PWP's 7-YEAR STATEMENT

(2023 – 2029)

(Issue 17)

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GLOSSARY

APSR	Authority for Public Services Regulation, Oman
ASA	Ancillary Services Agreement
BST	Bulk Supply Tariff
BTU/scf	British thermal units per standard cubic foot
CCGT	Combined-cycle gas turbine
COD	Commercial operation date
CRT	Cost reflective tariff
CSP	Concentrated Solar Power
DR	Demand Response
DPS	Dhofar Power System
Nama Dhofar Services	Nama Dhofar Services Company
EE	Energy Efficiency
ESCO	Energy Services Company
EWEC	Emirates Water and Electricity Company
GCCIA	Gulf Cooperation Council Interconnection Authority
HHV	Higher Heating Value
IPP	Independent power project
IWP	Independent water project
IWPP	Independent water and power project
kWh	Kilowatt hour(s)
KSA	Kingdom of Saudi Arabia
LOLH	Loss of load hours
m^3	Cubic metre(s)
m^3/d	Cubic metres per day
MEDC	Muscat Electricity Distribution Company (SAOC)
MEM	Ministry of Energy and Minerals
MoHUP	Ministry of Housing and Urban Planning
MIS	Main Interconnected System
MISC	Majis Industrial Services Company (SAOC)
MJEC	Majan Electricity Company (SAOC)
MMS	Market Management System
MSF	Multi-stage flash (desalination technology)
MW	Megawatt(s)
MZEC	Mazoon Electricity Company (SAOC)
MPS	Musandam Power System
Nama Distribution	Nama Electricity Distribution Company
Nama PWP	Nama Power and Water Procurement Company (SAOC)
Nama Water Services	Nama Water Services Company
OCGT	Open-cycle gas turbine
OETC	Oman Electricity Transmission Company (SAOC)
PDO	Petroleum Development Oman (LLC)
PPA	Power purchase agreement
PSPA	Power Supply Purchase Agreement
PWPA	Power and water purchase agreement
PV	Photovoltaic
RE	Renewable Energy
RFP	Request for Proposal
RFQ	Request for Qualification
RO	Reverse osmosis (desalination technology)
SAC	Sohar Aluminium Company
SCOD	Scheduled Commercial Operation Date
Sm^3	Standard cubic metre(s)
Sm^3/d	Standard cubic metres per day
TWh	Terawatt hour(s)

WRA	Wind Resource Assessment

OVERVIEW

Introduction

This statement provides a 7-year outlook for power in the main power systems of Sultanate of Oman: the Main Interconnected System (MIS), the Duqm Power System, the Dhofar Power System (DPS), and the Musandam Power System (MPS). The 7-Year Statement also provides an outlook for desalinated water supply in the Main Interconnected System, the Sharqiyah Zone, and the Dhofar Zone.

Over the next seven years, PWP[1] is committed to achieve ambitious goals to diversify the sources of electricity generation. New solar and wind projects are projected to contribute almost 11% of electricity production by 2025, and efficient utilisation of gas consumption will continue to improve over the planning horizon. In early 2022, PWP launched the region's first wholesale electricity spot market. It will drive further efficiency improvements and provide a means for generation capacity that is not contracted to PWP to sell power into the national grid.

PWP prepares the 7-Year Statement annually in accordance with Condition 5 of its license. This is Issue 17, for the period 2023 to 2029; previous issues and additional information are available on the PWP website at www.omanpwp.com

Demand for Electricity

In the MIS, peak demand is expected to grow at about 3.4% per year on average, from 6,628 MW in 2022 to 8,350 MW in 2029. Most of this growth is expected to occur in the near term, as the economy recovers from the effects of the COVID-19 pandemic.

High and Low Case scenarios are also considered. The Low Case projects 1.3% annual growth in peak demand, reaching 7,260 MW in 2029, 1,090 MW below the Expected Case. The High Case projects 5.2% annual growth in peak demand at 9,430 MW by 2029, exceeding the Expected Case by 1,080 MW.

In the Dhofar Power System, peak demand is expected to grow at 5% per year, from 612 MW in 2022 to 837 MW in 2029. The Low Case projects 2% growth, reaching 721 MW by 2029, 115 MW below the Expected Case. The High Case, on the other hand, projects 7% growth in peak demand, reaching 956 MW by 2029, exceeding the Expected Case by 119 MW.

Power Generation Requirements

In the MIS, the major developments include the completion of the 400 kV North-South Interconnect to the Duqm Power System in Q3 2023 and the deployment of RE projects to reduce energy costs, driven by economics. The North-South Interconnect will stimulate development of the Special Economic Zone of Ad Duqm and development of RE projects in Al Wusta. In addition, it is expected to expand the North-South interconnector further to DPS by Q4 2026.

Project developments in the MIS are expected to include: (1) procurement of capacity via a combination of uncontracted contributions from the Spot Market and dedicated, contract-based procurement rounds (Power 2024 and Power 2027-2029 to the extent required); (2) completion of phase 3 of the Wind Resource Assessment by Q3 2024; (3) Manah I and II Solar IPPs to commence operation in 2025 ; (4) Ibri III Solar IPP procurement with

[1] It was Oman Power and Water Procurement Company before rebranding which was on 18th May 2023.

capacity of 500 MW planned for COD in 2026 (5) a wind IPP of around 100 MW planned for COD in Q3 2026 and to be located in the Sharqiyah region; and (6) Development of Waste-to-Energy project for COD in 2028.

In the Duqm Power System, PWP plans to develop 100 MW Wind IPP project to commence operation in 2026.

In the Dhofar Power System, PWP seeks to develop an additional Wind IPP with a capacity of around 100 MW to begin operation in 2026 and will be located adjacent to the existing project in Harweel.

In addition, in 2023 PWP will conduct study to evaluate the potential role of energy storage technologies in Sultanate of Oman's power system over the period 2025 to 2040 and another study to review the Bulk Supply Tariff Methodology for the electricity.

Fuel Requirements

The planned solar and wind projects are forecasted to contribute about 11% of total electricity production by 2025. This percentage is anticipated to increase further to around 30% by 2029.

In the MIS and DPS, the contributions of RE are expected to reduce fuel requirements by 3% per year on average through 2029, despite the similar level of annual growth in electrical energy requirements. Average gas utilisation by the generation fleet (sm^3 per MWh produced) is projected to improve by almost 28% from 2022 to 2029. From 2023 onwards, the main improvements will be due to the addition of solar, wind and WTE IPPs.

Desalinated Water Requirements

Peak water demand in the MIS is projected to increase at 2% per year, from 1,172 thousand m^3/d in 2022 to around 1,387 thousand m^3/d in 2029. In the Sharqiyah Zone, peak water demand is expected to increase at 5%, from 145,000 m^3/d in 2022 to 196,000 m^3/d in 2029.

In the MIS, developments include: (1) addition of Barka V IWP of 100,000 m^3 in 2024; (2) addition of Ghubrah III IWP capacity 300,000 m^3/d in 2026; and (3) replacement desalination capacity (102,000 to 120,000 m^3/d) in the Barka Zone in 2024.

In Dhofar, water demand is projected to grow at 7%, and peak water demand to increase from 177,000 m^3/d in 2022 to 283,000 m^3/d in 2029.

Procurement Activities

The main procurement activities for power projects in 2023 include: (1) construction activities of Manah Solar I & II IPPs projects; and (2) commencement of procurement of Ibri III Solar IPP**,** Duqm Wind IPP, Jalaan Bani bu Ali Wind IPP, Dhofar II Wind IPP, and Waste to Energy IPP. Beyond 2023, future procurement initiatives include additional RE solar and wind IPPs, Power 2024 and potentially Power 2027-2029 procurement rounds.

The main procurement activities for water projects in 2023 include Water 2024 IWP.

SECTION 1 POWER

MAIN INTERCONNECTED SYSTEM and AD DUQM SYSTEM

The MIS extends throughout the Governorates of Muscat and Buraymi, and most of the Governorates of Al Batinah North, Al Batinah South, Ad Dakhiliyah, Ash Sharqiyah North, Ash Sharqiyah South and Ad Dhahirah, serving 1,183,932[2] electricity customers.

The MIS comprises nine power generation facilities, seven of which are operational and provides capacity contribution to the system, two of which are contracted to provide only Ancillary Services to the system, owned and operated by separate companies; the 400/220/132 kV transmission grid, owned and operated by Oman Electricity Transmission Co. (OETC); one for distribution services covering all the areas in the MIS and one supply services company. The MIS is interconnected with the power system of Petroleum Development Oman (PDO), and with the power system of the Emirate of Abu Dhabi and other Member States of the GCC Interconnection Authority via the Abu Dhabi Interconnect.

PWP's role is to aggregate the power and desalinated water requirements of licensed electricity suppliers and water companies, and to economically procure the required power and desalinated water in bulk from generation/production facilities connected to the MIS and water transmission systems. PWP is required to ensure that sufficient power generation resources are available to meet licensed electricity suppliers' demands. Wherever beneficial, PWP co-procures desalinated water to meet the needs of water departments in joint power-water facilities and procures stand-alone desalinated water facilities upon the request of NAMA WATER SERVICES.

The North-South Interconnect project is under construction by OETC and is expected to connect the Ad Duqm Power System to the MIS in Q3 2023. Following this connection, Ad Duqm demand may be served mainly by lower cost generation in the MIS. In addition to rural areas that are currently supplied by Tanweer plants, and will be connected to MIS in 2025 and 2026 such as Sarab, Khaloof, Wadi Aswad, Masirah, and Khuwaima.

Ad Duqm is located on the eastern coastline of the Al Wusta region, approximately halfway between the MIS and the DPS. The latest population data from the National Centre for Statistics & Information reports that the total population in Wilayat Al Duqm, as of 2021, is 20,579 [3]. This figure represents 7% growth when compared against 2020 population and is linked to the developments of a new economic and industrial centre.

The Ad Duqm region is currently served by generation, owned and operated by Tanweer, the Rural Areas Electricity Company. Tanweer owns and operates a 67 MW diesel-fuel fired power plant for supply to this grid area. Currently the units are on stand-by mode for emergency supply. Tanweer also has supply contract with Marafiq, the operator of the generator serving OQ Duqm Refinery, for surplus capacity.

[2] APSR Annual Report 2021

[3] National Centre for Statistics & Information, – Statistical Yearbook 2022: issue 50.

1.1. a Demand for Electricity

PWP evaluates electricity demand at the system level, including transmission and distribution system losses with consumer-level loads. This must be secured by the total output capacity of power generation plants at the power system delivery points, excluding the internal power consumption of auxiliary systems.[4]

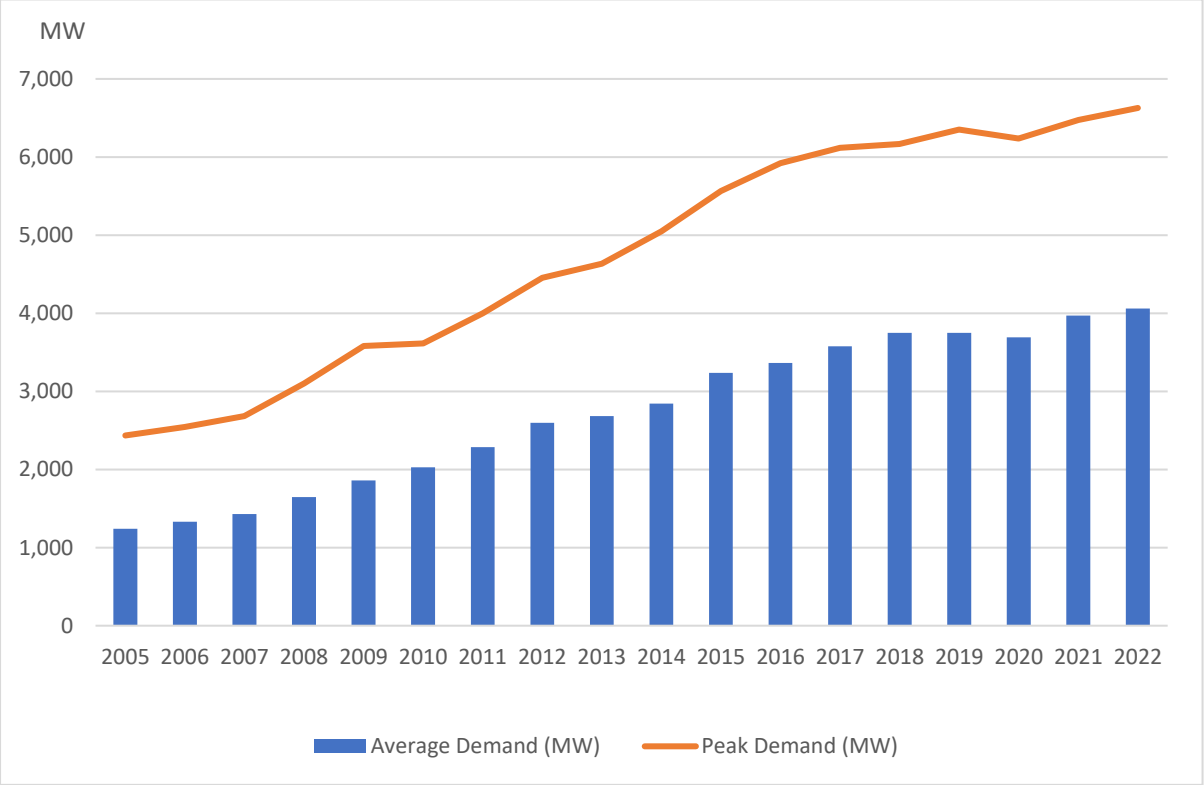
MIS Historical Demand

In 2022, electricity demand was lower than what was expected under PWP's previous forecast. The average demand shows 2.3% growth over 2021 demand, which is consistent with the normal-high temperature profile in 2022. Peak demand grew by about 2.4% to 6,628MW and the average demand increased to 4,062MW (corresponding to 35.6TWh of energy).

Over the last 7-year period (2015-2022), peak electricity demand in the MIS grew at an average annual rate of about 2.5%, from 5,565 MW in 2015 to 6,628 MW in 2022. Energy consumption grew by 3.3% and average demand grew by about 3.3% annually during the same period. Single year growth rates have fluctuated widely, influenced strongly by the economic growth and the weather: annual peak demand growth has ranged from a low of -1.8% to a high of 15.6% since 2006.

Figure 1 illustrates the growth in peak and average demand in the MIS from 2005 to 2022.

Figure 1 MIS Historical Electricity Demand – MIS



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

	Average Demand (MW)	*Growth (%)*	Peak Demand (MW)	*Growth (%)*
2005	1,240	-	2,435	-
2006	1,329	*7.2%*	2,544	*4.5%*
2007	1,430	*7.6%*	2,682	*5.4%*
2008	1,646	*15.1%*	3,100	*15.6%*
2009	1,859	*12.9%*	3,581	*15.5%*
2010	2,028	*9.1%*	3,613	*0.9%*
2011	2,285	*12.7%*	4,000	*10.7%*
2012	2,599	*13.7%*	4,455	*11.4%*
2013	2,684	*3.3%*	4,634	*4.0%*
2014	2,845	*6.0%*	5,047	*8.9%*
2015	3,237	*13.8%*	5,565	*10.3%*
2016	3,364	*3.9%*	5,920	*6.4%*
2017	3,578	*6.4%*	6,116	*3.3%*
2018	3,748	*4.8%*	6,168	*0.9%*
2019	3,748	*0.0%*	6,353	*3.0%*
2020	3,690	*-1.6%*	6,237	*-1.8%*
2021	3,971	*7.6%*	6,473	*3.8%*
2022	4,062	*2.3%*	6,628	*2.4%*
Average Growth (%)		***7.2%***		***6.1%***

MIS Demand Projections

PWP's 7-year electricity demand projections cover energy, average demand, and peak demand requirements. Peak demand is the most relevant parameter for purposes of assessing capacity expansion requirements. The projections of energy demand are crucial to align the renewable energy development with the national target set to achieve 35-39% renewable energy generation by 2040. In addition, the energy demand is necessary in identifying the fuel requirements over the forecast period, which is illustrated further in the fuel section.

The demand projections for the MIS have been developed on the basis of: (1) quantitative analyses of weather, macroeconomic, and demographic demand drivers; (2) assessment of demand drivers' uncertainty (3) consultations with the electricity distribution company and other relevant entities such as large industries; (4) historical growth trends; and (5) assessment of past forecasts against out-turns.

Energy demand is modelled separately for the residential and non-residential sectors. The residential demand projections are derived from population growth scenarios while the non-residential demand projections are derived principally from scenarios of economic growth in the Sultanate, using an econometric model of the relationship of electricity demand to real Gross Domestic Product (GDP) over a recent period, with adjustments for weather and price. Economic growth has been relatively slow since oil prices fell in 2014 and 2015 and has been affected by the impacts of the COVID-19 pandemic in 2020. The most recent GDP growth estimates for 2022 and 2023 are 4.5% and 3.9% respectively.[5]

PWP demand scenarios reflect the assessment of uncertainty in several factors such as: GDP forecast, population forecast, econometric model coefficients, energy efficiency programs, tariff reform, CRT impact, and development of rooftop solar and other private solar PV installations. Based on the associated risk of the factors, PWP developed a range determining the Low, Expected, and High Case scenarios for electricity demand projections. These influences on the demand projections are described further as follows:

[5] The World Bank, Global Economic Prospect, January 2023.

GDP Forecast. The forecast model for peak demand and non-residential energy demand uses a GDP forecast as the main influence. The GDP forecast is subject to error, and the forecast uncertainty considers the historical record of forecast vs. out-turn GDP for the Sultanate.

CRT Impact. Many large customers shifted their demand away from the peak period following the introduction of the Cost Reflective Tariff (CRT) in 2017. PWP expects further demand shifts in response to tariff changes as the CRT develops and consumers shift consumption to periods of lower cost. In 2022 and 2023 the BST has been revised such that the afternoon tariff is reduced, and the night tariff has increased compared to 2021 due to the operation of Ibri II solar IPP in 2021. The tariffs now are relatively close. By 2025, the afternoon tariff level is expected to be similar to the current off-peak tariff, while the night-time tariff will increase further. PWP expects that many CRT consumers will revert to pre-CRT consumption profiles benefiting from low afternoon tariffs and the initial CRT impact on peak demand may reverse.

In 2021, APSR introduced a second CRT option, a flat seasonal tariff available to all CRT customers. It is a single charge differentiated for summer and winter periods, with no time-of-day differentiation. A third CRT option was introduced in 2022: an annual flat tariff with no seasonal differentiation. These flat tariff options, and the changes occurring in the time-pattern of prices of CRT option 1, are affecting the demand profile. PWP has observed a shift of at least 200 MW back to the afternoon peak period in 2021. The distribution companies report that as of 2022, around 50% of CRT customers have shifted to the new flat tariff CRT options, where the magnitude of the demand shift remains to be seen. PWP is tracking these developments, incorporating them into the demand forecast.

Permitted Tariff Reform. A tariff reform policy has been initiated in 2021 aiming to remove the subsidies in residential and small commercial tariffs completely by 2030. Consumers are expected to modify their consumption behaviour accordingly which will reduce the demand. PWP assessed the scope for demand reduction on the basis of electricity price elasticity, energy efficiency improvement potential, and development of rooftop solar for these customers.

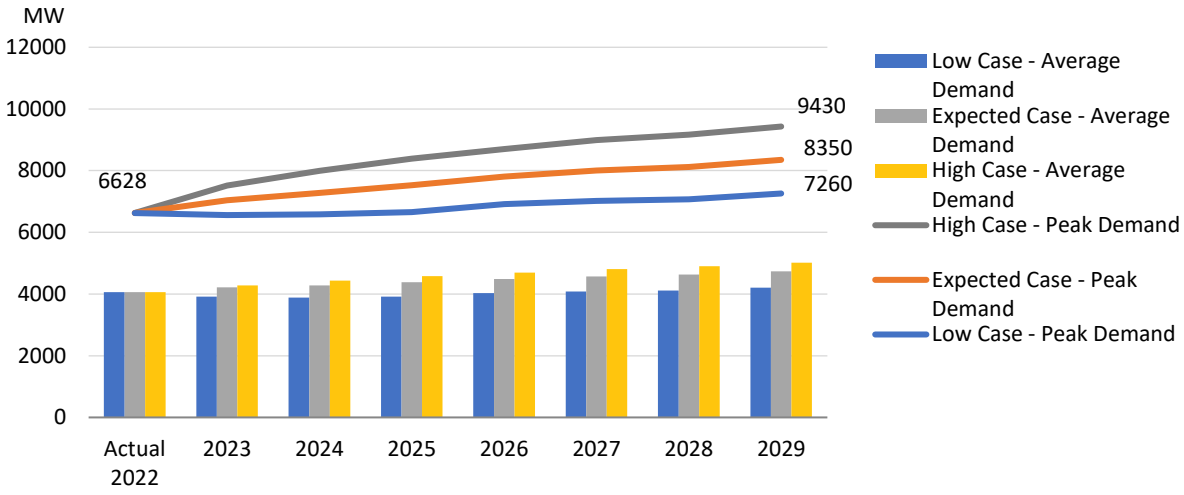
Private Solar PV Development. While the level of rooftop solar PV and industrial solar PV is currently modest, the demand forecast considers that the growth rate may accelerate rapidly, particularly once public policies are defined with respect to electricity market evolution, transmission wheeling charges, etc. Private Solar PV development is considered as an offset to energy and peak demand requirements that need to be met by the power system.

Energy Efficiency Policy Initiatives. PWP expects that energy efficiency (EE) promotion and appliance standards programs may have a direct reduction in the demand in the coming period. The Ministry of Commerce, Industry and Investment Promotion has launched an electronic system for issuing energy efficiency cards for air conditioners (ACs) in 2019 / 2020 that assist consumers in choosing more efficient models. The forecast considers energy efficiency impacts to occur gradually, mainly as the equipment asset base is replaced by more efficient devices, such as LED lamps and efficient AC units.
The projections are then aligned with analyses of distribution system demands, which are assessed on a “macro” basis by distribution company zone, and certain bulk loads that are assessed on a specific customer basis. Distribution system demand is comprised mainly of residential, service sector (including government and commercial buildings, tourism facilities), and small- to medium- scale industrial demand in all MIS regions.

The growth in demand from very large loads (generally large industries and infrastructure projects) comprises both new projects and expansion of existing industrial plants. Industrial projects are located mainly in the Sohar Industrial Port and Sohar Free Zone. Infrastructure projects include, for example, the desalination plants and airports.

The projections are presented as a range bounded by Low Case and High Case scenarios, and a central Expected Case forecast. These are summarized in Figure 2.

Figure 2 Electricity Demand Projections – MIS



	Actual 2022	2023	2024	2025	2026	2027	2028	2029	Average Growth (%)
Expected Case									
Annual Energy (TWh)	**36**	**37**	**38**	**38**	**39**	**40**	**41**	**42**	**2.2%**
Energy change from 2022-2028 Statement (TWh)	*1*	*2*	*2*	*1*	*2*	*2*	*2*		
Average Demand (MW)	**4,062**	**4,210**	**4,280**	**4,370**	**4,490**	**4,570**	**4,630**	**4,740**	**2.2%**
Distribution Loads	3,311	3,400	3,410	3,420	3,440	3,510	3,560	3,670	1.5%
Directly-Connected Loads	750	810	870	950	1,050	1,060	1,070	1,070	5.2%
Peak Demand (MW)	**6,628**	**7,040**	**7,280**	**7,530**	**7,810**	**8,000**	**8,120**	**8,350**	**3.4%**
Peak change from 2022-2028 Statement (MW)	*-152*	*90*	*50*	*70*	*40*	*60*	*10*		
Low Case									
Annual Energy (TWh)	**36**	**34**	**34**	**34**	**35**	**36**	**36**	**37**	0.5%
Energy change from 2022-2028 Statement (TWh)	*3*	*2*	*1*	*0.3*	*1*	*1*	*1*		
Average Demand (MW)	**4,062**	**3,920**	**3,890**	**3,920**	**4,030**	**4,080**	**4,110**	**4,210**	**0.5%**
Distribution Loads	3,311	3,170	3,140	3,160	3,240	3,280	3,310	3,410	0.4%
Directly-Connected Loads	750	750	750	760	790	800	800	800	0.9%
Peak Demand (MW)	**6,628**	**6,560**	**6,580**	**6,660**	**6,920**	**7,020**	**7,070**	**7,260**	**1.3%**
Peak change from 2022-2028 Statement (MW)	*258*	*230*	*110*	*-30*	*20*	*20*	*-70*		
High Case									
Annual Energy (TWh)	**36**	**37**	**39**	**40**	**41**	**42**	**43**	**44**	3.1%
Energy change from 2022-2028 Statement (TWh)	*-0.1*	*1*	*0.3*	*1*	*0.3*	*0.5*	*0.4*		
Average Demand (MW)	**4,062**	**4,280**	**4,430**	**4,580**	**4,700**	**4,810**	**4,900**	**5,020**	**3.1%**
Distribution Loads	3,311	3,430	3,480	3,530	3,550	3,650	3,720	3,840	2.1%
Directly-Connected Loads	750	850	950	1,050	1,150	1,160	1,180	1,180	6.7%
Peak Demand (MW)	**6,628**	**7,520**	**7,990**	**8,390**	**8,700**	**8,990**	**9,170**	**9,430**	**5.2%**
Peak change from 2022-2028 Statement (MW)	*-572*	*-50*	*0*	*160*	*70*	*110*	*90*		

The Expected Case scenario projects 2.2% annual growth in energy demand (i.e. average demand). Peak demand is projected to increase at an annual average of 3.4% per year, from 6,628 MW in 2022 to 8,350MW in 2029 growing along with the economy. In the expected case scenario, peak demand is projected to register high growth in 2023, considering the increase in oil prices and world recovery from Covid-19.

The additional solar projects in 2025 and 2027 will further affect the CRT. CRT consumers are expected to begin reacting to changes in CRT by shifting part of their demand back to the afternoon period. This will be observed more starting from 2025 once the Manah solar projects begin operation. These shifts toward the peak period may occur gradually in response to the CRT changes but are expected to represent a persistent increase in peak demand for the remainder of the period. The aggregate impact is about 200 MW in the Expected Case.

The Low Case scenario projects peak demand growth at an average of 1.3% per year, from 6,628MW in 2022 to 7,260 MW in 2029. Annual average demand under this scenario is expected to have low growth of 0.5% per year. This follows an assumption of lower economic growth than the Expected Case scenario, a higher consumer response to CRT changes, EE program and tariff reform policy.

The High Case scenario projects peak demand to grow at 5.2% annually, to 9,430MW by 2029. The total energy growth rate is projected to grow at a slightly lower rate, at 3.1% per year. These higher growth rates correspond to lower demand reduction through energy efficiency program and tariff reform policy. From 2023 onwards it is assumed that CRT consumers responses to change in BST will be larger than the Expected Case Scenario.[6]

The three demand projections are reference scenarios assuming normal weather conditions. Extreme weather may occur in any year, potentially increasing or decreasing demand relative to the projected peak demand. These potential fluctuations are not shown in the demand forecast, as they do not affect the underlying multi-year trend. However, they are taken into account in the assessment of capacity requirements, though with low probability of occurrence.

Ad Duqm Historical Demand

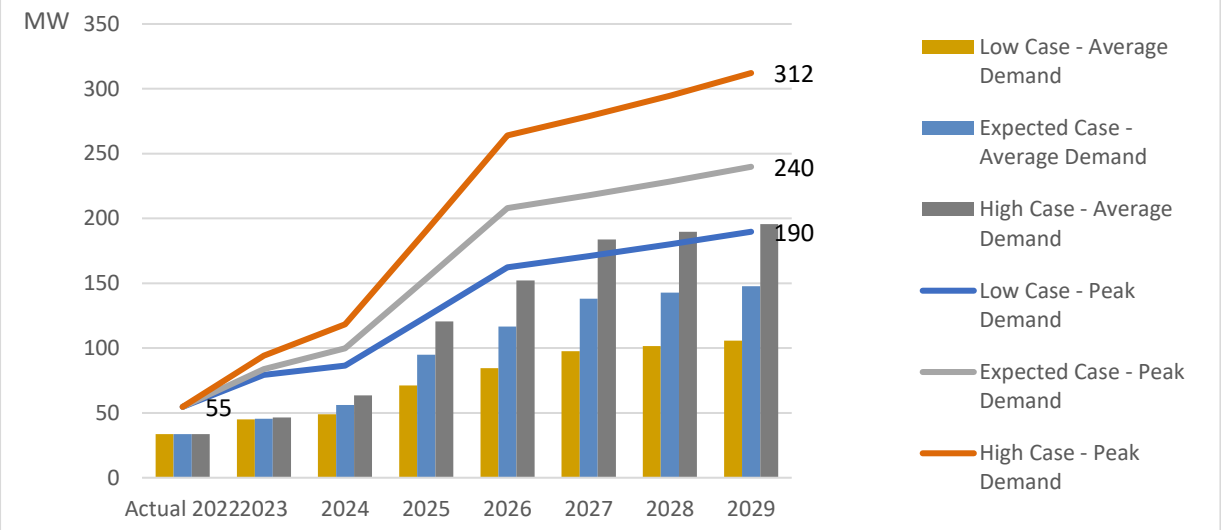
Historically, all requirements to meet electricity demand in Ad Duqm has been within the jurisdiction of Tanweer. However, Duqm is currently experiencing ongoing development of large commercial, tourism, and industrial projects. In addition, the grid will expand further as new demand centres are connected such as Mahout.

Ad Duqm Demand Projections

For the purposes of electricity demand projections, PWP reports demand projections provided by Nama Distribution with slight adjustments that deemed necessary. These demand projections reflect domestic and industrial/commercial developments in the area.

[6] There is a further possibility that the shift in BST prices will attract demand from industries that currently self-supply using their own generators, because afternoon CRT rates may be below their cost of generation.

Figure 3 Electricity Demand Projections – Ad Duqm Power System



	Actual 2022	2023	2024	2025	2026	2027	2028	2029	Average Growth (%)
Expected Case									
Annual Energy (TWh)	**0.30**	**0.40**	**0.49**	**0.83**	**1.02**	**1.21**	**1.25**	**1.30**	**24%**
Energy Change from 2022-2028 Statement (TWh)	*0.0*	*-0.1*	*-0.5*	*-0.3*	*-0.2*	*0.0*	*0.0*		
Average Demand (MW)	**34**	**45**	**56**	**95**	**116**	**138**	**143**	**148**	**23%**
Peak Demand (MW)	**55**	**84**	**100**	**154**	**208**	**218**	**229**	**240**	**24%**
Peak Change from 2022-2028 Statement (MW)	*-6*	*-10*	*-92*	*-44*	*1*	*3*	*6*	-	
Low Case									
Annual Energy (TWh)	**0.30**	**0.39**	**0.43**	**0.62**	**0.74**	**0.85**	**0.89**	**0.93**	**18%**
Energy Change from 2022-2028 Statement (TWh)	*0.0*	*0.0*	*-0.2*	*-0.1*	*0.0*	*0.1*	*0.1*		
Average Demand (MW)	**34**	**45**	**49**	**71**	**84**	**98**	**102**	**106**	**18%**
Peak Demand (MW)	**55**	**79**	**87**	**124**	**162**	**171**	**180**	**190**	**19%**
Peak Change from 2022-2028 Statement (MW)	*-5*	*-7*	*-55*	*-22*	*9*	*12*	*16*	-	
High Case									
Annual Energy (TWh)	**0.30**	**0.41**	**0.56**	**1.06**	**1.33**	**1.61**	**1.67**	**1.72**	**29%**
Energy Change from 2022-2028 Statement (TWh)	*0.0*	*-0.1*	*-0.8*	*-0.5*	*-0.3*	*0.0*	*0.0*		
Average Demand (MW)	**34**	**47**	**63**	**121**	**152**	**184**	**190**	**196**	**29%**
Peak Demand (MW)	**55**	**94**	**118**	**191**	**264**	**279**	**295**	**312**	**28%**
Peak Change from 2022-2028 Statement (MW)	*-8*	*-9*	*-114*	*-50*	*12*	*16*	*22*	-	

Under the Expected Case scenario, peak demand is expected to grow at an average rate of 24% per year, from 55 MW in 2022 to 240 MW in 2029. Average demand is expected to grow from 34 MW in 2022 to 148 MW in

2029 (corresponding to 1.3 TWh annual energy) with an average increase of 23% per year. The Expected Case scenario accounts for historical demand and normal population growth within the area, the inclusion of interlinked and new demand areas, and demand related to committed and ongoing industrial and infrastructure projects within the Ad Duqm area. Following the completion of the Interconnect project to the MIS in Q3 2023, demand in Mahout is expected to be absorbed by the system, and as such, is included in the demand projections. Mahout is expected to be connected to Ad Duqm in Q3 2023, accounting for the most growth shown in 2023.

The growth in 2025 and 2026 is mainly due to the additional of new industrial projects including Duqm Cement project within SEZAD area. These projections do not include uncommitted projects in the industrial area, i.e., the potentially large influx of industrial demand associated with SEZAD development plans. SEZAD plans large-scale industrial projects, diverse economic developments, and associated residential and commercial requirements over the next 30 years. Accordingly, the demand growth rate within the zone is expected to accelerate rapidly as key projects are established. PWP will attend closely to the development pace and implications for electricity demand. The High Case scenario assumes that more of the prospective projects become committed. This scenario anticipates an average growth rate of 28% in peak demand, increasing from 55 MW in 2022 to 312 MW in 2029. The annual average demand is projected to grow at 29% per year. This also includes a higher growth scenario in Mahout demand area.

Alternatively, the Low Case scenario assumes a slower rate of materialisation in prospective projects in Ad Duqm region, in addition to possible lower consumption in major projects such as Duqm cement and lower growth rate of demand in Mahout following its interconnection in the year 2023. The Low Case scenario anticipates an average growth rate of 19% in peak demand, increasing from 55 MW in 2022 to 190 MW in 2029. Moreover, the average demand in the low case scenario is expected to grow from 34 MW in 2022 to 106 MW in 2029 with an average rate of 18% per year.

1.1.b Power Generation Resources

Sources of Power

PWP purchases power from a number of sources via power purchase agreements (PPAs), power and water purchase agreements (PWPAs) and other similar agreements. The contractual arrangements for power delivery under these agreements may be differentiated as firm capacity, reserve-sharing, non-firm capacity, and energy-only. These terms are relevant for generation planning purposes.

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

PWP also purchases power from a number of sources where the contractual arrangements do not provide a guaranteed level of capacity upon demand. They may be termed collectively as **“non-firm resources”**. They currently include: (1) reserve-sharing arrangements with other power systems via international interconnection agreements; (2) capacity exchanges/energy purchases from industries with captive power generation facilities, where such industries use their embedded generators mainly for self-supply; and, (3) renewable energy (RE) projects from intermittent sources, such as solar PV (without storage) and wind. Collectively, non-firm resources provide reliability benefits to the MIS, and that capacity is generally available according to pre-arranged schedules or during contingency events. Accordingly, a portion of this capacity can be considered to provide contributions towards meeting peak demand requirements.

Based on the 2040 vision, the renewables target is to reach 35-39% by 2040. A key objective of this target is to release domestic gas committed to the power sector, to be available to stimulate industrial and economic development. PWP has embraced this target and expects to reach 30% renewable energy generation, within the sector, by 2030 as low costs are now driving RE development on their economic merits alone. Solar and wind

projects are non-firm resources to the extent that their energy output is intermittent and non-dispatchable. PWP has estimated the energy production and expected contribution to system reliability standards of RE projects on the basis of power system simulations using ground measurement data collected over a number of years and correlations with satellite data where no such ground measured data is available. Once specific projects are under development, and later in operation, PWP will look to re-assess these estimates based on specific locations, technology being deployed, and production out-turns.

Contracted Capacity

PWP's present portfolio of contracted capacity for electricity generation in the MIS comprises nine P(W)PAs and Ancillary Services. The Ancillary Services are the services that OETC requires to operate the Transmission System in accordance with its statutory obligations. A summary of MIS contracted capacities can be found in Table 1.

A summary of the generation capacity that is expected to be provided under these P(W)PAs over the 2023-2029 period is set out in Figure 4[7]. This shows total contracted capacity of 7,511 MW in 2023, which then steadily decreases to 3,305 MW by 2029. The reduction in contracted capacity is due to a number of contract expirations during the period as detailed amongst the following main developments:

Barka II IWPP: Contracted capacity of 688 MW at 45°C. The PWPA is scheduled to expire on 31st March 2024.

Barka III IPP: Contracted capacity of 750 MW at 45°C. The PPA is scheduled to expire on 1st May 2028.

Sohar II IPP: Contracted capacity of 750 MW at 45°C. The PPA is scheduled to expire on 1st May 2028.

Sur IPP: Contracted capacity of 2,018 MW at 45°C. The PPA is scheduled to expire on 1st May 2029.

Rusail IPP: Contracted capacity of 194 MW at 45°C for ancillary services only based on OETC request until the end of December 2023.

Manah IPP: Contracted capacity of 179 MW at 45°C for ancillary services only based on OETC request. The contract will end in 2023.

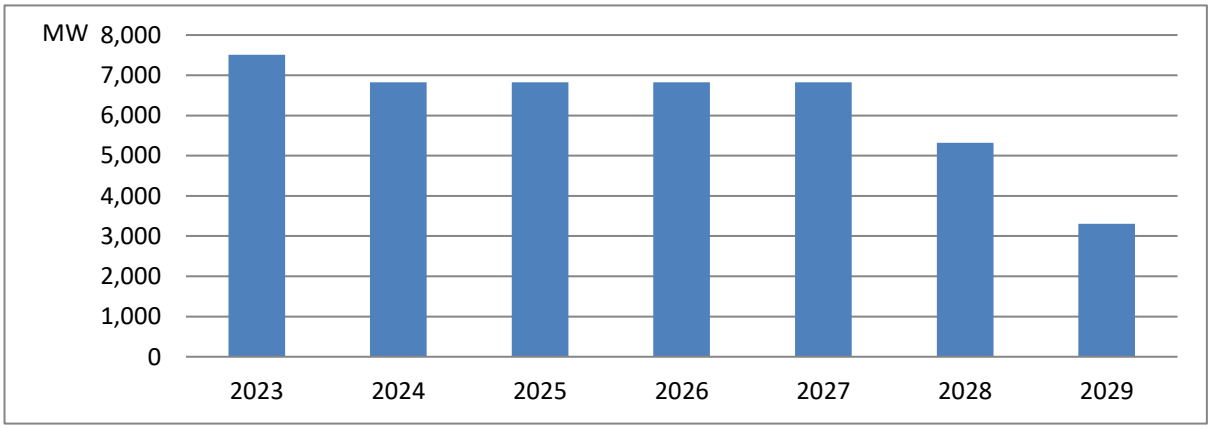
Table 1 Details of PPAs/PWPAs – MIS

Project Name	Contracted Capacity[a]	Contract Type	Project Company	Project Status	Technology	Contract Expiry
Contracted Capacities to meet Capacity Target						
Barka II IWPP	688 MW	PWPA	SMN Barka Power Co. (SAOG)	Operational	CCGT Natural gas fired Fuel oil as back-up	2024
Barka III IPP	750 MW	PPA	Al Suwadi Power Co. (SAOC)	Operational	CCGT Natural gas fired Fuel oil as back-up	2028
Ibri IPP	1,557 MW	PPA	Ad-Dhahirah Generating Co. (SAOC)	Operational	CCGT Natural gas fired Fuel oil as back-up	2034
Ibri II Solar IPP	500 MW	PPA	Shams Ad-Dhahirah Generating Co. (SAOC)	Operational	Solar PV – Tracking	2035

[7] While RE projects are to be contracted under a PPA, they are classified as a non-firm resource, and so are represented in Table 2 (Non-Firm Contracts).

Sohar II IPP	750 MW	PPA	Al Batinah Power Co. (SAOG)	Operational	CCGT Natural gas fired Fuel oil as secondary fuel and back-up	2028
Sohar III IPP	1,748 MW	PPA	Shinas Generating Co. (SAOC)	Operational	CCGT Natural gas fired Fuel oil as back-up	2034
Sur IPP	2,018 MW	PPA	Phoenix Power Co. (SAOG)	Operational	CCGT Natural gas fired Fuel oil as back-up	2029
Contracted Capacities for Ancillary Services						
Rusail IPP	194 MW	ASA	Rusail Power Co. (SAOC)	Operational (for ancillary services only)	OCGT Natural gas fired Fuel oil as back-up	2023
Manah IPP	179 MW	ASA	United Power Co. (SAOG)	Operational (for ancillary services only)	OCGT Natural gas fired Fuel oil as back-up	2023
a- Contracted capacities are shown as of summer 2023 at 45°C, adjusted from the reference condition of 50°C using contractually agreed upon correction factors and as reported as net of plant auxiliaries.						

Figure 4 Contracted Generation Capacity – MIS



	2023	2024	2025	2026	2027	2028	2029
Contracted Capacity	**Net MW [a]**						
Barka II IWPP	688	-	-	-	-	-	-
Sohar II IPP	750	750	750	750	750	-	-
Barka III IPP	750	750	750	750	750	-	-
Sur IPP	2,018	2,018	2,018	2,018	2,018	2,018	-
Ibri IPP	1,557	1,557	1,557	1,557	1,557	1,557	1,557
Sohar III IPP	1,748	1,748	1,748	1,748	1,748	1,748	1,748
Total	**7,511**	**6,823**	**6,823**	**6,823**	**6,823**	**5,323**	**3,305**
[a] All capacities are rated on a net basis (i.e. after allowing for auxiliary consumption inside the plants) at 45°C ambient temperature.							

In addition to the contracted generation capacities presented above, PWP also currently maintains a contract with Manah and Rusail Power Plants to provide ancillary services to the system. The term of the contract for Manah Power Plant is until the end of December 2024 with a provision for early termination. While the term of contract for Rusail Power Plant (GT7&8) is till end of December 2023.

Non-Firm Contracts

PWP has contracts with other generation sources where the contractual commitment is not for firm capacity. They include the following and are summarised in Table 2:

- The 220 kV interconnect with the GCCIA via the UAE (Abu Dhabi) power system at Mahadha;
- North-South Interconnector with the PDO power system and DPS; and,
- The surplus generation of industries that have captive power generation facilities.

Table 2 Non-Firm Contracts - MIS

	2023	2024	2025	2026	2027	2028	2029
Non-Firm Contracts	MW						
SAC[a]	180	-	-	-	-	-	-
GCCIA Interconnection[b]	200	200	200	200	200	200	200
Total	**380**	**200**	**200**	**200**	**200**	**200**	**200**

[a] The agreement with SAC will expire in December 2023.
[b] This capacity may be revisited after the completion of the second international interconnection with GCCIA in Q4 2026.

GCCIA Interconnect: A 220 kV interconnection between the Sultanate of Oman (MIS) and the GCCIA power systems, via the UAE (Abu Dhabi) has been commercially operational since 2012.The Sultanate of Oman has been a member of the GCCIA since December 2014 and has access to the other five Member State power systems via this link. Benefits of the interconnection include firm support during emergencies, and opportunities to trade electricity and coordinate both planning reserves and operating reserves.

The interconnection is a double circuit link that supports reliable transfers of up to 400 MW and can carry up to 800 MW in emergencies. The link has provided emergency reserves on a number of occasions, preventing power failures in the MIS. In 2016, APSR approved PWP's recognition of the interconnect's assessed capacity benefit of reserve-sharing arrangements and contribution to planning reserve requirements of 200 MW. This is based on its record of performance and the contractual obligations with the GCCIA to provide reserves support. The capacity benefit associated to this resource may vary over the 7-year period. This would be influenced by a number of different factors, including the demand profile, the amount of reserve capacity in the system, amount of renewable energy resources, and trade transactions with neighbouring power systems. PWP will re-assess the capacity contribution from time to time in consideration of developments in the power system.

GCCIA conducted a detailed study for a second interconnection to connect the Sultanate of Oman directly through UAE network (Sila-UAE to Ibri-OMN). The proposed link is a 400 kV AC link of about 500 km. The study's outcomes indicated that the net transfer capacity to the Sultanate of Oman would increase from 400 MW to about 1,300 MW. Accordingly, it is expected that the two interconnects would contribute more to the planning reserve requirements. Following approval and a confirmed development timetable, the expanded interconnect capacity and the assessment of capacity benefit of reserve-sharing would be included in PWP's 7-year resource planning.

North- South Interconnector. The construction of Phase 1 of the North-South Interconnect will enhanced the transfer capacity between the MIS and PDO power systems. Previously, the systems were connected at Nizwa

via a 132 kV link with transfer capacity of 60 MW. The current phase of the 400 kV North-South Interconnect has established a new connection point at Nahadha, with transfer capacity of around 1,000 MW. Two additional connection points are scheduled for completion in 2023 via new grid substations at Barik and Suweihat in Al Wusta Governorate. Energy transfers between the two systems are enabled via a Power Supply Purchase Agreement (PSPA) between PWP and PDO.

Phase 1 of the North-South Interconnect is scheduled for completion in Q3,2023, linking the MIS to PDO via the three grid substations noted above, then on to Duqm and Mahout. The interconnect enables supply from the MIS to Nama Distribution supply zones within the PDO Concession Area that are currently supplied by PDO. It also enhances the sharing of spinning reserves between MIS and PDO, reducing costs on both systems.

Phase 2 of the interconnector is scheduled for completion by Q4 2026. This phase of the interconnector will connect Dhofar Power System (DPS) with the Main Interconnected System (MIS). It will strengthen DPS system and enhances the system security. It will also help in evacuating a lot of the wind projects outputs to the main interconnected system. This interconnector will help us to meet the requirements of DPS in the short and long term by exporting from MIS to DPS as will be explained in detail in DPS power section of this statement.

Surplus Generation*:* PWP has an agreement with Sohar Aluminium Co. (LLC), whereby Sohar Aluminium exports up to 180 MW to the MIS during the summer and imports similar amounts of energy during the winter on an annually determined schedule. The schedule and operations are managed to assure that energy exports balance with energy imports. This arrangement benefits both parties: Sohar Aluminium is better able to schedule the maintenance of its generating units and gain reliability of supply, while PWP gains an efficient generating resource during the summer and improves the system load factor. The current agreement with Sohar Aluminium will expire at the end of 2023.

Resource Development Plan

The resource development plan comprises new capacity contracts, renewable energy contracts and capacity contributions from other non-firm resources. New capacity contracts and Spot Market resources are considered as flexible resources, where the amount of capacity made available from these resources can closely match capacity needs as the demand forecast changes throughout the years.

Renewable Energy (RE) Development Plan

PWP's renewable energy development plan currently comprises solar, wind, and waste to energy projects. The aim of this plan is to achieve up to 30% of the total system generated energy to be from RE resources by 2030. PWP plans to procure around 3,840 MW of RE IPPs in the MIS and Ad Duqm by 2029, in addition to the 500 MW of Ibri II IPP. Additional RE IPPs are being planned for other systems and are reported later in this publication. Table 3 summarizes the plan through 2029. The locations and type of future RE projects depend on demand growth, approval of transmission projects, and site allocations. Procurement timelines may be amended following demand forecast updates.

PWP's currently contracted renewable energy projects are described as follows:

- **Ibri II Solar IPP:** The 500 MW Solar PV project began commercial operation in August 2021. It is owned and operated by Shams Ad Dhahira Generating Company under a PPA with PWP. The project is configured with single-axis tracking and bi-facial PV panels.

PWP's plans for solar and wind development are described as follows:

- **Manah I Solar and Manah II Solar IPPs:** PWP began procurement of its second and third solar IPPs in 2019. The RFQ process is complete, and the RFP was completed in 2022 for award in 2023. The projects are located on adjacent sites in Ad-Dakhiliyah. It is a single procurement process, in which there will be separate single awards for each site, to different developers. Each project will have contracted maximum offtake capacity

of around 500 MW using PV technology. The two projects have different COD schedules, Q1 2025 and Q2 2025, respectively. This site has different terrain than the Ibri site and will accommodate a fixed tilt PV panel configuration rather than a tracking system.

- **Ibri III Solar IPP:** This project is expected to use PV technology, with capacity around 500 MW. The RFQ is planned for release in Q3 2023, and the project will have the COD scheduled in Q4 2026.

- **Duqm Wind IPP:** PWP plans to develop a wind power project in the Duqm region for COD in Q3, 2026 PWP has access to a site in SEZAD and will undertake a feasibility study for developing a Wind IPP at the site in 2023. As part of PWP's Wind Resource Assessment Campaign (WRA), two 100 metre wind masts were installed in February 2020, and collected wind data until November 2021 (the data collected is available to the public via PWP's website). PWP plans to issue the RFQ in Q3 2023 and the RFP in Q1 2024. The installed capacity is nominally estimated at around 200 - 300 MW but will be updated following assessment of the measured wind data and wind farm layout optimization analyses.

- **JBB Wind IPP:** PWP plans to develop a wind power project in the MIS for COD in Q3 2026. PWP has reserved a site at Jalan Bani bu Ali in North Sharqiyah Governorate and will undertake a feasibility study for developing a Wind IPP at the site this year. As part of PWP's Wind Resource Assessment Campaign (WRA), two 100-metre-tall wind masts were installed in February 2020 and collected wind resource data until November 2021 (the data collected is made available to the public via PWP's website). PWP plans to issue the RFQ in Q3 2023 and the RFP in Q1 2024. The installed capacity is nominally estimated at around 100 MW but will be confirmed following assessment of the measured wind data and farm layout optimization analyses.

- **Barka WTE IPP:** In 2018, PWP completed a feasibility study of a waste-to-energy (WTE) project, for a project at Barka to be supplied by municipal waste collected from Muscat and South Batinah Governorates with a capacity between (130-140 MW). PWP plans to issue the RFP in 2023.

- **MIS Solar IPP 2027:** PWP plans to develop a fifth utility-scale solar PV project for 2027 COD. This project may be located in the Al Wusta region with a capacity of around 500 MW. PWP notes that both the capacity and the location of the project may be amended in future iterations of the 7 Year Statement as more assessments are carried out. The procurement activities related to this project may not commence until 2024. This solar IPP assumed in our analysis that it will have similar technology as Ibri II Solar IPP.

- **Ras Madrakah Wind IPP:** PWP plans to develop a second wind power project at Ras Madrakah in the Duqm region for COD in 2027. The site is approximately 60 kilometres from the city of Duqm, with sufficient area to develop a utility-scale wind power project with a capacity of at least 200 MW. As part of PWP's Wind Resource Assessment Campaign (WRA), two 100 metre wind masts were installed in November 2021, and collected wind data until November 2022 (the data collected is available to the public via PWP's website). PWP will proceed with a feasibility study that will reconfirm the expected capacity. Until then, this Wind IPP is assumed to have a similar capacity as Duqm Wind IPP above.

- **Solar PV IPPs 2029:** PWP plans to develop a sixth utility-scale solar PV project for 2029 COD with a total capacity of 1000 MW. PWP notes the capacity of the project may be amended in future iterations of the 7 Year Statement as more assessments are carried out. The procurement activities related to this project may not commence until 2025. This project is a single procurement process, in which there will be separate single awards for each site, to different developers. Each project will have contracted maximum offtake capacity of around 500 MW using PV technology.

- **Wind IPP 2029:** PWP plans to develop a fourth wind power project in the MIS for COD in 2029 for a capacity of 200 MW. PWP notes the capacity of the project may be amended in future iterations of the 7 Year

Statement as more assessments are carried out. The procurement activities related to this project may not commence until 2025. The location of this project might be at AlJazir or Shaleem where we are conducting Phase III of Wind Resource Assessment Study.

Table 3 Renewable Energy Development Plan – MIS and Duqm

	2023	2024	2025	2026	2027	2028	2029
Contracted Projects				MW			
Ibri II Solar IPP[a]	500	500	500	500	500	500	500
Total Contracted Capacity	**500**	**500**	**500**	**500**	**500**	**500**	**500**
Planned Projects							
Manah I Solar IPP [a]			500	500	500	500	500
Manah II Solar IPP [a]			500	500	500	500	500
Ibri III Solar IPP					500	500	500
JBB Wind IPP [b]					100	100	100
Duqm Wind IPP [b]					200	200	200
Ras Madrakah Wind IPP [b]					200	200	200
MIS Solar IPP 2027					500	500	500
Barka WTE IPP						140	140
Solar PV IPPs 2029							1000
Wind IPP 2029							200
Total Planned Capacity	-	-	**1000**	**1000**	**2500**	**2640**	**3840**
RE Day Peak Contribution[a]	**460**	**460**	**1250**	**1250**	**2413**	**2540**	**3464**
RE Night Peak Contribution	**-**	**-**	**-**	**-**	**287**	**414**	**536**

[a] RE Day Peak Contribution: Solar PV IPP will have a greater contribution during the day-time peak. The estimated capacity contribution will vary according to the proposed locations and the assumed technology. For Ibri site capacity credit considered reaches up to 92% during the day-time peak. While for Manah, it is expected to have lower contribution to about 79% due to the site conditions which may not be suitable for tracking technology.

[b] Wind IPP generation is generally expected to vary throughout the day and the year. However, wind data support that average output during the day peak and night peak periods are quite consistent. The average contribution is assessed at about 40% for the JBB wind project and about 67% for the Duqm wind and Ras Madrakah wind projects.

The lower portion of Table 3 indicates three measures of the aggregate capacity or output levels for the renewable energy projects. These measures recognize that generation output from solar and wind projects varies throughout the day according to the availability of the respective resources. The measures are: Total Planned Capacity (maximum contractual output), RE Day Peak Contribution, and RE Night Peak Contribution. The MIS has two peak periods during the summer season that are both relevant to capacity planning. The day peak is highest, generally occurring between 2pm and 3pm after rising steadily from mid- morning, then dropping off sharply until the early evening. The night peak is in the range of 400 to 500 MW less than the day peak, typically occurring between 1am and 2am, but demand is relatively high on either side of this peak for an extended period.

The variability and the intermittency of the RE resources is one of the challenges that are taking into consideration. To minimise this impact on the system operation, a combination of wind and solar PV development is considered. Another initiative from PWP is to evaluate the potential role of energy storage technologies in Sultanate of Oman's power system over the period from 2025 to 2040, with a particular focus on the role of such technologies in supporting the transition from today's predominantly gas-based system to a mixed system with a high RE share consistent with Oman Vision 2040. A study will be initiated in 2023 to determine the optimal generation mix including storage optimization for the short- and long-term horizons.

The values for RE Day Peak Contribution and RE Night Peak Contribution correspond to the expected generation output from the RE plants at the time of these peak periods. PWP has assessed the values based on several years of hourly weather data at each RE site and simulated hourly generation output using expected technology

configurations. PWP expects to adjust the assessed peak contributions as operational data from the planned RE plants becomes available. The Day Peak and Night Peak contributions corresponding to the projects listed in Table 3 are assessed as follows in Table 4, in terms of the proportion of contracted maximum output to the grid:

Table 4 RE Capacity Contribution

Project	Day Peak	Night Peak
Ibri II Solar IPP	92%	0%
Manah I Solar IPP	79%	0%
Manah II Solar IPP	79%	0%
Ibri III Solar	79%	0%
JBB Wind IPP	40%	43%
Duqm Wind IPP	67%	61%
Ras Madrakah Wind IPP	67%	61%
MIS Solar IPP 2027	92%	0%
Barka WTE IPP	91%	91%
Solar PV IPP 2029	79%	0%
Wind IPP 2029	67%	61%

Private Solar Projects and Demand Response

PWP continues to project the scale of private solar PV development for its impact on the power system, but the assessed system impact is now embedded within the demand forecast (rather than being treated as an explicit supply resource). Rooftop solar projects and other private solar PV developments are expected to grow steadily.

Demand Response (DR) can provide a significant and cost-effective resource toward reducing capacity requirements. PWP plans to conduct a study of DR potential and develop a roadmap in 2023, beginning with a study of DR potential prior to committing to project development.

Capacity Transactions with Other Power Systems

Energy trades and firm capacity transactions with neighbouring power systems are important potential resources. Firm capacity exchanges have taken place between PWP and a member of GCCIA in 2016 and 2018, and PWP exported capacity to a member of GCCIA during the 2020, 2021 and 2022 summer periods.

PWP is currently exploring a number of potential transactions with other power systems, Capacity exports represent additional demand on the MIS, which PWP expects to accommodate.

A direct 400 kV interconnect from Ibri to Silaa (UAE) boarder with KSA and linking to GCCIA has also been evaluated and is in the planning process. This project would provide direct access to all GCCIA Member States and would enhance the benefits in stability, generation planning, and trade opportunities relative to the existing 220 kV link via UAE.

Phase 1 of the 400 kV North-South Interconnect project is currently on schedule for completion in Q3 2023. PWP developed supply plans accordingly for Duqm, Mahout, and the MIS. These systems will be fully integrated and power flows between them will not be considered as capacity transactions.

The 400 kV connection with the PDO system at Nahadah enables large-scale capacity transactions and operational integration with PDO. No specific transactions have yet been planned, but PWP and PDO are exploring the possible future opportunities.

Procurement Plans and Spot Market

Considering the contracted firm and non-firm resources, capacity impacts of the RE development program, trade transactions with other power systems, and other initiatives such as Demand Response, PWP plans to meet the remaining capacity and energy needs via the Spot Market and dedicated procurement rounds (i.e., long-term contracts). The annual capacity needs remaining to be addressed by PPA procurement rounds and the Spot Market are indicated in Table 5. The aggregate requirement for capacity is discussed further in the following Section 1.1.c, Resource Adequacy and Mitigation Plans.

Current plans for procurement rounds and Spot Market initiatives are described below:

- **Electricity Spot Market:** The Spot Market is now in live operation. The first effective Trading Day was 1st January 2022. Spot market will allow PWP to purchase electricity through a short-term run each day with prices for each half hour set each day based on what Generators have offered to sell. The electricity Spot Market is operating alongside the existing system of long-term P(W)PAs.

  Considering the uncertainty about the level of market participation by uncontracted generators, PWP has not yet assigned a value to their expected capacity contributions. This value will be assessed and updated in future 7 Year Statements once more information can be made available.

- **Power 2024:** The procurement of Power 2024 is intended to meet the system demand at MIS between 2024 and 2026.

- **Power 2027-2029:** At the time of preparing this publication and in alignment with PWP intent to review procurement needs for long-term contracts every two years, Power 2027-2029 is maintained as a potential round for procurement that may materialize following the outcome of Power 2024 and if PWP identifies a need for capacity that was not met by Power 2024 nor procured through the Spot Market. This procurement will be necessary to cover the need after Salalah I IWPP, Barka III IPP, Sohar II IPP and Sur IPP's expiration.

Table 5 summarizes the capacity expectations from these resources.

Table 5 Procurement Plans and Spot Market - MIS

	2023	2024	2025	2026	2027	2028	2029
	MW						
Power 2024		TBD	TBD	TBD	TBD	TBD	TBD
Spot Market	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Future Procurement Power 2027-2029					TBD	TBD	TBD
Total Capacity Need[a]	-	428	790	1,137	1,020	2,529	4,682

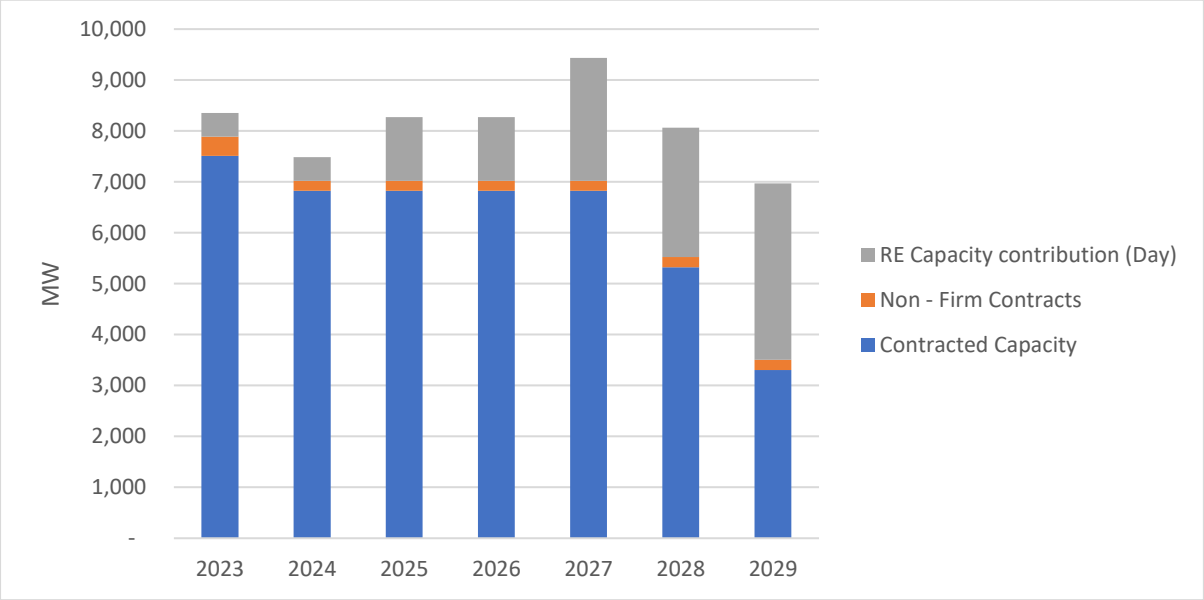
[a] Total Capacity Need represents amount of capacity required to achieve targeted reserve margins. The main driver for the capacity need from 2025 onwards is the shift of the peak demand towards the night; hence the capacity needs will be higher during the night peak to maintain the LOLH security standard.

Summary

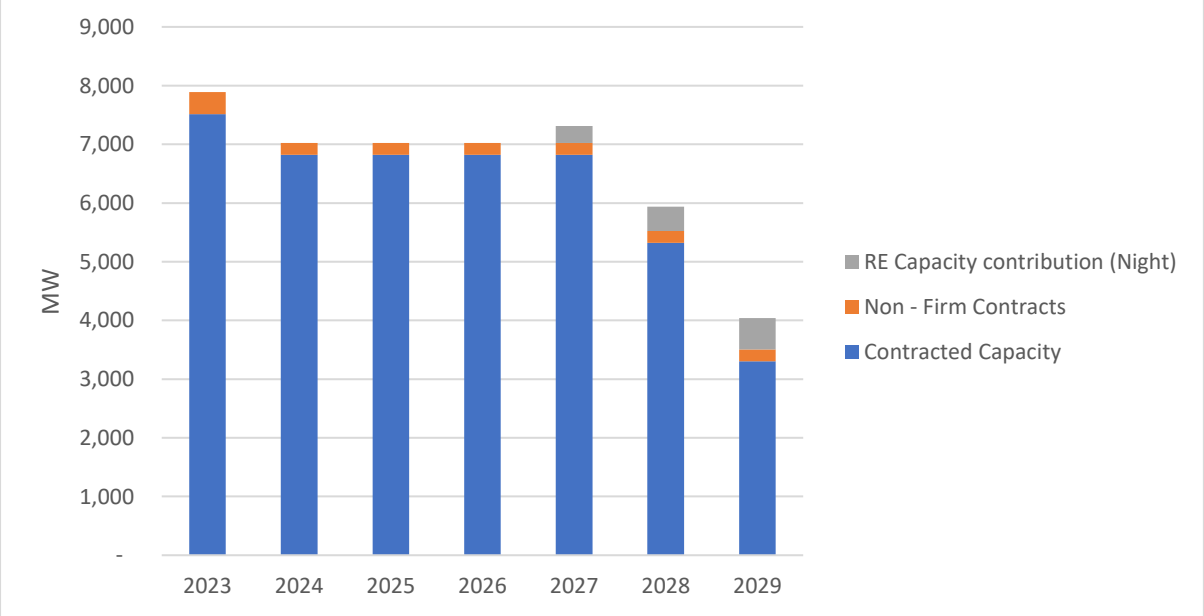
Figure 5 provides a summary of PWP's current plans for generation capacity and resource development in the MIS for the period 2023 to 2029. The capacity indicated for each year corresponds to the quantity available as of the onset of the summer peak.

Figure 5 Capacity Contributions from Generation Resources MIS

RE Day Contribution:



RE Night Contribution:



	2023	2024	2025	2026	2027	2028	2029
	MW						
Contracted Capacity	7,511	6,823	6,823	6,823	6,823	5,323	3,305
Capacity Contributions from:							
Non - Firm Contracts	380	200	200	200	200	200	200
RE Capacity Contribution (Day)	460	460	1,250	1,250	2,413	2,540	3,464
RE Capacity Contribution (Night)	-	-	-	-	287	414	536
Procurement Plans and Spot Market	-	428	790	1,137	1,020	2,529	4,682
Total Capacity Available during Day Peak	**8,351**	**7,911**	**9,063**	**9,410**	**10,456**	**10,592**	**11,653**
Total Capacity Available during Night Peak	**7,891**	**7,451**	**7,813**	**8,160**	**8,330**	**8,466**	**8,725**

1.1.c Resource Adequacy and Mitigation Plans

Statutory and Regulatory Requirements

PWP 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 PWP's general responsibility to secure sufficient generation resources to meet the aggregated demands of licensed electricity suppliers. Further to this, the license issued to PWP by APSR stipulates a specific generation security standard for the MIS that PWP must comply with.

The generation security standard sets the target for the aggregate duration of power outages for the system, termed Loss-of-Load Hours (LOLH). PWP must enter into agreements for enough production capacity to ensure that expected demand does not exceed expected available capacity for more than 24 hours in any year. This LOLH measure considers relevant uncertainties such as the reliability of generation units, the availability of non-firm generation resources, and the level of demand. On a short-term basis, PWP must demonstrate to the APSR that sufficient supply agreements are in place to meet the 24 LOLH standard. On a long-term basis, PWP must demonstrate that it has credible plans to put such agreements in place (via the procurement of new capacity or otherwise).

PWP conducts computer simulations of power system performance to assess LOLH under a wide range of conditions that fluctuate randomly. The simulations are the basis for determining the expected level of LOLH and the adequacy of generation to meet the statutory standard. Generally, the number and type of generating units and the demand profile affect the expected LOLH level, which may also be sensitive to generation technology and other factors.

Resource Adequacy in the Expected Demand Scenario

During the 7-year planning horizon PWP commits to meeting the minimum reliability standard of 24 LOLH. The capacity plan is developed to ensure that, after accounting for demand variability, potential forced outages from generators, and RE generation fluctuations, the potential occurrences of insufficient supply are expected to be less than 24 hours in each year.

Over the next 7 years, capacity requirements to meet the 24 LOLH standard are expected to change, because demand is projected to grow, the load profile is expected to evolve as consumers respond to tariff changes, and new intermittent RE resources are planned toward reducing the cost and gas consumption of power generation. This is evident in Figure 6, which shows the capacity target during the day and night peaks that is required to meet the security standard under the Expected Demand scenario.

Currently contracted resources are expected to be sufficient in 2023, with some surplus. APSR is leading the efforts for the development of bilateral agreements as an alternative framework to facilitate direct-sales arrangements between certain generators and certain customers.

The capacity needed to meet the security standard is equivalent to a reserve margin of about 7.2% during both day and night peaks in 2023 and 2024. This is due to a combination of the output intermittency of the Ibri II Solar IPP during the hours around the day peak period in the afternoon, and the emergence of the night peak as a more critical and longer duration period of reserve needs.

In Q3 2023, it is expected that the first phase of the North-South Interconnect project (including from Izki to Nahadah in the PDO system, Barik and Suweihat in the PDO system and then to the Duqm Power System, and on to Mahout) will be completed. Figure 6 accounts for the additional demand requirements of the Duqm Power System under Expected Case scenarios that can be met by utilising capacity in the MIS.

Phase II of the North-South Interconnector is planned to be commissioned by Q1 2027. This phase will support the system security of Dhofar. As can be noticed from the figure below that the MIS system is expecting to export up to 44 MW to DPS for the Expected Case requirement through this interconnector. The maximum capability of this link as per OETC is about 860 MW considering N-1 security.

In 2024, Barka II IWPP will reach the end of its P(W)PA term. Additional resources due to annual load growth and the expiry of the Barka II P(W)PA are required which will managed through Power 2024 procurement round.

In 2025 and 2026, reserve margin requirements to meet the security standard also increase to about 8.5% to manage the increasing night peak period. In 2025, the Manah I and II Solar projects with a total capacity of 1,000 MW are expected to be operating before the summer season. The projects create a surplus over capacity requirements during the afternoon but make no contribution to the night peak. From 2025 onwards, night peak demand will be the main driver for capacity requirements. Figure 6 shows this change as the planned capacity level at night meets the capacity target, whereas there is surplus during the day peak period. Such developments will drive the procurement plan described in Table 4 of Section 1.1.b.

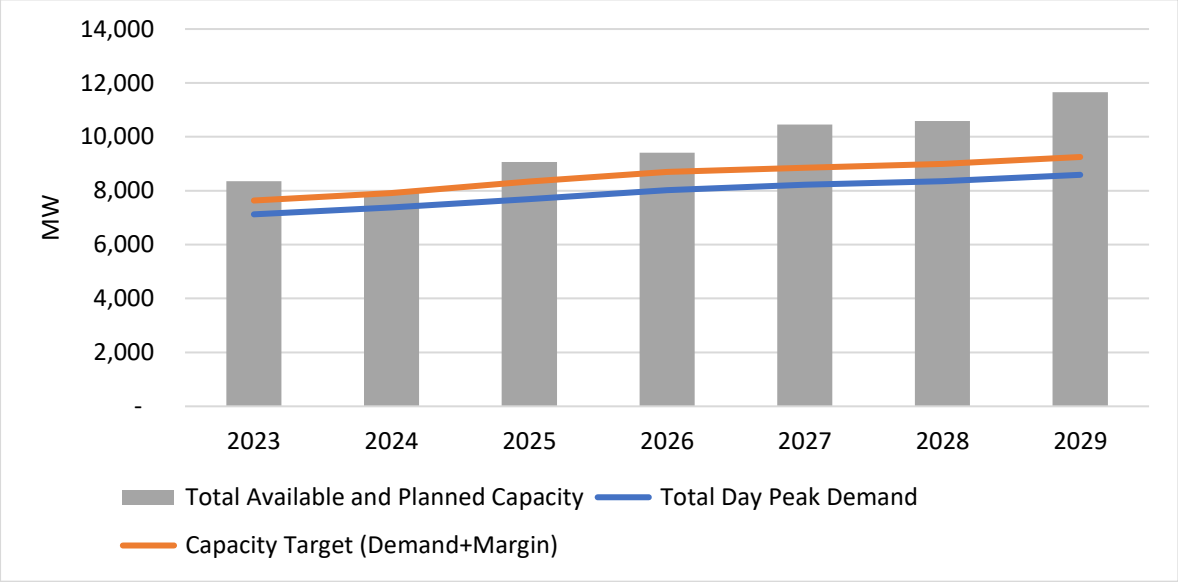
From 2027 to the end of the 7-year planning period, the reserve margin requirement drops to about 7.7%, partly in response to new wind resources beginning operation and stabilization of the load profile following tariff reform. In future, as PWP investigates the impact of new technologies, the assessment of loss-of-load incidence may change.

In 2027 Salalah I IWPP will expire with a total capacity of 445 MW and in 2028, PPAs with Sohar II and Barka III will expire, reducing contracted capacity by around 1,500 MW. Further reduction in the contracted capacity of around 2000 MW is expected due to the expiration of Sur IPP in 2029. PWP expects to launch a Power 2027-2029 procurement round, to address the capacity needs that emerge at that time through a potential combination of new PPAs and Spot Market resources.

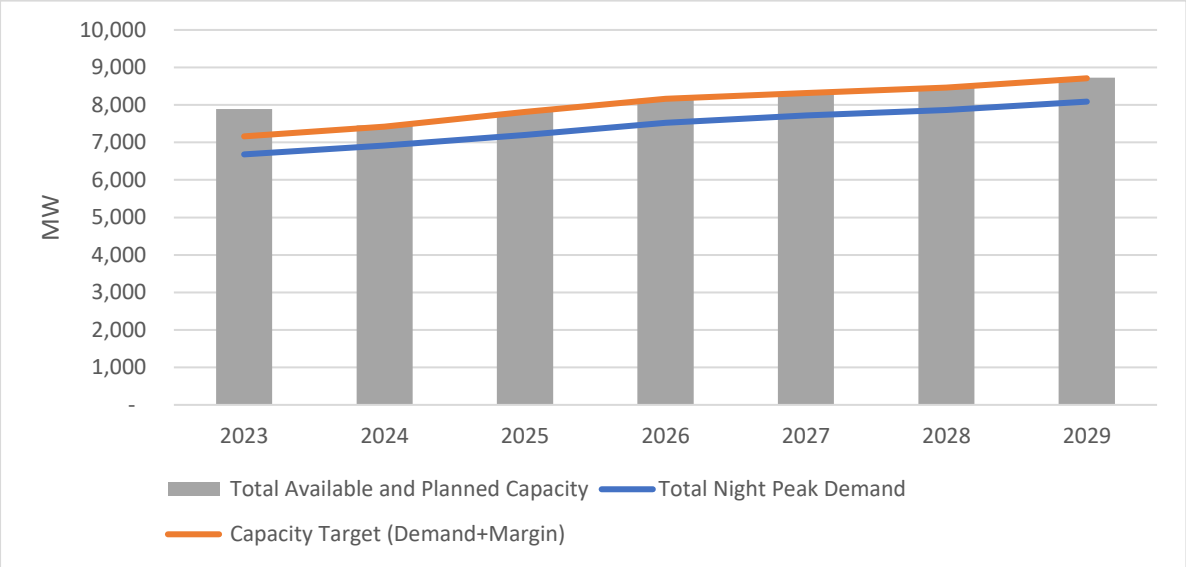
The resource development plan is developed to provide sufficient capacity to meet the generation security standard for the Expected Demand scenario, with allowances for feasible mitigations that address requirements of the Low and High Demand scenarios. Figure 6 compares planned capacity with the capacity target under the Expected Demand scenario. The resource development plan provides sufficient capacity to exceed the capacity target in every year. Part of this capacity is expected to be transferred to DPS upon interconnection completion in 2027.

Figure 6 Resource Adequacy - Expected Demand Scenario- MIS + Duqm

Day Peak Resources:



Night Peak Resources:



	2023	2024	2025	2026	2027	2028	2029
Total Day Peak Demand	**7,124**	**7,380**	**7,684**	**8,018**	**8,218**	**8,349**	**8,590**
Capacity Target (Peak Demand + Margin)	7,637	7,911	8,337	8,700	8,851	8,991	9,251
Exports to DPS (North-South Interconnect)	-	-	-	-	40	16	44
Total Available and Planned Capacity	**8,351**	**7,911**	**9,063**	**9,410**	**10,456**	**10,592**	**11,653**
Additional Capacity required for Day Peak	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Total Night Peak Demand	**6,681**	**6,921**	**7,201**	**7,520**	**7,721**	**7,861**	**8,088**
Capacity Target (Peak Demand + Margin)	7,162	7,419	7,813	8,160	8,315	8,466	8,711
Exports to DPS (North-South Interconnect)	-	-	-	-	15	-	14
Total Available and Planned Capacity	**7,891**	**7,451**	**7,813**	**8,160**	**8,330**	**8,466**	**8,725**
Additional Capacity required for Night Peak	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Mitigation Options for the High Case Demand Scenario

In the High Case demand scenario, the capacity requirement in 2024 is about 781 MW higher than under the Expected Case scenario and about 1,241 MW higher in 2029. Similar to the Expected Case above, the High Case also accounts for supply requirements to the Duqm Power System, also under the High Case for that demand area. The High Case is a plausible, upper-bound demand scenario: it is possible but unlikely that demand would exceed this level. But it is also quite likely that demand will be between the High Case and Expected Case scenarios. The following paragraphs consider options to mitigate capacity needs in the range between these two demand scenarios.

Figure 7 illustrates resource adequacy for this scenario. In 2024 there is a deficit of nearly 781 MW in the day peak demand. This deficit decreases to almost 316 MW by 2026. For the night peak demand, the deficit varies between 700 MW in 2024 and 1,292 MW in 2029. Contingency options to cover these potential deficits if demand trends against the High Case, are illustrated below:

Power 2027-2029 Procurement Round. PWP has considered the potential for the next round of procurement to be between 2027 and 2029, depending on the need for capacity. The amount of capacity may be adjusted in consideration of needs, existing contract expirations in those years, the competition process to be developed for the procurement round, and developments in the Spot Market. As per current forecasts of the High Case Demand scenario, more than 1000 MW of additional Capacity through a Power 2027-2029 Procurement Round would be required to cater the need because of the expiration of some plants during the said period.

Spot Market Capacity. The largest of the contingency options is our assessment of spot market resources, comprising plants that represent generators with expiring P(W)PAs or captive generators and may participate in the Spot Market as uncontracted generation. PWP anticipates a considerable capacity to be available from the Spot Market in 2024. The feasibility to extend permits or other necessary conditions for plant operation would alter this assessment, accordingly, as would changes in the assessment of market prices.

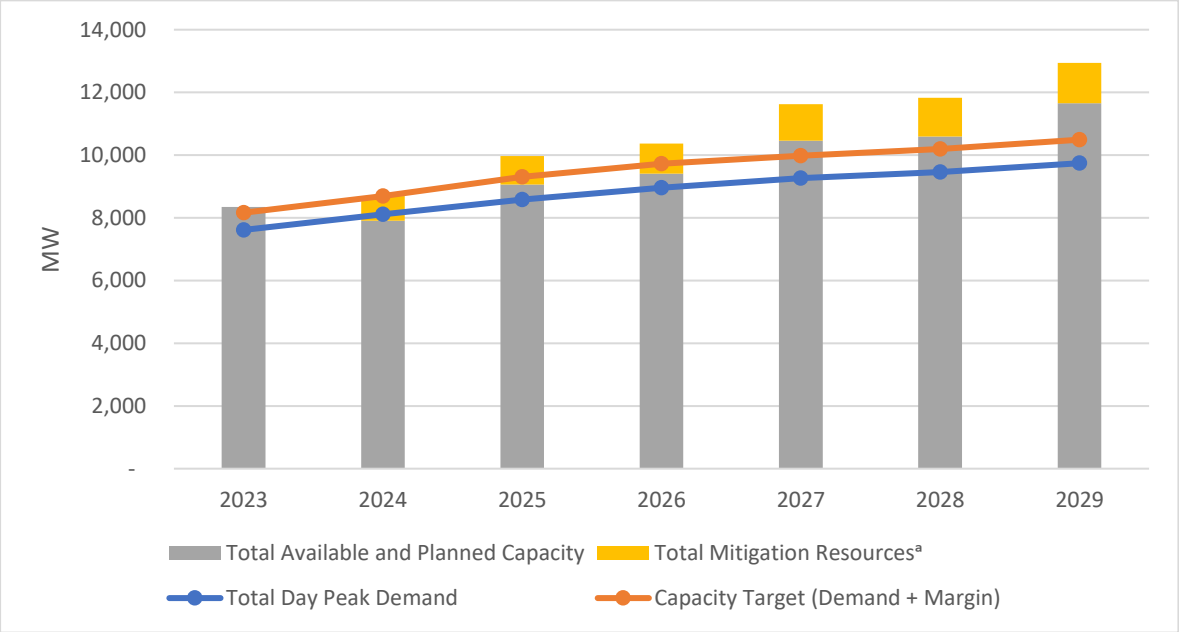
GCCIA Interconnection Exchange. PWP notes that the interconnection with the GCCIA is a double circuit link that support reliable transfers of up to 400 MW. This transfer of energy has already been demonstrated in the recent years and, accordingly, PWP is able to rely on potentially cost-effective exchanges across the GCCIA to secure an additional 200 MW (200 MW is in addition to the 200 MW already accounted for under the Expected Case for a total of 400 MW). PWP reviews these opportunities and the economic benefits of conducting an exchange across the GCCIA on an annual basis. In case PWP is committed to an export transaction via GCCIA than this mitigation capacity will not be available.

Demand Response. Under a High Case Demand Scenario, Demand Response may become a useful contingency resource due to its ability to directly incentivize a reduction in demand during specific periods in the year and during specific periods in the day. This would allow PWP to directly reduce peak demand requirements for a given year. While this option still requires further research, study, and approvals to be implemented, PWP recognizes its potential cost-effective application in certain circumstances.

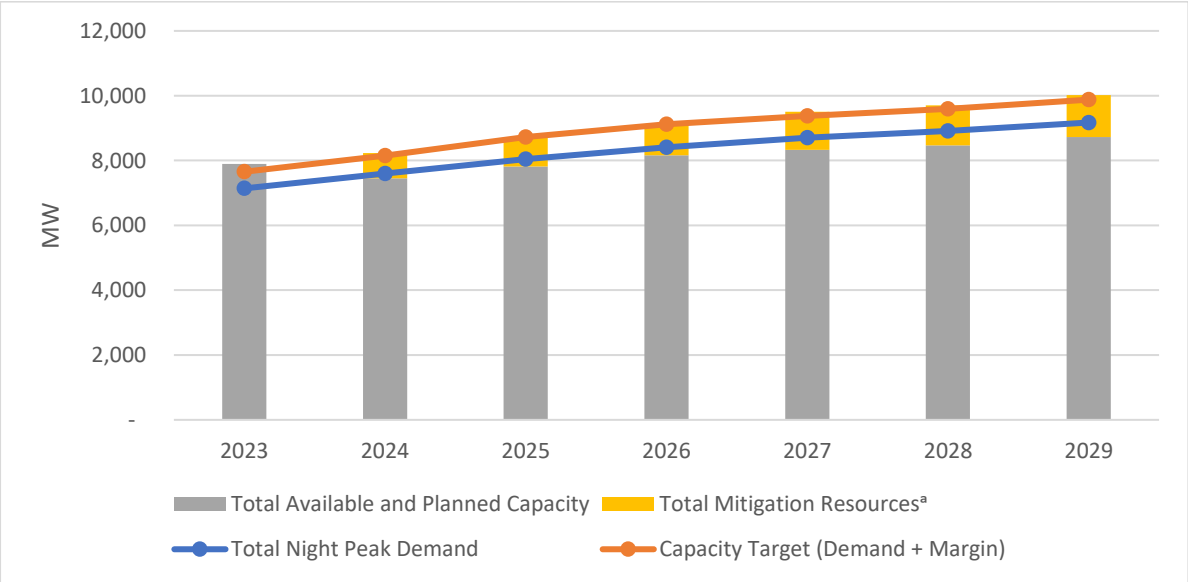
These mitigation options confirm PWP's ability to respond to a surge in demand beyond our Expected Demand forecast. This is important considering the Sultanate's aspirations to stimulate economic growth, and particularly to attract investment in the new industrial hub of Ad Duqm and other industrial zones.

Figure 7 Adequacy and Mitigation Options -High Case Demand Scenario –MIS +Duqm

Day Peak Resources:



Night Peak Resources:



	2023	2024	2025	2026	2027	2028	2029
Total Day Peak Demand	**7,614**	**8,108**	**8,581**	**8,964**	**9,269**	**9,465**	**9,742**
Capacity Target (Demand + Margin)	8,162	8,692	9,310	9,726	9,982	10,193	10,492
Exports to DPS (North-South Interconnect)	0	0	0	0	152	138	172
Total Available and Planned Capacity	**8,351**	**7,911**	**9,063**	**9,410**	**10,456**	**10,592**	**11,653**
Additional capacity required for Day Peak	**0**	**781**	**247**	**316**	**0**	**0**	**0**
Total Night Peak Demand	**7,141**	**7,604**	**8,041**	**8,408**	**8,708**	**8,912**	**9,173**
Capacity Target (Demand + Margin)	7,655	8,152	8,725	9,123	9,379	9,598	9,879
Exports to DPS (North-South Interconnect)	0	0	0	0	122	104	137
Total Available and Planned Capacity	**7,891**	**7,451**	**7,813**	**8,160**	**8,330**	**8,466**	**8,725**
Additional Capacity required for Night Peak	**0**	**700**	**912**	**963**	**1,171**	**1,236**	**1,292**
Mitigation Plan for Deficit							
Remaining Potential Spot market Capacity	-	581	712	763	971	1036	1092
2027-2029 Procurement Target					TBD	TBD	TBD
GCCIA Interconnection Purchase		200	200	200	200	200	200
Captive Power Plants		TBD	TBD	TBD	TBD	TBD	TBD
Demand Response				TBD	TBD	TBD	TBD
Total Mitigation Resources[a]	**-**	**781**	**912**	**963**	**1,171**	**1,236**	**1,292**
Total Available and Mitigation Resources for Day Peak	**8,351**	**8,692**	**9,975**	**10,373**	**11,627**	**11,828**	**12,944**
Total Available and Mitigation Resources for Night Peak	**7,891**	**8,232**	**8,725**	**9,123**	**9,501**	**9,702**	**10,016**

[a] The mitigation plan is determined to meet the night peak requirements.

Mitigation Options for the Low Case Demand Scenario

In the Low Case demand scenario, the capacity target is around 1,228 MW less than in the Expected Demand scenario by 2029. In order to minimize capacity surpluses in case of low demand growth, PWP would implement mitigation options such as reducing capacity procurement targets and improving capacity utilisation via exports. Mitigation options are described below, and shown with their impacts in Figure 8:

Adjust Procurement Round and Spot Market Targets. The capacity requirement in 2024 is currently planned to be met through a combination of Spot Market contributions and new contracts via the possible Power 2024, with an increased reliance on Spot Market contributions throughout to 2029. The amount from possible Power 2024 will be assessed prior to the launch of the procurement activities. If demand were to track the current Low Case, the capacity requirement for the Spot Market and possible Power 2024 may be less, and the procurement target would be adjusted accordingly. The values presented here reflect the inverse of the Procurement Plans and Spot Market, and represent the upper end of possible reductions in procurement activities, whether through long term contracts or via the Spot Market.

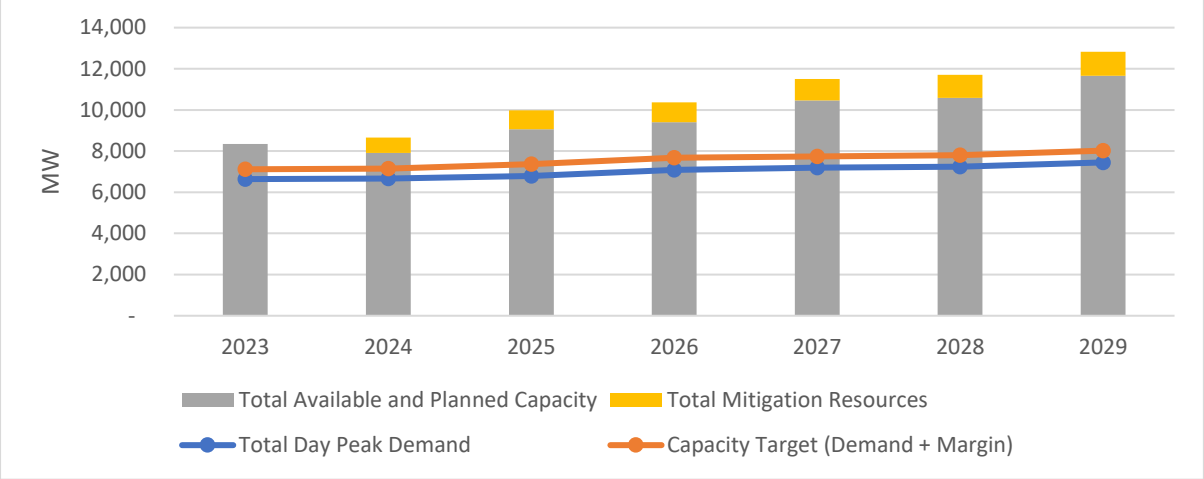
GCCIA Interconnection Export. The GCCIA interconnect via UAE will accommodate up to 400 MW of capacity export. PWP would explore export contracts with GCC Member States, provided they would cover generation costs and the economic value of gas supply as defined by MEM. PWP exported 400 MW to one of the Member States in 2021 and PWP explores the possible trading opportunities with other GCC member state.

PDO (and other oil/gas developers) Export. The North-South Interconnect will permit increased levels of energy trading with PDO starting in Q3 2023. The potential for export to PDO is currently uncertain. A large share of PDO generation is dedicated to steam generation for oilfields, with electricity as a by-product, and cannot be displaced. Other generators would be candidates for displacement by lower cost energy imports. However, PDO and the other oil/gas developers are also currently considering development of solar PV plants to offset thermal generation. PWP currently coordinates resource development plans with PDO. Exports to PDO as a capacity mitigation option by PWP would be explored if needed through this coordination.

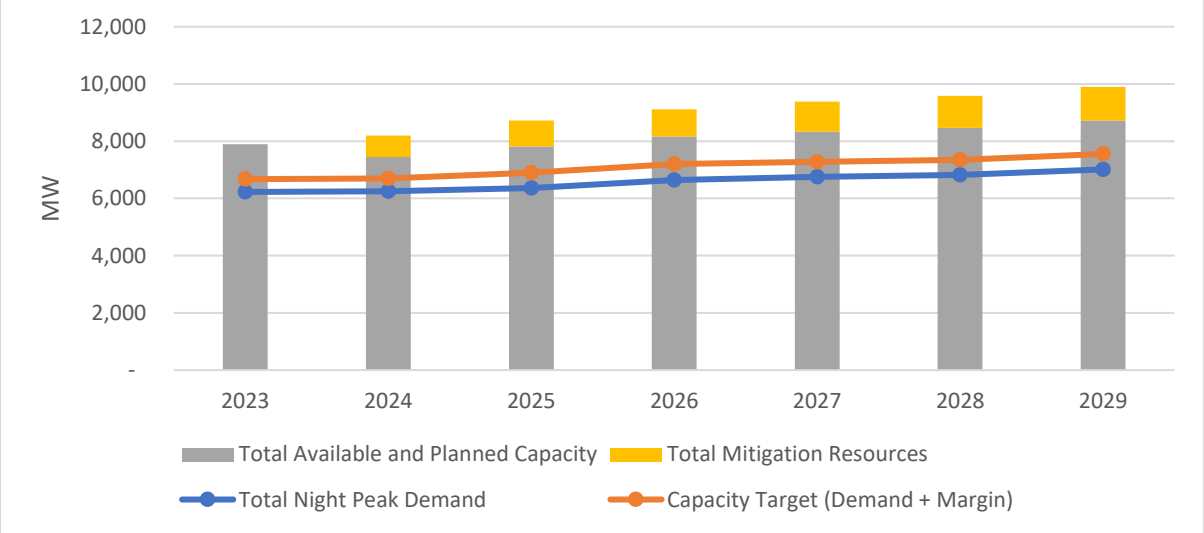
Figure 8 demonstrates that, under a low demand scenario, PWP has options available to minimize the potential for capacity surpluses and thereby manage costs.

Figure 8 Adequacy and Mitigation Options -Low Case Demand Scenario – MIS + Duqm

Day Peak Resources:



Night Peak Resources:



	2023	2024	2025	2026	2027	2028	2029
Total Day Peak Demand	**6,639**	**6,667**	**6,784**	**7,082**	**7,191**	**7,250**	**7,450**
Capacity Target (Peak Demand + Margin)	7,117	7,147	7,361	7,684	7,745	7,808	8,023
Exports to DPS (North-South Interconnect)					-	-	-
Total Available and Planned Capacity	**8,351**	**7,911**	**9,063**	**9,410**	**10,456**	**10,592**	**11,653**
Surplus over Capacity	**1,234**	**765**	**1,702**	**1,725**	**2,711**	**2,784**	**3,629**
Total Night Peak Demand	**6,226**	**6,252**	**6,358**	**6,643**	**6,756**	**6,826**	**7,014**
Capacity Target (Peak Demand + Margin)	6675	6702	6898	7207	7276	7352	7555
Exports to DPS (North-South Interconnect)					-	-	-
Total Available and Planned Capacity	**7,891**	**7,451**	**7,813**	**8,160**	**8,330**	**8,466**	**8,725**
Surplus over Capacity	**1,216**	**749**	**915**	**952**	**1,054**	**1,114**	**1,170**
Mitigation Plan for Surplus							
Adjust Procurement Round and Spot Market Targets	0	-428	-790	-952	-1020	-1114	-1170
Other Mitigation resources:		-321	-125	0	-34	0	0
GCC Interconnection Export			TBD	TBD	TBD	TBD	TBD
Export to Displace Captive Power Generation			TBD	TBD	TBD	TBD	TBD
PDO and Other Oil Developer Export			TBD	TBD	TBD	TBD	TBD
Total Mitigation Resources	0	-749	-915	-952	-1054	-1114	-1170
Total Available and Mitigation Resources for Day Peak	**8,351**	**7,162**	**8,148**	**8,457**	**9,402**	**9,478**	**10,483**
Total Available and Mitigation Resources for Night Peak	**7,891**	**6,702**	**6,898**	**7,207**	**7,276**	**7,352**	**7,555**
[a] The Mitigation plan is determined to meet the night peak requirements							

DHOFAR POWER SYSTEM

The Dhofar Power System (DPS) covers the city of Salalah and surrounding areas in the Governorate of Dhofar, serving around 129,354[8] electricity customers.

The DPS comprises three generation facilities, the 132 kV transmission grid that is owned and operated by OETC, and the distribution network which is owned and operated by the Nama Dhofar Services[9]. Nama Dhofar Services also acts as the supplier of electricity for consumers in the DPS.

The DPS is interconnected with the Petroleum Development Oman (PDO) power system via a 132 kV link between Thumrait and Harweel, with transfer capacity up to 150 MW. This interconnection provides important reliability benefits through the sharing of generation reserves. The North-South Interconnect is expected to be extended to Dhofar in 2026.

PWP's role in the DPS is similar to its role in the MIS, which is to economically procure power required by Nama Dhofar Services, respectively, in bulk from generation/production facilities connected to the DPS. PWP is required to ensure that sufficient power generation resources are available to meet Nama Dhofar Services

[8] APSR Annual Report 2021

[9] It was Dhofar Integrated Services Company before rebranding which was on 21st March 2023.

electricity demand. If assessed to be beneficial, PWP is also required to co-procure desalinated water with power generation in joint facilities.

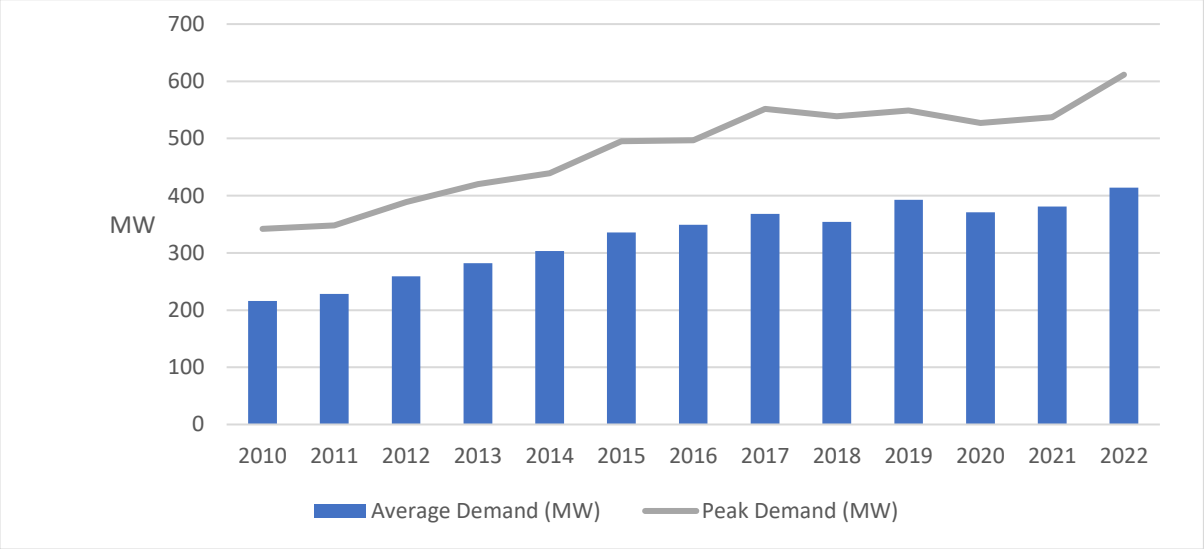
1.2. a Demand for Electricity

Historical Demand

Average electricity demand in 2022 is higher than 2021 by 8.7%. The average demand increased to 414 MW (corresponding to 3.6TWh) in 2022. Peak demand increases by 13.9% to 612 MW when compared against the 2021 peak demand. PWP notes that the increase in demand is likely due to a combination of factors including oil price, world recovery from Covid-19, and tourism recovery as restrains on travel and entry to Dhofar region were lifted during Kharif period.

Figure 9 shows that the average growth rate in annual average demand over the past seven years was 9.2%, while single-year growth has reached as high as 11.1%. Peak demand in the DPS has grown at an annual average of 3.5% over the same period.

Figure 9 Historical Electricity Demand – DPS



	Average Demand (MW)	Growth (%)	Peak Demand (MW)	Growth (%)
2010	216		342	
2011	228	5.6%	348	1.8%
2012	259	13.6%	389	11.8%
2013	282	8.9%	420	8.0%
2014	303	7.4%	439	4.5%
2015	336	10.9%	495	12.8%
2016	349	3.9%	497	0.4%
2017	368	5.4%	552	11.1%
2018	354	-3.8%	539	-2.4%
2019	393	11.1%	549	1.9%
2020	371	-5.6%	527	-4.2%
2021	381	2.6%	537	2.0%
2022	414	8.7%	612	13.9%
Average Growth (%)		**5.6%**		**5.0%**

Demand Projections

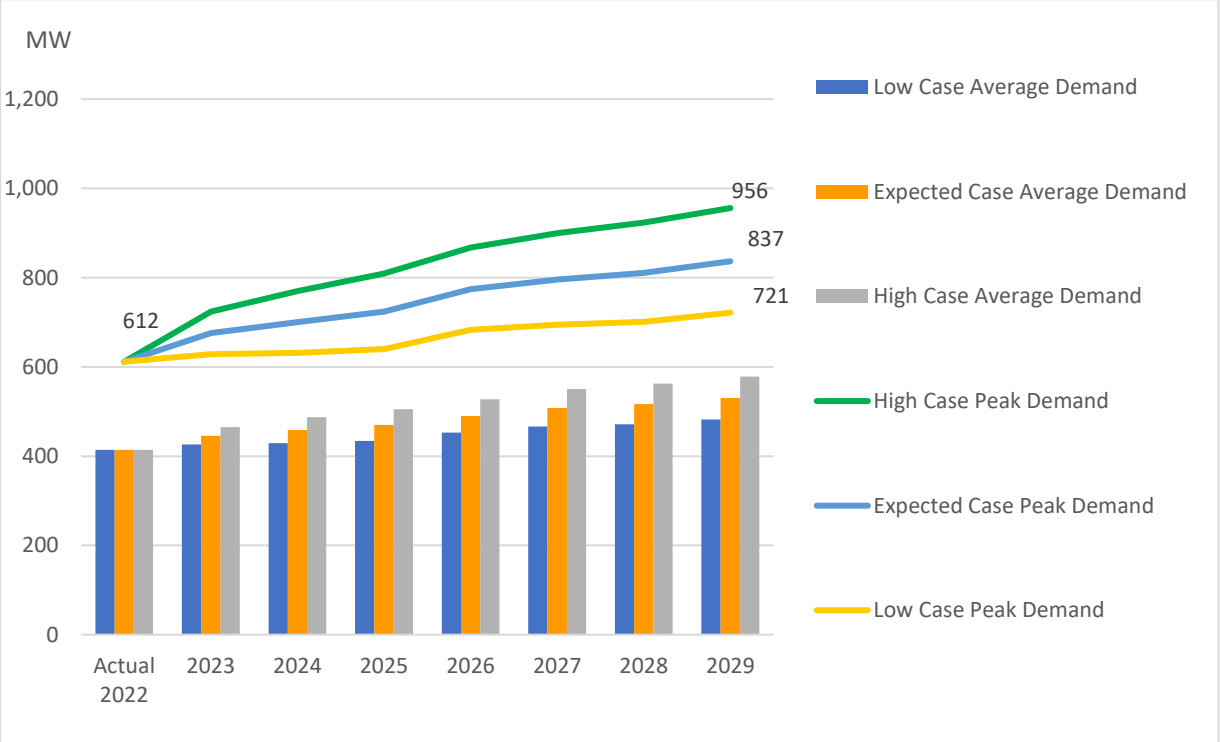
Demand projections represent the "net system demand", in that they are inclusive of assumed transmission and distribution system losses but exclude the internal auxiliary consumption of power and desalination plants. The methodology for demand forecasts assesses the influences of macroeconomic growth in addition to a separate analysis of underlying demand and certain bulk loads, comprising mainly industrial demands, which are assessed on a customer-specific basis.

The projections in Figure 10 are presented as a range including Low Case, High Case and central Expected Case scenarios. All scenarios assume normal weather. The Low Case and High Case scenarios assume contrasting growth levels, with the same growth assumptions used for the MIS projections.

Consistent with growth assumptions used for the MIS, the Expected Case scenario, peak demand increases at about 5% per year, from 612 MW in 2022 to 837 MW in 2029. Energy consumption is projected to grow from 3.6TWh (corresponding to 414MW average demand) in 2022 to 4.6TWh (530MW average demand) in 2029, with an average increase of 4% per year. In 2023 Saih Al Kahirat, which is currently supplied by Tanweer plants and will be connected to the DPS. Also, areas of AlMazyounah, Mudhai and Shahb Asaib and Motorah will be connected to DPS by 2026. In addition, the impacts of confirmed bulk load projects are included in the years that they expected to occur.

The High Case scenario projects growth in annual energy demand at 5% per year and peak demand at 7% per year whereas the Low Case scenario project lower annual growth of 2% For the peak and energy demand.

Figure 10 Electricity Demand Projections – DPS



	Actual 2022	2023	2024	2025	2026	2027	2028	2029	Average Growth (%)
Expected Case									
Annual Energy (TWh)	**3.6**	**3.9**	**4.0**	**4.1**	**4.3**	**4.5**	**4.5**	**4.6**	**4%**
Energy change from 2022-2028 Statement (TWh)	*0.2*	*0.4*	*0.4*	*0.4*	*0.3*	*0.5*	*0.4*		
Average Demand (MW)	**414**	**446**	**458**	**470**	**490**	**508**	**517**	**530**	**4%**
Underlying Demand	275	296	301	303	306	311	316	326	3%
Bulk Loads	140	150	157	166	184	198	201	204	6%
Peak Demand (MW)	**612**	**676**	**700**	**724**	**774**	**796**	**811**	**837**	**5%**
Peak change from 2022-2028 Statement (MW)	*21*	*70*	*69*	*73*	*69*	*73*	*72*		
Low Case									
Annual Energy (TWh)	**3.6**	**3.7**	**3.8**	**3.8**	**4.0**	**4.1**	**4.1**	**4.2**	2%
Energy change from 2022-2028 Statement (TWh)	*0.4*	*0.4*	*0.4*	*0.4*	*0.4*	*0.5*	*0.4*		
Average Demand (MW)	**414**	**426**	**429**	**434**	**452**	**466**	**471**	**482**	**2%**
Underlying Demand	275	286	287	288	290	301	306	317	2%
Bulk Loads	140	140	142	146	163	165	165	165	2%
Peak Demand (MW)	**612**	**629**	**631**	**640**	**683**	**694**	**701**	**721**	**2%**
Peak change from 2022-2028 Statement (MW)	*57*	*76*	*66*	*55*	*56*	*58*	*51*		
High Case									
Annual Energy (TWh)	**3.6**	**4.1**	**4.3**	**4.4**	**4.6**	**4.8**	**4.9**	**5.1**	5%
Energy change from 2022-2028 Statement (TWh)	*0.1*	*0.3*	*0.4*	*0.4*	*0.3*	*0.4*	*0.5*		
Average Demand (MW)	**414**	**465**	**487**	**505**	**527**	**550**	**562**	**578**	**5%**
Underlying Demand	275	308	324	333	337	343	352	365	4%
Bulk Loads	140	157	164	172	190	207	211	214	6%
Peak Demand (MW)	**612**	**724**	**769**	**809**	**867**	**900**	**924**	**956**	**7%**
Peak change from 2022-2028 Statement (MW)	*-15*	*64*	*73*	*90*	*83*	*90*	*94*		

1.2. b Power Generation Resources

Contracted Capacity and Non-Firm Energy

PWP's generation portfolio in the DPS includes the two plants that provide guaranteed capacity and a PPA with the wind farm to provide non-firm energy. They are described in Table 6 and are as follows:

- **Salalah IWPP:** Contracted capacity of 445 MW. The Salalah IWPP is a CCGT plant comprising of five gas turbines and two steam turbines. It is located in the Mirbat/Taqah region and achieved COD in 2012. The P(W)PA is scheduled to expire before the summer period in 2027.
- **Salalah II IPP:** Contracted capacity of 717 MW. Located in Raysut, the facility comprises eight OCGT units with a total capacity of 273 MW and six CCGT units (two blocks of 2 GTs and 1 ST each) with a total capacity of 444 MW.
- **Dhofar I Wind IPP:** The wind farm located in Harweel has an installed capacity of 49.4 MW, comprising of 13 x 3.8 GE wind turbines. Following a similar methodology used for the Solar IPPs, PWP has estimated a provisional capacity contribution value of 50% following the results of analyses that looked at both correlation between wind speed and demand profile, and the expected impact and contributions towards meeting LOLH requirements whilst adopting a new approach that better reflects the variability in resource availability. PWP will continue to monitor and analyse relevant data to update capacity contribution estimates, if needed.

Table 6 Contracted Capacities (PPAs/PWPA) - DPS

Project Name	Contracted Capacity	Contract Type	Project company	Project status	Technology	Contract Expiry
Salalah I IWPP	445 MW [a] 68,000 m^3/d	PWPA	Sembcorp Salalah Power & Water Co. (SAOC)	Operational	CCGT Natural gas fired Fuel oil as back-up	2027
Salalah II IPP	717 MW [a]	PPA	Dhofar Generating Co. (SAOC)	Operational	OCGT CCGT Natural gas fired Fuel oil as back-up	2033
Dhofar I Wind IPP	49.4 MW	PPA	Tanweer	Operational	Wind Turbine	2034

[a] Capacities are rated on a net basis (i.e. after allowing for auxiliary consumption inside the plants) at 35°C ambient temperatures output.

Resource Development Plan

PWP has no plans to procure new gas-fired generation capacity for the DPS but plans additional RE development. The Dhofar region has excellent potential for wind energy development, consequently, PWP has plans to develop a second wind energy farm, currently estimated at 100 MW for COD in Q4 2026. Both wind resource and land are available for the power project, Dhofar II Wind IPP, which is expected to be developed adjacent to the existing Dhofar I Wind IPP. This project is anticipated to be competitively tendered. The final capacity of this project may vary slightly from the value mentioned here and is subject to wind farm layout optimization analyses. PWP further notes that when the North-South Interconnect project is completed to Dhofar, PWP expects to develop more renewable energy projects in the DPS.

Furthermore, PWP assumed and based on the discussion with OETC that the North-South Interconnector all the way to Dhofar will be available by 2027. Accordingly, and as per OETC recent confirmation, the estimated capacity to be exported to Dhofar region via this link about 860 MW considering N-1 security standard. This value might be revised according to the project progress and demand development.

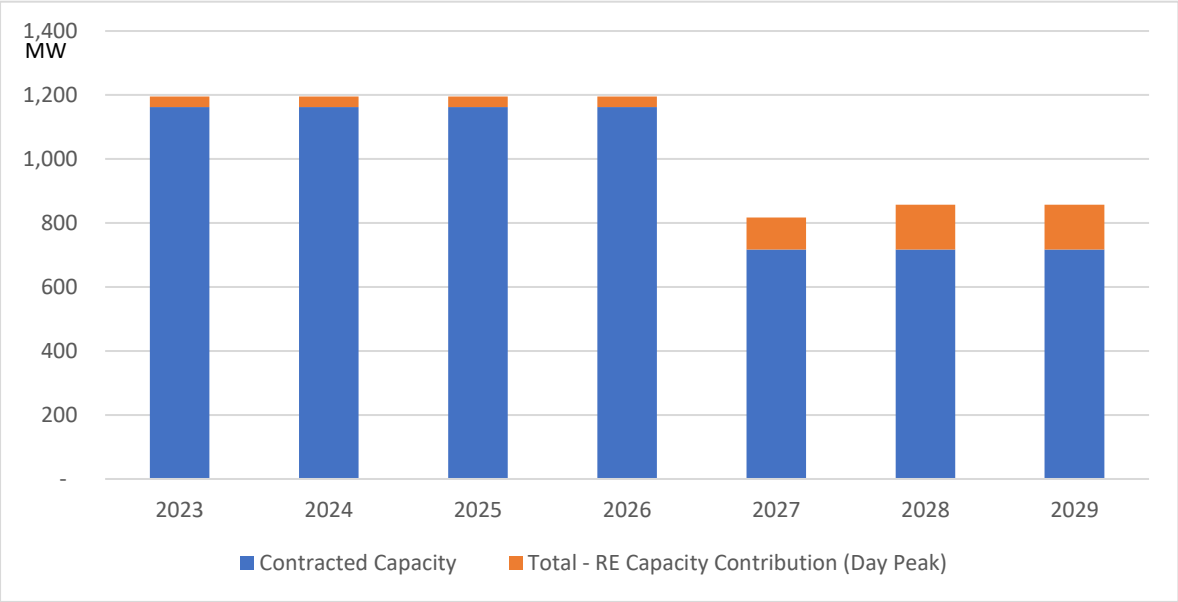
To utilise the existence of the interconnector and to secure DPS capacity requirements, PWP plan to procure another wind IPP at Sadah site. As per the wind data measured this site will have a good potential to develop up to 100 MW of wind IPP. The expected COD is 2028.

Summary

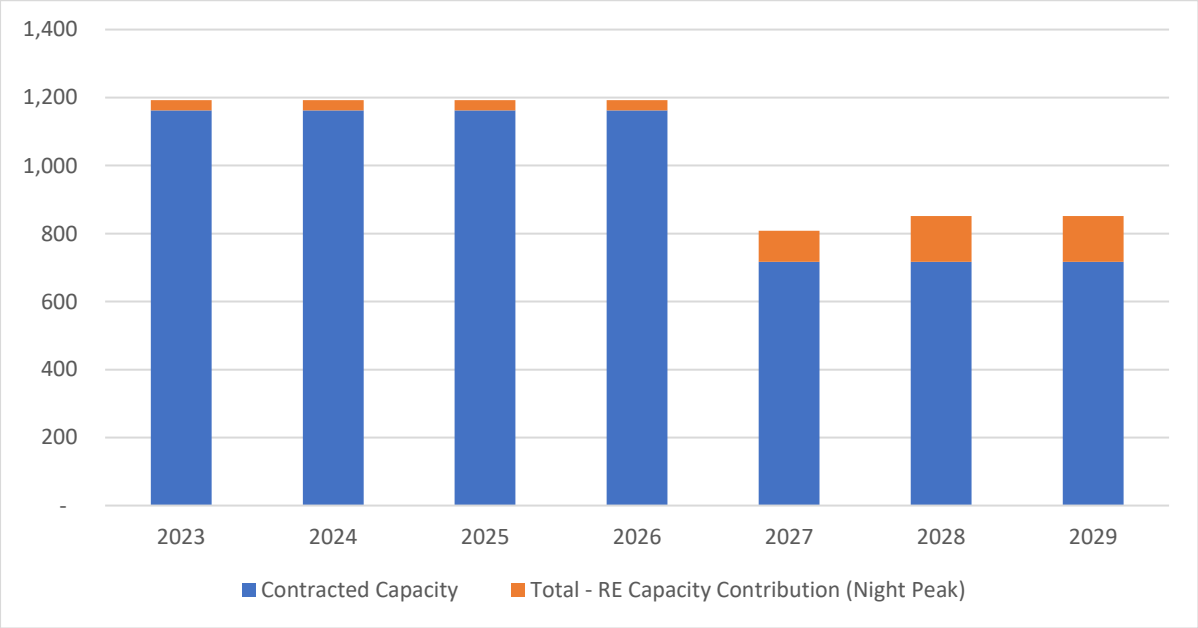
Figure 11 presents the capacity contributions from power generation resources in the DPS.

Figure 11 Capacity Contributions from Generation Resources During the Day Peak– DPS

Day Peak Resources:



Night Peak Resources:



	2023	2024	2025	2026	2027	2028	2029
Contracted Capacity	Net MW [a]						
Salalah I IWPP	445	445	445	445			
Salalah II IPP	717	717	717	717	717	717	717
Total Contracted Capacity	**1,162**	**1,162**	**1,162**	**1,162**	**717**	**717**	**717**
Renewable Energy Projects							
Dhofar I Wind IPP	49	49	49	49	49	49	49
Dhofar II Wind IPP					100	100	100
Sadah Wind IPP						100	100
Total - RE Capacity Contribution (Day Peak) [b]	**33**	**33**	**33**	**33**	**100**	**140**	**140**
Total - RE Capacity Contribution (Night Peak) [b]	**30**	**30**	**30**	**30**	**91**	**134**	**134**
Total Capacity Contribution to Day Peak Demand	**1,195**	**1,195**	**1,195**	**1,195**	**817**	**857**	**857**
Total Capacity Contribution to Night Peak Demand	**1,192**	**1,192**	**1,192**	**1,192**	**808**	**851**	**851**

[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] Capacity contribution of 67% during the Day Peak and 61% during the night Peak is currently assumed for Dhofar I, Dhofar II, and Sadah Wind IPPs. The capacity contribution for Sadah Wind IPP is about 40% during the day peak and about 43% during the night peak.

- The capacity contribution from Wind Resources assumed to be different during the day peak than the night peak. Even though they are very close to each other as the wind profile is very consistent during the day and night. The assumed capacity contribution is about 67% during the day peak and about 61% during the night peak. This is assumed for both Dhofar I Wind IPP and Dhofar II Wind IPP as assumed they will be developed in the same site (Harweel). Based on the collected data from phase II of the WRA, the capacity contribution for Sadah Wind IPP is about 40% during the day peak and about 43% during the night peak.

1.2. c Resource Adequacy and Mitigation Plans

Statutory and Regulatory Requirements

PWP is required by the Sector Law and its license to ensure the adequacy of generation resources in the DPS to meet future power demands. The Sector Law establishes PWP's general responsibility to secure sufficient generation resources to meet demand and the PWP License establishes the generation security standard as 24 LOLH.

- PWP has concluded that, on the basis of simulation studies of the DPS, a reserve margin of about 12% over peak demand is necessary to achieve the 24 LOLH standard, considering the size of the system, characteristics of generation resources, and limited access to security reserves. From 2027 onwards after the North-South interconnection is completed, the reserve margin considered is similar to the MIS (about 7.7%). This shared reserve margin between the two system encourages system efficiency. PWP will further assess the impact of the interconnection on the system reserve margin fulfilling the requirement of maintaining less than 24 hours LOLH.

This sets the capacity target for each of the three demand scenarios over the 7-year planning horizon, shown in Figure 12.

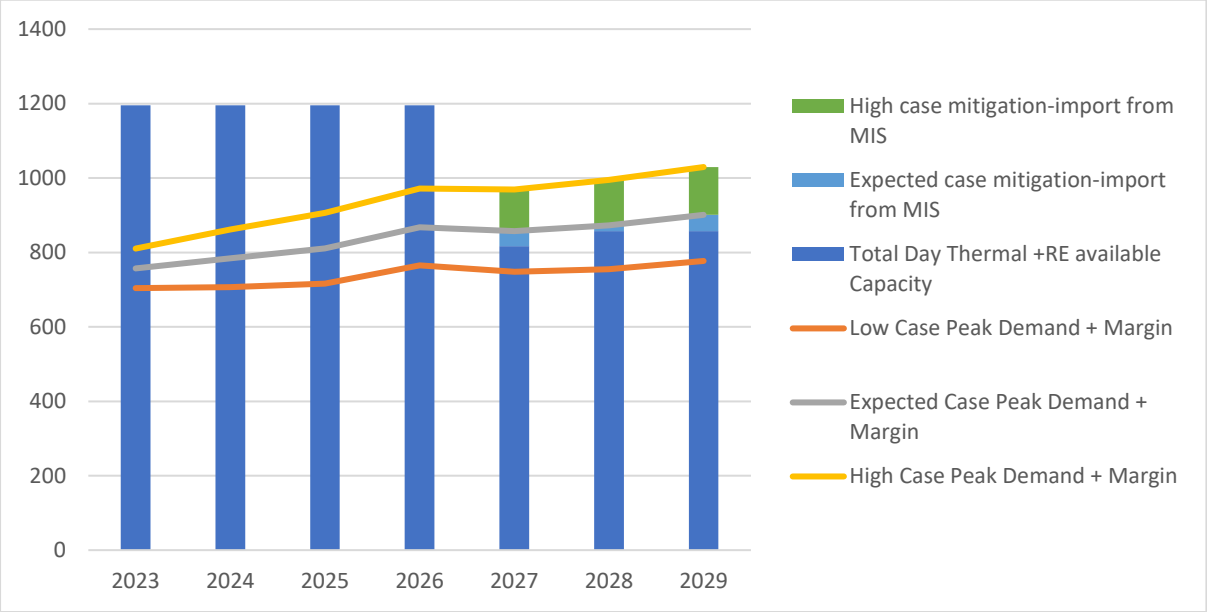
Subject to the success of the North-South Interconnect project from MIS to Ad Duqm Power System in Q3 2023, the interconnection may then be extended to the DPS as planned by OETC. Subsequently, planning and operations of the DPS and MIS will be fully integrated. It is assumed that the interconnect to the DPS is expected to be complete by 2027. PWP expects that the reserve margin requirement for the DPS would be reduced at

that time from 2027 onwards, aligning with that of the MIS. The reserve margin expected to drop to about 7.7% from 2027 onwards after the North-South Interconnector constructed.

Resource Adequacy and Mitigation Plans

There is a net reduction in the available contracted capacity in 2027 due to the expiration of Salalah IWPP before the 2027 peak demand period. This results in a shortfall in high case (Day Peak) of around 152 MW, 138 MW and 172 MW in 2027, 2028 and 2029, respectively. Figure 12 and the accompanying table indicate capacity surpluses that reduce gradually with demand growth.

Figure 12 Resource Adequacy – DPS



	2023	2024	2025	2026	2027	2028	2029
Generation Resources	Net MW [a]						
Total Day Contracted Capacity + RE Capacity Contribution	1,195	1,195	1,195	1,195	817	857	857
Total Night Contracted Capacity + RE Capacity Contribution	1,192	1,192	1,192	1,192	808	851	851
Expected Case Demand							
Day Peak Demand	676	700	724	774	796	811	837
Capacity Target (Peak Demand + Margin)	757	784	811	867	857	873	901
Additional Capacity Required for Day Peak : (Potential Existing Resources/ Imports from MIS (North-South Interconnect)					40	16	44
Night Peak Demand	649	672	695	743	764	778	803
Capacity Target (Peak Demand + Margin)	727	753	778	833	823	838	865
Additional Capacity Required for Night Peak : (Potential Existing Resources/ Imports from MIS (North-South Interconnect)					15	-	14
High Case Demand							
Day Peak Demand	724	769	809	867	900	924	956

Capacity Target (Peak Demand + Margin)	810	862	906	971	969	995	1029
Additional Capacity Required for Day Peak : (Potential Existing Resources/ Imports from MIS (North-South Interconnect)					152	138	172
Night Peak Demand	695	739	777	833	864	887	918
Capacity Target (Peak Demand + Margin)	778	827	870	932	930	955	988
Additional Capacity Required for Night Peak : (Potential Existing Resources/ Imports from MIS (North-South Interconnect)					122	104	137
Low Case Demand							
Day Peak Demand	629	631	640	683	694	701	721
Capacity Target (Day Peak Demand + Margin)	704	707	716	765	748	755	777
Additional Capacity Required for Day Peak : (Potential Existing Resources/ Imports from MIS (					-	-	-
Night Peak Demand	603	606	614	656	666	673	693
Capacity Target (Peak Demand + Margin)	676	679	688	734	718	725	746
Additional Capacity Required for Night Peak : (Potential Existing Resources/ Imports from MIS (North-South Interconnect)					-	-	-

MUSANDAM POWER SYSTEM

The Musandam Governorate is located in the northern-most region of the Sultanate of Oman and extends into the Strait of Hormuz. The Musandam Governorate is an exclave of Oman, separated from the rest of the country by the United Arab Emirates. The latest population data from the National Centre for Statistics & Information reports that the total population is estimated at around 53,693 [10] which is expected to grow steadily over the coming years.

1.3. a Demand for Electricity

Demand Projections

The pace of demand growth in Musandam is driven by distribution level load and projects that aim to boost tourism, economic, and commercial activities. The Expected, Low, and High Case peak demand scenarios for the Musandam Power System have been provided by Nama Distribution[11].

Similar to the demand forecasts presented for the other power systems, the different cases represent alternate assumptions of annual growth rates for underlying demand and materialisation of identified bulk consumers.

[10] National Centre of Statistics & Information Data Portal, – Musandam total population registered in December 2022

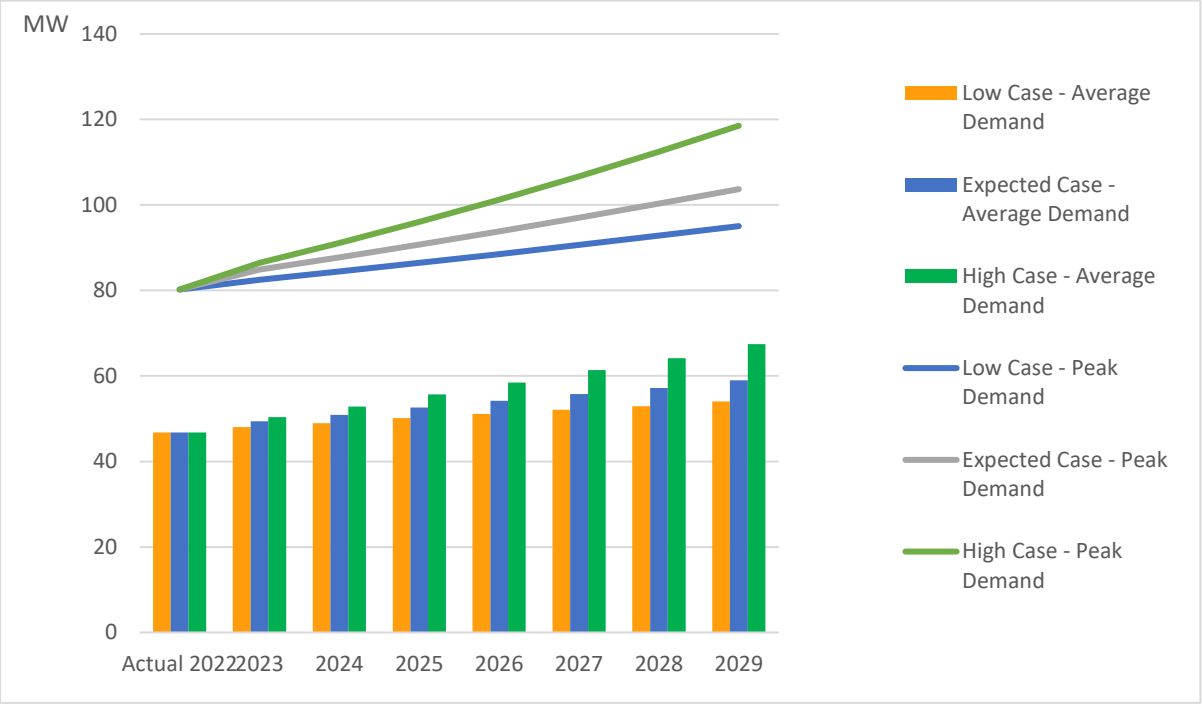
[11] The four distribution and supply companies (MJEC, MZEN, MEDC and Tanweer) have been merged into two entities on 6th June 2023; Nama Supply Company, responsible for supply services (billing and collection) and Nama Distribution Company, responsible for electricity distribution to all governates except Dhofar.

These three demand scenarios are shown in Figure 13. Across all three scenarios, the growth projections are slightly higher than those in the previous 7-Year Statement. Further, the differences between the high and low peak demand cases reflect the greater uncertainty currently observed with local and global economic trends.

Under the Expected Demand forecast, peak demand is expected to grow from 80 MW in 2022 to 104 MW in 2029, an average increase of 4% per year. The Low Case scenario projects a growth rate of 2% for peak demand, increasing only to 95 MW by 2029. The High Case scenario assumes a larger growth of population as well as increased tourism, fishery activities, and other development. In this scenario, peak demand is projected to grow by an average of 6% per year to reach 119 MW in 2029.

As it is shown in Figure 13 The average demand is expected to grow from 47 MW in 2022 to 59 MW in 2029, with an average increase of 3% per year for the Expected Case. The Low Case scenario considers a growth rate of 2% per year for the average demand, increasing to only 54 MW in 2029. The High Case Scenario represents higher growth rate of 5% per year, projecting average demand to reach 67 MW in 2029.

Figure 13 Electricity Demand Projections – Musandam Power System



	Actual 2022	2023	2024	2025	2026	2027	2028	2029	Average Growth (%)
Expected Case									
Annual Energy (TWh)	**0.41**	**0.43**	**0.45**	**0.46**	**0.47**	**0.49**	**0.50**	**0.52**	**3%**
Energy Change from 2022-2028 Statement (TWh)	*-0.02*	*-0.01*	*-0.02*	*-0.03*	*-0.03*	*-0.04*	*-0.04*		
Average Demand (MW)	**47**	**49**	**51**	**53**	**54**	**56**	**57**	**59**	**3%**
Peak Demand (MW)	**80**	**85**	**88**	**91**	**94**	**97**	**100**	**104**	**4%**
Peak Change from 2022-2028 Statement (MW)	*-2*	*-2*	*-3*	*-4*	*-6*	*-8*	*-9*		
Low Case									
Annual Energy (TWh)	**0.41**	**0.42**	**0.43**	**0.44**	**0.45**	**0.46**	**0.47**	**0.47**	**2%**
Energy Change from 2022-2028 Statement (TWh)	*-0.01*	*-0.01*	*-0.01*	*-0.01*	*-0.01*	*-0.02*	*-0.02*		

Average Demand (MW)	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**2%**
Peak Demand (MW)	**80**	**82**	**84**	**86**	**89**	**91**	**93**	**95**	**2%**
Peak Change from 2022-2028 Statement (MW)	*0*	*0*	*-1*	*-1*	*-2*	*-2*	*-3*		
High Case									
Annual Energy (TWh)	**0.41**	**0.44**	**0.46**	**0.49**	**0.51**	**0.54**	**0.56**	**0.59**	**5%**
Energy Change from 2022-2028 Statement (TWh)	*-0.03*	*-0.03*	*-0.03*	*-0.03*	*-0.04*	*-0.04*	*-0.04*		
Average Demand (MW)	**47**	**50**	**53**	**56**	**58**	**61**	**64**	**67**	**5%**
Peak Demand (MW)	**80**	**86**	**91**	**96**	**101**	**107**	**112**	**119**	**6%**
Change from 2022-2028 Statement (MW)	*-5*	*-4*	*-6*	*-7*	*-9*	*-11*	*-13*		

1.3. b Power Generation Resources

Sources of Power

PWP's present portfolio of contracted capacity for electricity generation in Musandam comprises two PPAs. They are described in Table 7 and are as follows:

- **Tanweer Diesel Plants -** Tanweer owns and operates power stations distributed near load centres in the Musandam Governorate. They are all diesel-fired generators, Khasab plant has total installed capacity of about 80 MW. In addition, Tanweer own and operates diesel plant in Dibba with a capacity of about 12 MW.. The PPA is scheduled to expire on 31st December 2026.

- **Musandam IPP** commenced operation in 2017 under a PPA with PWP. The IPP provides firm capacity of 123 MW using reciprocating engines fuelled primarily by natural gas. The PPA is scheduled to expire on 30th April, 2032.

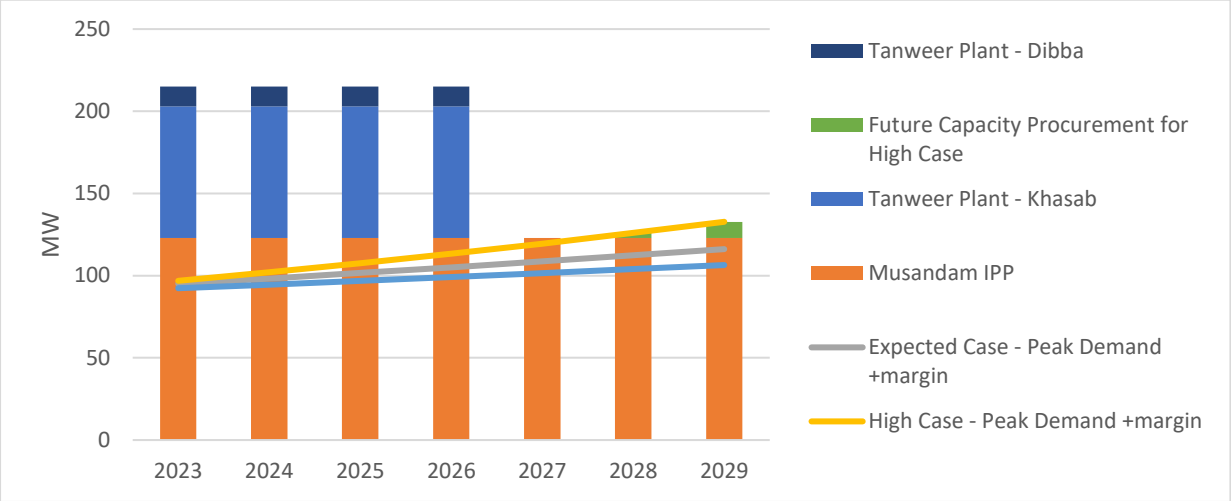
Table 7 Contracted Capacities (PPAs) – Musandam

Project Name	Contracted Capacity	Contract Type	Project company	Project status	Technology	Contract Expiry
Tanweer Diesel Plants	Khasab- 83 MW Dibba -12 MW	PPA	Tanweer	Operational	Diesel-fired reciprocating engines	2026
Musandam IPP	123 MW	PPA	Musandam Power Company (SAOG)	Operational	Dual-fuel Reciprocating Engines	2032

Resource Development Plan

Figure 14 illustrates Musandam's supply/demand balance. The Musandam IPP provides sufficient capacity to meet electrical energy requirements across all the Low and Expected Case demand scenarios until 2026. It is not anticipated to require Tanweer diesel generators in Khasab and Dibba to meet the expected demand. Tanweer diesel generators will continue to be available to provide additional capacity or as a contingency resource if needed until the end of 2026.

Figure 14 Future Power Generation Expansion Plans - Musandam Power System



	2023	2024	2025	2026	2027	2028	2029
Peak Demand				**MW**			
Expected Case	85	88	91	94	97	100	104
Low Case	82	84	86	89	91	93	95
High Case	86	91	96	101	107	112	119
Capacity Target (Peak Demand +Margin)							
Expected Case	95	98	102	105	109	112	116
Low Case	92	95	97	99	102	104	106
High Case	97	102	108	113	120	126	133
Contracted Capacity							
Musandam IPP [a]	123	123	123	123	123	123	123
Tanweer Khasab Plant	80	80	80	80			
Tanweer Dibba Plant	12	12	12	12			
Total Contracted Capacity	**215**	**215**	**215**	**215**	**123**	**123**	**123**
Required Capacity to meet the Expected Case Capacity Target (Peak Demand + Margin)	-	-	-	-	-	-	-
Required Capacity to meet the Low Case Capacity Target (Peak Demand + Margin)	-	-	-	-	-	-	-
Required Capacity to meet the High Case Capacity Target (Peak Demand + Margin)	-	-	-	-	-	3	10
[a] The MW figures are at 45°C							

Alternative Supply Options

To meet the additional capacity required from 2028 onwards under the high case scenario, PWP in coordination with other stakeholders such as OETC and OQ exploring several alternative supply options described below:

- **International transmission**

PWP will explore international interconnection options for supply.

- **Renewable Energy Options:**

PWP is exploring several sites within Musandam region to develop wind and/or solar projects. PWP will continue exploring and investigating the availability of sites and potential of wind and solar in Musandam region.

SECTION 2 FUEL

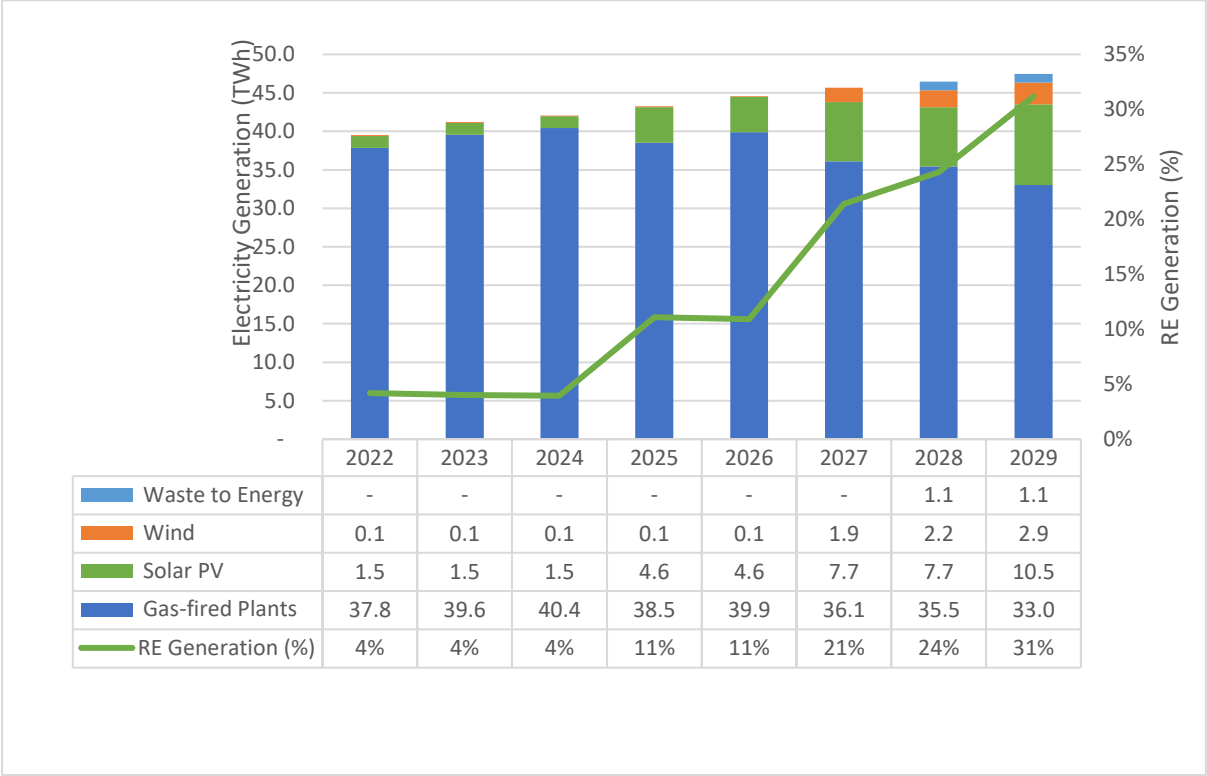
OVERVIEW

Fuel Diversification Policy

Following Oman vision 2040 target to have 35-39% renewable generation by 2040, PWP continuing to develop renewable projects. The favourable economic costs of wind and solar PV technologies are driving renewable projects development. As of 2022, PWP has total contracted capacity of 550 MW of RE (Ibri II Solar IPP and Dhofar I Wind IPP) and plans to develop another 4040 MW by 2029 in MIS and DPS systems. Furthermore, PWP continues to support improvements in efficient gas utilisation in the sector.

Figure 15 shows our projection of energy generation shares by fuel type among PWP-contracted generators. By 2025, about 11% of generation will be provided by renewable energy sources, primarily solar energy. By 2029, the renewables share, within the sector, will exceed 30%.

Figure 15 Fuel Shares in Electricity Generation



	2022	2023	2024	2025	2026	2027	2028	2029
Waste to Energy	-	-	-	-	-	-	1.1	1.1
Wind	0.1	0.1	0.1	0.1	0.1	1.9	2.2	2.9
Solar PV	1.5	1.5	1.5	4.6	4.6	7.7	7.7	10.5
Gas-fired Plants	37.8	39.6	40.4	38.5	39.9	36.1	35.5	33.0
RE Generation (%)	4%	4%	4%	11%	11%	21%	24%	31%

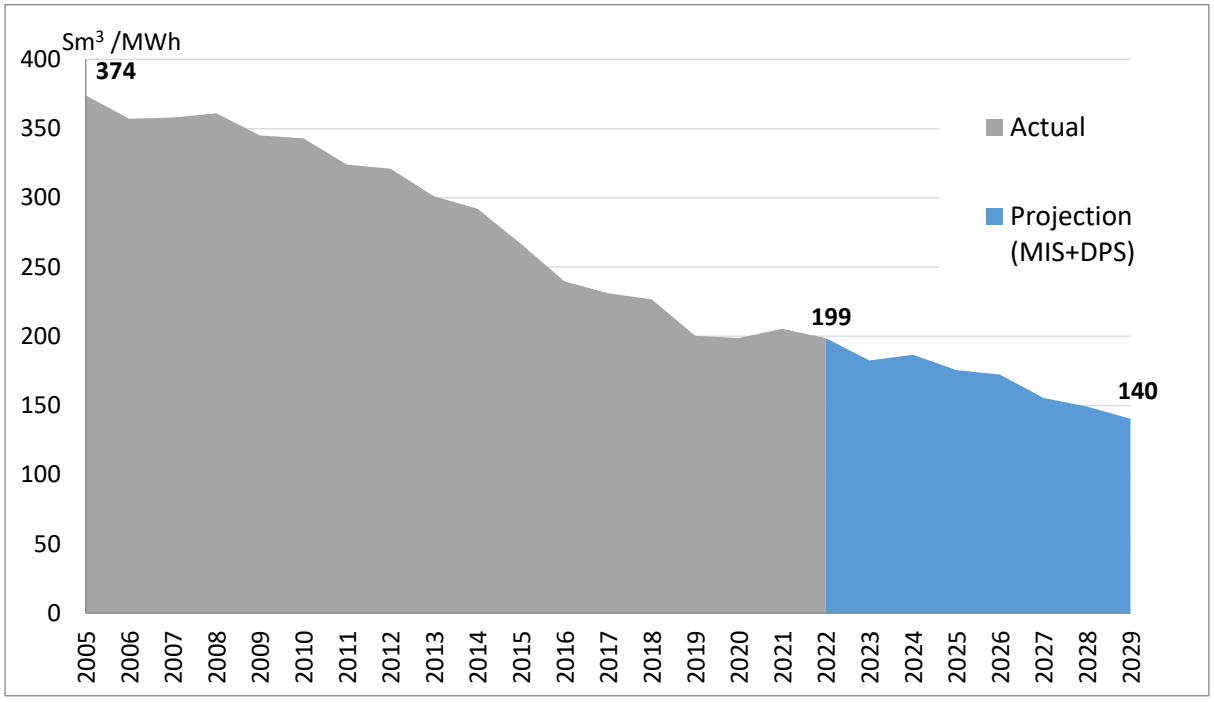
Generation Share by Technology	2022	2023	2024	2025	2026	2027	2028	2029
Gas-fired Plants	37.8	39.6	40.4	38.5	39.9	36.1	35.5	33.0
Solar PV	1.5	1.5	1.5	4.6	4.6	7.7	7.7	10.5
Wind	0.1	0.1	0.1	0.1	0.1	1.9	2.2	2.9
Private Solar PV Initiatives	0.0	0.0	0.0	0.1	0.2	0.3	0.4	0.5
Waste to Energy	-	-	-	-	-	-	1.1	1.1
Energy	39.5	41.2	42.1	43.3	44.8	45.9	46.8	48.0

Efficiency in Fuel Utilisation

Since 2005, through the introduction of progressively more efficient generation plants, PWP has achieved a 47% reduction in the gas required per unit of electricity production, from 374 Sm^3/MWh in 2005 to 199 Sm^3/MWh in 2022. In 2022 alone, improvements in gas utilisation (when compared against gas utilisation rates in 2005) suggest savings in excess of OMR 383 million. This is driven by PWP's introduction of renewable energy projects, procurement of new state-of-the-art CCGT plants in 2019, new water desalination plants that shift water production from energy-intensive MSF technology to efficient RO technology, and the continuous efforts to improve the dispatch efficiency in coordination with OETC.

With the introduction of solar, wind, and waste to energy plants alongside with the MIS to DPS interconnection in Q4 2026, PWP expects that the gas requirements for electricity generation will fall to around 140 Sm^3/MWh by 2029 onward, 62% less than the requirement in 2005.

Figure 16 Gas Required per Unit of Electricity Generation – MIS + DPS



MAIN INTERCONNECTED SYSTEM and DHOFAR POWER SYSTEM

2.1. a 2022 Fuel Consumption

Total gas consumption at the MIS and DPS power and water plants in 2022 was about 7.6 billion Sm^3, equivalent to 20.9 million Sm^3/d, about 1% less than in 2021. This reduction is due to the full year operation of Ibri II Solar IPP, and the expiration of some plants which are less efficient.

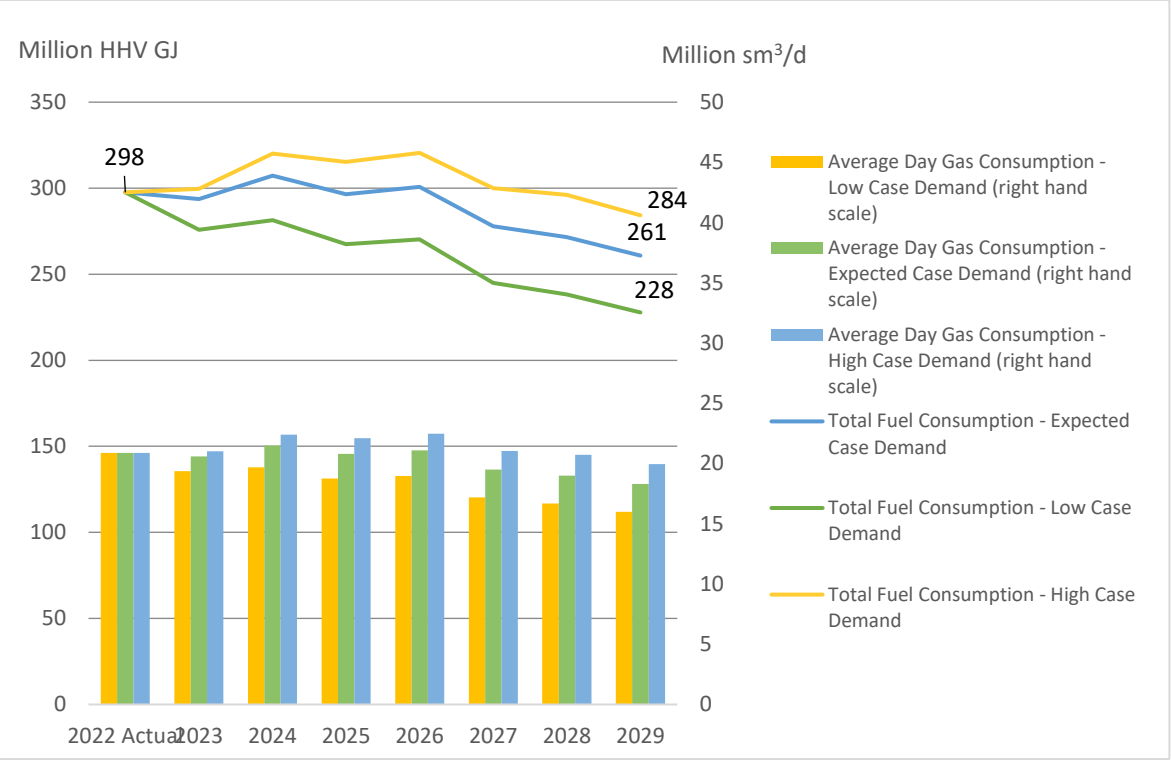
2.1. b Projected Fuel Requirements

PWP projects total annual fuel requirements to decrease by around 1.9% per year from 2022 to 2029 under the Expected Case. This scenario, in addition to the Low Case and High Case scenarios, are illustrated in Figure 17.

Under the Low Case demand scenario, total fuel consumption would decrease at an average of 3.7% per year. In the High Case demand scenario, total fuel consumption would decrease at an average rate of 0.7% per year.

Figure 17 shows MIS and DPS fuel requirements. The two system are expected to be interlinked upon the completion the North-South interconnection in Q4 2026 which will play an important role in improving the gas utilization. The average gas consumption of 20.6 million Sm3/d in 2023, is less than 2022 consumption by 1.3%. The energy demand growth, and the interconnection to Duqm impact on fuel consumption can been seen in gas consumption increase in 2024. While in 2025 the gas consumption drops due to the operation of Manah I and Manah II Solar IPPs. In 2026 there is a slightly increase in gas consumption, due to increase in the demand. The gas requirement is then expected to drop from 2027 onwards in all cases as more RE projects are being develop.

Figure 17 Projected Fuel Requirements – MIS + DPS



	2022 Actual	2023	2024	2025	2026	2027	2028	2029	Average Growth (%)
Expected Demand									
Gas Consumption (million Sm³/d)									
Annual Average	20.9	20.6	21.5	20.8	21.1	19.5	19.0	18.3	-1.9%
Total Fuel Consumption (million HHV GJ)[a]	**298**	**294**	**307**	**296**	**301**	**278**	**272**	**261**	*-1.9%*
Low Case Demand									
Gas Consumption (million Sm³/d)									
Annual Average	20.9	19.4	19.7	18.8	19.0	17.2	16.7	16.0	-3.7%
Total Fuel Consumption (million HHV GJ)[a]	**298**	**276**	**281**	**267**	**270**	**245**	**238**	**228**	*-3.7%*
High Case Demand									

Gas Consumption (million Sm³/d)									
Annual Average	20.9	21.0	22.4	22.1	22.5	21.0	20.7	19.9	-0.7%
Total Fuel Consumption (million HHV GJ)[a]	**298**	**300**	**320**	**315**	**321**	**300**	**296**	**284**	*-0.7%*

a Based on natural gas HHV of 1,050 BTU/scf

MUSANDAM POWER SYSTEM

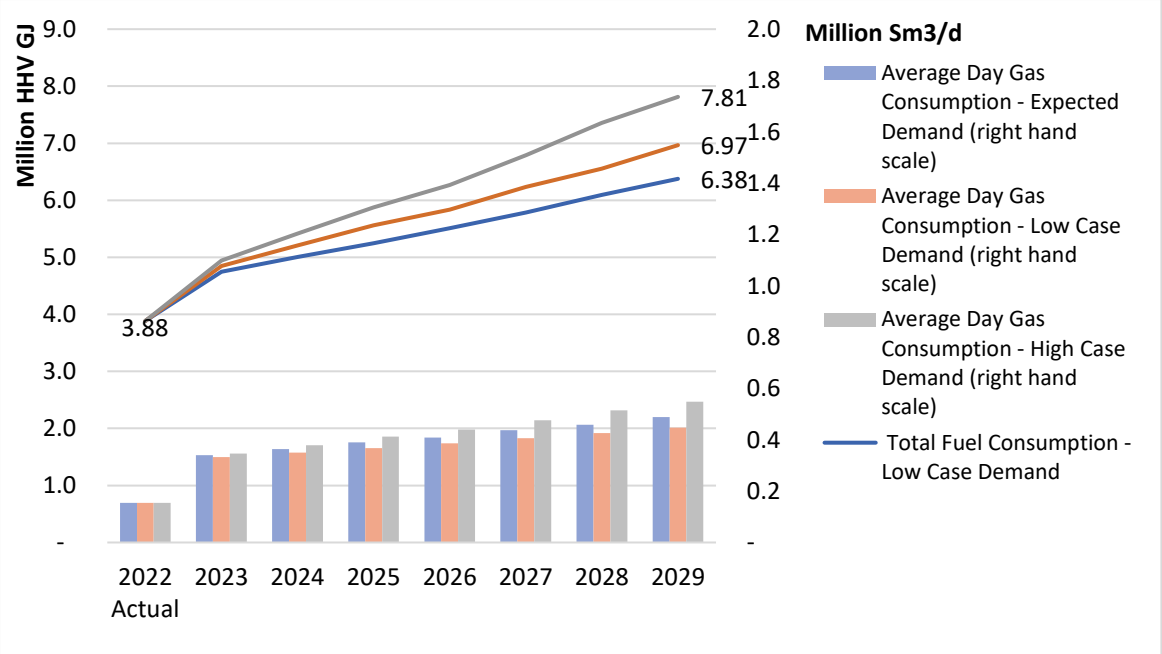
2.2. a 2022 Fuel Consumption

Gas consumption in 2022 was 56.5 million Sm^3, equivalent to 0.15 million Sm^3/d, about 4% lower than in 2021. While the consumption of fuel oil reach 45.65 million litres about 11% higher than 2021. The increase in demand during 2022 coupled with the unavailability of gas in Musandam Governorate until the Dolphin Gas project was completed on 11 November 2022 resulted in a variance in gas consumption between 2021 and 2022 at Musandam IPP. As a consequence, more diesel fuel was used to operate Musandam IPP in 2 022 in comparison to 2021.

2.2. b Projected Fuel Requirements

Fuel requirements projections for each of the three demand scenarios are illustrated in Figure 18. Total fuel consumption is expected to increase at an annual average of around 9% under the Expected Demand scenario. Under the High and Low Case scenarios, the consumption is expected to increase by 10% and 7% respectively. The projections have been developed assuming full operation on fuel gas for Musandam IPP.

Figure 18 Projected Fuel Requirements – Musandam Power System



	2022 Actual	2023	2024	2025	2026	2027	2028	2029	Average Growth (%)
Expected Demand [c]									
Gas Consumption (million Sm³/d)									
Annual Average	0.15	0.34	0.36	0.39	0.41	0.44	0.46	0.49	18%
Diesel Fuel Consumption (million litres) [a]	45.65	-	-	-	-	-	-	-	-
Total Fuel Consumption (million HHV GJ) [b]	**3.88**	**4.85**	**5.21**	**5.56**	**5.83**	**6.23**	**6.55**	**6.97**	**9%**
Gas	2.21	4.85	5.21	5.56	5.83	6.23	6.55	6.97	18%
Diesel Fuel	1.68	-	-	-	-	-	-	-	-
Low Case Demand									
Gas Consumption (million Sm³/d)									
Annual Average	0.15	0.33	0.35	0.37	0.39	0.41	0.43	0.45	16%
Diesel Fuel Consumption (million litres) [a]	45.65	-	-	-	-	-	-	-	-
Total Fuel Consumption (million HHV GJ) b	**3.88**	**4.75**	**5.00**	**5.25**	**5.51**	**5.79**	**6.09**	**6.38**	**7%**
Gas	2.21	4.75	5.00	5.25	5.51	5.79	6.09	6.38	16%
Diesel Fuel	1.68	-	-	-	-	-	-	-	-
High Case Demand [c]									
Gas Consumption (million Sm³/d)									
Annual Average	0.15	0.35	0.38	0.41	0.44	0.48	0.51	0.55	20%
Diesel Fuel Consumption (million litres) [a]	45.65	-	-	-	-	-	-	-	-
Total Fuel Consumption (million HHV GJ) [b]	**3.88**	**4.94**	**5.41**	**5.87**	**6.27**	**6.79**	**7.36**	**7.81**	**10%**
Gas	2.21	4.94	5.41	5.87	6.27	6.79	7.36	7.81	20%
Diesel Fuel	1.68	-	-	-	-	-	-	-	-

[a] In the previous issues of the 7 years statements the gas consumption of the plant was estimated as if the plant fully operated by gas. In this issue for better representation of the actual data, gas figures as well as the diesel figures that were actually used to operate the plant in 2022 were added to the above table.

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

[c] In the high cases, there is additional demand that can't be met by Musandam IPP in the period from 2028 to 2029. As mentioned in Musandam Power System section 1.3b Power Generation Resources it will be met by either Transmission interconnection with UAE or Renewable Energy Options. Thus, fuel forecast for the mentioned period maybe affected.

SECTION 3 WATER

3.1 MAIN INTERCONNECTED SYSTEM

The Main Interconnected System (MIS) serves the largest population area and the greatest demand for potable water in the Sultanate of Oman. PWP provides desalinated water Nama Water Services[12] and it's responsible for potable water supply to consumers. The MIS is an integrated network that currently serves potable water requirements of the Governorates of Muscat, Batinah South, Batinah North, Ad Dakhiliyah, Al Buraimi, and Ad Dhahirah.

The MIS consists of three supply Zones, each of which has sources of desalinated water under contract to PWP, other Nama Water Services water supply sources, and transmission facilities that allow water transfer between Zones under the management of Nama Water Services. The supply Zones are as follows:

Muscat Zone includes water demands of the Governorate of Muscat. The current sources of desalinated water for this Zone are Ghubrah II IWP, Qurayyat IWP, and transfers from Barka Zone. In addition, Ghubrah temporary RO considered one of Nama Water Services sources expected to be in operation by summer 2023 with a desalinated water capacity of 20,000 m^3/d.

Barka Zone includes water demands of the Governorates of Batinah South and Ad Dakhiliyah. The current sources of desalinated water for this Zone are Barka IWPP, Barka II IWPP, Barka IV IWP with the possibility of transfers from Sohar Zone.

Sohar Zone includes water demands of the Governorates of Batinah North, Al Buraimi, and Ad Dhahirah. The current sources of desalinated water for this Zone are Sohar IV IWP, and transfers from Barka Zone. In addition, Nama Water Services has a long-term contract with Majis Industrial Services Company (MISC) to supply a desalinated water capacity of 11,000 m^3/d.

3.1.a Demand for Water

Nama Water Services has provided PWP with projections of average and peak water demand for MIS Zone, shown in Figure 19. Peak demand represents the average daily demand (including network losses) during the week on which the highest demand of the year is present.

Nama Water Services medium case scenario is driven fundamentally by population growth, distribution network expansion, and growth in per-capita water consumption. Nama Water Services demand forecasts are based on the official NCSI population forecast for the Sultanate of Oman until 2040 as published in March 2017 and updated with information from the NCSI census 2020 data[13].

The medium case scenario projects an average annual growth of about 2% over the forecast horizon to 2029. This is less than the previous year forecast, which presented 4% annual growth to 2028. In MIS, Out-turn average water demand in 2022 was 1,041 thousand m^3/d more than the forecasted average demand by 1%. This increase is caused by the recovery of the economy and the return of expatriate workers to the Sultanate, which is clearly evident from the annual rate of increase in the population witnessed in 2022, amounting to about 9%compared to 2021, as the annual growth rate of the average water demand in MIS reached about 8% in 2022 compared to 2021.

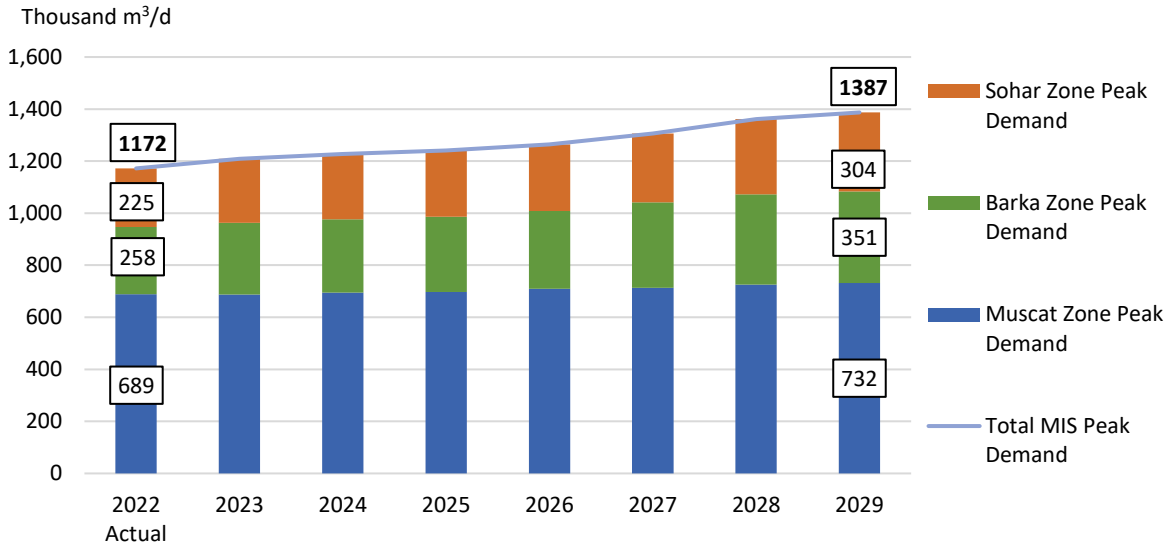
Nama Water Services expects a decline in the average water demand in the coming years compared to those expectations in the previous statement, and this decline in the average demand for water is expected to reach 82,000 m^3/d in 2028. This expected decline was due to the changes in some assumptions on which the

[12] It was Oman Water & Wastewater Services Company before rebranding which was on 8th March 2023.

[13] National Centre for Statistics and Information, Population Projections in the Sultanate of Oman, March 2017, this scenario is based on the medium fertility rate 3.3 for the Omanis and the expatriate to Omani ratio is declining to 33% in 2040.

projections were based, including the decrease in the average water consumption per capita resulting from the tariff change, in addition to the expected improvement in the water losses rates.

Figure 19 Water Demand Projections – MIS



	2022[a]	2023	2024	2025	2026	2027	2028	2029	Average Growth (%)
	Thousand m³/d								
Muscat zone									
Peak Demand	689	687	695	697	710	713	725	732	1%
Average Demand	614	613	619	621	632	635	645	651	1%
Barka zone									
Peak Demand	258	276	282	290	298	328	348	351	5%
Average Demand	231	247	253	259	266	292	308	312	4%
Sohar zone									
Peak Demand	225	247	251	254	257	265	288	304	4%
Average Demand	196	214	218	221	223	230	250	262	3%
Total MIS		3%	2%	1%	2%	3%	4%	2%	
Peak Demand	**1,172**	**1,209**	**1,228**	**1,241**	**1,265**	**1,307**	**1,361**	**1,387**	2%
Change from 2022-2028 Statement	*-8*	*-5*	*-23*	*-61*	*-85*	*-107*	*-100*	-	
Average Demand	**1,041**	**1,075**	**1,090**	**1,101**	**1,121**	**1,157**	**1,203**	**1,225**	**2%**
Change from 2022-2028 Statement	*6*	*9*	*-9*	*-42*	*-63*	*-82*	*-77*	-	

[a] The Average Demand is based on actual 2022 outturns (desalination and underground water supply) while the Peak Demand is estimated using peak factor.

3.1. b Water Supply Sources

The sources of water supply include the existing water desalination plants, new desalination plants (under development or construction phases), and Nama Water Services sources. The water desalination sources that are under contract with PWP in the MIS are summarized in Table 7.

PWP's contracted sources of desalinated water in the MIS are classified by Zones as follows:

Muscat Zone :

Ghubrah II IWP. Owned by Muscat City Desalination Company and operated under a WPA with PWP, the plant has a contracted desalination capacity of 191,000 m^3/d using RO technology.

Qurayyat IWP. Owned by Qurayyat Desalination Company and operated under a WPA with PWP, Qurayyat IWP has a contracted desalination capacity of 200,000 m^3/d, using RO technology. Qurayyat IWP is currently operated as "pre-COD" water production of 180,000 m^3/d, until it achieves its Commercial Operation Date (COD).

Ghubrah III IWP. Awarded in November 2020 to Capital Desalination Company, and to be operated under a WPA with PWP. The plant is under construction, with a contracted desalination capacity of 300,00 m^3/d using RO technology.

Barka Zone :

Barka IWP (ROs). Owned by ACWA Power Barka and operated under a WPA with PWP, Barka IWP has a contracted ROs desalination capacities of 45,460 m^3/d in 2014 and 56,826 m^3/d in 2016. The WPA for Barka IWP ROs is scheduled to expire on 31st March 2024.

Barka II IWPP. Owned by SMN Power Barka and operated under a PWPA with PWP, the Barka II IWPP has a capacity of 120,000 m^3/d using RO technology. The PWPA will expire in March 2024.

Barka IV IWP. Owned by Barka Desalination Company and operated under a WPA with PWP, Barka IV IWP utilises RO technology with a contracted capacity of 281,000 m^3/d.

Barka V IWP. Awarded in November 2020 to GS Inima Barka 5 Desalination Company and operated under a WPA with PWP. The project is under construction, with a contracted capacity of 100,000 m^3/d, using RO technology.

Sohar Zone :

Sohar IV IWP. Owned by Myah Gulf Desalination Company and operated under a WPA with PWP, Sohar IV IWP utilises RO technology with a contracted capacity of 250,000 m^3/d.

Table 8 Water Desalination Plants – MIS

Project	Contracted Capacity	Contract Type	Plant Owner	Plant Status	Technology	Contract Expiry
Barka IWP (ROs)	45,460 m^3/d	WPA	ACWA Power Barka (SAOG)	Operational	RO	2024
	56,826 m^3/d	WPA		Operational	RO	2024
Barka II IWPP	120,000 m^3/d	PWPA	SMN Barka Power Co. (SAOC)	Operational	RO	2024
Barka IV IWP	281,000 m^3/d	WPA	Barka Desalination Co. (SAOC)	Operational	RO	2038
Barka V IWP	100,000 m^3/d	WPA	GS Inima Barka 5 Desalination Company	Under construction	RO	2043
Ghubrah II IWP	191,000 m^3/d	WPA	Muscat City Desalination Co. (SAOC)	Operational	RO	2034
Ghubrah III IWP	300,000 m^3/d	WPA	Capital Desalination Company	Under construction	RO	2046
Qurayyat IWP	200,000 m^3/d	WPA	Qurayyat Desalination Co. (SAOC)	Under construction	RO	2037
Sohar IV IWP	250,000 m^3/d	WPA	Myah Gulf Desalination Co. (SAOC)	Operational	RO	2038

In addition to the sources that are under contract to PWP, Nama Water Services operates wellfields at several locations in the MIS that offset the need for water desalination capacity. The production capacities needed from these sources are shown in aggregate by year in Figures 20, 21, and 22. It was noticed that in 2023, the wellfields extraction rate has grown significantly, this is due to the need for underground sources to cover the water demand in the remote areas.

3.1.c Resource Adequacy and Development Plan

The expansion plan for water desalination capacity aims to meet water peak demand plus a reserve margin (the headroom factor) to meet the security of supply requirements. In 2019 Nama Water Services re-assessed the reserve margin required to meet the level of capacity target, considering uncertainty in the demand forecast and operational outages. A factor of 8% was considered as a reserve margin for the first four years period (2022 – 2026) followed by 9% for the following years of the forecast period.

PWP's assessment of sources adequacy and development plans is presented by the supply Zone. It shows the extent of transfers between Zones, inter-zonal reserve sharing, and constraints that are otherwise not evident in a summary presentation of the MIS.

Muscat Zone

The Muscat Zone is currently supplied by Ghubrah II IWP, Qurayyat IWP, Nama Water Services sources (Ghubrah Temporary ROs and wellfields), and transfers from Barka Zone. Qurayyat IWP is currently delivering commercial water as "pre-COD" until its Commercial Operation Date (COD) is achieved. The local sources within the Muscat Zone are not sufficient to meet the forecasted demand and therefore water transfers from Barka Zone are required to provide for the balance.

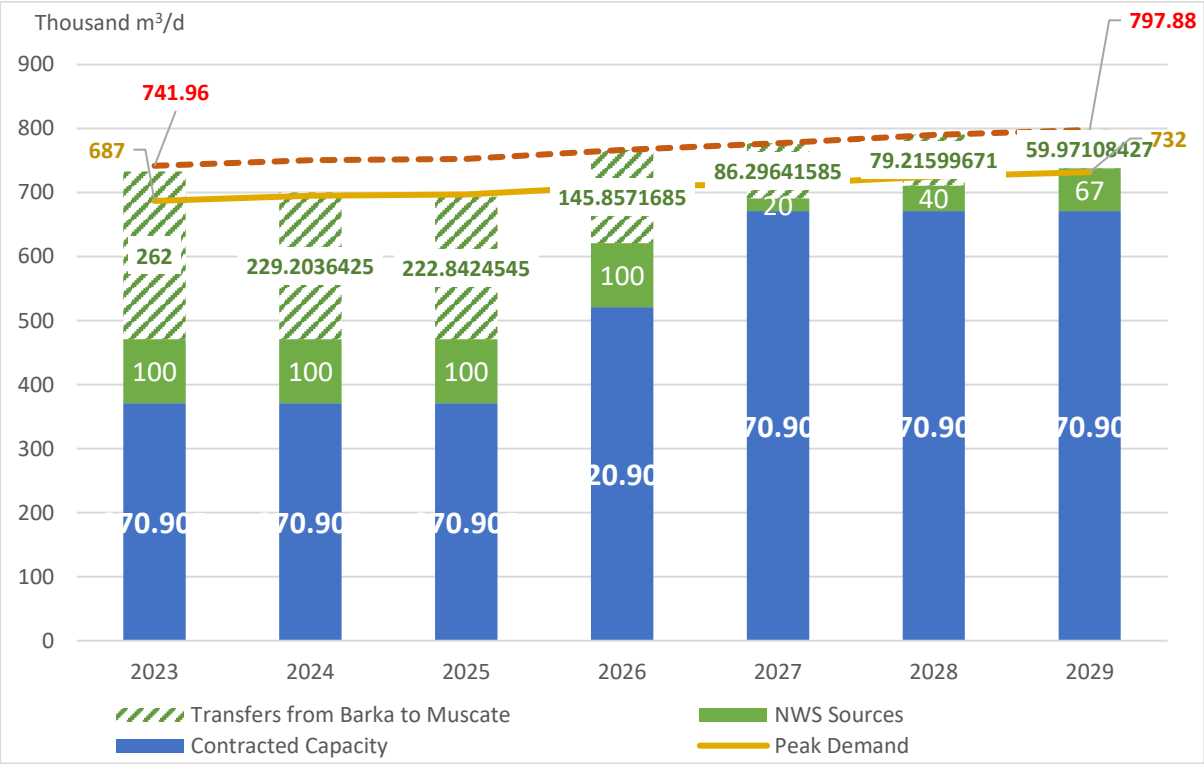
The transmission facilities relevant to transfers from Barka Zone are currently undergoing a multi-year reinforcement and capacity expansion program. The existing transmission line capacity from Barka to Al Al Seeb and Ad Dakhiliyah is 320,000 m^3/d. In 2023, the reinforcement increased the total capacity transfer from Barka to Al Seeb (in Muscat Zone) by 100,000 m^3/d. Reinforcement of Al Khoud Main Pumping Station is scheduled for completion in 2023, increasing transfer capacity to Ad Dakhiliyah Governorate to meet its peak demand plus margin is expected to be around 229,000 m3/d by 2029. This allows for additional water flow to Ad Dakhiliyah Governorate, consequently, it reduces the maximum available transfer capacity from Barka to Al Seeb. This transfer capacity will reduce steadily from 262,000 m3/d in 2023 to about 60,000 m3/d in 2029 as water demand in Ad Dakhiliyah Governorate grows. In 2026 Ghubrah III IWP will be available with an early water capacity of 150,000 m3/d to cover the capacity target (peak demand with margin) in Muscat Zone.

Figure 20 provides a summary of annual water supply requirements and supply sources in the Muscat Zone. For the Muscat Zone, the Barka transfers are required to meet the peak demand plus margin. In the years 2023, 2024 and 2025, the limitation of the water availability in Muscat Zone and transfer capacity from Barka Zone causes a supply shortfall against capacity target in Muscat Zone of about 9,000 m^3/d, 50,000 m^3/d, and 59,000 m^3/d respectively. PWP will work closely with Nama Water Services to minimize this shortfall through exploring supply options and sources.

The early water from Ghubrah III IWP of 150,000 m^3/d is expected to be available in summer 2026. The plant COD with the full capacity is scheduled for operation in the second half of 2026, contributing to demand requirements from 2026 onwards.

Nama Water Services has requested PWP to resume the project development of Wadi Dhayiqah IWP and requested to procure a capacity of 65,000 m^3/d, provided that the project will supply 35,000 m^3/d of desalinated water to Nama Water Services network, while the rest of the capacity will be supplied to the farmers for irrigation water in the local vicinity who are represented by the Ministry of Agriculture, Fisheries Wealth and Water Resources (MAFWWR). PWP initiated the procurement in coordination with the APSR and relevant stakeholders.

Figure 20 Resource Adequacy and Development Plan – Muscat Zone



	2023	2024	2025	2026	2027	2028	2029
Muscat Zone				Thousand m³/day			
Average Demand	613	619	621	632	635	645	651
Peak Demand	687	695	697	710	713	725	732
Peak Demand + Margin	742	751	753	767	777	790	798
Contracted Capacity							
Ghubrah II IWP	191	191	191	191	191	191	191
Qurayyat IWP[a]	180	180	180	180	180	180	180
Ghubrah III IWP[b]	-	-	-	150	300	300	300
Prospective Capacity							
Wadi Dhayiqah[c]	-	-	-	-	-	-	-
Nama Water Services Sources							
Required Wells Supply[d]	80	80	80	80	0	40	67
Ghubrah Temporary	20	20	20	20	20	0	0
Planned Transfers							
Transfers from Barka to Muscat[e]	262	223	226	146	86	78	60
Total Muscat Zone Capacity +/- Planned Transfers	**733**	**694**	**697**	**767**	**777**	**789**	**798**
Reserve including Planned Transfers over Peak Demand (shortfall)	46	-1	0	57	64	64	66
Reserve including Planned Transfers over Peak Demand + Margin (shortfall)	-9	-57	-56	0	0	-1	0

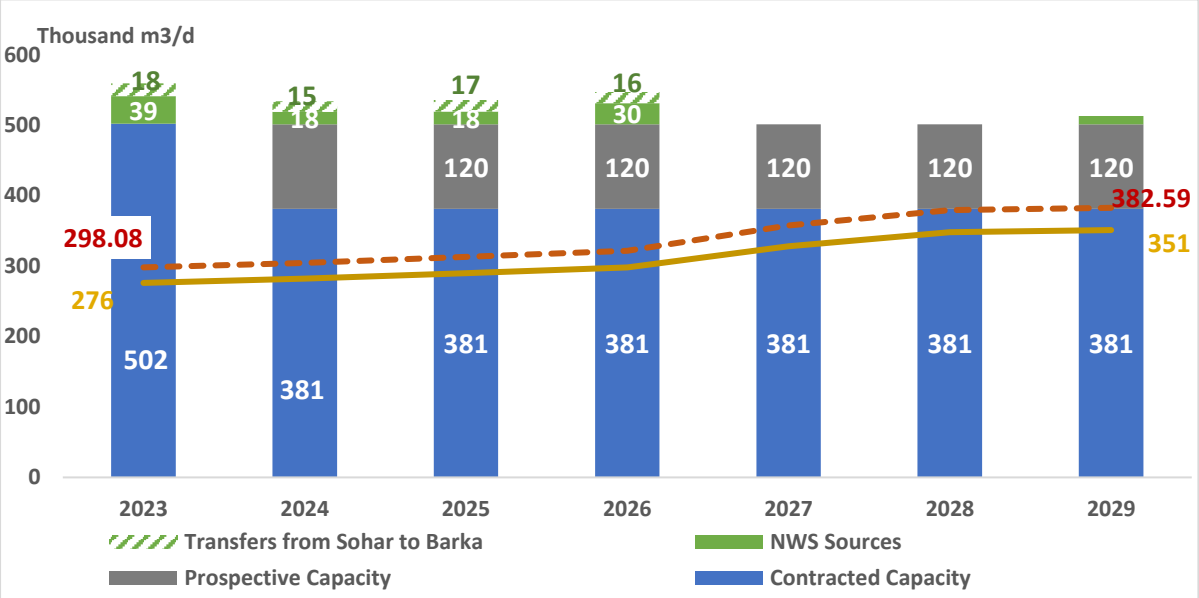
[a] 180 is expected to be available during this period.
[b] Early water expected in Q2 2026 with 150,000 m³/d and to reach the full capacity of 300,000 m³/d in Q4 2026.
[c] Nama Water Services requested new plant for Wadi Dhayiqah in 2027 with capacity 65,000 m³/d.
[d] The wells will be used up to the maximum capacity during peak demand periods when the desalination capacity is not sufficient to meet the demand. Nama Water Services is maintaining and operating these wells to overcome supply deficit.
[e] From 2022 to 2025 represent the maximum transfers capacity to Muscat Zone.

Barka Zone

The Barka Zone is currently supplied by Barka IWPP (ROs), Barka II IWPP, Barka IV IWP, and Nama Water Services -operated wellfields source. These sources currently exceed the demand requirements within the Barka Zone and enable transfers to support the needs of the Muscat Zone and Sohar Zone.

Figure 21 provides a summary of annual water supply requirements and supply sources in the Barka Zone. Barka V IWP, which is under construction, will be available by Summer 2024 to provide a capacity of 100,000 m³/d, contributing to 2024 peak demand requirements. PWP is planning to procure an additional water desalination capacity within the Barka Zone. Barka Water 2024 with a capacity between 100,000 m³/d to 120,000 m³/d is expected to secure sufficient capacity to meet targets at a reasonable cost and provide for demand growth in this supply Zone.

Figure 21 Resource Adequacy and Development Plan – Barka Zone



	2023	2024	2025	2026	2027	2028	2029
Barka Zone	Thousand m³/d						
Average Demand	247	253	259	266	292	308	312
Peak Demand	276	282	290	298	328	348	351
Peak Demand + Margin	298	305	313	322	358	379	383
Contracted Capacity							
Barka I IWPP (ROs)[a]	101	-	-	-	-	-	-
Barka II IWPP[b]	120	-	-	-	-	-	-
Barka IV IWP	281	281	281	281	281	281	281
Barka V IWP	-	100	100	100	100	100	100
Prospective Capacity							
Barka Water 2024 [c]	-	100	100	100	100	100	100
Nama Water Services Sources							
Required Wells Supply[d]	39	18	18	30	0	0	12
Planned Transfers							
Transfers from Barka to Muscat	-262	-223	-226	-146	-86	-78	-60
Transfers from Barka to Sohar	0	0	0	0	-2	-24	-41

Transfers from Sohar to Barka	18	15	17	16	0	0	0
Total Barka Zone Capacity +/- Planned Transfers	**297**	**291**	**290**	**381**	**393**	**379**	**392**
Reserve including Planned Transfer over Peak Demand (shortfall)	21	9	0	83	65	31	41
Reserve including Planned Transfer over Peak Demand + Margin (shortfall)	-1	-14	-24	59	36	0	9

a Barka I IWPP RO Plants is contracted until 31 March 2024.
b Barka II IWPP will expired on 31 March 2024.
C Nama Water Services requested a capacity of 100,000 m3/d.
d The wells will be used up to the maximum capacity during peak demand periods when the desalination capacity is not sufficient to meet the demand. Nama Water Services is maintaining and operating these wells to overcome supply deficit.

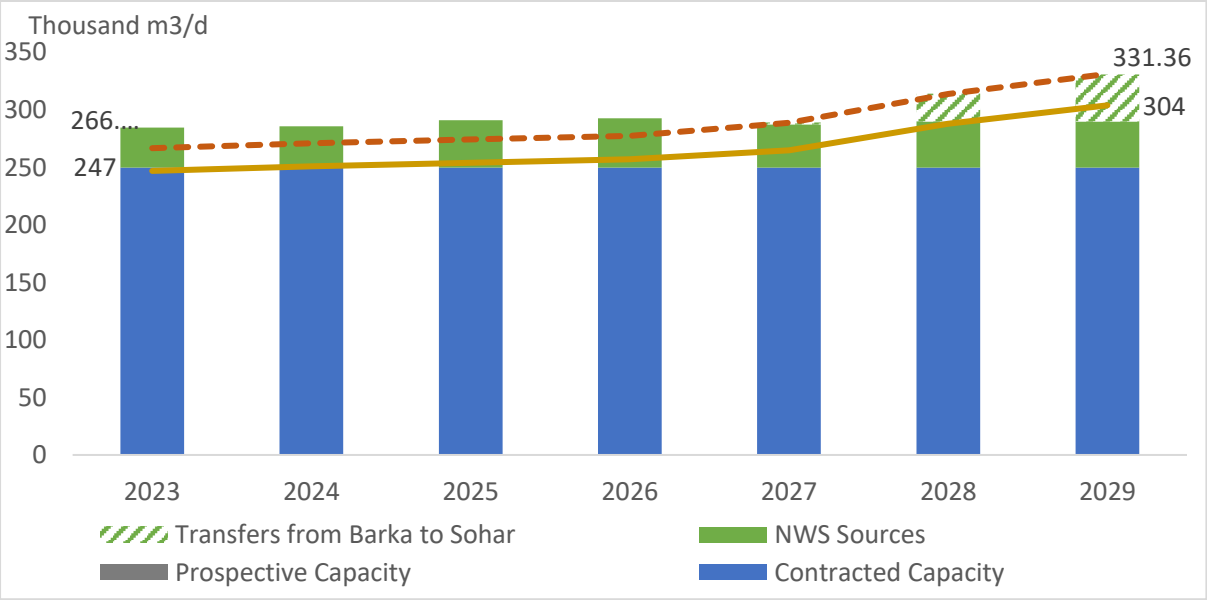
Sohar Zone

The Sohar Zone is currently supplied by the existing Sohar IV IWP and Nama Water Services sources which include wellfields supply and an RO plant operated by MISC under contract to Nama Water Services.

The available sources have sufficient capacity to meet water requirements until 2029. Nama Water Services wellfields capacities are needed to meet the peak demand plus reserve margin.

Figure 22 provides a summary of annual water supply requirements and supply sources in the Sohar Zone. The existing capacities in Sohar Zone are sufficient to meet the capacity target (peak demand + margin) throughout the 7 years period.

Figure 22 Resource Adequacy and Development Plan – Sohar Zone



	2023	2024	2025	2026	2027	2028	2029
Sohar Zone	Thousand m3/d						
Average Demand	214	218	221	223	230	250	262
Peak Demand	247	251	254	257	265	288	304
Capacity Target (Peak Demand + Margin)	267	271	274	278	289	314	331
Contracted Capacity							
Sohar IV IWP	250	250	250	250	250	250	250
Nama Water Services Sources							

Required Wells Supply[a]	24	25	30	32	27	29	29
Sohar RO MISC	11	11	11	11	11	11	11
Planned Transfers							
Transfers from Barka to Sohar	0	0	0	0	2	24	41
Transfers from Sohar to Barka	-18	-15	-17	-16	0	0	0
Total Sohar Zone Capacity +/- Planned Transfers	**266**	**271**	**274**	**277**	**289**	**314**	**331**
Reserve including Planned Transfers over Peak Demand (shortfall)	19	20	20	20	24	26	27
Reserve including Planned Transfers over Capacity Target (Peak Demand + Margin) (shortfall)	0	0	0	0	0	0	0

a The wells will be used up to the maximum capacity during peak demand periods when the desalination capacity is not sufficient to meet the demand includes Batinah North wells, Buraymi wells, and Dhahirah wells. Nama Water Services is maintaining and operating these wells to overcome supply deficit.

Summary

The supply plan meets capacity target (peak demand and margin) requirements in the MIS across the forecast period to a very good level. However, a minor shortfall against the capacity target is expected in the short term in Muscat Zone from 2023 to2025. Muscat Zone depends on transfers from Barka Zone to meet peak demand until the early water capacity of Ghubrah III IWP becomes available in the first half of 2026. Margins in certain years may appear caused by delays in the development of planned projects, such that contingency plans need to be available.

Nama Water Services continues to create and develop its transmission system capability tool, it is an ongoing process, the purpose of this tool is to provide an annual assessment of the capacity of the transmission system compared to the growth in the demand for water and used to consider the expected availability of existing production capacities of PWP and Nama Water Services, and technical constraints related to transmission capacities between Sohar, Barka and Muscat Zones.

PWP and Nama Water Services will continue to work together to anticipate potential difficulties and to develop supply mitigation plans as necessary.

3.2 SHARQIYAH ZONE

Sharqiyah Zone includes the water demands of the Sharqiyah North and Sharqiyah South Governorates excluding Wilayat Musairah. The Zone is not connected with the MIS. Currently, PWP supplies desalinated water to Nama Water Services from two plants Sur II IWP and Aseelah IWP.

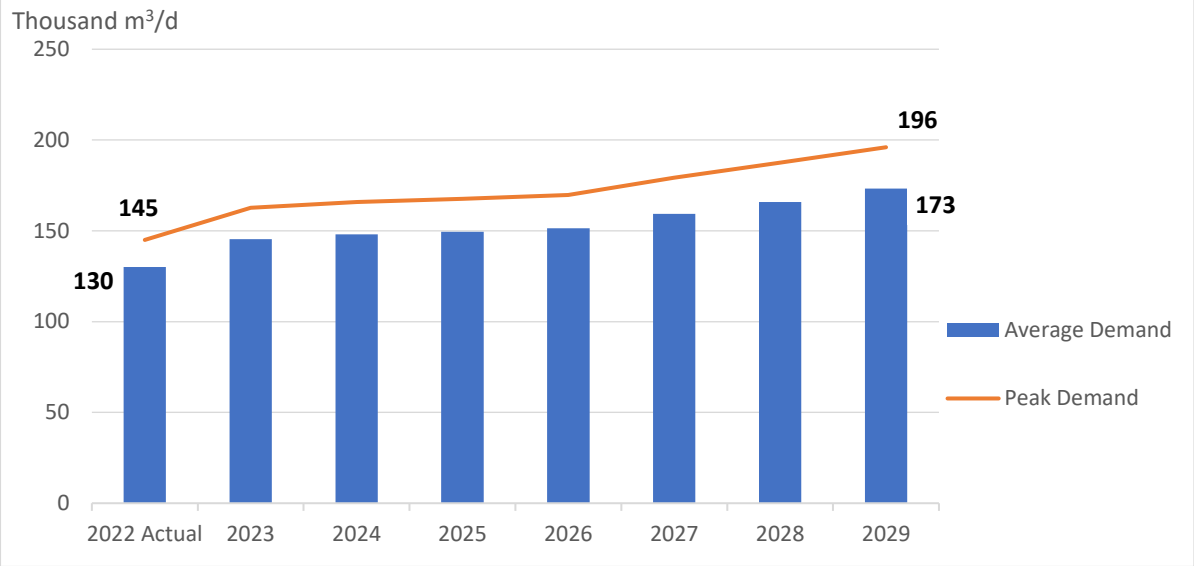
3.2.a Demand for Water

Figure 23 shows Nama Water Services water demand forecast for Sharqiyah Zone. Sharqiyah Zone served by Sharqiyah Water Network that is connected to water desalination plants under contract with PWP.

The average actual water consumption in Sharqiyah Zone for 2022 is lower by 5,000 m^3/d compared with the last 7 Year Statement projections, bringing the average consumption to about 130,000 m^3/d and the peak consumption to 145,000 m^3/d.

Nama Water Services projects average growth for peak and annual average demand at 4% over the 7-year period. The annual average growth varies within a range of 1% - 5%.

Figure 23 Water Demand Projections – Sharqiyah Zone



	2022[a]	2023	2024	2025	2026	2027	2028	2029	Average Growth (%)
	Thousand m³/d								
Peak Demand	**145**	**163**	**166**	**168**	**170**	**179**	**187**	**196**	**4%**
Change from 2022-2028 Statement	*(6)*	*0*	*(6)*	*(18)*	*(20)*	*(15)*	*(10)*		
Average Demand	**130**	**145**	**148**	**150**	**151**	**159**	**166**	**173**	**4%**
Change from 2022-2028 Statement	*(5)*	*1*	*(4)*	*(15)*	*(16)*	*(13)*	*(9)*		

[a] The Average Demand is based on actual 2022 outturns (desalination and underground water supply) while the Peak Demand is estimated using peak factor.

3.2.a Water Supply Sources

The supply sources presented to meet water demand include existing water desalination plants and Nama Water Services sources. The sources that are under contract with PWP in Sharqiyah Zone are indicated in Table 8 and described as follows:

Sur II IWP. Owned and operated by Sharqiyah Desalination Company under a WPA with PWP, Sur II IWP has contracted capacity of 131,837 m³/d, using RO technology.

Aseelah IWP. Owned and operated by Al Aseelah Desalination Company under a WPA with PWP, the plant achieved the Commercial Operation Date in January 2022, the contracted capacity is 80,000 m³/d, using RO technology.

In addition to the capacity under contract to PWP, Nama Water Services has wellfields resource located in several locations. They may be utilised, to a limited degree, for water supply when desalinated water capacity is not sufficient to meet the peak demand plus margin in the Sharqiyah Zone. Nama Water Services will be able to utilise around 2,000 m³/d of wells capacity in 2029.

Table 9 Water Desalination Plants – Sharqiyah Zone

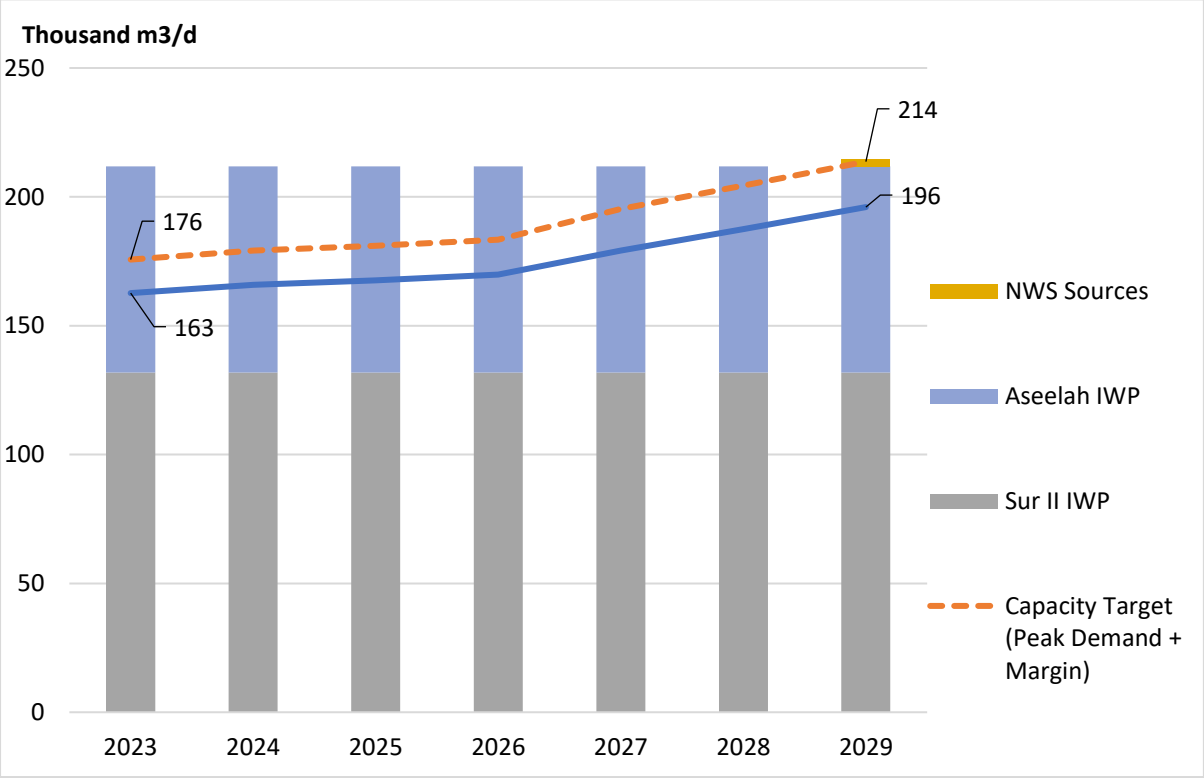
Project Name	Contracted Capacity	Contract Type	Project Company	Project Status	Technology	Contract Expiry
Sur II IWP	131,837 m^3/d	WPA	Sharqiyah Desalination Company (SAOG)	Operational	RO	2029
Aseelah IWP	80,000 m^3/d	WPA	Al Asilah Desalination Company (SAOC)	Operational	RO	2041

3.2.b Resource Adequacy and Development Plan

The forecasted capacity target (peak demand plus margin) for the Sharqiyah Zone varies between 1%-7% in the 7 years horizon, the lowest growth is in 2025 and 2026 with 1% annual growth rate only and the highest growth is in 2027 with 7% annual growth.

Figure 24 below shows that the contracted capacity is sufficient to meet the capacity target until 2029. However, it is important to note that Nama Water Services is currently working on the development of its transmission and distribution in Sharqiyah Zone. Nama Water Services plans to use around 2,000 m^3/day of wells water in 2029 to meet the capacity target.

Figure 24 Resource Adequacy and Development Plan – Sharqiyah Zone



	2023	2024	2025	2026	2027	2028	2029
Sharqiyah Zone				Thousand m^3/d			
Peak Demand	163	166	168	170	179	187	196
Capacity Target (Peak Demand + Margin)	176	179	181	183	195	204	214
Contracted Capacity							
Sur II IWP	132	132	132	132	132	132	132
Aseelah IWP	80	80	80	80	80	80	80
Prospective Capacity Nama Water Services Sources							
Required Wells Supply[a]	0	0	0	0	0	0	2
Total Sharqiyah Zone Capacity including Nama Water Services Sources	**212**	**212**	**212**	**212**	**212**	**212**	**214**
Reserve over Peak Demand (Shortfall)	**49**	**46**	**44**	**42**	**33**	**24**	**18**
Reserve over Capacity Target (Peak Demand + Margin) (Shortfall)	**36**	**33**	**31**	**28**	**17**	**7**	**0**

a Capacity requirement expected to be supplied by Nama Water Services to meet the Peak Demand + Margin.

3.3 DHOFAR ZONE

Nama Dhofar Services is responsible for potable water supply to consumers, and for the development, operation, and maintenance of the Dhofar Water Network. PWP supplies water to Nama Dhofar Services from Salalah IWPP and Salalah III IWP.

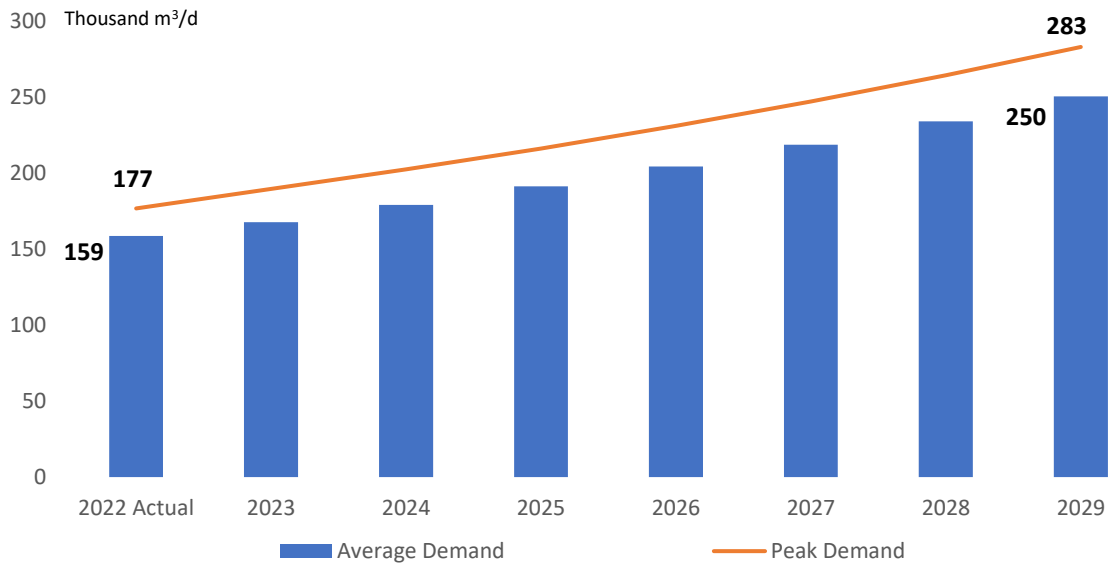
3.3. a Demand for Water

The water demand projections for Dhofar water network as provided by Nama Dhofar Services, shown in Figure 25. It includes the aggregated potable water demands of Wilayats Salalah, Taqah and Mirbat.

The forecast demand is consisted of two parts: (1) Cities of Salalah, Taqah, and Mirbat, which comprise demand served by the existing water distribution network; and (2) Jabal, which represents the demand in Jabal areas that are partially connected to the network. At present, the Jabal demand is mainly served by local wellfields. Nama Dhofar Services plans to expand its network to supply the Jabal communities during the forecast period. Nama Dhofar Services has a plan to expand the existing water network to include all areas in the Jabal (mountain), in addition to studying the possibility of expanding the network to some neighbouring Wilayat as (Thumrait and Sadah). However, the water supply plan considers a scenario in which the development occurs.

The average actual water consumption for 2022 was lower by 13,000 m^3/d compared to the projections provided in the previous 7 Year statement, Issue 16. The accumulated reduction in average demand and peak demand for 2028 is about 23,000 m^3/d and 20,000 m^3/d respectively.

Figure 25 Water Demand Projections – Dhofar Zone



	2022[a]	2023	2024	2025	2026	2027	2028	2029	Average Growth (%)
Peak Demand				Thousand m³/d					
Cities	125	131	138	145	153	161	170	179	5%
Jabal	52	59	64	71	78	86	95	104	11%
Total	**177**	**190**	**202**	**216**	**231**	**247.1**	**264**	**283**	**7%**
Change from 2022-2028 Statement	*(12)*	*(12)*	*(13)*	*(15)*	*(16)*	*(18)*	*(20)*	-	
Average Demand									
Cities	111	115	121	127	134	141	149	156	5%
Jabal	48	53	58	64	70	78	85	94	10%
Total	**159**	**168**	**179**	**191**	**204**	**219**	**234**	**250**	**7%**
Change from 2022-2028 Statement	*(13)*	*(16)*	*(17)*	*(18)*	*(19)*	*(21)*	*(23)*	-	

[a] The Average Demand is based on actual 2022 outturns (desalination and underground water supply) while the Peak Demand is estimated using peak factor.

3.3. b Water Supply Sources

The sources of water supply include water desalination plants under contract to PWP and groundwater sources operated by Nama Dhofar Services. PWP has contracted with two water desalination plants for water supply to Nama Dhofar Services. They are described in Table 9 and as follows:

Salalah IWPP. Owned and operated by Sembcorp Salalah Power and Water Company under a PWPA with PWP, Salalah IWPP has a capacity of 68,190 m³/d, using RO technology, and was commissioned in 2012.

Salalah III IWP. Owned by Dhofar Desalination Company under a WPA with PWP, Salalah IWP has a capacity of 113,650 m³/d, using RO technology, and was commissioned in 2021.
In addition to the above desalination capacity, Nama Dhofar Services uses a its groundwater sources to meet the balance of water demand. Nama Dhofar Services plans to utilise desalinated water to meet average and peak demand requirements, and to utilise groundwater from wells only as a reserve for emergency supply.

Table 10 Water Desalination Plants – Dhofar Water Network

Project Name	Contracted Capacity	Contract Type	Project Company	Project Status	Technology	Contract Expiry
Salalah IWPP	68,190 m³/d	PWPA	Sembcorp Salalah Power & Water Company (SAOC)	Operational	RO	2027[a]
Salalah III IWP	113,650 m³/d	WPA	Dhofar Desalination Company (SAOC)	Operational	RO	2040

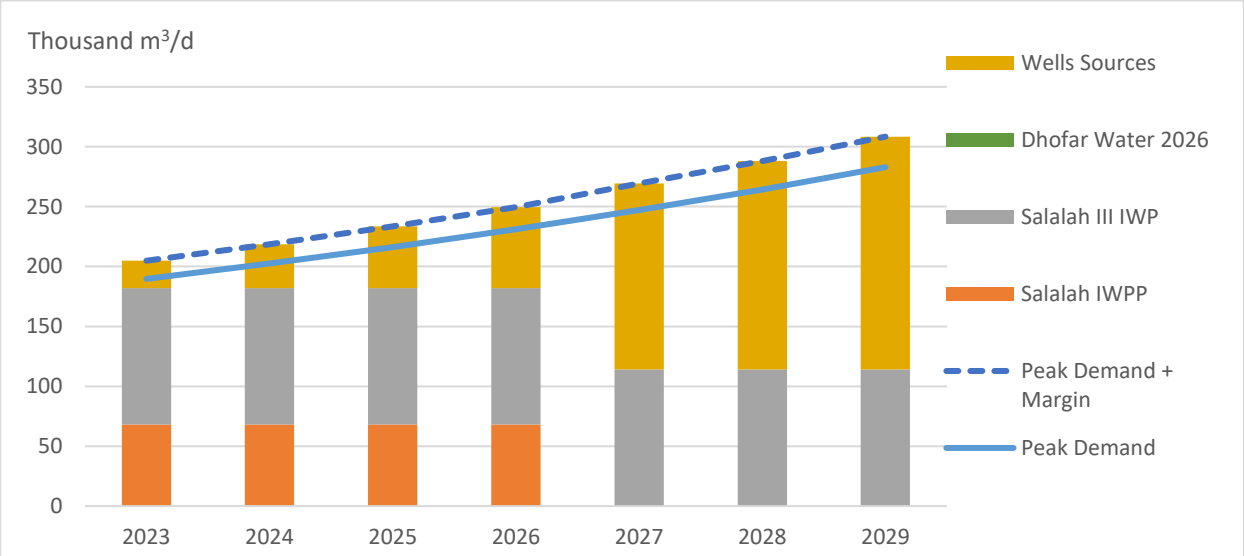
[a] The contract expiry date for Salalah IWPP is in April 2027.

3.3.c Resource Adequacy and Development Plan

The resource adequacy addresses Dhofar Cities' and Jabal demand, which corresponds to Nama Dhofar Services's proposed network expansion plan. The capacity target assumes the same reserve margin standard as the MIS and Sharqiyah Zone in the northern regions of the Sultanate. Figure 28 shows the demand-supply balance, considering network expansion to include water demand in the Jabal areas. It demonstrates that from 2023, groundwater supply would be required in every year to supplement desalinated water supply, unless additional desalination capacity becomes available.

Due to the expiry of the Salalah IWPP contract in 2027, Nama Dhofar Services is to reviewing its water demand forecasts and verify the need to replace this capacity or a higher capacity. PWP is working closely with Nama Dhofar Services to develop procurement plan to meet Nama Dhofar Services request once it is approved by APSR.

Figure 26 Resource Adequacy and Development Plan – Dhofar Cities and Jabal



	2023	2024	2025	2026	2027	2028	2029
Supply Requirements				Thousand m³/d			
Peak Demand – Cities	131	138	145	153	161	170	179
Peak Demand – Jabal	59	64	71	78	86	95	104

Total Peak Demand	**190**	**202**	**216**	**231**	**247**	**264**	**283**
Capacity Target (Peak Demand + Margin)	**205**	**219**	**234**	**250**	**269**	**288**	**308**
Contracted Capacity							
Salalah IWPP	68	68	68	68	-	-	-
Salalah III IWP	114	114	114	114	114	114	114
Prospective Capacity							
Dhofar Water 2027	-	-	-	-	68	68	68
Nama Dhofar Services **Sources**							
Required Wells Supply[a]	23	37	52	68	87	106	126
Total Dhofar Zone Capacity including Nama Dhofar Services **Sources**	**205**	**219**	**234**	**250**	**269**	**288**	**308**
Reserve over Peak Demand (Shortfall)	15	16	17	18	22	24	25
Reserve over Capacity Target (Peak Demand + Margin) (Shortfall)	0	0	0	0	0	0	0

[a] Capacity requirement expected to be supplied by Nama Dhofar Services to meet the Peak Demand + Margin.

SECTION 4 PROCURMENT ACTIVITIES

POWER PROJECTS

PWP's current and near-term procurement activities for power projects include the following, and are summarized in Table 10:

Wind IPPs. PWP plans to commence the procurement of two wind IPPs in different locations in the beginning of 2023 (RFQ to be released in Q3), to achieve commercial operation in 2026. The expected locations for these two projects are in Duqm and Jalaan Bani Bu Ali (MIS). Both IPPs are expected to have a combined installed capacity of around 300 MW.

Ibri III Solar IPP. PWP plans to launch the RFQ process for the third of the series of solar IPP procurements in Q3 2023, to achieve commercial operation in 2026. This project may also have installed capacity of 500 MW.

Power 2024. PWP currently plans to initiate a procurement round for new PPAs that would begin operating in 2024. Existing generators with expiring or expired P(W)PAs and participants in the Spot Market will participate in this competition. The total capacity requirement in 2024 will be determined following review of demand developments and considerations for supply via the Spot Market.

Power 2027-2029. In-line with assessing the procurement needs for long-term contracts every two years, PWP has identified the possibility to initiate a procurement round for new PPAs that would begin operating in 2027. Similar to Power 2024, existing generators with expiring or expired P(W)Pas and participants in the Spot Market may be eligible to participate in this competition, subject to qualifications. The overall capacity need for this procurement round will only be determined at a later point in time and following the outcome of the capacity procurement framework review, outcome of Power 2024 procurement, demand developments, and considerations for supply via the Spot Market.

Dhofar II Wind IPP. PWP plans to procure a wind project of capacity between 100-200 MW in Harweel, adjacent to the existing Dhofar Wind IPP in the DPS. The RFP expected to be released by Q1 2024, to achieve commercial operation in 2026.

Barka WTE IPP. PWP completed a feasibility study for a Waste-to-Energy plant, in preparation for procurement. The facility will utilize municipal waste collected by Be'ah from Muscat and South Batinah areas and will be located near Barka. The facility is expected to produce between (130-140) MW under a PPA with PWP. PWP expects to issue the RFP in Q2 2023, and to award the project in Q3 2024. The operation of this plant is expected in Q2 2028.

Table 11 Procurement Activities in 2022-2023 – Power Projects

	System	Capacity	RFQ	RFP	Bids Due	Award Anticipated	SCOD
Dhofar II Wind IPP[a]	Dhofar	100 – 200 MW	Q3, 2023	Q1, 2024	Q2, 2024	Q3, 2024	Q4, 2026
Duqm Wind IPP[a]	Duqm	200 – 300 MW	Q3, 2023	Q1, 2024	Q2, 2024	Q3, 2024	Q3, 2026
JBB Wind IPP[a]	MIS	100 – 150 MW	Q3, 2023	Q1, 2024	Q2, 2024	Q3, 2024	Q3, 2026
Ibri III Solar IPP	MIS	500 MW	Q3, 2023	Q1, 2024	Q3, 2024	Q4, 2024	Q4, 2026
Power 2024	MIS	TBD	N/A[b]	Q١, 2023	Q3, 2023	Q4, 2023	Q2, 2024
Barka WTE IPP	MIS	130-150 MW	Q2, 2023	Q2, 2023	Q2, 2024	Q4, 2024	Q4, 2028

[a] The Projects Capacities are subject to the outcomes of a feasibility study.
[b] RFQ is included as part of the RFP.

Future Procurement Activities

From 2025 to 2029, PWP plans to continue to procure new solar and/or wind IPPs on an annual basis. The RE development plan includes three Solar PV projects, five wind projects. The future planned projects in addition to the above listed projects are MIS Solar IPP for COD in 2027, Ras Madrakah Wind IPP for COD in 2027, Sadah Wind IPP for COD in 2028, Solar PV IPPs 2029 for COD in 2029 and Wind IPP 2029 for COD in 2029.

Depending upon demand growth and other factors, a third procurement round for existing generator contract may be initiated for operational start in 2027. If the need for additional capacity should arise, or according to opportunity, PWP may also procure short-term capacity or energy via transactions with neighboring power systems, or initiate development of a Demand Response program in which demand reductions will be contracted with participating electricity customers.

WATER PROJECTS

Current/Near-Term Procurement Activities

PWP's current and near-term procurement activities for water projects include the following, and are summarized in Table 11:

Dhofar Water IWP 2027[14]**.** Following the expiration of Salalah IWPP, PWP notes that additional capacity will be required to cover the resulting deficit. The targeted capacity is around 68,000 m^3/d and may increase following the confirmation of Nama Dhofar Services on the future water capacity need. The procurement details will be updated in the next iteration of the 7 Year Statement.

Barka Water IWP 2024. Following the expiration of Barka II PWPA in 2024, PWP notes that additional capacity will be required to cover the resulting deficit. Accordingly, PWP will follow the approved procurement strategy by APSR to procure a capacity of 100,000 – 120,000 m^3/d for COD in Q2 2024.

[14] The project was called Dhofar Water 2025 in previous issue.

Wadi Dayqah IWP. Nama Water Services requested PWP to procure Wadi Dayqah IWP. PWP initiated the procurement process and in the process of securing the necessary approval in coordination with the APSR and relevant stakeholders. The procurement details will be updated in the next iteration of the 7 Year Statement.

Table 12 Procurement Activities in 2022-2023 – Water Projects

	System	Capacity (m^3/day)	RFQ	RFP	Bids Due	Award Anticipated	SCOD
Dhofar Water IWP 2027[a]	Dhofar Zone	68,000 (with A potential increase to 150,000)	TBD	TBD	TBD	TBD	TBD
Barka Water IWP 2024	MIS	100,000 - 120,000	N/A	Q1, 2023	Q3, 2023	Q4, 2023	Q2, 2024
Wadi Dhayiqah IWP	MIS	65,000	TBD	TBD	TBD	TBD	TBD

[a] Subject to confirmation of capacity needs, site allocation and other approvals.