الشركة العمانية لشراء الطاقة والمياه (ش.م.ع.م)

OMAN POWER AND WATER PROCUREMENT CO. (SAOC)

OPWP's 7-YEAR STATEMENT

(2011 – 2017)

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 (SAOG)
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

Introduction

This statement provides a 7-year outlook on the demands for electricity and desalinated water, and the power generation and water desalination resources required to meet those demands, in the two main systems in Oman – the Main Interconnected System (MIS) and the Salalah System.

OPWP prepares and publishes such a statement on an annual basis in accordance with Condition 5 of its license.

An overview of the key points of this year's statement, which covers the period from 2011 to 2017, is provided below. Further details in respect of each of the MIS and the Salalah System are provided in section 1 (starting on page 9) and section 2 (starting on page 35) respectively.

More information is available on the web at www.omanpwp.co.om.

Demand for Electricity – MIS

- After two years of remarkably strong growth in 2008 and 2009, electricity demand growth in the MIS slowed somewhat in 2010. Average demand increased 7% on the year, to 1924 MW (corresponding to 16.9 TWh of energy), whilst peak demand increased just 2% to about 3500 MW.[1] This followed two years of growth of around 12-13% per year in both average and peak demands.

- This slowdown was attributable in part to weather-related factors, in particular the effects of Cyclone Phet in June and lower peak summer temperatures in 2010 compared to the previous two years. But the slowdown is also believed to reflect to some degree the changing economic situation, and a return to more "normal" underlying growth trends after the very rapid economic, and related population, expansion seen in the Sultanate in the preceding few years.

- Looking back over the last 5-10 years, and smoothing out the impact of year to year variations caused by weather and the unusually rapid growth of 2008-2009, electricity demands in the MIS have grown at around 7-9% per year.

- OPWP's central 7-year demand projection for the MIS is broadly consistent with this medium-term trend. Average demand is expected to increase from 1924 MW (16.9 TWh) to 3464 MW (30.3 TWh) by 2017 – an average growth rate of about 9% per year. Peak demand is expected to increase at around the same rate, rising from 3500 MW to 6371 MW by 2017.

- In light of the uncertainty inherent in demand projections, OPWP also considers "low case" and "high case" scenarios, which are intended to represent the range of reasonably credible future demand paths around the central projection, or "expected demand" scenario.

- Under OPWP's "low case" scenario, demand growth is more moderate at about 6% per year – roughly equivalent to the growth rate seen through much of the 1990s. This results in peak demand reaching

[1] "Average demand" represents the average level of electricity demand over the whole year. "Peak demand" represents the highest level of electricity demand reached at any time during the year. The ratio of average to peak demand is known as the load factor and is an indicator of the degree of "peakiness" of demand. The total annual demand in energy terms is the multiple of the average demand and the number of hours in the year.

5402 MW by 2017, almost 1000 MW less than the expected peak demand. In contrast, under "high case" assumptions, demand growth returns to the 2008-2009 levels of 12-13% per year. This results in peak demand reaching 7899 MW by 2017, about 1500 MW higher than the expected peak demand and almost 2500 MW higher than in the "low case". OPWP has to consider the needs for generation resources across this range of potential outturns, and must develop its generation procurement strategy in the context of this uncertainty.

Additional Power Generation Requirements – MIS

- At present, the primary sources of power in the MIS are the existing power (and desalination) plants at Ghubrah, Rusail, Wadi Jizzi, Manah, Al Kamil, Barka (Phases I and II) and Sohar. The net power generation capacity of these plants – currently totaling around 3800 MW – is fully contracted to OPWP under long-term P(W)PAs. This "contracted capacity" is supplemented by a number of other resources able to provide power to the MIS – including the surplus generation of industries and other parties with captive power generation facilities, and interconnections with the PDO power system and (in the near future) Abu Dhabi.

- OPWP has determined that, in order to comply with the generation security standard stipulated in its license, it needs to enter into agreements in respect of 300 MW of temporary generation capacity for the summer of 2011. OPWP conducted a competitive procurement process during 2010 for the provision of this temporary capacity and expects to enter into the relevant agreements in the first quarter of 2011 – in time for the facilities to be installed and commissioned ahead of the summer peak demand period. The addition of this capacity is required to overcome a potential short-term shortfall during the summer of 2011, pending the commissioning of new IPPs in 2012, 2013 and 2014.

- Two of these new IPPs – Sohar II and Barka III – are currently under construction and are scheduled to be commissioned on a phased basis in 2012 and 2013. Each of these will add 495 MW of contracted capacity in 2012 and a further 250 MW in 2013, for a total addition of 1490 MW.

- OPWP launched during 2010 a competitive procurement process for a further new IPP, to be located at Sur in the Ash Sharqiyah region. Proposals for the Sur IPP are due to be submitted by pre-qualified developers during the first quarter of 2011, and a PPA is expected to be entered into with the successful developer before mid-year. The Sur IPP will have an installed capacity of 1500-2000 MW, and is expected to be fully commissioned before summer 2014. The PPA will also require that a minimum of 400 MW of capacity be made available on an interim basis during the summer of 2013.

- A further addition of contracted capacity is expected to be provided around 2015 as a result of a Government initiative to promote the development of one or more grid-connected solar power projects. Subject to the Government providing a final go-ahead, this is likely to involve OPWP conducting a competitive process for the provision of 100-200 MW of solar generation capacity for the MIS.

- A number of existing generation units are scheduled to fall out of contract in the coming years and some of these are expected to be permanently de-commissioned due to their age and condition. In addition, several short-term increases in capacity will expire, and the Al Kamil PPA will expire in its entirety in early 2017. In total, about 750 MW of existing contracted capacity is due to fall out of contract by 2017, though around 500 MW of this total is likely to remain available and could potentially be re-contracted.

- Taking into account all of these prospective additions and reductions, OPWP has calculated the minimum and maximum amounts of additional contracted capacity that it would need to procure in the 2012-2017 period – to ensure compliance with the generation security standard stipulated in its license – under the expected, "low case" and "high case" demand scenarios.

- The need for additional contracted capacity is highly dependent on the path of demand. The potential requirements by 2017 range from zero to over 2000 MW. The earliest that additional capacity might be needed is 2015, with a maximum requirement for 483 MW under the "high case" demand scenario. The maximum requirement rises to 2069 MW by 2017 under this scenario. In contrast, under the expected and "low case" scenarios, additional capacity may not be required until 2017 or even later.

- In this context, OPWP intends to plan towards an earliest potential in-service date of 2016 for the next major installment of new generation capacity in the MIS after the Sur IPP, and the potential solar project(s). In the event that demand growth appears to be tracking lower than the "high case" projection over the next year or so, it may be possible to push back this in-service date to 2017, or even 2018, prior to launching the relevant competitive procurement process – which would likely need to commence during 2012 to meet a 2016 in-service date. Under this timetable, any requirements in 2015 (in the event of demand growth following the "high case" path) may need to be met by short-term measures such as temporary generation, but given the maximum potential magnitude of the requirement this is seen as manageable.

Desalinated Water Requirements – MIS

- Water demand projections for the 2011-2017 period have been provided to OPWP by PAEW and MISC in respect of the Governorates of Muscat and Al Buraymi, and the Al Batinah, Ad Dakhiliyah, Ad Dhahirah, Ash Sharqiyah and Al Wusta regions.

- These show the overall demand for potable and industrial water increasing from around 163 million m^3 in 2010 to 278 million m^3 in 2017 – an average growth rate of around 8% per year.

- For purposes of assessing future resource requirements, the water demands are analyzed in five separate zones, reflecting the general configuration of the water supply infrastructure and the principal sources of supply – the "Ghubrah Zone", "Barka Zone", "Sohar Zone", "Sur Zone" and "Ad Duqm Zone".

- Assessment of the demand/supply balance in the "Ghubrah Zone" indicates a requirement for new desalination capacity, to cover rising demand and to compensate for the upcoming retirement of some older desalination units at the Ghubrah Power and Desalination Plant. In this context, PAEW has advised OPWP of a requirement for an additional 191,000 m^3/d (42 MIGD) by 2014 (which is expected to be developed on a phased basis with an initial 138,000 m^3/d (30 MIGD) in 2013). This is to be located adjacent to the existing Ghubrah Power and Desalination Plant.

- Assessment of the demand/supply balance in the "Barka Zone" indicates a need for new desalination capacity from 2014 onwards – with the requirement rising from 32,000 m^3/d (7 MIGD) in 2014 to 96,000 m^3/d (21 MIGD) by 2017.

- Assessment of the demand/supply balance in the "Sohar Zone" indicates a need for new desalination capacity from 2015 onwards – with the requirement rising from 18,000 m^3/d (4 MIGD) in 2015 to 64,000 m^3/d (14 MIGD) by 2017.

- Assessment of the demand/supply balance in the "Sur Zone" indicates the existing desalination plant at Sur should be sufficient to cover projected demands through 2017.

- Assessment of the demand/supply balance in the "Ad Duqm Zone" indicates a need for new desalination capacity from 2013 onwards – with the requirement rising from 6,000 m^3/d (1 MIGD) in 2013 to 15,000 m^3/d (3 MIGD) by 2017.

- 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.

- OPWP had previously contemplated combining new power generation capacity with the planned desalination capacity at Ghubrah in 2013/2014, but decided in 2010 to concentrate the development of power generation at Sur instead – specifically, at the new Sur IPP – as the large available "green-field" site at Sur offered a number of advantages over the existing Ghubrah site. As a result of this decision, the new desalination capacity at Ghubrah will go ahead on a water-only basis, as an IWP (OPWP will however manage the competition process for this project, on behalf of PAEW).

- OPWP believes that new desalination capacity required from 2014/2015 for the "Barka Zone" and "Sohar Zone", as well as new capacity required in the "Ad Duqm Zone" from 2013, will also most likely need to go ahead on a water-only basis, mainly due to the time horizon in which the water is required.

Procurement Strategy – MIS

- OPWP's current procurement activities for the MIS are focused on temporary generation capacity for the summer of 2011 and the ongoing competition process for the 1500-2000 MW Sur IPP. In addition, subject to receiving a final go-ahead from the Government, OPWP expects to commence during 2011 the competition process for the proposed solar IPP(s).

- The Government has recently requested OPWP to carry out 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 review is expected to be completed during 2011 and may lead to the initiation of a competition process for an IPP at Ad Duqm.

- At the same time, OPWP intends to commence initial studies in 2011 to develop its strategy for the procurement of new capacity for the MIS in the 2016-2018 timeframe. These studies will include consideration of feasible locations and fuel availability for new plant(s). Consideration will also be given to the impact of the expiry of existing P(W)PAs in the same timeframe, and the interaction between options for the development of new capacity and the renewal of P(W)PAs for existing capacity. The interaction between the Ad Duqm options (mentioned above) and options for the MIS as a whole – in the context of Ad Duqm potentially being interconnected with the MIS – will also be considered.

- OPWP also intends to study a number of options aimed primarily at improving overall fuel-efficiency in the MIS, including the conversion of one or more existing OCGT plants to CCGT operation, and the addition of "flexible" resources in the form of energy storage technology and/or dedicated load-following plant(s). In the event that OPWP's analysis indicates that any of these options is likely to be

economically viable, then OPWP would look to develop an appropriate procurement process tailored to the relevant option.

Demand for Electricity – Salalah System

- Electricity demand growth in the Salalah System remained relatively strong in 2010. Average demand increased 9% on the year, to 216 MW (corresponding to 1.89 TWh of energy). The estimated peak demand increased 20% to 356 MW, though this may somewhat overstate the true growth due to comparability issues related to demand management measures at the peak time.

- Looking back over the last 5-10 years, and smoothing out the impact of year to year variations caused by weather and special factors, electricity demands in the Salalah System have grown at around 9-12% per year – slightly faster than in the MIS.

- OPWP's central 7-year demand projection for the Salalah System is broadly consistent with this medium-term trend. Average demand is expected to increase from 216 MW (1.89 TWh) to 443 MW (3.88 TWh) by 2017 – an average growth rate of about 11% per year. Peak demand is expected to increase at around the same rate, rising from 356 MW to 719 MW by 2017.

- OPWP also considers "low case" and "high case" scenarios for Salalah System. Under OPWP's "low case" scenario, demand growth is more moderate, at about 8% per year. This results in peak demand reaching 598 MW by 2017, about 120 MW less than the expected peak demand. In contrast, under "high case" assumptions, demand is increased substantially by a significant build-up in large industrial loads, resulting in peak demand growing at an average rate of 14% per year – to reach 918 MW by 2017, about 200 MW higher than the expected peak demand and some 320 MW higher than in the "low case".

- 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, and OPWP has to consider the needs for generation resources across this range of potential outturns and develop its generation procurement strategy accordingly.

Additional Power Generation Requirements – Salalah System

- Demand for electricity in the Salalah System is currently met by the gas-fired Raysut New Power Station and the Raysut A&B diesel power plants. OPWP has identified a need to supplement this with 75 MW of temporary generation capacity for the summer of 2011.

- OPWP is in discussions with RAEC to make this capacity available at two sites within the Salalah System, and expects to enter into the relevant PPAs in the first quarter of 2011 – in time for the facilities to be installed ahead of the summer peak demand period. The addition of this capacity is required to overcome a potential short-term shortfall during the summer of 2011 pending the scheduled commissioning of the Salalah IWPP capacity later in the year.

- The Salalah IWPP (a new 445 MW/15 MIGD power and desalination plant, currently under construction) is expected to be commissioned in phases in the second half of 2011 and in early 2012, and be fully operational for the summer of 2012. This will bring the total contracted generation capacity in the Salalah System (including the Salalah IWPP and the Raysut New Power Station) to about 700 MW.

- The need for further additional capacity is highly dependent on the path of demand. Under the expected scenario, a minimum of about 60 MW of additional capacity would be required by 2017. Under the "low case" scenario this requirement may not arise until after 2017. However, under the "high case" scenario, additional capacity is required as early as 2013 – and the requirements increase rapidly, with about 175 MW required in 2015 and a potential requirement of around 270 MW by 2017.

- Whilst short-run measures such as temporary generation can be used to cover capacity shortfalls on a year by year basis – and given the uncertainty associated with the requirements this may be considered a sensible course in the near term – it is unlikely to be practical or economical to rely on such measures for requirements in excess of 200 MW.

- Accordingly, OPWP believes that it is prudent to plan for a potential permanent new addition of capacity no later than 2016. A wide range of options exist for such capacity, in terms of plant type, location and size. OPWP is currently carrying out a detailed study to review all the various options and map out an optimal generation procurement strategy, looking at the merits of the initial options within the context of an overall long-term resource plan, and under a number of future scenarios.

Desalinated Water Requirements – Salalah System

- Water demand projections for the 2011-2017 period have been provided to OPWP by the Directorate General of Water in the Office of the Minister of State and Governor of Dhofar (DGW). DGW has advised that the relevant demands for OPWP (i.e. those that may potentially be served by desalination capacity associated with power generation resources in the Salalah System) are the aggregated potable water demands of the Salalah, Taqa and Mirbat wilayats.

- The projections show the overall demand for potable water in the Salalah/Taqa/Mirbat area increasing from around 29.9 million m^3 in 2010 to 50.9 million m^3 in 2017 – an average growth rate of around 8% per year.

- Demands for potable water in the Salalah/Taqa/Mirbat area are currently met exclusively from groundwater resources. This will change with the planned commissioning of the 68,190 m^3/d (15 MIGD) Salalah IWPP during the second half of 2011. But even with the Salalah IWPP in operation after 2011, a significant portion of demand – roughly half – will continue to be met from groundwater resources.

- DGW has advised OPWP that its medium-term objective is to minimize the use of groundwater under normal circumstances. Assessment of the demand/supply balance indicates that to meet this objective, at least 85,000 m^3/d (19 MIGD) of additional desalination capacity is likely to be required by 2017.

- 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.

- OPWP is presently evaluating the possibility of combining the procurement of desalination capacity with the addition of new power generation capacity around 2016. A decision in this regard is expected to be taken, in consultation with DGW, during 2011. If it is decided not to combine the procurement of desalination capacity with new power generation capacity, then possible alternatives

would include stand-alone desalination capacity procured by DGW, or a water-only extension to the Salalah IWPP.

Procurement Strategy – Salalah System

- For the Salalah System, current procurement activities are focused on temporary generation capacity for the summer of 2011. These activities are well advanced and OPWP expects to enter into the relevant PPAs with RAEC in the first quarter of the year.

- Procurement activities in the next few years are expected to be driven by any needs for temporary generation that emerge between 2013 and 2015 if demand growth tracks towards the "high case" projection, and the outcome of the study (mentioned above) currently being carried out by OPWP with a view towards a potential permanent new addition of power generation capacity in the Salalah System around 2016.

- This study is expected to be completed by mid-2011 and will form the basis for a decision with respect to the initiation of a competitive procurement process for new capacity (for power generation only or in combination with desalination capacity). In order to meet the potentially required 2016 in-service date, it is likely that the competition process would need to commence in 2012.

Fuel Requirements

- The primary fuel resource for power generation (and associated water production) in both the MIS and the Salalah System is currently natural gas, supplied to power and desalination plants by the Ministry of Oil & Gas (MOG). Natural gas represented more than 99.5%, in energy equivalent terms, of fuel used in 2010. A small amount – representing less than 0.5% of total fuel consumption – of diesel fuel was also used, mainly in the Salalah System.

- The power and desalination plants in the MIS and the Salalah System are amongst the largest gas consumers in Oman, collectively accounting for roughly 20% of the Sultanate's annual gas production.

- Total gas consumption at the main power and desalination plants in 2010 was about 6.3 billion Sm^3 (equivalent to 17.2 million Sm^3/d), an increase of 6% over 2009. The peak daily gas consumption during 2010 was 23.8 million Sm^3, an increase of 2% over 2009.

- These increases in average and peak day gas consumption essentially reflected the year on year growth in average and peak day power (and water) demands, with a minor improvement in overall fuel efficiency. More significant improvements in fuel efficiency are expected in the coming years however as new IPPs using newer, more fuel-efficient, technology than existing plants come on line in both the MIS and the Salalah System.

- OPWP has prepared indicative projections for the fuel requirements of the MIS and the Salalah System over the 2011-2017 period, under expected, "low case" and "high case" demand scenarios. These are based on an assumption of an all-gas generation strategy in the medium term, with the exception of about 1-2% of annual energy generated by the proposed solar IPP(s).

- The projections show total gas consumption increasing to between 8.2 billion Sm^3 and 11.5 billion Sm^3 by 2017 (equivalent to 22.5-31.6 million Sm^3/d), with a peak day consumption of between 31.1 million Sm^3 and 43.3 million Sm^3. In all scenarios, the growth in gas consumption is significantly

less than the corresponding growth in power demands, reflecting improved fuel efficiency (and to a lesser extent the anticipated introduction of the solar IPP(s)).

- 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 confirmed supply for the Sur IPP and has provided OPWP with an overall medium-term committed gas reservation for power generation (and associated water production) that is expected – under OPWP's current projections – to be sufficient to cover projected requirements until 2018 under the "low case" demand scenario, 2016 under the expected demand scenario, and 2013 under the "high case" demand scenario.

- 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.

- 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 (possibly starting with new capacity potentially required in 2016).

Long-Term Strategy

- OPWP also intends to work closely with the Government over the coming year with regard to the development of longer-term strategy. This is expected to involve looking out beyond the 7-year horizon and mapping out a future vision for the power (and associated water) sector – including consideration of such issues as:

  - fuel sources, diversity and security;

  - the role of renewables and nuclear power as long-term supply alternatives;

  - the role of conservation and demand side management; and

  - the role of regional interconnects.

  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.

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, Ad Dakhiliyah, Ash Sharqiyah and Ad Dhahirah regions, 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 in Oman with the power system of Petroleum Development Oman (PDO), and will shortly be interconnected with the power system of 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.

1.1 DEMAND FOR ELECTRICITY

Historical Demand

After two years of remarkably strong growth in 2008 and 2009, electricity demand growth in the MIS slowed somewhat in 2010. Average demand increased 7% on the year, to 1924 MW (corresponding to 16.9 TWh of energy), whilst peak demand increased just 2% to about 3500 MW.[2] This followed two years of growth of around 12-13% per year in both average and peak demands.

This slowdown was attributable in part to weather-related factors, in particular the effects of Cyclone Phet in June and lower peak summer temperatures in 2010 compared to the previous two years – these factors are believed to have particularly suppressed the peak demand, and to a lesser degree the average demand. But the slowdown is also believed to reflect to some degree the changing economic situation, and a return to more "normal" underlying growth trends after the very rapid economic, and related population, expansion seen in the Sultanate in the preceding few years.

Looking back over the last 5-10 years, average electricity demands in the MIS grew at a rate of about 9% per year over the five years from 2005 to 2010, and about 8% per year over the ten years from 2000 to 2010. Peak

[2] OETC reported a 2010 peak MIS "gross" demand (including auxiliary consumption inside power and desalination plants) of 3613 MW at 3 pm on Tuesday, June 1. Net of such auxiliary consumption, the peak system demand is estimated to have been about 3500 MW.

demand growth has generally followed average demand growth over the years, though at a slightly lower rate as the system load factor (the ratio of average to peak demand) has gradually increased. Peak demand increased about 8% per year over the five years from 2005 to 2010, and about 7% per year over the ten years from 2000 to 2010.

These figures smooth out the impact of year to year variations caused by weather and the unusually rapid growth of 2008-2009, and are considered to be more representative of the underlying trends. Adjusting for weather effects, the 2010 growth was broadly consistent with these medium-term trends.

Demand Projections

OPWP's 7-year electricity demand projections for the MIS have been developed after consultation with MEDC, MZEC, MJEC, RAEC and other relevant entities.

The projections cover both average demand (i.e. energy) and peak demand, the latter being most relevant for purposes of assessing capacity requirements. 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.[3] This accords with the basis on which OPWP transacts with power and desalination plants.

The projected demands are based on an assumption of "normal" weather. It needs to be recognized that 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. An estimate of the actual 2010 weather impact has been made in establishing the baseline for the projections. However, the impact of weather in future years is an inherent uncertainty in the projections.

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 – mainly large industries – that are directly connected to the transmission system or power plants and which are assessed on a specific load-wise basis.

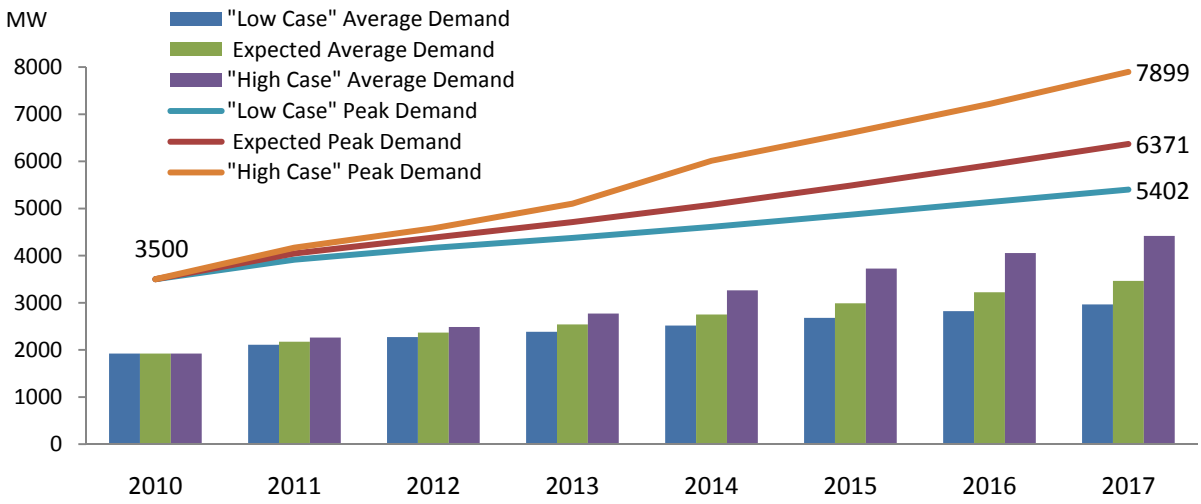
The principal drivers of distribution system demand are residential and service sector (including government and private sector) demands in all regions – from continuing growth of population and the number of households, and general economic development and new construction, with an additional boost from the investments being made in particular in tourism-related projects.

The growth in demand from directly-connected loads is driven primarily by new industrial consumers, focused mainly around the Sohar Industrial Port, but with the possibility of increased development at Sur. Specific provision has also been made in the projections for the demands of potential new stand-alone desalination plants in Muscat and in the Al Batinah region.

The projections are presented as a range with a "low case", a "high case" and a central, expected demand forecast. The projections are summarized in Figure 1 below.

[3] The power consumption of stand-alone desalination plants taking power from the grid is however included as demand.

Figure 1 Electricity Demand Projections – MIS



	Actual 2010[a]	2011	2012	2013	2014	2015	2016	2017	Ave.% Growth
Expected Demand									
Average Demand (MW)	1924	2176	2367	2542	2753	2991	3225	3464	*9%*
Distribution Loads	*1847*	*2033*	*2187*	*2353*	*2532*	*2725*	*2932*	*3155*	*8%*
Large Industrial Loads	*69*	*135*	*170*	*174*	*184*	*198*	*211*	*224*	*18%*
Other Directly-Connected Loads	*8*	*9*	*9*	*14*	*37*	*69*	*83*	*84*	*40%*
Annual Energy (TWh)	**16.9**	**19.1**	**20.8**	**22.3**	**24.1**	**26.2**	**28.3**	**30.3**	***9%***
Peak Demand (MW)	**3500**	**4048**	**4383**	**4714**	**5079**	**5488**	**5923**	**6371**	***9%***
Change from 2010-2016 Statement (MW)[b]	*-300*	*-256*	*-363*	*-351*	*-332*	*-192*	*-33*	*n/a*	
"Low Case" Demand									
Average Demand (MW)	1924	2110	2273	2385	2516	2680	2823	2966	*6%*
Distribution Loads	*1847*	*1990*	*2096*	*2207*	*2325*	*2449*	*2579*	*2717*	*6%*
Large Industrial Loads	*69*	*112*	*168*	*169*	*169*	*169*	*169*	*169*	*14%*
Other Directly-Connected Loads	*8*	*8*	*8*	*9*	*22*	*62*	*75*	*80*	*39%*
Annual Energy (TWh)	**16.9**	**18.5**	**20.0**	**20.9**	**22.0**	**23.5**	**24.8**	**26.0**	***6%***
Peak Demand (MW)	**3500**	**3916**	**4165**	**4378**	**4611**	**4868**	**5138**	**5402**	***6%***
"High Case" Demand									
Average Demand (MW)	1924	2263	2486	2771	3264	3728	4056	4419	*13%*
Distribution Loads	*1847*	*2080*	*2290*	*2521*	*2776*	*3056*	*3366*	*3706*	*10%*
Large Industrial Loads	*69*	*175*	*187*	*229*	*421*	*578*	*595*	*616*	*37%*
Other Directly-Connected Loads	*8*	*9*	*10*	*21*	*67*	*94*	*95*	*97*	*43%*
Annual Energy (TWh)	**16.9**	**19.8**	**21.8**	**24.3**	**28.6**	**32.7**	**35.6**	**38.7**	***13%***
Peak Demand (MW)	**3500**	**4169**	**4581**	**5103**	**6012**	**6603**	**7220**	**7899**	***12%***

[a] *actual, not weather-adjusted*

[b] *excluding Ad Duqm*

Under the central forecast, average demand in the MIS is expected to grow from 1924 MW (corresponding to 16.9 TWh) in 2010 to 3464 MW (30.3 TWh) in 2017, an average increase of around 9% per year. Similarly, peak demand is expected to grow at about 9% per year, from 3500 MW in 2010 to 6371 MW in 2017. The forecast envisages an accentuated increase in demand in 2011 reflecting a "rebound" from the weather-suppressed demands of 2010, but from 2012 onwards the growth is relatively even with some small year to year variations based on the assumed timing of new bulk loads. Over the 7-year horizon, this scenario is broadly consistent with the average growth seen over the five years from 2005 to 2010, and is essentially unchanged from the expected demand projection presented in OPWP's 2010-2016 7-Year Statement.

Under the "low case" scenario, the medium-term growth rate of both average and peak demands is reduced to around 6% per year. This scenario generally reflects the possibility of a weaker than expected economic backdrop (perhaps due to a fall back in oil prices), combined potentially with increased policy efforts to improve consumption efficiency and to introduce more cost-reflective electricity tariffs for industrial and commercial consumers. For comparison, the 6% annual growth rate under this scenario is roughly equivalent to that seen through much of the 1990s.

In contrast, the "high case" scenario generally reflects the possibility of a stronger than expected economic backdrop (perhaps due to further increases in oil prices) and a resumption of the elevated growth rates seen in 2008 and 2009. This scenario is marked in particular by a very significant build-up in large industrial loads, as a positive economic climate coupled with continued low electricity prices encourages the development of energy-intensive industrial projects. Under this "high case" scenario, average and peak demands are projected to increase at rate of about 12-13% per year over the 7-year horizon.

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 region are currently located within the service area of RAEC and are not connected with the MIS. Current arrangements for electricity supply are based around a new 67 MW diesel-fuel fired power plant recently commissioned by RAEC.

However, as a result of Government plans to promote the development of a major industrial and economic city around the new seaport at Ad Duqm, demand for electricity is expected to grow rapidly in the coming years. RAEC has provided projections that show peak demands increasing to around 75-100 MW by 2017.

Ad Duqm has been previously identified as a potential location for a large power generation plant, intended to both serve local demands and supply power into the MIS. Previous 7-Year Statements have shown Ad Duqm being connected with the MIS from around 2015 onwards, mainly due to the anticipated development of a large power generation plant.

The Government has recently requested OPWP to carry out 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). Until this evaluation is completed it is uncertain whether or not (or from which year) the demands of Ad Duqm

will become MIS demands. Accordingly, the prospective Ad Duqm demands have been excluded from the MIS demand projections in this 7-Year Statement.

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. Also, a 220 kV link with the power system of the Emirate of Abu Dhabi has been constructed and is expected to enter operations in 2011.

In addition to providing reliability benefits (through the sharing of generation reserves), these interconnects provide the opportunity for the "commercial" export of power, which would add to the expected demand to be served by generation resources in the MIS.

For the time being, however, no definite arrangements have been agreed for commercial exports to either PDO or Abu Dhabi, and accordingly the current MIS demand projections (presented above) include the native demands of the MIS only.

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 under which OPWP obtains power pursuant to these agreements essentially fall into two categories.

Firstly, there are arrangements where specific capacity is contractually committed to OPWP – this is termed ***"contracted capacity"*** and is the basis for the P(W)PAs that OPWP currently has with all of the main power (and desalination) plants in the MIS.

And secondly, there are arrangements where OPWP purchases available power from industries or other parties with captive power generation facilities used mainly for self-supply, or from other systems that are interconnected with the MIS. In these cases (referred to below as ***"other resources"***) no specific capacity is committed to OPWP, and the availability of capacity for use by OPWP at any particular time will be generally subject to the other party's first use. For this reason, these resources are regarded differently for resource adequacy purposes (as explained further in section 1.3 below).

Contracted Capacity

OPWP's present portfolio of contracted capacity in the MIS comprises ten P(W)PAs. Eight of these relate to existing operational power (and desalination) plants, whilst two 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	Contract Type	Plant Owner	Plant Status	Plant Type	Contract Expiry[a]
Ghubrah	PWPA	Al Ghubrah Power and Desalination Co. (SAOC)	Operational	OCGT/Steam MSF Desalination Natural gas fired (Fuel oil as back-up)	2018
Rusail	PPA	Rusail Power Co. (SAOC)	Operational	OCGT Natural gas fired (Fuel oil as back-up)	2022
Wadi Jizzi	PPA	Wadi Al-Jizzi Power Co. (SAOC)	Operational	OCGT Natural gas fired (Fuel oil as back-up)	2020
Manah	PPA	United Power Co. (SAOG)	Operational	OCGT Natural gas fired (Fuel oil as back-up)	2020
Al Kamil	PPA	Al Kamil Power Co. (SAOG)	Operational	OCGT Natural gas fired (Fuel oil as back-up)	2017
Barka I	PWPA	ACWA Power Barka (SAOG)	Operational	CCGT MSF Desalination Natural gas fired (Fuel oil as back-up)	2018
Sohar I	PWPA	Sohar Power Co. (SAOG)	Operational	CCGT MSF Desalination Natural gas fired (Fuel oil as back-up)	2022
Barka II	PWPA	SMN Barka Power Co. (SAOC)	Operational	CCGT RO Desalination Natural gas fired (Fuel oil as back-up)	2024
Sohar II	PPA	Al Batinah Power Co. (SAOC)	Under Construction	CCGT Natural gas fired (Fuel oil as secondary fuel and back-up)	2028
Barka III	PPA	Al Suwadi Power Co. (SAOC)	Under Construction	CCGT Natural gas fired (Fuel oil as secondary fuel and back-up)	2028

[a] *in all cases the contracts expire prior to the summer period of the year indicated*

A summary of the MW capacity that is expected to be provided under these P(W)PAs over the 2011-2017 period is set out in Figure 2 below.

This shows total contracted capacity of 3807 MW in 2011, rising to a maximum of 5006 MW in 2013, before falling back to 4531 MW by 2017. The main developments over the 7-year period are:

- the Sohar II and Barka III plants currently under construction are scheduled to be commissioned on a phased basis in 2012 and 2013 – each adds 495 MW in 2012 and a further 250 MW in 2013 for a total addition of 1490 MW;
- a number of the older generation units at Ghubrah are scheduled to fall out of contract after the summers of 2012 and 2013, resulting in reductions of 150 MW and 90 MW respectively (and the plant owner, GPDC, has advised OPWP that given their age and condition it intends to permanently de-commission these units at such time);

- similarly, several of the older generation units at Wadi Jizzi are scheduled to fall out of contract after the summers of 2011 and 2014 – in the absence of contract extension(s), this will result in reductions of 80 MW and 88 MW respectively in the subsequent years;

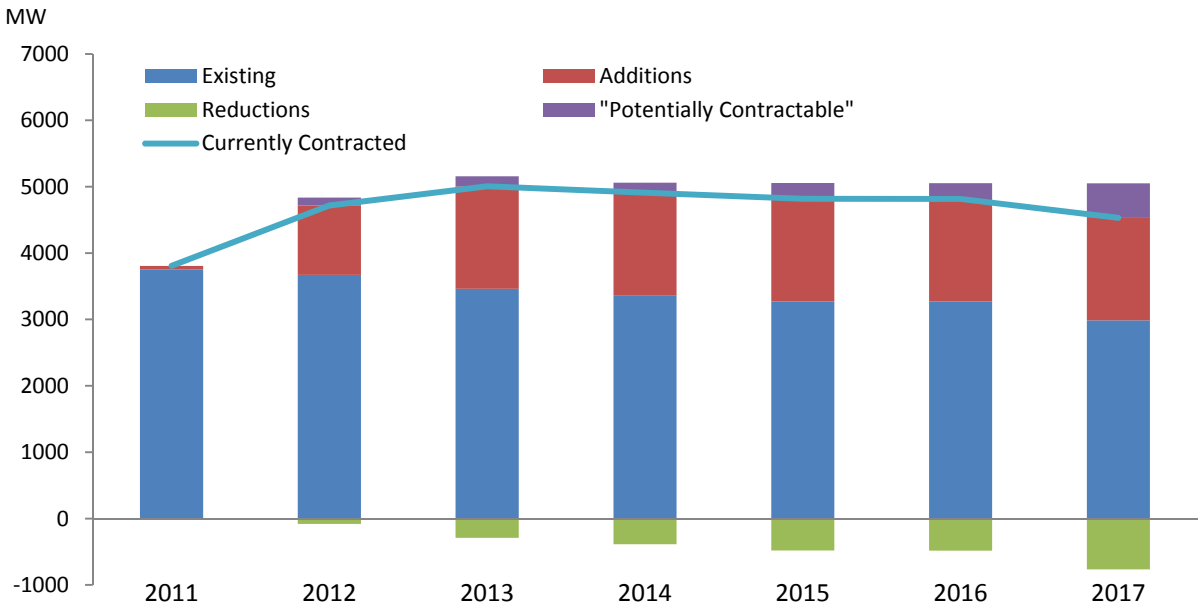
- the PPA for the Al Kamil plant is due to expire prior to the summer of 2017 – if not renewed, this will result in a reduction of 282 MW of capacity in 2017; and

- several temporary arrangements providing additional MW on a short-term basis are planned to run through 2012 only and if not extended will result in an aggregate reduction of 60 MW in 2013 – these include short-term agreements for an uplift in contracted capacity at Barka I and Al Kamil and an arrangement with PAEW to secure additional MW from Barka II though reduced desalinated water output during peak periods.

In addition to showing the MW currently covered by the relevant P(W)PAs, Figure 2 also shows the amount of "potentially contractable" capacity from the same plants – that is, capacity not presently covered by contract that may be offered to OPWP by the plant owner and could (subject to satisfaction of relevant regulatory requirements and commercial terms being agreed) be contracted by OPWP in the future.

This mainly includes the capacity at Wadi Jizzi and Al Kamil 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. Also included under the heading of "potentially contractable" are possible extensions of the temporary contracted capacity uplifts at Barka I and Al Kamil, as well as similar uplifts at other plants where the owners have advised OPWP of the possible availability of incremental capacity.

Figure 2 Contracted Generation Capacity – MIS



	2011	2012	2013	2014	2015	2016	2017
				Net MW [a]			
Current Contracted Capacity							
Ghubrah	475	475	325	235	235	235	235
Rusail	687	687	687	687	687	687	687
Wadi Al Jizzi	325	245	245	245	157	157	157
Manah	273	273	273	273	273	273	273
Al Kamil	297	297	282	282	282	282	-
Barka I	450	450	435	435	435	435	435
Sohar I	590	590	590	590	590	590	590
Barka II	710	710	679	679	678	678	678
Sohar II	-	495	745	742	740	739	738
Barka III		495	745	742	740	739	738
TOTAL	**3807**	**4717**	**5006**	**4910**	**4817**	**4815**	**4531**
Additions	*55*	*990*	*500*	-	-	-	-
Reductions	-	*80*	*211*	*96*	*93*	*2*	*284*
"Potentially Contractable" Capacity							
Rusail	-	10	10	10	10	10	10
Wadi Al Jizzi	-	80	80	80	168	168	168
Al Kamil	-	-	15	15	15	15	297
Barka I	-	-	15	15	15	15	15
Sohar I	-	20	20	20	20	20	20
Barka II	-	10	10	10	10	10	10
TOTAL	**-**	**120**	**150**	**150**	**238**	**238**	**520**

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

Planned Capacity

During 2010, OPWP conducted a competitive procurement process for the provision of temporary generation capacity for the summer of 2011. As a result of this process, OPWP expects during the first quarter of 2011 to enter into PPAs in relation to 300 MW of contracted capacity (based on small diesel engine units installed at six locations around the MIS). This will specifically supplement the 2011 contracted capacity shown in Figure 2 above.

In addition, OPWP also launched during 2010 a competitive procurement process for a major new IPP, to be located at Sur in the Ash Sharqiyah region. Proposals for the Sur IPP are due to be submitted by pre-qualified developers during the first quarter of 2011, and a PPA is expected to be entered into with the successful developer before mid-year.

The Sur IPP will have an installed capacity of 1500-2000 MW, and is expected to be fully commissioned before summer 2014. The PPA will also require that a minimum of 400 MW of capacity be made available on an interim basis during the summer of 2013. The capacity provided by the Sur IPP will accordingly supplement the contracted capacity portfolio shown in Figure 2 above from 2013 onwards.

A further addition of contracted capacity is expected to be provided around 2015 as a result of a Government initiative to promote the development of one or more grid-connected solar power projects. Subject to the Government providing a final go-ahead, this is likely to involve OPWP procuring, via a competitive process, around 100-200 MW of solar generation capacity for the MIS. However, 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.

Other Resources

In addition to the contracted capacity described above, OPWP has access to a number of other sources of power for the MIS. These include:

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

Several industries with captive power plants are connected with the MIS and from time to time have surplus power that can be purchased by OPWP for the MIS. In particular, OPWP has agreements with Sohar Aluminium Co. (LLC), Oman Refineries and Petrochemicals Co. (LLC), Oman Mining Co. (LLC), Oman Cement Co. (SAOG) and Oman India Fertilizer Co. (SAOC) to purchase available surplus power. OPWP also has a contract with the Ministry of Defense to purchase available surplus power from its power plants for the MIS. In total, the surplus power potentially available from these resources amounts to around 350 MW (the approximate MW associated with each is indicated in Figure 3 below).

Access to these generation resources is useful in two respects. Firstly, they 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 can in some instances 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.

The MIS is interconnected 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 a reserve sharing arrangement 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.

A 220 kV interconnect between the MIS and the Abu Dhabi power system is expected to enter operation during 2011. This double circuit link is expected to support transfers of up to 200 MW. Again, the main purpose of this interconnect will be to support a reserve sharing arrangement – subject to the availability of surplus generation in the Abu Dhabi system, up to around 200 MW of contingency support could potentially be provided to the MIS.[4]

In addition to supporting reserve sharing arrangements, both the PDO and the Abu Dhabi interconnect could potentially support "commercial" imports in the future – based on the relative costs of generation in the respective systems. However, no significant imports of this kind are currently planned.

Summary

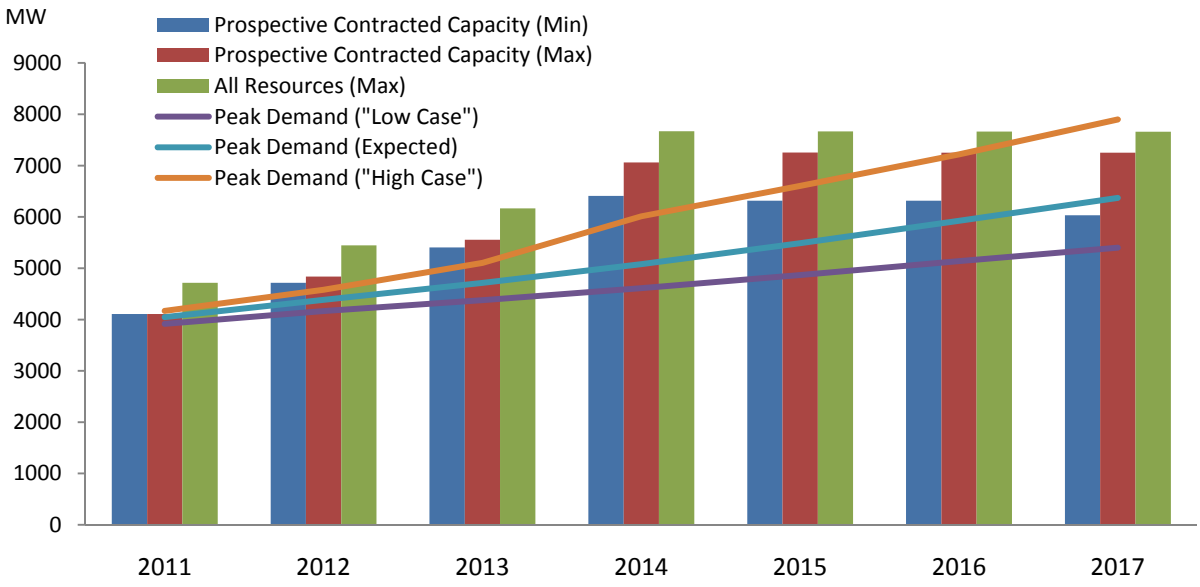
Figure 3 below provides an overall summary of all the generation resources that OPWP expects to have access to for the MIS, including the contracted and "potentially contractable" capacity shown in Figure 2, together with the planned capacity and other resources described above.

Two totals are shown in Figure 3. Firstly, the "total prospective contracted capacity" – this is confined to those resources providing contracted capacity and is shown in Figure 3 as a range, with the lower figure reflecting the sum of the currently contracted capacity and the *minimum* additions expected to result from the planned capacity already under procurement; and the higher figure reflecting the currently contracted capacity, the *maximum* additions from planned capacity and all of the "potentially contractable" capacity from existing plants. This "total prospective contracted capacity" is particularly relevant when assessing the minimum need for new capacity (as explained further in section 1.3 below).

The second total in Figure 3, the "total (maximum) all resources", represents the maximum potential capacity from all sources and provides an indication of the potential overall degree of reserve margin (including all contingency reserves) in the MIS.

[4] Preliminary plans exist to upgrade the transfer capacity of the interconnect to 600 MW in the medium-term.

Figure 3 Total Power Generation Resources – MIS



	2011	2012	2013	2014	2015	2016	2017
				Net MW			
Contracted Capacity							
Currently Contracted Capacity *(Details in Figure 2)*	3807	4717	5006	4910	4817	4815	4531
"Potentially Contractable" Capacity *(Details in Figure 2)*	-	120	150	150	238	238	520
Planned Capacity							
Temporary Diesel	300	-	-	-	-	-	-
Sur IPP	-	-	400	1500-2000	1500-2000	1500-2000	1500-2000
Solar Project(s)					0-200	0-200	0-200
Total Prospective Contracted Capacity							
Minimum	***4107***	***4717***	***5406***	***6410***	***6317***	***6315***	***6031***
Maximum	***4107***	***4837***	***5556***	***7060***	***7255***	***7253***	***7251***
Other Resources							
Industry/Other Surplus Generation							
Sohar Aluminium Co.	300	300	300	300	300	300	300
Oman Refineries and Petrochemicals Co.	15	15	15	15	15	15	15
Oman Mining Co.	20	20	20	20	20	20	20
Oman Cement Co.	0-5	0-5	0-5	0-5	0-5	0-5	0-5
Oman India Fertilizer Co.	0-5	0-5	0-5	0-5	0-5	0-5	0-5
Ministry of Defense	0-5	0-5	0-5	0-5	0-5	0-5	0-5
Interconnects							
PDO	60	60	60	60	60	60	60
Abu Dhabi	200	200	200	200	200	200	200
TOTAL (MAXIMUM) ALL RESOURCES	**4717**	**5447**	**6166**	**7670**	**7665**	**7663**	**7661**

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 is based on loss of load hours (known as "LOLH") and essentially requires that OPWP enter into agreements for enough *contracted capacity* to ensure that the expectation of this capacity being insufficient to meet demand does not exceed 24 hours in any year – taking into account 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 longer-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 – whilst other resources (such as the surplus generation of industries and reserve sharing arrangements with interconnected systems, as described above) provide a degree of reserve margin and will generally contribute to improved overall reliability of supply, these resources are not considered for purposes of meeting the 24 hour LOLH standard and are viewed instead as providing security against contingencies.

2011 Capacity Requirement

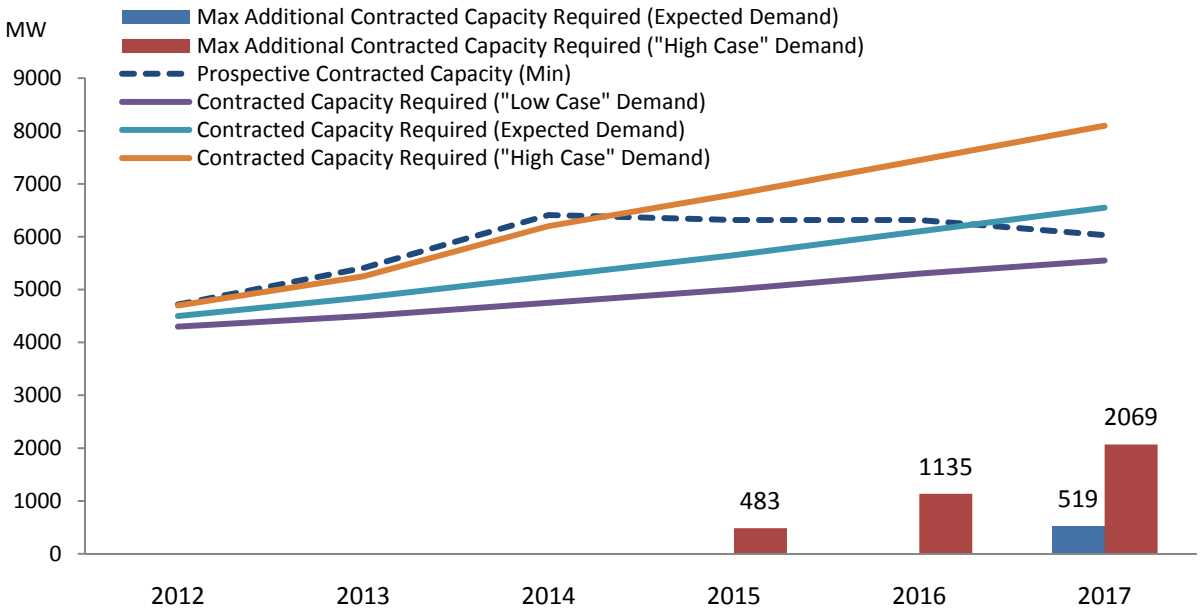
OPWP has determined, and agreed with the AER, that in order to comply with the 24 hour LOLH standard for 2011, it needs to enter into agreements in respect of 300 MW of temporary generation capacity, thus raising the total contracted capacity for 2011 to 4107 MW. As described above, OPWP conducted a competitive procurement process during 2010 for the provision of this temporary capacity and expects to enter into the relevant agreements in the first quarter of 2011 – in time for the facilities to be installed and commissioned ahead of the summer peak demand period.

Future Capacity Requirements

OPWP has calculated the approximate amounts of contracted capacity it would require to comply with the 24 hour LOLH standard in each year during the 2012-2017 period, in the context of the three demand projections described above (i.e. expected demand, "low case" and "high case").[5] The approximate total requirements are shown in Figure 4 below, along with the *additional* requirements – relative to the currently contracted capacity, and relative to the prospective contracted capacity identified in Figure 3 above.

[5] Such calculations are necessarily approximate as the LOLH depends to some extent on the exact nature (e.g. type and size) of the generation capacity, which is not known with certainty in respect of future capacity.

Figure 4 Future Power Generation Capacity Requirements – MIS



	2012	2013	2014	2015	2016	2017
				Net MW		
Expected Demand						
Peak Demand	4383	4714	5079	5488	5923	6371
Total Contracted Capacity Required	4500	4850	5250	5650	6100	6550
Additional Contracted Capacity Required:						
Above Currently Contracted	-	-	*340*	*833*	*1285*	*2019*
Above Minimum "Prospective Contracted Capacity"	-	-	-	-	-	*519*
Above Maximum "Prospective Contracted Capacity"	-	-	-	-	-	-
"Low Case" Demand						
Peak Demand	4165	4378	4611	4868	5138	5402
Total Contracted Capacity Required	4300	4500	4750	5000	5300	5550
Additional Contracted Capacity Required:						
Above Currently Contracted	-	-	-	*183*	*485*	*1019*
Above Minimum "Prospective Contracted Capacity"	-	-	-	-	-	-
Above Maximum "Prospective Contracted Capacity"	-	-	-	-	-	-
"High Case" Demand						
Peak Demand	4581	5103	6012	6603	7220	7899
Total Contracted Capacity Required	4700	5250	6200	6800	7450	8100
Additional Contracted Capacity Required:						
Above Currently Contracted	-	*244*	*1290*	*1983*	*2635*	*3569*
Above Minimum "Prospective Contracted Capacity"	-	-	-	*483*	*1135*	*2069*
Above Maximum "Prospective Contracted Capacity"	-	-	-	-	*197*	*849*

It can be seen that the planned capacity at the Sur IPP (1500-2000 MW) is likely to be sufficient to meet the requirements until around 2016/2017. Only under the "high case" demand projection is additional capacity potentially required any earlier, in 2015. And in this case the 2015 requirement is likely to be relatively low – 483 MW as a maximum, and most likely less. OPWP believes that a potential requirement of this order

of magnitude – in the relatively unlikely event of it transpiring – would be capable of being managed via short-run measures such as temporary generation.

Accordingly, OPWP believes that it can plan towards an earliest potential in-service date of 2016 for the next major installment of new generation capacity in the MIS after the Sur IPP, and the potential solar project(s). In the event that demand growth appears to be tracking lower than the "high case" projection over the next year or so, it may be possible to push back this in-service date to 2017, or even 2018, prior to launching the relevant competitive procurement process (which would likely need to commence during 2012 to meet a 2016 in-service date).

1.4 DESALINATED WATER REQUIREMENTS

Demand for Water

Water demand projections have been provided to OPWP by relevant "water departments", i.e.:

- PAEW – in respect of the demand for potable water in the Governorates of Muscat and Al Buraymi, and the Al Batinah, Ad Dakhiliyah, Ad Dhahirah, Ash Sharqiyah and Al Wusta regions[6]; and
- MISC – in respect of the demand for desalinated water for industrial use in the Sohar Industrial Port area.

For purposes of assessing future resource requirements, PAEW has advised that the projections be analyzed on a zonal basis as follows:

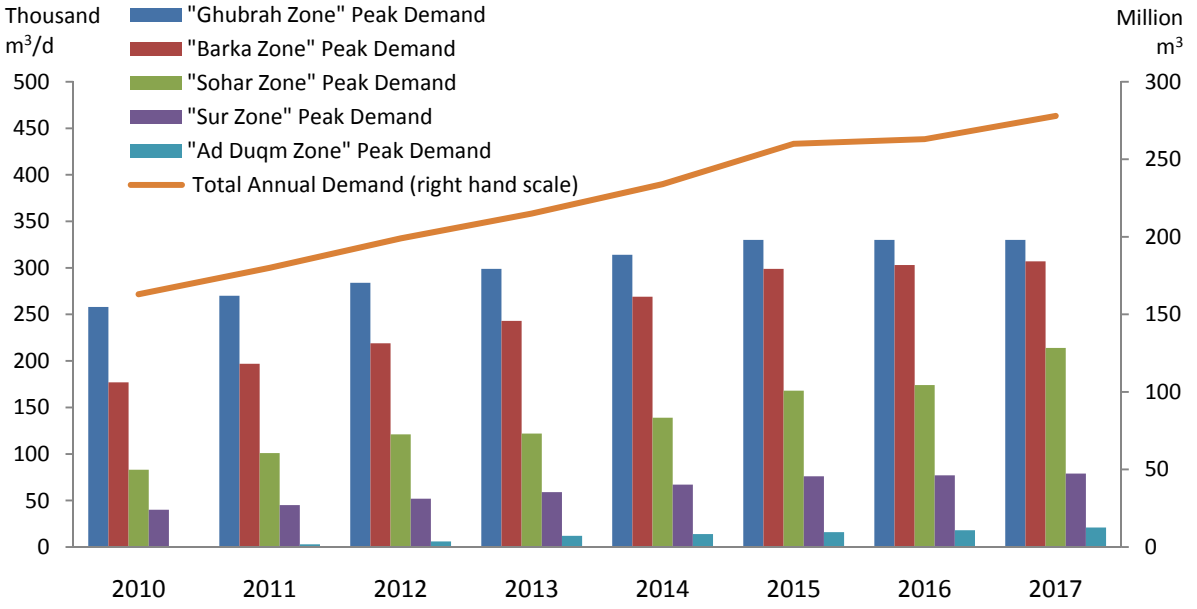
- The ***"Ghubrah Zone"*** includes the potable water demands of the Muscat, Mutrah, Al Amrat and Bawshar wilayats in the Governorate of Muscat. The principal source of water for this zone is currently the existing Ghubrah Power and Desalination Plant.
- The ***"Barka Zone"*** includes the potable water demands of the As Seeb wilayat in the Governorate of Muscat, the Barka, Al Musanaah, Wadi Al Maawil, Nakhal, Al Awabi and Ar Rustaq wilayats in the Al Batinah region, and the whole of the Ad Dakhiliyah region. The principal sources of water for this zone are currently the existing Barka I and Barka II Power and Desalination Plants.
- The ***"Sohar Zone"*** includes the potable water demands of the As Suwayq, Al Khaburah, Saham, Sohar, Liwa and Shinas wilayats in the Al Batinah region, the Governorate of Al Buraymi, and the whole of the Ad Dhahirah region, together with the MISC demands for the Sohar Industrial Port area.[7] The principal source of water for this zone is currently the existing Sohar I Power and Desalination Plant.
- The ***"Sur Zone"*** includes the potable water demands of the Ash Sharqiyah region excluding Masirah wilayat. The principal source of water for this zone is currently the existing Sur Desalination Plant.
- The ***"Ad Duqm Zone"*** includes the potable water demands of the Al Wusta region. This zone is currently served by a small desalination plant in Ad Duqm and a number of local water sources.

[6] The projections provided by PAEW exclude (i) the Governorate of Musandam, the wilayat of Quriyat in the Governorate of Muscat, and the wilayat of Masirah in the Ash Sharqiyah region, 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.

[7] The MISC demands for desalinated water for industrial use are included in the projections up to 2013 only, after which MISC is expected to meet these demands from its own newly-constructed desalination plant.

The projected "peak demands" for these five zones, as provided by PAEW and MISC, for the 2011-2017 period are shown in Figure 5 below. Peak demand represents the average daily demand (inclusive of network losses), during the peak month of the year, and is the basis for assessing resource capacity requirements. Based on the peak 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)



	Actual 2010	2011	2012	2013	2014	2015	2016	2017	Ave.% Growth
Peak Water Demand					***thousand m³/d***				
"Ghubrah Zone"	258	270	284	299	314	330	330	330	*4%*
"Barka Zone"	177	197	219	243	269	299	303	307	*8%*
"Sohar Zone"	83	101	121	122	139	168	174	214	*14%*
"Sur Zone"	40	45	52	59	67	76	77	79	*10%*
"Ad Duqm Zone"	1	3	6	12	14	16	18	21	*54%*
Total - All Zones	**559**	**616**	**682**	**735**	**803**	**889**	**902**	**951**	***8%***
Change from 2010-2016 Statement	*-44*	*-44*	*-44*	*-54*	*-56*	*-58*	*-57*	*n/a*	
Total Annual Demand					***million m³***				
All Zones	**163**	**180**	**199**	**215**	**234**	**260**	**263**	**278**	***8%***
Change from 2010-2016 Statement	*-13*	*-13*	*-13*	*-16*	*-16*	*-17*	*-18*	*n/a*	

In overall terms, water demands are expected to increase at an average rate of around 8% 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 rates are expected in those zones with relatively undeveloped networks, whilst lower growth rates are expected in the more developed zones (in particular, the "Ghubrah Zone"), where network build out will be less of a factor and the scope for loss reduction greatest.

The total water demands shown in Figure 5 are broadly similar to those included in OPWP's 2010-2016 7-Year Statement, with a slight downward adjustment (of around 7%) reflecting PAEW's latest assessment of the likely development of demand.[8]

Desalination Capacity Requirement – "Ghubrah Zone"

As noted above, the principal source of water for the "Ghubrah Zone" is currently the existing Ghubrah Power and Desalination Plant, owned by GPDC and operated under a PWPA with OPWP. The desalination plant comprises seven MSF units, with a total net capacity of approximately 182,000 m^3/d (40 MIGD).

The PWPA provides for two of the older MSF units to drop out of contract within the 2012/2013 timeframe (the first unit after the summer of 2012 and the second unit after the summer of 2013). GPDC has indicated to OPWP that it does not anticipate making these units available beyond the currently contracted period, and it expects to permanently decommission the units at that time. With these retirements, the net desalination capacity will step down to approximately 165,000 m^3/d (36 MIGD) in the fourth quarter of 2012 and 138,000 m^3/d (30 MIGD) in the fourth quarter of 2013.

The desalination capacity provided by GPDC under the PWPA is currently supplemented by a temporary RO plant at Ghubrah, which provides water directly to PAEW. This has 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 2013.

PAEW is able to supplement the desalinated water supply in the "Ghubrah Zone" with imports from the "Barka Zone" – a transfer capacity of about 80,000 m^3/d exists, subject to the availability of surplus water in the "Barka Zone". PAEW has indicated that it expects to use surplus water from the "Barka Zone" to help balance supply and demand in the "Ghubrah Zone" in 2011 and 2012.

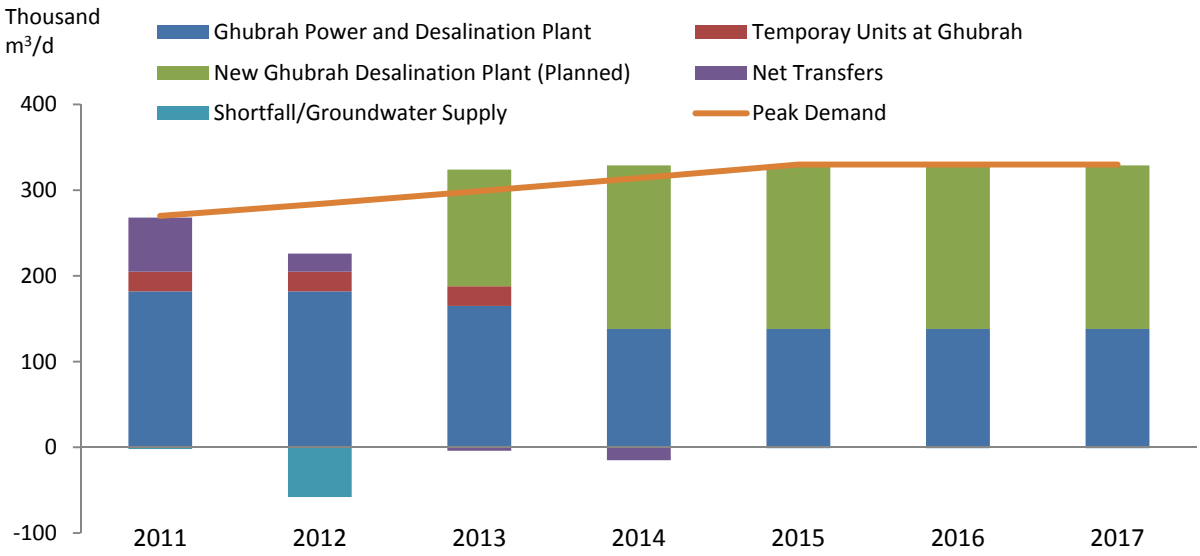
Finally, PAEW is able to manage short-run shortfalls in desalination capacity (after transfers) by utilizing groundwater from well-fields to meet demand. PAEW has indicated however that its intention is to regard the groundwater supplies as a contingency reserve, and minimize their use under normal circumstances. This requires that sufficient desalination capacity be planned to cover the projected peak demand for water.

In this context, PAEW has advised OPWP of a requirement for an additional 191,000 m^3/d (42 MIGD) in the "Ghubrah Zone" by 2014 (which is expected to be developed on a phased basis with an initial 138,000 m^3/d (30 MIGD) in 2013). This capacity is to be procured as an IWP, to be located adjacent to the existing Ghubrah Power and Desalination Plant. The new plant (the "Ghubrah IWP") is expected to use RO desalination technology and import all required electricity from the grid.

Figure 6 below provides a summary of the demand/supply balance in the "Ghubrah Zone" over the 2011-2017 period. It can be seen that the "Ghubrah Zone" is expected to be dependent on imports from the "Barka Zone" and some groundwater supply during 2011 and 2012. The addition of the new desalination plant at Ghubrah however is expected to allow some exports to the "Barka Zone" (and provide some additional reserve) in 2013/2014, and leave the "Ghubrah Zone" essentially in balance, with minimal dependence on groundwater, from 2015 to 2017.

[8] Some of the individual zonal demands have changed more significantly from those included in OPWP's 2010-2016 7-Year Statement. This is due in part to a re-assessment and re-basing by PAEW of the current level of end-demand in each zone (before considering imports into and exports out of the zone), which results in some off-setting adjustments.

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



	2011	2012	2013	2014	2015	2016	2017
"Ghubrah Zone"	*thousand m³/d*						
Peak Water Demand	**270**	**284**	**299**	**314**	**330**	**330**	**330**
Desalination Capacity	**205**	**205**	**324**	**329**	**329**	**329**	**329**
Ghubrah Power and Desalination Plant	*182*	*182*	*165*	*138*	*138*	*138*	*138*
Temporary Units at Ghubrah	*23*	*23*	*23*				
New Ghubrah Desalination Plant (Planned)			*136*	*191*	*191*	*191*	*191*
Net Transfers	**63**	**21**	**(4)**	**(15)**	**-**	**-**	**-**
Imports from "Barka Zone"	*63*	*21*	*-*	*-*	*-*	*-*	*-*
Exports to "Barka Zone"	*-*	*-*	*(4)*	*(15)*	*-*	*-*	*-*
Reserve (after Transfers)	**-**	**-**	**21**	**-**	**-**	**-**	**-**
Shortfall / Groundwater Supply Required	**2**	**58**	**-**	**-**	**1**	**1**	**1**

Desalination Capacity Requirement – "Barka Zone"

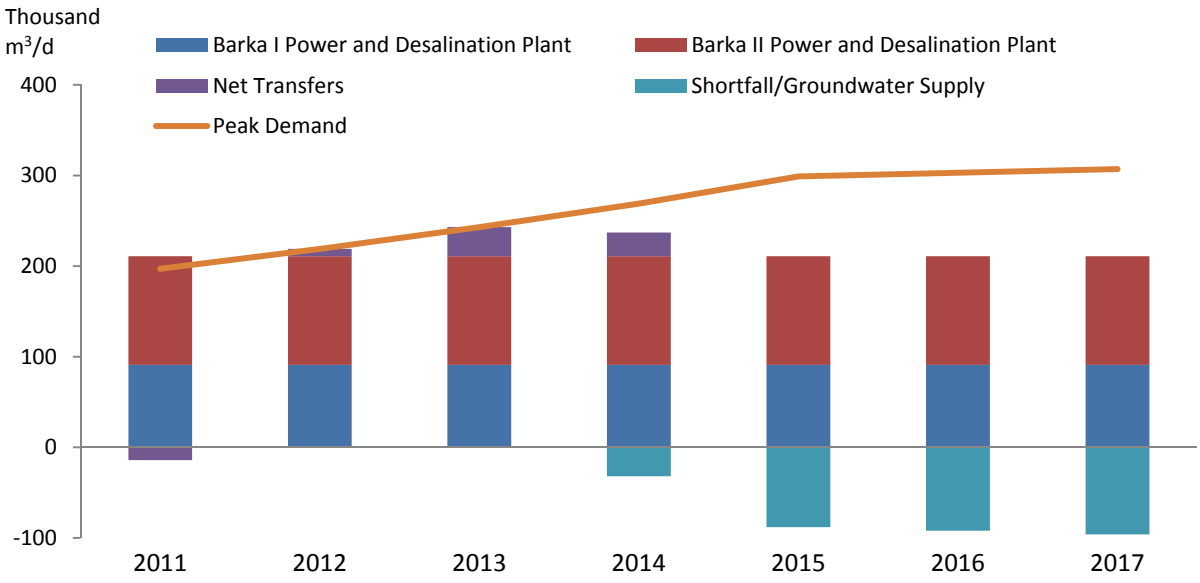
The principal sources of water for the "Barka Zone" are currently the existing Barka I and Barka II Power and Desalination Plants, owned by ACWA Power Barka and SMN Power Barka respectively, and operated under PWPAs with OPWP. The Barka I plant has a desalination capacity of 91,200 m^3/d (20 MIGD), using MSF units. The Barka II plant has a capacity of 120,000 m^3/d (26 MIGD), using RO technology.

The "Barka Zone" is located between the "Ghubrah Zone" and the "Sohar Zone" and PAEW is able – within limits – to transfer water to and from either of the other zones (up to about 55,000 m^3/d can be transferred between the "Barka Zone" and the "Sohar Zone", and up to about 80,000 m^3/d can be transferred between the "Barka Zone" and the "Ghubrah Zone"). PAEW has indicated that it intends to utilize this transfer capability to help balance supply and demand across the zones, in particular relying on the transfer of surplus water from the "Sohar Zone" to the "Barka Zone", which in turn allows the "Barka Zone" to support the "Ghubrah Zone" in the short-run.

Figure 7 below provides a summary of the demand/supply balance in the "Barka Zone", factoring in these transfers. It can be seen that the "Barka Zone" is expected to be dependent on net inward transfers from 2012. Based on the projections for the "Ghubrah Zone" and the "Sohar Zone" the surpluses available to support the "Barka Zone" will be insufficient and a shortfall will emerge in the "Barka Zone".

As in the case of the "Ghubrah Zone", PAEW may be able to cover short-run shortfalls with groundwater supplies, but the intention is to minimize groundwater use under normal circumstances, by ensuring that new desalination capacity is developed in line with projected peak demands. On this basis, there is a need for new desalination capacity for the "Barka Zone" from 2014 onwards – with the requirement rising from 32,000 m^3/d (7 MIGD) to 96,000 m^3/d (21 MIGD) by 2017.

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



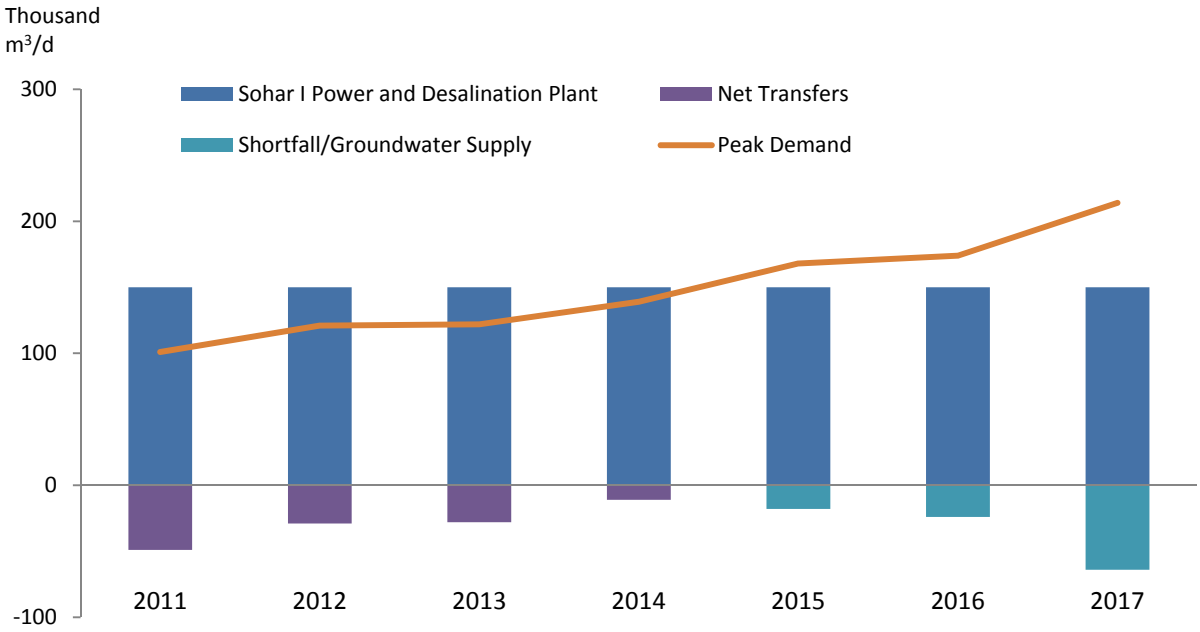
	2011	2012	2013	2014	2015	2016	2017
"Barka Zone"	*thousand m^3/d*						
Peak Water Demand	**197**	**219**	**243**	**269**	**299**	**303**	**307**
Desalination Capacity	**211**	**211**	**211**	**211**	**211**	**211**	**211**
Barka I Power and Desalination Plant	*91*	*91*	*91*	*91*	*91*	*91*	*91*
Barka II Power and Desalination Plant	*120*	*120*	*120*	*120*	*120*	*120*	*120*
Net Transfers	**(14)**	**8**	**32**	**26**	**-**	**-**	**-**
Imports from "Sohar Zone"	*49*	*29*	*28*	*11*			
Imports from "Ghubrah Zone"	*-*	*-*	*4*	*15*			
Exports to "Ghubrah Zone"	*(63)*	*(21)*	*-*				
Reserve (after Transfers)	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Shortfall / Groundwater Supply Required	**-**	**-**	**-**	**32**	**88**	**92**	**96**

Desalination Capacity Requirement – "Sohar Zone"

The principal source of water for the "Sohar Zone" is currently the existing 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.

As discussed above, PAEW is able to transfer water between the "Sohar Zone" and the "Barka Zone" and expects to do so over the next few years. By 2015 however, demand is expected to have caught up with the current desalination capacity and, as shown in Figure 8 below, new desalination capacity will be required if reliance on groundwater supply is to be minimized – with the requirement rising from 18,000 m^3/d (4 MIGD) in 2015 to 64,000 m^3/d (14 MIGD) by 2017.

Figure 8 Desalination Capacity Reserve/Shortfall – "Sohar Zone"



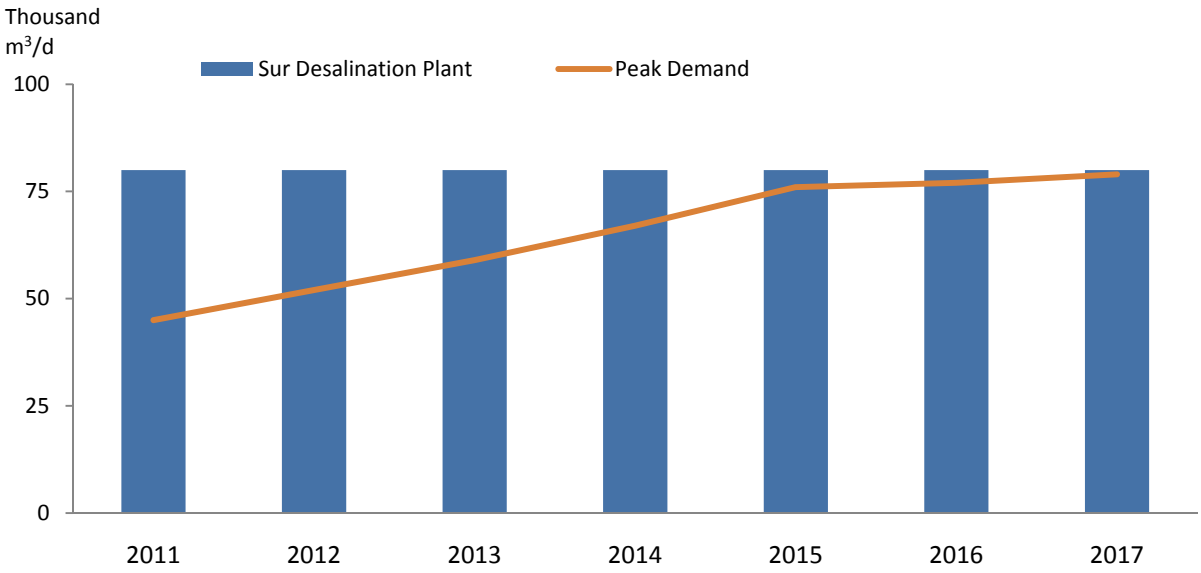
	2011	2012	2013	2014	2015	2016	2017
"Sohar Zone"	*thousand m^3/d*						
Peak Water Demand	**101**	**121**	**122**	**139**	**168**	**174**	**214**
Desalination Capacity	**150**	**150**	**150**	**150**	**150**	**150**	**150**
Sohar I Power and Desalination Plant	*150*	*150*	*150*	*150*	*150*	*150*	*150*
Net Transfers	**(49)**	**(29)**	**(28)**	**(11)**	**-**	**-**	**-**
Exports to "Barka Zone"	*(49)*	*(29)*	*(28)*	*(11)*	*-*	*-*	*-*
Reserve (after Transfers)	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Shortfall / Groundwater Supply Required	**-**	**-**	**-**	**-**	**18**	**24**	**64**

Desalination Capacity Requirement – "Sur Zone"

The principal source of water for the "Sur Zone" is currently the existing 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 9 below provides a summary of the demand/supply balance in the "Sur Zone" during 2011-2017 period. This indicates that the current desalination capacity at Sur should be sufficient to cover projected demands through 2017.

Figure 9 Desalination Capacity Reserve/Shortfall – "Sur Zone"

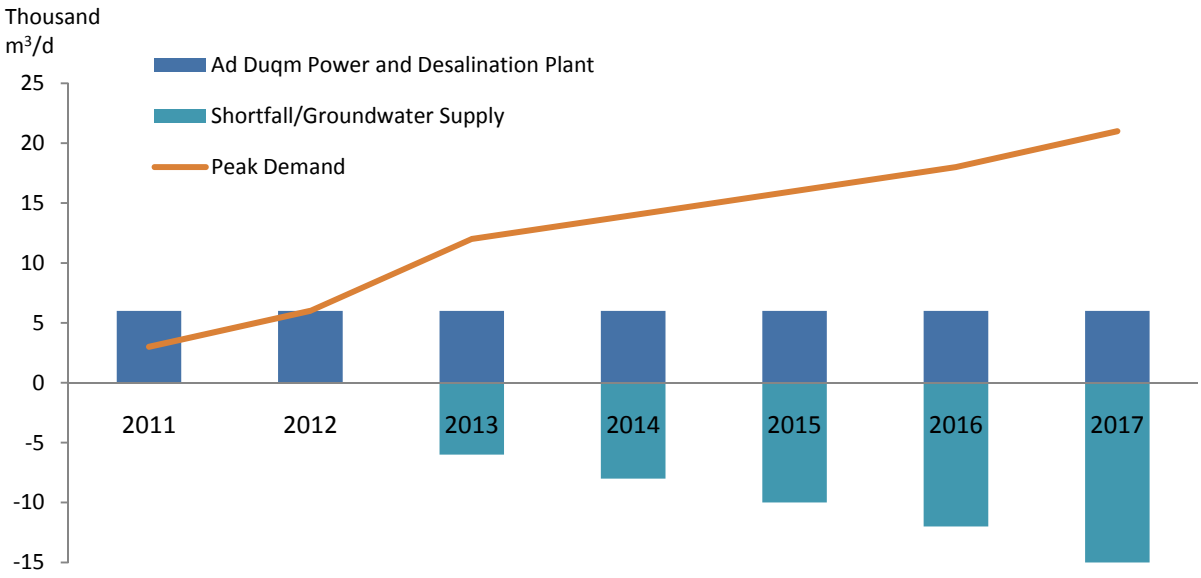


	2011	2012	2013	2014	2015	2016	2017
"Sur Zone"	*thousand m^3/d*						
Peak Water Demand	**45**	**52**	**59**	**67**	**76**	**77**	**79**
Desalination Capacity	**80**	**80**	**80**	**80**	**80**	**80**	**80**
Sur Desalination Plant	*80*	*80*	*80*	*80*	*80*	*80*	*80*
Reserve (after Transfers)	**35**	**28**	**21**	**13**	**4**	**3**	**1**
Shortfall / Groundwater Supply Required	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Desalination Capacity Requirement – "Ad Duqm Zone"

The "Ad Duqm Zone" is currently served by a small (6,000 m^3/d) desalination plant in Ad Duqm, 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, and new desalination capacity will be required if heavy dependence on groundwater supplies is to be avoided. Figure 10 below provides an indication of the potential shortfalls in desalination capacity, which reach about 15,000 m^3/d (3 MIGD) by 2017.

Figure 10 Desalination Capacity Reserve/Shortfall – "Ad Duqm Zone"



	2011	2012	2013	2014	2015	2016	2017
"Ad Duqm Zone"	*thousand m³/d*						
Peak Water Demand	**3**	**6**	**12**	**14**	**16**	**18**	**21**
Desalination Capacity	**6**	**6**	**6**	**6**	**6**	**6**	**6**
Ad Duqm Desalination Plant	*6*	*6*	*6*	*6*	*6*	*6*	*6*
Reserve (after Transfers)	**3**	**-**	**-**	**-**	**-**	**-**	**-**
Shortfall / Groundwater Supply Required	**-**	**-**	**6**	**8**	**10**	**12**	**15**

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, the main requirements for new desalination capacity over the 2011-2017 period are:

- the requirement for 191,000 m^3/d (42 MGD) of new desalination capacity at Ghubrah from 2013/2014;
- the requirement for at least 160,000 m^3/d (35 MGD) of new desalination capacity (in aggregate) for the "Barka Zone" and "Sohar Zone" from 2014/2015; and

- the requirement for at least 15,000 m^3/d (3 MIGD) of new desalination capacity for the "Ad Duqm Zone".

OPWP had previously contemplated combining new power generation capacity with the planned desalination capacity at Ghubrah in 2013/2014, but decided in 2010 to concentrate the development of power generation at Sur instead – specifically, at the new Sur IPP – as the large available "green-field" site at Sur offered a number of advantages over the existing Ghubrah site. As a result of this decision, the new desalination capacity at Ghubrah will go ahead on a water-only basis, as an IWP.[9]

OPWP believes that new desalination capacity required from 2014/2015 for the "Barka Zone" and "Sohar Zone" will also most likely need to go ahead on a water-only basis, mainly due to the time horizon involved – as suggested in section 1.3 above, new power generation is not likely to be required until sometime after 2014/2015. In addition, it is not clear that a location on the Al Batinah coast would be most suitable for the development of further power generation capacity. However, consideration could be given – in consultation with PAEW – to the feasibility of allowing existing plant owners at Sohar and Barka to propose water-only extensions to the existing plants, as a possible alternative to the development of entirely stand-alone desalination capacity.

At the request of PAEW, OPWP intends to consider the potential for combining desalination with power generation capacity as part of its strategic review of options for the development of a power generation plant at Ad Duqm (as discussed in section 1.1 above). However, given the lead time associated with the development of any such power plant, this is only likely to represent a longer term option – the more immediate need for additional desalination capacity indicated by Figure 10 above (i.e. starting from 2013) will most likely need to be met on a water-only basis.

1.6 PROCUREMENT STRATEGY

Current Projects

As indicated above, OPWP's current procurement activities for the MIS are focused on temporary generation capacity for the summer of 2011 and the ongoing competition process for the Sur IPP.

In addition, OPWP expects to commence during 2011 the procurement of the proposed solar plant(s) (subject to receiving a final go-ahead from the Government).

Future Procurement

Procurement activities in the next few years are expected to be driven by:

- the potential need for new capacity in the 2016-2018 timeframe, as described in section 1.3 above;
- the review of options, noted in section 1.1 above, relating to the development of a power generation plant at Ad Duqm, with or without interconnection with the MIS and/or other power systems; and
- consideration of a number of options to improve fuel-utilization efficiency in the MIS.

[9] OPWP will however manage the competition process for this project, on behalf of PAEW.

OPWP intends to commence initial studies in 2011 to develop its strategy for the procurement of new capacity in the 2016-2018 timeframe. These studies will include consideration of feasible locations and fuel availability for new plant(s). Consideration will also be given to the impact of the expiry of existing P(W)PAs in the same timeframe, and the interaction between options for the development of new capacity and the renewal of P(W)PAs for existing capacity. The interaction between the Ad Duqm options and options for the MIS as a whole (in the context of Ad Duqm potentially being interconnected with the MIS) will also be considered.

At the same time, OPWP intends to study a number of options aimed primarily at improving overall fuel-efficiency in the MIS, including the conversion of one or more existing OCGT plants to CCGT operation, and the addition of "flexible" resources in the form of energy storage technology and/or dedicated load-following plant(s). All of these options would likely involve the addition of relatively low amounts of capacity, at a relatively high cost per MW installed, but may be economically viable based on their ability to reduce overall fuel consumption in the MIS. In the event that OPWP's analysis indicates that any of these options is likely to be economically viable, then OPWP would look to develop an appropriate procurement process tailored to the relevant option.

Long-Term Strategy

OPWP also intends to work closely with the Government over the coming year with regard to the development of longer-term strategy. This is expected to involve looking out beyond the 7-year horizon and mapping out a future vision for the power (and associated water) sector – including consideration of such issues as:

- fuel sources, diversity and security;
- the role of renewables and nuclear power as long-term supply alternatives;
- the role of conservation and demand side management; and
- the role of regional interconnects.

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

2010 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 2010 was about 5.7 billion Sm^3 (equivalent to 15.6 million Sm^3/d), an increase of around 6% over 2009.[10] The peak daily gas consumption during 2010 was 21.9 million Sm^3, an increase of 2% over 2009. The increases in average and peak day gas consumption essentially reflected the year on year growth in average and peak day power (and water) demands, with a minor improvement in fuel efficiency.

[10] This total excludes gas consumed by industries and other parties (e.g. the Ministry of Defense and PDO) in generating electricity supplied to the MIS. Such quantity is estimated at around 0.05 to 0.1 billion Sm^3 in total for 2010.

A small amount (about 0.6 million litres in total) of diesel fuel was used as the primary fuel for temporary generation facilities connected to the MIS in 2010 – in energy-equivalent terms, this represented less than 0.01% of the total MIS fuel consumption.

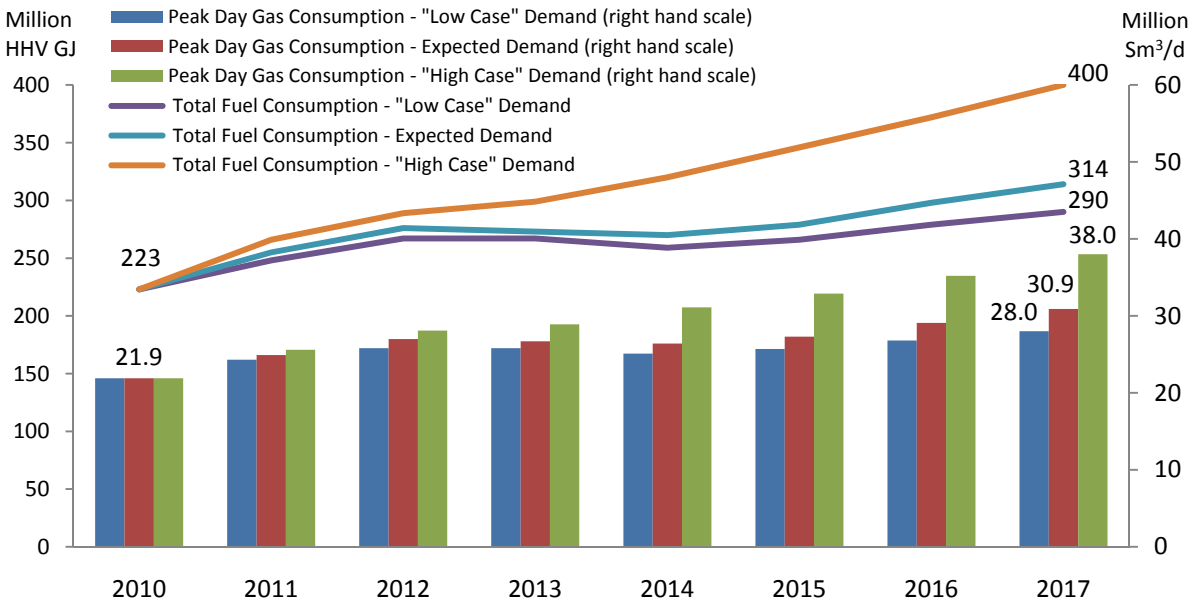
Projected Fuel Requirements

OPWP has prepared indicative projections for the fuel requirements of the MIS over the 2011-2017 period, under the expected, "low case" and "high case" demand scenarios. These projections are based on a number of key assumptions, including:

- all generation other than the planned 2011 diesel-fueled temporary generation and the prospective solar plant(s) is assumed to be gas-fueled;
- 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 2015 onwards;
- new gas-fueled generation (in particular, the planned Sur IPP) is assumed to have a similar fuel efficiency to the Sohar II and Barka III plants; and
- the impact of potential fuel-efficiency improvement options described in section 1.6 above has not been included at this stage (to the extent that any of these are judged to be economically viable and are ultimately carried out, the projected quantities of gas required will be somewhat reduced).

The projections are shown in Figure 11 below.

Figure 11 Projected Fuel Requirements – MIS



	Actual 2010	2011	2012	2013	2014	2015	2016	2017	*Ave.% Growth*
Expected Demand									
Gas Consumption (million Sm^3/d)									
Annual Average	15.6	17.8	19.3	19.1	18.9	19.5	20.8	22.0	*5%*
Peak Day	21.9	24.9	27.0	26.7	26.4	27.3	29.1	30.9	*5%*
Diesel Fuel Consumption (million litres)	0.6	19	-	-	-	-	-	-	*n/a*
Total Fuel Consumption (million HHV GJ)[a]	**223**	**255**	**276**	**273**	**270**	**279**	**298**	**314**	***5%***
Gas	*223*	*255*	*276*	*273*	*270*	*279*	*298*	*314*	*5%*
Diesel Fuel	*0.02*	*0.7*	-	-	-	-	-	-	*n/a*
"Low Case" Demand									
Gas Consumption (million Sm^3/d)									
Annual Average	15.6	17.3	18.7	18.6	18.1	18.6	19.5	20.2	*4%*
Peak Day	21.9	24.3	25.8	25.8	25.1	25.7	26.8	28.0	*4%*
Diesel Fuel Consumption (million litres)	0.6	8	-	-	-	-	-	-	*n/a*
Total Fuel Consumption (million HHV GJ)[a]	**223**	**248**	**267**	**267**	**259**	**266**	**279**	**290**	***4%***
Gas	*223*	*248*	*267*	*267*	*259*	*266*	*279*	*290*	*4%*
Diesel Fuel	*0.02*	*0.3*	-	-	-	-	-	-	*n/a*
"High Case" Demand									
Gas Consumption (million Sm^3/d)									
Annual Average	15.6	18.5	20.2	20.9	22.4	24.2	26.0	27.9	*9%*
Peak Day	21.9	25.6	28.1	28.9	31.1	32.9	35.2	38.0	*8%*
Diesel Fuel Consumption (million litres)	0.6	30	-	-	-	-	-	-	*n/a*
Total Fuel Consumption (million HHV GJ)[a]	**223**	**266**	**289**	**299**	**320**	**346**	**372**	**400**	***9%***
Gas	*223*	*265*	*289*	*299*	*320*	*346*	*372*	*400*	*9%*
Diesel Fuel	*0.02*	*1.1*	-	-	-	-	-	-	*n/a*

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

Overall fuel consumption (which is predominantly natural gas in 2011, and entirely natural gas from 2012 onwards) is expected to increase at an average rate of about 5% per year – somewhat lower than the expected growth rate of electricity demands of about 9% per year. Under the "low case" demand scenario, fuel consumption increases at an average of 4% per year, whilst in the "high case" demand scenario, it grows at an average rate of 9% per year – in both cases below the rate of growth of electricity demand.

The lower growth rates in fuel consumption relative to electricity demand are attributable to two main factors. Firstly, 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 and 2014, compared to the 2012 level, under the expected and "low case" demand scenarios And secondly, the assumed addition of the solar plant(s) in 2015 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 confirmed supply for the planned Sur IPP and has provided OPWP with an overall medium-term committed gas reservation for power generation (and associated water production) that is expected to be sufficient to cover the projected requirements until 2018 under the "low case" demand scenario, 2016 under the expected demand scenario, and 2013 under the "high case" demand scenario.[11]

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 (possibly starting with new capacity potentially required in 2016).

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

[11] This overall reservation relates to the combined gas requirements of the MIS and the Salalah System.

SECTION 2 SALALAH SYSTEM

The Salalah System covers the city of Salalah and surrounding areas in the Governorate of Dhofar, serving around 60,000 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, along with a single independent generation facility owned and operated by Rural Areas Electricity Co. (RAEC). DPC acts as the sole electricity supplier within the service area covered by the system, supplying existing and new electricity customers.

The Salalah System presently operates as an isolated system. However, it is anticipated that an interconnect with the power system of Petroleum Development Oman (PDO) will be established in 2011.

A further significant development of the system is expected in 2011 with the phased addition of a new independent power generation and water desalination facility (the Salalah IWPP), providing a substantial increase in power generation capacity as well as (for the first time in Salalah) desalination capacity to meet the requirements of the responsible "water department", the Directorate General of Water in the Office of the Minister of State and Governor of Dhofar.

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, procuring additional power to meet the requirements of the electricity supplier (that are not covered by its own generation) and, wherever beneficial, co-procuring desalinated water to meet the needs of the water department.

2.1 DEMAND FOR ELECTRICITY

Historical Demand

Electricity demand growth in the Salalah System remained relatively strong in 2010. Average demand increased 9% on the year, to 216 MW (corresponding to 1.89 TWh). The estimated peak demand (including demand management and load shedding) was 356 MW.[12] This was nominally an increase of some 20% over the 2009 recorded peak demand, though this may somewhat overstate the true growth due to comparability issues related to demand management measures at the peak time.

As with the MIS, it is informative to look at medium-term trends, abstracting from the impact of weather or other special factors that can affect demand growth in any particular year. Looking back over the last 5-10 years, both average and peak electricity demands in the Salalah System grew at a rate of about 12% per year over the five years from 2005 to 2010, and about 9% per year over the ten years from 2000 to 2010. The demand growth has thus followed a similar pattern as in the MIS – with an acceleration in demand over the last five years – but at somewhat higher rates than in the MIS.

[12] DPC reported a 2010 peak Salalah System demand of 356 MW at 3.15 pm on Sunday, May 16 – comprising an actual met demand of 335 MW plus an estimated 21 MW of demand management and load shedding.

Demand Projections

OPWP's 7-year electricity demand projections for the Salalah System have been developed after consultation with DPC and other relevant entities.

The projections have been developed in a similar manner as for the MIS; in particular:

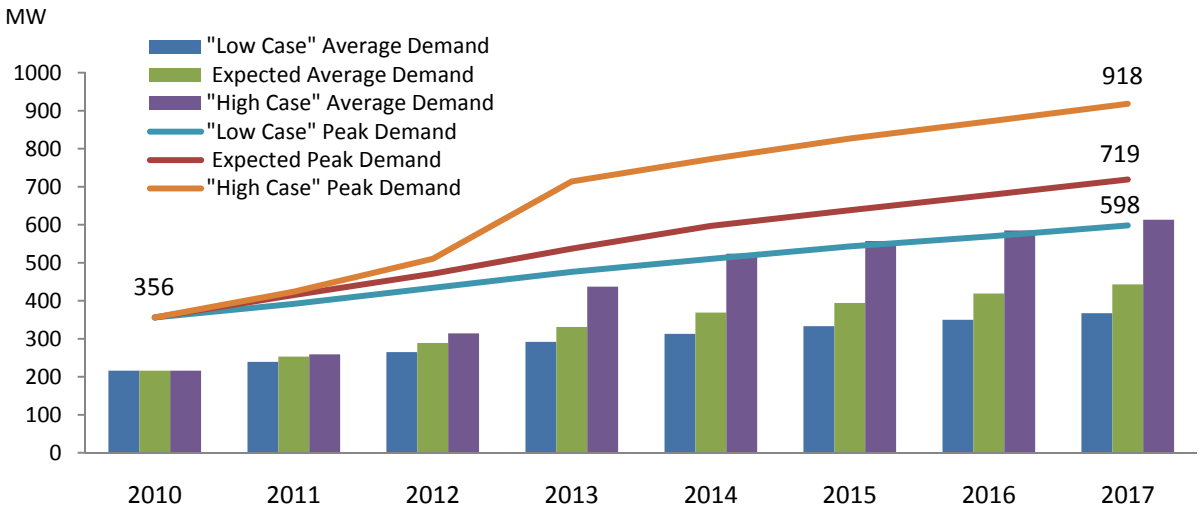
- they cover both average demand (i.e. energy) and peak demand;
- the projected demands represent the "net system demand", in that they are inclusive of assumed transmission and distribution system losses but exclude the internal auxiliary consumption of power and desalination plants;
- the projected demands are based on an assumption of "normal" weather;
- the projections 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[13]; and
- the projections are presented as a range with a "low case", a "high case" and a central, expected demand forecast.

As in the MIS, the principal drivers of underlying demand are residential and service sector (including government and private sector) demands – arising from continuing growth of population and the number of households, and general economic development and new construction, with an additional boost from the investments being made in particular in tourism-related projects. And also as in the MIS, the growth in demand from bulk loads is driven primarily by industrial consumers – in the case of the Salalah System, concentrated in particular around the Salalah Free Zone.

The projections are summarized in Figure 12 below.

[13] 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.

Figure 12 Electricity Demand Projections – Salalah System



	Actual 2010[a]	2011	2012	2013	2014	2015	2016	2017	*Ave.% Growth*
Expected Demand									
Average Demand (MW)	216	253	289	331	369	394	419	443	*11%*
Underlying Demand	*156*	*178*	*198*	*215*	*230*	*254*	*279*	*303*	*10%*
Large Industrial Loads	*50*	*63*	*77*	*102*	*125*	*126*	*127*	*127*	*14%*
Other Bulk Loads	*10*	*13*	*13*	*13*	*13*	*13*	*13*	*13*	*4%*
Annual Energy (TWh)	**1.89**	**2.22**	**2.54**	**2.90**	**3.23**	**3.45**	**3.68**	**3.88**	***11%***
Peak Demand (MW)	**356**	**415**	**471**	**537**	**597**	**638**	**678**	**719**	***11%***
Change from 2010-2016 Statement (MW)	*+5*	*+4*	*+7*	*+25*	*+48*	*+55*	*+63*	*n/a*	
"Low Case" Demand									
Average Demand (MW)	216	239	265	292	313	333	350	367	*8%*
Underlying Demand	*156*	*169*	*186*	*203*	*224*	*243*	*258*	*275*	*8%*
Large Industrial Loads	*50*	*58*	*66*	*75*	*76*	*77*	*78*	*79*	*7%*
Other Bulk Loads	*10*	*12*	*13*	*13*	*13*	*13*	*13*	*13*	*4%*
Annual Energy (TWh)	**1.89**	**2.10**	**2.33**	**2.55**	**2.74**	**2.92**	**3.07**	**3.21**	***8%***
Peak Demand (MW)	**356**	**392**	**434**	**476**	**510**	**543**	**569**	**598**	***8%***
"High Case" Demand									
Average Demand (MW)	216	259	314	437	524	557	585	613	*16%*
Underlying Demand	*156*	*184*	*204*	*231*	*274*	*299*	*326*	*354*	*12%*
Large Industrial Loads	*50*	*63*	*97*	*194*	*237*	*245*	*246*	*246*	*25%*
Other Bulk Loads	*10*	*13*	*13*	*13*	*13*	*13*	*13*	*13*	*4%*
Annual Energy (TWh)	**1.89**	**2.27**	**2.76**	**3.83**	**4.59**	**4.88**	**5.14**	**5.37**	***16%***
Peak Demand (MW)	**356**	**424**	**510**	**714**	**773**	**827**	**872**	**918**	***14%***

[a] *estimated, including demand management and load shedding*

Under the central forecast, average demand in the Salalah System is expected to grow from 216 MW (corresponding to 1.89 TWh) in 2010 to 443 MW (3.88 TWh) in 2017, an average increase of around 11% per year. Similarly, peak demand is expected to grow at an average rate of about 11% per year, from 356 MW in 2010 to 719 MW in 2017. These growth rates are around 2 percentage points higher than those projected for the MIS, continuing the trend of somewhat higher growth in the Salalah System that has been seen over the last 5-10 years.

Over the 7-year horizon, this scenario is essentially unchanged in terms of average demand from the expected demand projection presented in OPWP's 2010-2016 7-Year Statement. However, in terms of peak demand there is an upward adjustment – of about 10% by the end of the 7-year period – reflecting a revised view, in light of 2010 data, of the expected Salalah System load factor.

Under the "low case" scenario, the medium-term growth rate of both average and peak demands is reduced to around 8% per year. This scenario is essentially analogous to the "low case" scenario for the MIS, with growth about 3 percentage points below the expected demand scenario.

The "high case" scenario is also similar to that of the MIS, with elevated growth rates driven in particular by a significant build-up in large industrial loads – and with an unusually large step up in demand in 2013 when one prospective industrial customer with a demand in excess of 100 MW could potentially be added to the system.

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.

Exports to Interconnected Systems

The Salalah System presently operates as an isolated system, without any interconnections with other systems. However, an interconnection between the Salalah System and the PDO power system (via a 132 kV link between Thumrait and Harweel) is currently under construction and scheduled for completion during 2011.

In addition to providing immediate reliability benefits (through the sharing of generation reserves), this interconnect may in the future provide the opportunity for the "commercial" export of power to the PDO System, which would add to the expected demand to be served by generation resources in the Salalah System.

For the time being, no definite arrangements have been agreed for commercial exports to the PDO System, and accordingly the current Salalah System demand projections (presented above) include the native demands of the Salalah System only.

However, OPWP intends to consider the potential for economic benefits from commercial exports from the Salalah System to the PDO System – and the consequent impact on total demand – in conjunction with the development of its medium term generation procurement strategy for the Salalah System (discussed further below).

2.2 POWER GENERATION RESOURCES

Contracted Capacity

Demand for electricity in the Salalah System is currently met by a combination of:

- power generated by DPC pursuant to the Concession Agreement at the gas-fired Raysut New Power Station; and
- power generated by RAEC at the Raysut A&B diesel power plants, and sold to OPWP under a PPA.

These resources are regarded as analogous to the "contracted capacity" in the MIS.

The Raysut New Power Station comprises eight permanent OCGT units with a total net capacity of 256 MW, together with three temporary OCGT units with a total net capacity of 54 MW. The permanent units are planned to remain operational until at least 2023 (the expiry date of the Concession Agreement). The temporary units – which were installed in June 2010 – are currently planned to remain operational until the fourth quarter of 2011.

The Raysut A&B diesel power plants comprise twelve diesel engine units with a total net capacity of 55 MW. These units are also currently planned to remain operational until the fourth quarter of 2011, after which they are expected to be de-commissioned.

Further contracted capacity is expected to enter operation beginning in the second half of 2011, in the form of the Salalah IWPP. The Salalah IWPP will, when fully commissioned in 2012, have a net power capacity of 445 MW, fully contracted to OPWP under a 15-year PWPA. Initial phases of generation capacity – of 61 MW and 173 MW – are scheduled to be commissioned in the third and fourth quarters of 2011.

Planned Capacity

OPWP is presently in discussions with RAEC and expects during the first quarter of 2011 to enter into PPAs for the provision by RAEC of 75 MW of temporary diesel engine capacity – to be installed at two sites in the Salalah System for 3-6 months during the summer of 2011. The addition of these units is required to overcome a potential shortfall in generation capacity during the summer peak demand period, pending the scheduled commissioning of the Salalah IWPP capacity later in the year.

Other Resources

As noted above, the Salalah System currently operates as an isolated system, but an interconnection with the PDO Power System (via a 132 kV link between Thumrait and Harweel) is scheduled to enter operation in the second quarter of 2011.

The main purpose of this interconnect is to support a reserve sharing arrangement between the Salalah System 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, support can be provided to the Salalah System to help manage contingencies.

In addition to supporting reserve sharing arrangements, the interconnection potentially supports "commercial" imports to the Salalah System – based on the relative costs of generation between the Salalah System and the PDO system. This may be particularly beneficial in the short-term as a means of minimizing utilization of diesel fuel in the Salalah System, and OPWP intends to enter into discussions with PDO in respect of this option in 2011.

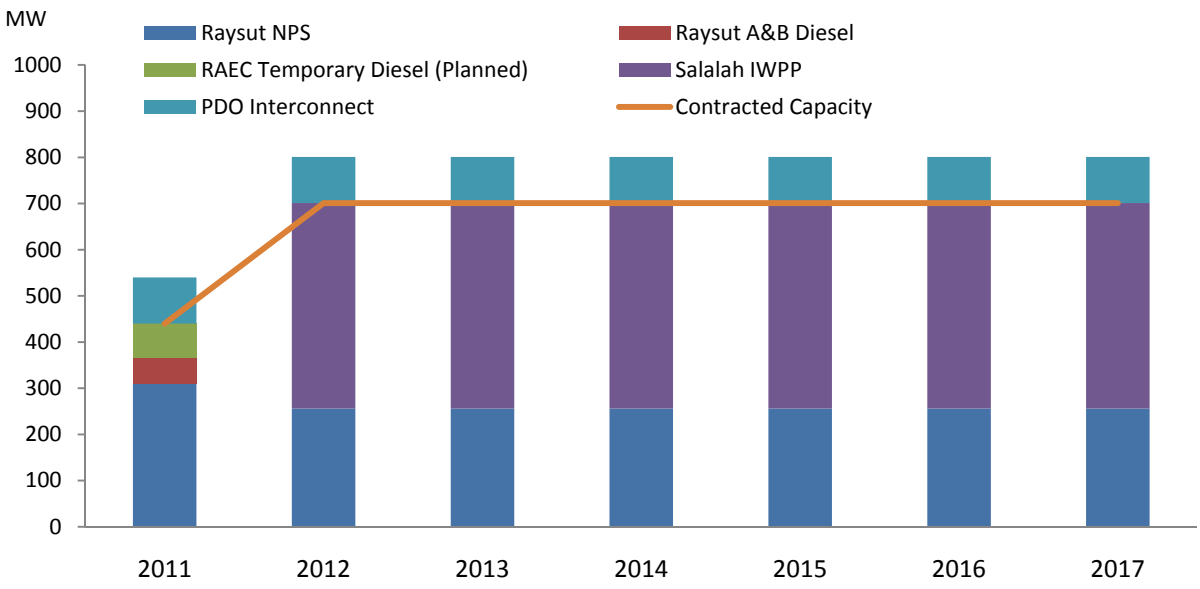
The nominal transfer capacity of the interconnection will be around 150 MW, but the availability of import power for the Salalah System is more likely in practice to be limited by generation availability and upstream transmission constraints in the PDO system. These factors will be reviewed in consultation with PDO on a year to year basis. For 2011, it is expected that up to around 100 MW of import capability will be available to the Salalah System following the completion of the interconnector.

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).

Summary

Figure 13 below provides an overall summary of the existing, under construction and planned generation resources that OPWP expects to have access to for the Salalah System.

Figure 13 Total Power Generation Resources – Salalah System



	2011	2012	2013	2014	2015	2016	2017
				Net MW [a]			
Contracted Capacity							
Existing / Under Construction							
Raysut New Power Station	310	256	256	256	256	256	256
Raysut A&B Diesel	55	-	-	-	-	-	-
Salalah IWPP	-	445	445	445	445	445	445
Planned							
RAEC Temporary Diesel	75	-	-	-	-	-	-
Total Prospective Contracted Capacity	**440**	**701**	**701**	**701**	**701**	**701**	**701**
Other Resources							
PDO Interconnect[b]	100	100	100	100	100	100	100
TOTAL ALL RESOURCES	**540**	**801**	**801**	**801**	**801**	**801**	**801**

[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] *provisional import capability*

2.3 ADDITIONAL POWER GENERATION REQUIREMENTS

Statutory and Regulatory Requirements

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. And whilst OPWP's license does not stipulate a specific generation security standard for the Salalah System, as it does for the MIS,

it does require that OPWP 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 means that, as a minimum, the MIS standard of 24 hours LOLH needs to be complied with. However, given the currently isolated nature of the Salalah System – without the same contingency support from interconnects and industry surplus generation as the MIS – OPWP has in practice sought in recent years to apply a somewhat more stringent standard, to ensure the required service quality.

In conjunction with the development of a medium term generation procurement strategy for the Salalah System (discussed further below), OPWP intends to consult with AER regarding the establishment of an appropriate specific generation security standard for the Salalah System for the future.

2011 Capacity Requirement

OPWP has determined, and agreed with the AER, that in order to ensure an appropriate degree of generation security, it needs to enter into agreements in respect of 75 MW of additional temporary generation capacity for the Salalah System in 2011 – to raise the total contracted capacity during the peak summer period to 440 MW.

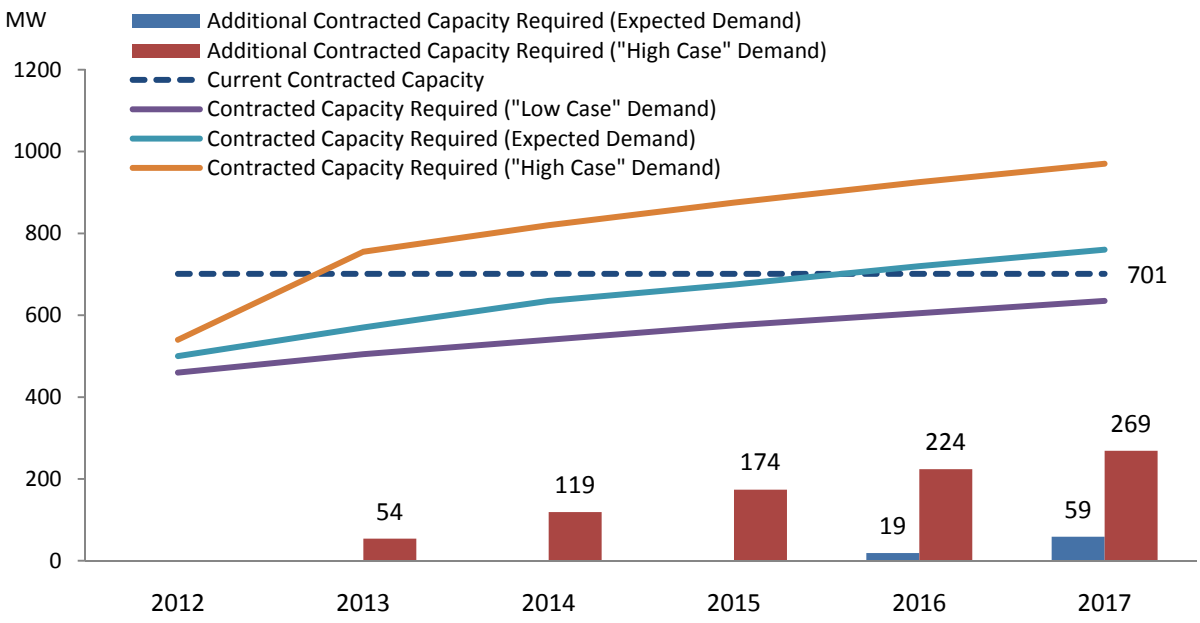
As indicated above, OPWP is in discussions with RAEC to make this capacity available at two sites within the Salalah System and expects to enter into the relevant PPAs in the first quarter of 2011 – in time for the facilities to be installed ahead of the summer peak demand period.

Future Capacity Requirements

OPWP has calculated the approximate amounts of contracted capacity it would require to comply with a 24 hour LOLH standard in each year during the 2012-2017 period, in the context of the three demand projections described above (i.e. expected demand, "low case" and "high case").[14] The approximate requirements are shown in Figure 14 below. As discussed above, these amounts should be regarded as minimum amounts of required capacity, and more capacity would be required to achieve a more stringent generation security standard in the medium-term.

[14] Such calculations are necessarily approximate as the LOLH depends to some extent on the exact nature (e.g. type and size) of the generation capacity, which is not known with certainty in respect of future capacity.

Figure 14 Future Power Generation Capacity Requirements – Salalah System



	2012	2013	2014	2015	2016	2017
			Net MW			
Expected Demand						
Peak Demand	471	537	597	638	678	719
Total Contracted Capacity Required	500	570	635	675	720	760
Additional Contracted Capacity Required	**-**	**-**	**-**	**-**	**19**	**59**
"Low Case" Demand						
Peak Demand	434	476	510	543	569	598
Total Contracted Capacity Required	460	505	540	575	605	635
Additional Contracted Capacity Required	**-**	**-**	**-**	**-**	**-**	**-**
"High Case" Demand						
Peak Demand	510	714	773	827	872	918
Total Contracted Capacity Required	540	755	820	875	925	970
Additional Contracted Capacity Required	**-**	**54**	**119**	**174**	**224**	**269**

It can be seen that the need for additional capacity is highly dependent on the path of demand. The expected and “low case” demand scenarios indicate that additional capacity may not be required in until 2016 or later. However, under the “high case” scenario, additional capacity is required as early as 2013 – and the requirements increase rapidly, exceeding 200 MW by 2016.

Whilst short-run measures such as temporary generation can be used to cover capacity shortfalls on a year by year basis – and given the uncertainty associated with the requirements this may be considered a sensible course in the near term – it is unlikely to be practical or economical to rely on such measures for requirements in excess of 200 MW.

Accordingly, OPWP believes that it is prudent to plan for a potential permanent new addition of capacity no later than 2016. A wide range of options exist for such capacity, in terms of plant type, location and size. OPWP is currently carrying out a detailed study to review all the various options and map out an optimal generation procurement strategy, looking at the merits of the initial options within the context of an overall long-term resource plan and under a number of future scenarios.

Some of the matters being considered as part of the study are:

- various technical options including "green-field" projects and extensions/modifications of existing plants;
- the potential for combining power capacity with desalination capacity;
- the impact of the PDO interconnect and in particular the potential for "commercial" exports from the Salalah System to the PDO system;
- the introduction of a specific generation security standard for the Salalah System;
- fuel availability; and
- the potential role for renewable resources such as solar and wind.

This study is expected to be completed by mid-2011 and will form the basis for consultations with AER and subsequent decisions with respect to the initiation of a competitive procurement process for new capacity. In order to meet the potentially required 2016 in-service date, it is likely that the competition process would need to commence in 2012.

2.4 DESALINATED WATER REQUIREMENTS

Demand for Water

Water demand projections for the Dhofar region have been provided to OPWP by the relevant "water department" – the Directorate General of Water in the Office of the Minister of State and Governor of Dhofar (DGW).

DGW has advised that the relevant demands for OPWP (i.e. those that may potentially be served by desalination capacity associated with power generation resources in the Salalah System) are the aggregated potable water demands of the Salalah, Taqa and Mirbat wilayats.[15]

The projected total annual demands of these wilayats, as provided by DGW, are shown in Figure 15 below. Based on the total annual demand figures, OPWP has estimated "peak demands", which are taken as the basis for assessing future resource capacity requirements.[16]

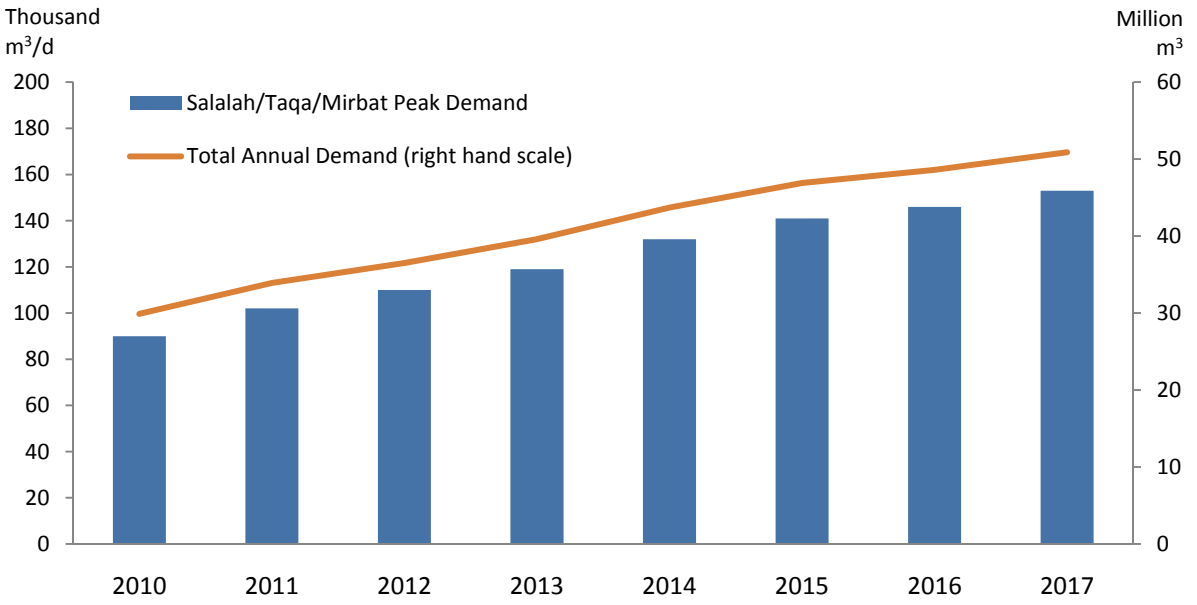
Over the 7-year horizon, water demand in the Salalah/Taqa/Mirbat area is expected to increase at an average rate of around 8% per year, similar to the overall growth rate expected in the other main supply areas in the Sultanate (as shown in Figure 5 above). As in the other supply areas, the main growth drivers are increasing

[15] Other demands in the Dhofar region are expected to be served from local supply sources.

[16] "Peak demand" here has the same meaning as in section 1.4, i.e. the average daily demand (inclusive of network losses), during the peak month of the year.

population, economic development and the continuing build out of water supply networks – moderated to some extent by loss reduction efforts. The current projections are unchanged from those included in OPWP's 2010-2016 7-Year Statement.

Figure 15 Water Demand Projections – Dhofar (Salalah/Taqa/Mirbat)



	Actual 2010	2011	2012	2013	2014	2015	2016	2017	Ave.% Growth
Peak Water Demand				***thousand m³/d***					
Total Salalah/Taqa/Mirbat	**90**	**102**	**110**	**119**	**132**	**141**	**146**	**153**	***8%***
Change from 2010-2016 Statement	---------- *no change* ----------							*n/a*	
Total Annual Demand				***million m³***					
Total Salalah/Taqa/Mirbat	**29.9**	**33.9**	**36.5**	**39.6**	**43.7**	**46.9**	**48.6**	**50.9**	***8%***
Change from 2010-2016 Statement	---------- *no change* ----------							*n/a*	

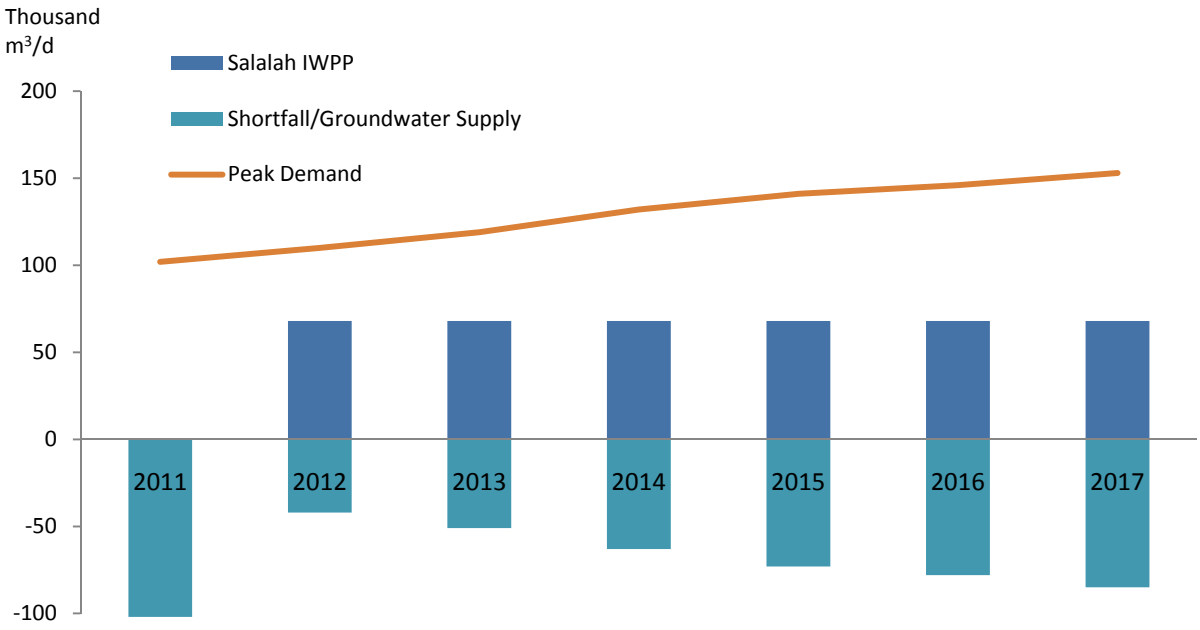
Desalination Capacity Requirement

Demands for potable water in the Salalah/Taqa/Mirbat area are currently met exclusively from groundwater resources. This will change with the planned commissioning of the Salalah IWPP during the second half of 2011. The Salalah IWPP will have a desalination capacity of 68,190 m^3/d (15 MIGD), using RO technology.

Even with the Salalah IWPP in operation after 2011, a significant portion of demand will continue to be met from groundwater resources.

Figure 16 below provides a summary of the demand/supply balance. This indicates that, without additional desalination capacity, DGW will be dependent on groundwater resources to meet roughly half its water requirements.

Figure 16 Desalination Capacity Reserve/Shortfall – Dhofar (Salalah/Taqa/Mirbat)



	2011	2012	2013	2014	2015	2016	2017
				thousand m³/d			
Peak Water Demand	**102**	**110**	**119**	**132**	**141**	**146**	**153**
Desalination Capacity	**-**	**68**	**68**	**68**	**68**	**68**	**68**
Salalah IWPP		*68*	*68*	*68*	*68*	*68*	*68*
Reserve	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Shortfall / Groundwater Supply Required	**102**	**42**	**51**	**63**	**73**	**78**	**85**

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 that at least 85,000 m^3/d (19 MIGD) of additional desalination capacity is likely to be required by 2017.

2.5 COMBINING POWER GENERATION AND WATER DESALINATION

Introduction

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.

Potential for Future Combined Power Generation and Desalination

As discussed in section 2.3 above, OPWP is studying options in respect of a potential permanent new addition of power capacity in the Salalah System around 2016. And as discussed in section 2.4, based on the needs

advised to OPWP by DGW, there is potential requirement for at least 85,000 m^3/d (19 MIGD) of additional desalination capacity by 2017.

Accordingly, OPWP is evaluating the potential for combining the required power and desalination capacities. As indicated in section 2.3, this matter is being considered as part of the study currently being carried out, and based on the findings of the study, a decision will be made in consultation with DGW with regard to the inclusion of desalination capacity in any competitive process for new power generation capacity initiated by OPWP.

If it is decided not to combine the procurement of desalination capacity with new power generation capacity, then possible alternatives would include stand-alone desalination capacity procured by DGW or a water-only extension to the Salalah IWPP.[17]

2.6 PROCUREMENT STRATEGY

Current Projects

As indicated above, OPWP's current procurement activities for the Salalah System are focused on temporary generation capacity for the summer of 2011. These activities are well advanced and OPWP expects to enter into the relevant PPAs with RAEC in the first quarter of the year.

Future Procurement

Procurement activities in the next few years are expected to be driven by:

- any needs for temporary generation that emerge between 2013 and 2015 if demand growth tracks towards the "high case" projection – as indicated in Figure 14 above, these requirements could potentially reach as much as 174 MW by 2015, though this is relatively unlikely; and
- the outcome of the study described in section 2.3 above, currently being carried out by OPWP with a view towards a potential permanent new addition of power generation capacity in the Salalah System around 2016.

2.7 FUEL REQUIREMENTS

2010 Fuel Usage

The primary fuel resources for power generation in the Salalah System are currently natural gas, supplied to the Raysut New Power Station by MOG, and petroleum diesel delivered by road tankers to the Raysut A&B plants.

Total gas consumption in 2010 was about 0.6 billion Sm^3 (equivalent to 1.65 million Sm^3/d), an increase of around 5% over 2009. This was less than the 8% increase in electricity generated using gas – reflecting an increase in efficiency attributable in part to the addition of fuel-efficient temporary OCGT units at the Raysut

[17] In the event that desalination capacity is added independently of power capacity, then OPWP will need to take account of the associated power demand (which would be regarded as an internal auxiliary load in the case of a combined plant).

New Power Station in June 2010. The peak daily gas consumption during 2010 was 2.15 million Sm^3, an increase of 11% over 2009, also attributable in part to the addition of the temporary units.

Total diesel fuel consumption in 2010 was about 20 million litres, an increase of around 50% over 2009. This reflected significantly increased utilization of the Raysut A&B plants, necessitated by higher overall electricity demand in the system. Nevertheless, even with this increased consumption, diesel fuel still represented no more than about 3% of overall annual fuel usage in energy-equivalent terms.

On an overall energy-equivalent basis, total fuel consumption increased around 6% in 2010 – compared with the 9% increase in average electricity demand.

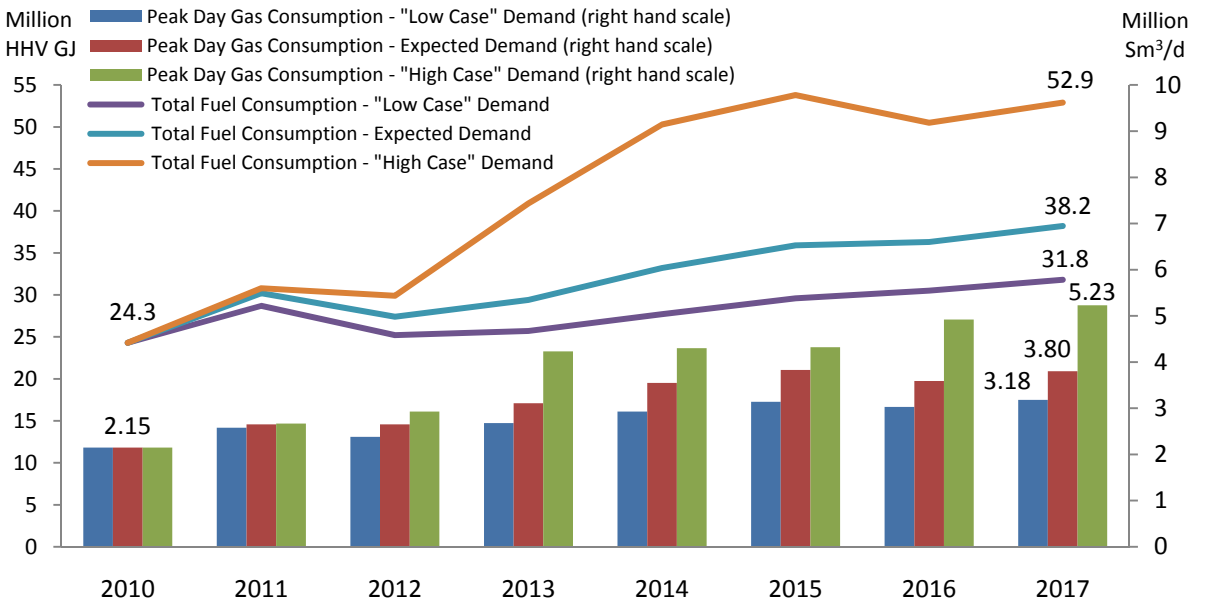
Projected Fuel Requirements

OPWP has prepared indicative projections for the fuel requirements of the Salalah System over the 2011-2017 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 2016, with a similar fuel efficiency to the Salalah IWPP;
- any generation shortfalls arising between 2012 and 2016 (anticipated under the "high case" demand scenario only) are met by diesel-fueled temporary generation; and
- the impact of potential "commercial" imports and/or exports over the PDO interconnection (as described in section 2.1 and 2.2 above) 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 17 below. These projections will be updated as part of the study referred to in section 2.3 above, based on the specifics of the optimal generation procurement strategy identified.

Figure 17 Projected Fuel Requirements – Salalah System



	Actual 2010	2011	2012	2013	2014	2015	2016	2017	*Ave.% Growth*
Expected Demand									
Gas Consumption (million Sm³/d)									
Annual Average	1.65	2.03	1.91	2.05	2.32	2.51	2.53	2.67	*7%*
Peak Day	2.15	2.65	2.65	3.11	3.55	3.83	3.59	3.80	*8%*
Diesel Fuel Consumption (million litres)	20	30	-	-	-	-	-	-	*n/a*
Total Fuel Consumption (million HHV GJ)[a]	**24.3**	**30.2**	**27.4**	**29.4**	**33.2**	**35.9**	**36.3**	**38.2**	***7%***
Gas	*23.6*	*29.1*	*27.4*	*29.4*	*33.2*	*35.9*	*36.3*	*38.2*	*7%*
Diesel Fuel	*0.7*	*1.1*	-	-	-	-	-	-	*n/a*
"Low Case" Demand									
Gas Consumption (million Sm³/d)									
Annual Average	1.65	1.96	1.76	1.80	1.93	2.07	2.12	2.22	*4%*
Peak Day	2.15	2.58	2.38	2.68	2.93	3.14	3.03	3.18	*6%*
Diesel Fuel Consumption (million litres)	20	18	-	-	-	-	-	-	*n/a*
Total Fuel Consumption (million HHV GJ)[a]	**24.3**	**28.7**	**25.2**	**25.7**	**27.7**	**29.6**	**30.5**	**31.8**	***4%***
Gas	*23.6*	*28.0*	*25.2*	*25.7*	*27.7*	*29.6*	*30.5*	*31.8*	*4%*
Diesel Fuel	*0.7*	*0.7*	-	-	-	-	-	-	*n/a*
"High Case" Demand									
Gas Consumption (million Sm³/d)									
Annual Average	1.65	2.06	2.08	2.85	3.48	3.66	3.52	3.70	*12%*
Peak Day	2.15	2.67	2.93	4.23	4.30	4.32	4.92	5.23	*14%*
Diesel Fuel Consumption (million litres)	20	35	-	2	16	38	-	-	*n/a*
Total Fuel Consumption (million HHV GJ)[a]	**24.3**	**30.8**	**29.9**	**40.9**	**50.3**	**53.8**	**50.5**	**52.9**	***12%***
Gas	*23.6*	*29.5*	*29.9*	*40.8*	*49.7*	*52.4*	*50.5*	*52.9*	*12%*
Diesel Fuel	*0.7*	*1.3*	-	*0.1*	*0.6*	*1.4*	-	-	*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 – somewhat lower than the expected growth rate of electricity demands of about 11% per year. Under the "low case" demand scenario, fuel consumption increases at an average of 4% per year, whilst in the "high case" demand scenario, it grows at an average rate of 12% per year – in both cases somewhat below the rate of growth of electricity demand.

The lower growth rates in fuel consumption relative to electricity demand are mainly attributable to the addition of the Salalah IWPP – the first CCGT plant in the Salalah System. The addition of this plant will result in a significant improvement in the overall fuel efficiency of the system, and is expected to *reduce* total fuel consumption in 2012, compared to the 2011 level, under all demand scenarios.

Diesel fuel consumption may increase quite significantly in 2011 (up to 75% under the "high case" demand scenario) as demand growth is met in part by planned diesel-fueled temporary generation, though would still represent no more than about 4% of total fuel consumption on an energy-equivalent basis.

And, as noted above, it may be possible to reduce this level of consumption via "commercial" imports from the PDO system once the interconnection is completed.

After 2011, diesel fuel consumption is only anticipated under the "high case" demand scenario. In this scenario, the maximum quantities required would be of the same order as in 2010 and 2011, though again it may be possible to reduce the amounts via "commercial" imports from the PDO system. The possible use of gas-fueled temporary generation as an alternative could also reduce the diesel requirements below the quantities indicated.

Gas Availability

As mentioned in section 1.7 above, 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.

OPWP intends to consult in particular with MOG regarding the outcome of the study referred to in section 2.3 above, and the availability of gas to support the optimal generation procurement strategy identified. This is likely to involve consideration of the total gas requirements of the Salalah System over the medium term – viewed in the context of the overall combined requirements of the MIS and the Salalah System – as well as the potential provision of supplies for new plant(s) in the Salalah System from around 2016 onwards.