP which reached full operation in 2012.

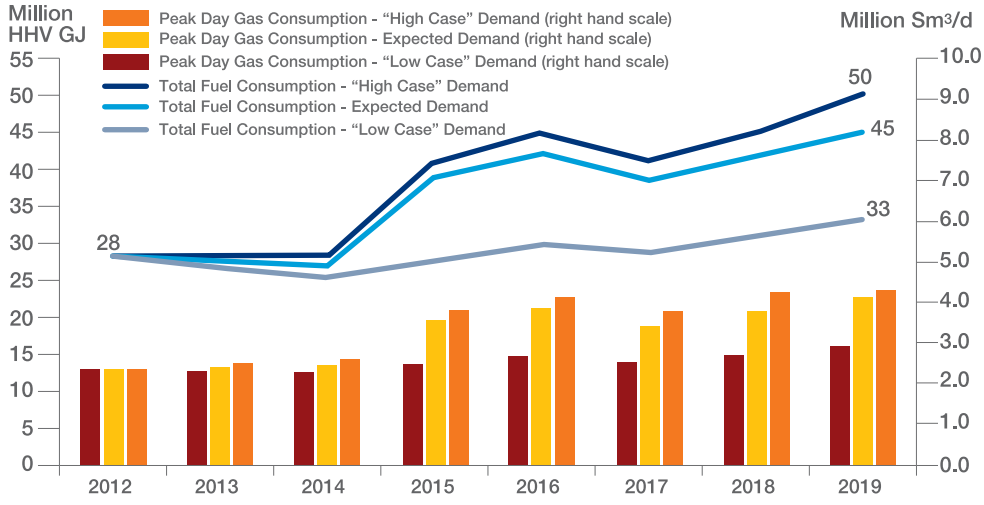
Projected Fuel Requirements

OPWP has prepared indicative projections for the fuel requirements of the Salalah System over the 2013-2019 period, under the Expected, Low Case and High Case demand scenarios. These projections are based on a number of key assumptions, including:

- new gas-fueled generation is assumed to be added in 2017, with a similar fuel efficiency to the Salalah IWPP;
- any generation shortfalls (such as in 2016 under Expected Demand, and in both 2015 and 2016 under the High Case) are met by diesel-fueled temporary generation; and
- the impact of potential "commercial" imports and/or exports over the PDO interconnection has not been included at this stage – to the extent that these ultimately take place then the projected quantities of diesel required may be reduced (if these requirements can be substituted with imported power) and/or the projected quantities of gas required may be increased by power exports (though this increase would likely be more than offset by reduced gas consumption within the PDO system).

The projections are shown in Figure 15 below.

Figure 15 Projected Fuel Requirements – Salalah System



	Actual 2012	2013	2014	2015	2016	2017	2018	2019	Ave.% Growth
Expected Demand									
Gas Consumption (million Sm³/d)									
Annual Average	2.0	1.9	1.9	2.7	2.9	2.7	2.9	3.1	7%
Peak Day	2.4	2.4	2.5	3.6	3.9	3.4	3.8	4.1	8%
Diesel Fuel Consumption (million litres)	-	-	-	-	0.1	-	-	-	n/a
Total Fuel Consumption (million HHV GJ)[a]	**28**	**27**	**27**	**39**	**42**	**38**	**41**	**45**	**7%**
Gas	28	27	27	39	42	38	41	45	7%
Diesel Fuel	-	-	-	-	0.0	-	-	-	n/a
Low Case Demand									
Gas Consumption (million Sm³/d)									
Annual Average	2.0	1.9	1.8	1.9	2.1	2.0	2.2	2.3	3%
Peak Day	2.4	2.3	2.3	2.5	2.7	2.5	2.7	2.9	3%
Diesel Fuel Consumption (million litres)	-	-	-	-	-	-	-	-	n/a
Total Fuel Consumption (million HHV GJ)[a]	**28**	**27**	**26**	**28**	**30**	**29**	**31**	**33**	**3%**
Gas	28	27	26	28	30	29	31	33	3%
Diesel Fuel	-	-	-	-	-	-	-	-	n/a
High Case Demand									
Gas Consumption (million Sm³/d)									
Annual Average	2.0	2.0	2.0	2.9	3.1	2.9	3.1	3.5	9%
Peak Day	2.4	2.5	2.6	3.8	4.1	3.8	4.3	4.3	9%
Diesel Fuel Consumption (million litres)	-	-	-	0.1	2.4	-	-	-	n/a
Total Fuel Consumption (million HHV GJ)[a]	**28**	**28**	**28**	**41**	**45**	**41**	**45**	**50**	**9%**
Gas	28	28	28	41	45	41	45	50	9%
Diesel Fuel	-	-	-	0.0	0.1	-	-	-	n/a

[a] *Based on natural gas HHV of 1050 BTU/scf*

Under the current projections, overall fuel consumption is expected to increase at an average rate of about 7% per year – substantially lower than the expected growth rate of electricity demand of about 13% per year. Under the Low Case demand scenario, fuel consumption increases at an average of 3% per year, whilst in the High Case demand scenario, it grows at an average rate of 9% per year – in both cases below the growth rate of electricity demand.

The lower growth rates in fuel consumption relative to electricity demand are mainly attributable to the addition of CCGT plants in the Salalah System. The impact of the addition of the Salalah 2 IPP in 2017 is particularly evident in the Expected Demand and High Case scenarios.

Modest levels of diesel fuel may be required for temporary generation units, for peaking purposes: in 2016 given Expected Demand, and in both 2015 and 2016 under the High Case demand scenario. The expected diesel fuel requirement is less than 10% of levels experienced in 2010 and 2011.

Gas Availability

OPWP consults with MOG on a regular basis, in order to confirm the future availability of gas for power generation (and associated water production) and to co-ordinate planning. In respect of the rapid growth rate in Salalah, and projected needs for the Salalah 2 IPP and later plants, it is particularly vital to secure future gas supply or identify a need for other fuel options. OPWP expects to secure the gas allocation for Salalah 2 IPP in 2013 before the tender issue, and to consult with MOG on the policy regarding gas supply for future plants.