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لشراء الطاقة والمياه
POWER & WATER PROCUREMENT

7 year Statement POWER (2025 – 2031)

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Overview

Introduction

The Oman Power and Water Procurement Company (PWP) is pleased to present the 19th edition of its 7-Year Statement, covering the period from 2025 to 2031. This publication outlines expected developments in electricity demand and generation across the Sultanate's key power systems: the Main Interconnected System (MIS), the Dhofar Power System (DPS), and the Musandam Power System (MPS). In accordance with Condition 5 of PWP's license, this statement is issued annually as a strategic reference for planners, investors, and policymakers involved in Oman's electricity sector.

Oman's power sector is undergoing a major transformation aimed at achieving a more balanced and optimal energy mix that aligned with national sustainability goals and Oman Vision 2040. A central focus is the transition to renewable energy, with a national target of generating 30% of electricity from renewable sources by 2030. Based on the current pipeline of utility-scale solar and wind projects, this contribution is expected to reach around 30%, positioning Oman to meet and potentially exceed its national target. In parallel, PWP continues to optimize natural gas utilization, ensuring reliable and efficient electricity procurement.

To support future capacity adequacy and diversification, PWP is evaluating the role of energy storage systems (ESS) for capacity planning and peak shaving, particularly as renewable energy penetration increases during the daytime. These technologies could reduce reliance on conventional peaking plants and improve the efficiency of future capacity additions.

PWP is also assessing the potential of geothermal energy generation and hydropower storage, to broaden the energy mix and enhance long-term sustainability.

A major milestone in this transition was the launch of the region's first wholesale electricity spot market early 2022. This platform enables generation resources not under contract with PWP to sell electricity into the national grid, fostering competition, transparency, and procurement efficiency. In parallel, PWP is exploring demand response (DR) initiatives that encourage bulk load consumers to shift or reduce consumption during peak periods. These developments are foundational to a more resilient, cost-effective, and dynamic electricity sector. The 7-Year Statement provides analysis of peak demand, generation capacity, fuel requirements, reserve margins, and market trends, supported by data visualizations and forecasts. Previous editions are available at www.omanpwp.om.

Electricity Demand Outlook

Electricity demand across Oman's main power systems is projected to grow significantly between 2025 and 2031, driven by sustained economic growth and the development of large-scale industrial and commercial projects.

In the MIS, peak demand is projected to increase at an average annual rate of 7.2%, rising from 7,503 MW in 2024 to 12,198 MW by 2031, where Dhofar Power System, peak demand is forecasted to grow at an average rate of 9.1%, increasing from 801 MW in 2024 to 1,469 MW by 2031. This significant growth is primarily driven by robust GDP expansion, major infrastructure developments, and the anticipated connection of large-scale applicants across priority sectors as part of the national economic diversification agenda.

Power Generation Requirements

To meet the projected demand, Oman's power system will undergo significant expansion between 2025 and 2031. PWP's strategy prioritizes a balanced generation mix, including utility-scale renewable energy, energy storage system and high-efficiency thermal capacity, aligned with Oman Vision 2040. The objective is to ensure long-term capacity adequacy, fuel efficiency, and energy security.

A critical enabler is the 400 kV North–South Interconnect, which links Oman's northern and central regions, including Duqm and Al Wusta. By Q4 2026, this interconnection is expected to extend to the DPS, enabling the integration of MIS and DPS into a single unified national grid.

Renewable Energy Contribution

The planned deployment of solar and wind projects is expected to contribute approximately 8% of total electricity production by 2026, increasing to meet the national target of around 30% by 2030. Current development trajectories suggest the contribution could modestly exceed this target, depending on project execution, demand growth, and system readiness.

SECTION 1
DEMAND PROJECTIONS & RESOURCES PLAN

1 Main Interconnection System (MIS) & Dhofar Power System (DPS)

The Main Interconnected System (MIS), is the largest and most critical electricity network in Oman, supplying over 1.3 million customers across the Governorates of Muscat, Al Batinah North, Al Batinah South, Ad Dakhiliyah, Ash Sharqiyah North, Ash Sharqiyah South, Ad Dhahirah, Al Buraimi and Al Wusta.

The MIS comprises thirteen operational power generation facilities, owned and operated by independent companies, contributing firm and non-firm capacity to the grid. These generation assets are supported by the 400/220/132 kV transmission network, owned and operated by the Oman Electricity Transmission Company (OETC), and a unified distribution and supply services structure serving all regions within the MIS.

The system is interconnected with the power system of Petroleum Development Oman (PDO) and also linked regionally via the Abu Dhabi Interconnect, which connects Oman to the power system of the Emirate of Abu Dhabi and other GCC Interconnection Authority (GCCIA) member states. These interconnections enhance the system›s flexibility, resilience, and capacity to manage peak demand and emergencies.

The MIS plays a central role in Oman's electricity sector, serving as the backbone of national power supply and enabling the large-scale integration of future generation projects both conventional and renewable. Its extensive geographic reach and strategic interconnections support grid stability, industrial development, and the delivery of reliable electricity to key economic zones such as Sohar and Duqm.

Sohar remains a key industrial hub within the MIS, hosting extensive operations in petrochemicals, manufacturing, and logistics. Duqm strategically positioned along Oman's eastern coastline has recently been integrated into the MIS through the successful completion of Phase 1 of the North-South Interconnect project in Q4 2023. This milestone enhances system connectivity and unlocks significant opportunities for regional growth, industrial development, and grid integration.

The Dhofar Power System (DPS), covering Salalah and surrounding areas in the Governorate of Dhofar, supplies approximately 149,372 customers. The DPS comprises three generation facilities, a 132 kV transmission network owned and operated by OETC, and a distribution and supply network owned and operated by Nama Dhofar Services. The DPS is linked to PDO's network through a 132 kV interconnection between Thumrait and Harweel, with a transfer capability of up to 150 MW. This connection provides crucial reliability benefits through shared reserves and coordinated system support.

A major development currently underway is the planned extension of the North–South Interconnect to Dhofar, scheduled for completion by Q4 2026. Upon completion, the MIS and DPS are expected to form a fully interconnected national grid by the end of 2026, enabling unified system operation, enhanced reliability, improved economic dispatch, and optimized utilization of generation resources across the entire Sultanate.

1.1. Electricity Demand

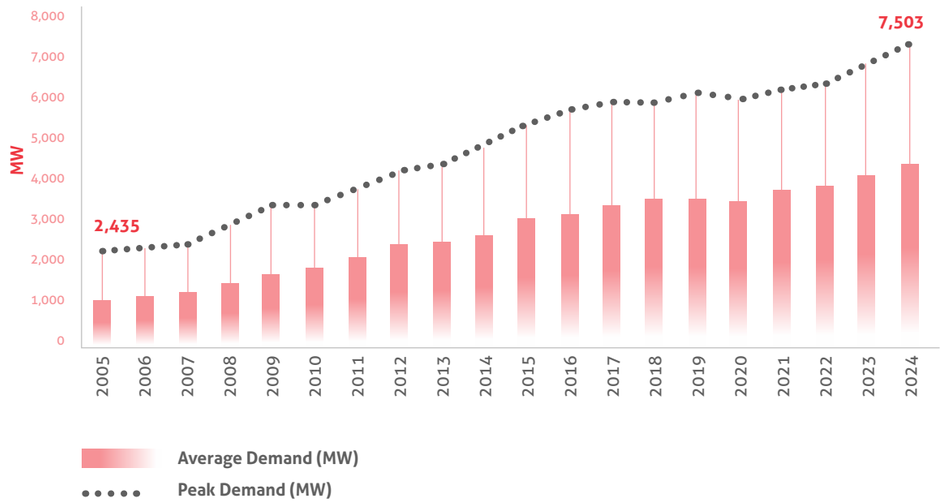
PWP evaluates electricity demand at the system level, including transmission and distribution system losses with consumer-level loads. This must be secured by the total output capacity of power generation plants at the power system delivery points, excluding the internal power consumption of auxiliary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

(i) MIS Historical Demand

In 2024, electricity demand was slightly higher than what was expected under PWP's previous forecast. The average demand shows 6.6% growth over 2023 demand to reach 4,585 MW in 2024 (corresponding to around 40 TWh of energy), which is consistent with the normal-high temperature profile in 2024. Peak demand grew by about 5.5% to 7,503 MW.

Over the last 7-year period (2017-2024), peak electricity demand in the MIS grew at an average annual rate of about 3.0%, from 6,116 MW in 2017 to 7,503 MW in 2024. Average demand grew by about 3.6% 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. F-01 illustrates the growth in peak and average demand in the MIS from 2005 to 2024.

F-01 Historical Electricity Demand – MIS



	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	-1.5%	6,237	-1.8%
2021	3,971	7.6%	6,473	3.8%
2022	4,062	2.3%	6,628	2.4%
2023	4,303	5.9%	7,112	7.3%
2024	4,585	6.6%	7,503	5.5%
Average Growth (%)	7.1%		6.1%	

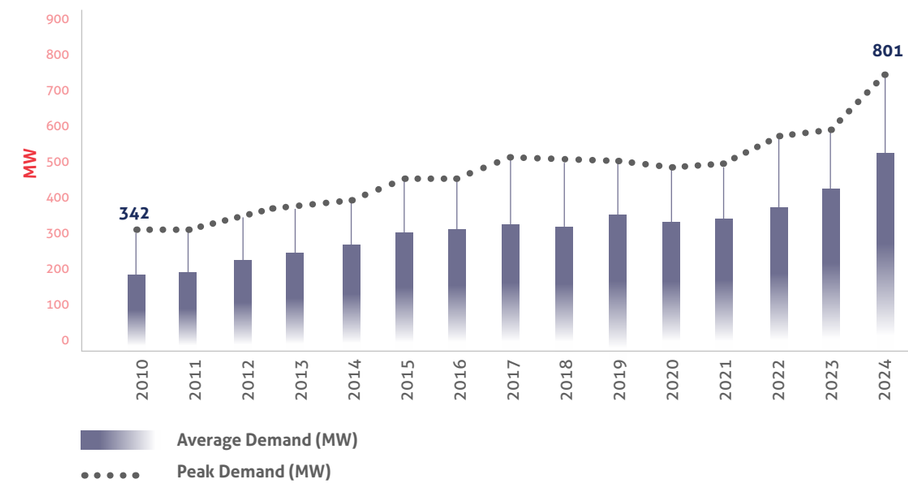
The data from 2005 to 2023 represents MIS historical demand without Duqm Power System. Duqm Power System has been connected to MIS in Q4 2023.

(ii) DPS Historical Demand

Average electricity demand in 2024 is higher than 2023 by 22.0%. The average demand increased to 571 MW (corresponding to 5.0 TWh) in 2024. Peak demand increased by 25.5% to 801 MW when compared against the 2023 peak demand. PWP notes that the increase in demand is due to a combination of factors tourism, commercial developments, and large investments.

F-02 shows that the historical average demand growth since 2010. The annual average demand over the past seven years is 6.5%. While peak demand in the DPS has grown at an annual average of 5.5% over the last 7-year period.

F-02 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%
2023	468	13.0%	638	4.3%
2024	571	22.0%	801	25.5%
Average Growth (%)	7.2%		6.3%	

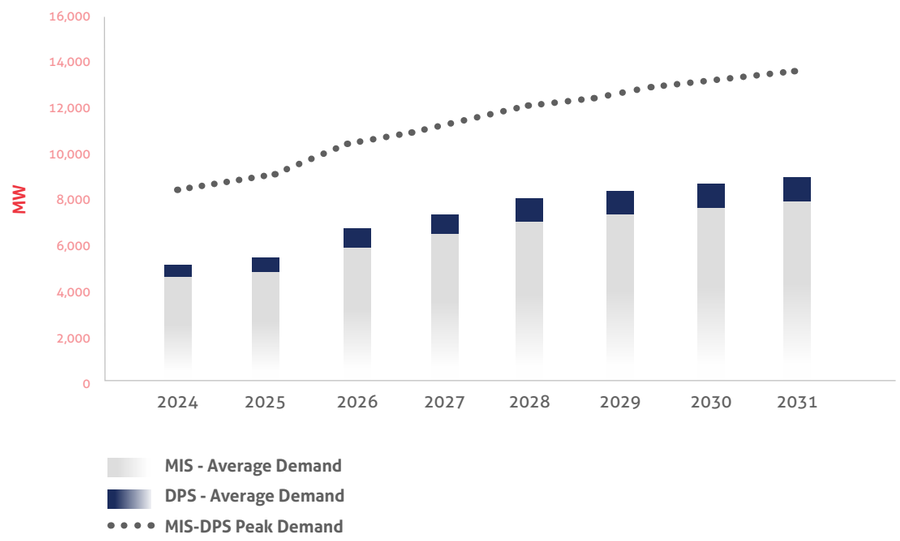
(iii) Demand Projections

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 policy direction target set to achieve 60-70% 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 of Oman, 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. However, the economy is recovering and anticipated to moderately grow in the coming period. The GDP growth estimates for 2024 and 2025 are 1.7% and 3% respectively.

F-03 Electricity Demand Projections – MIS & DPS



	Actual 2024	2025	2026	2027	2028	2029	2030	2031	Average Growth (%)
MIS									
Annual Energy (TWh)	40	42	52	57	62	65	67	69	8.1%
Average Demand (MW)	4,585	4,831	5,884	6,487	7,050	7,393	7,627	7,910	8.1%
Distribution Loads	3,613	3,798	3,899	4,101	4,313	4,475	4,666	4,888	4.4%
Bulk Loads	973	1,033	1,985	2,386	2,737	2,919	2,960	3,022	17.6%
Peak Demand (MW)	7,503	8,206	9,463	10,029	10,836	11,333	11,751	12,198	7.2%
DPS									
Annual Energy (TWh)	5.0	5.8	7.7	8.2	9.1	9.3	9.7	10.0	10.4%
Average Demand (MW)	571	663	885	932	1,033	1,063	1,104	1,140	10.4%
Distribution Loads	345	328	343	364	385	401	424	449	3.8%
Bulk Loads	226	335	542	568	648	662	680	691	17.3%
Peak Demand (MW)	801	874	1,076	1,127	1,318	1,362	1,423	1,469	9.1%

MIS energy demand (i.e., average demand) is projected to grow at an annual rate of 8.1%, while peak demand is expected to rise at an average of 7.2% per year reaching 12,198 MW by 2031 from 7,503 MW in 2024 driven by sustained economic expansion. Notably, peak demand is anticipated to register high growth during 2026 and 2028, reflecting a surge in commercial developments and large-scale investments across the Sultanate.

Consistent with growth assumptions used for the MIS, DPS peak demand increases at about 9.1% per year, from 801 MW in 2024 to 1,469 MW in 2031. Energy consumption is projected to grow from 5 TWh (corresponding to 571 MW average demand) in 2024 to 10 TWh (1,140 MW average demand) in 2031, with an average increase of 10.4% per year. The areas of AlMazyounah, Mudhai and Shahb Asaib and Motorah which are currently supplied by Nama Electricity Generation Company plants will be connected to DPS by 2026. In addition, the impacts of confirmed bulk load projects are included in the years in which they are expected to occur.

[1]*The World Bank, Poverty and Economic Policy Global Departments. Emissions data sourced from CAIT and OECD, April 2025.*

1.2. Power Generation Resources

(i) Sources of Power

PWP purchases power from 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 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 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.

According to the policy direction issued by the Ministry of Energy and Minerals, the national renewable-energy targets aim to achieve 30–40% of total electricity generation by 2030, increasing to approximately 60–70% 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 and contribute towards achieving Oman net zero target by 2050 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 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 on the basis of specific locations, technology being deployed, and production out-turns.

1.3. Resource Adequacy & Mitigation Plans

(i) Statutory & 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.

(ii) 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 F-06, which shows the capacity target during the day and night peaks that is required to meet the security standard under the Expected Demand scenario.

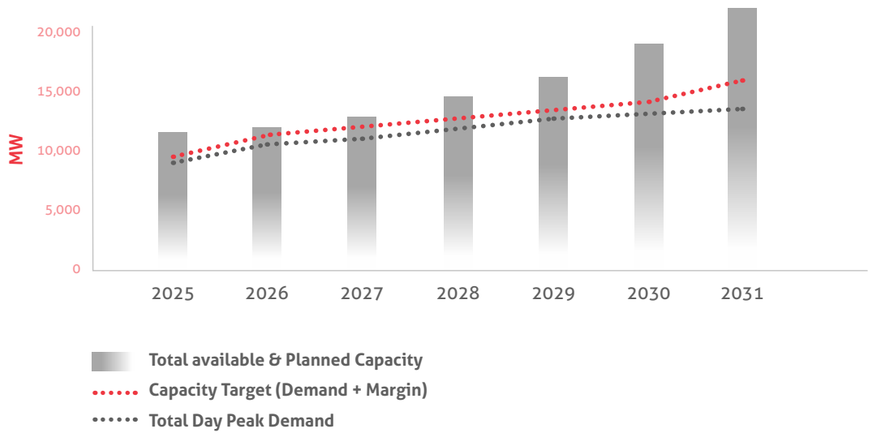
The capacity needed to meet the security standard is equivalent to a reserve margin of about 8.5% during both day and night peaks in 2025. This is due to a combination of the output intermittency of the Ibri II Solar IPP, Manah I Solar IPP and Manah II Solar IPP during the hours around the day peak period in the afternoon, and the emergence of the night peak as a more critical and longer duration period of reserve needs.

Phase II of the North-South Interconnector is planned to be commissioned by Q4 2026. This phase will support the security of DPS. The maximum capability of this link as per OETC declaration is about 860 MW considering N-1 security.

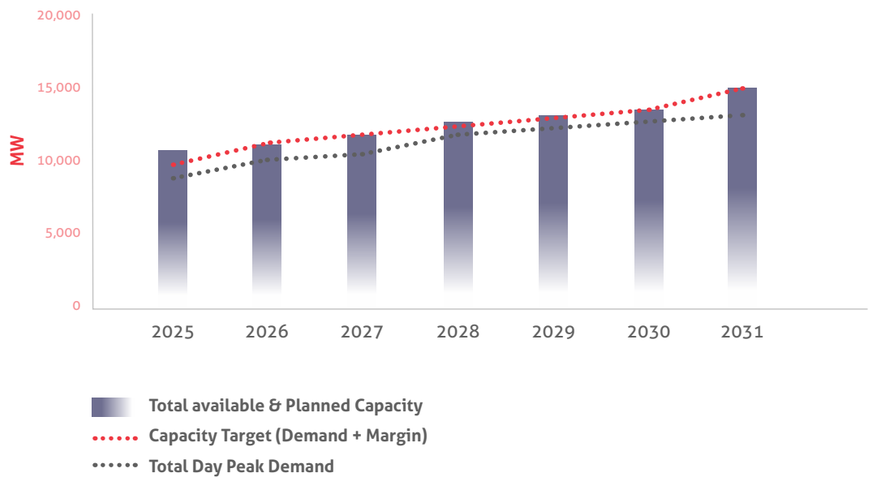
Starting from 2028 and continuing through to 2030, the reserve margin requirement is projected to decline to approximately 7.7%. This reduction reflects improvements in overall system adequacy, supported by the planned interconnection between the MIS and the DPS, the commissioning of new wind generation capacity, and the stabilization of demand patterns. However, by 2031, accounting for the significant rise in installed solar capacity and the anticipated connection of a large number of major customers to the grid, PWP is considering higher reserve margin requirement of 15.2% based on the latest system risk assessment analysis outcomes.

The resource development plan is structured to meet the generation security standard. As shown in F-04 and F-05, the contracted and planned capacity is sufficient to meet both day and night peak demand across the period for the MIS, Duqm, and DPS.

F-04 Resource Adequacy for the Day Peak - MIS, Duqm & DPS



F-05 Resource Adequacy for the Night Peak - MIS, Duqm & DPS



2 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 55,006 which is expected to grow steadily over the coming years.

2.1. MPS Electricity Demand & Resource Adequacy

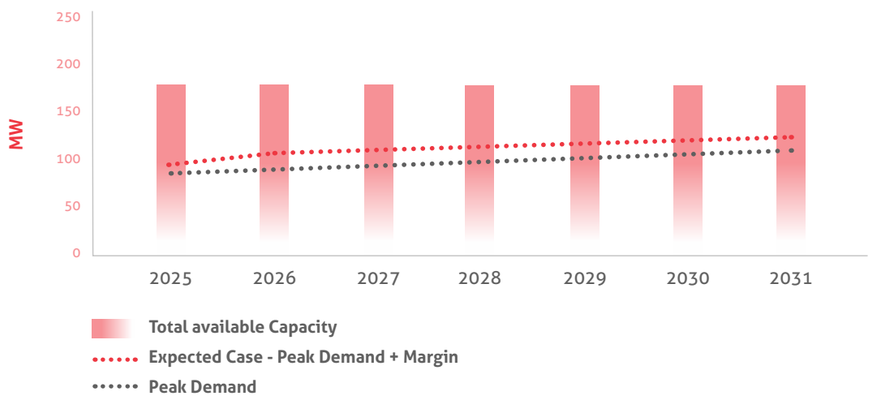
(i) Demand Projections

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 Case peak demand scenarios for the Musandam Power System have been prepared by NEDC. While the Low, and High Cases were adjusted and prepared by PWP.

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. These three demand scenarios are shown in F-13. Across all three scenarios, the growth projections are lower 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 MPS Demand forecast, peak demand is expected to grow from 91 MW in 2024 to 130 MW in 2031, an average increase of 5% per year. As it is shown in F-06 The average demand growth is expected to grow from 52 MW in 2024 to 73 MW in 2031, with an average increase of 5% per year for the Expected Case.

F-06 Electricity Demand Projections & Resource Adequacy – Musandam Power System

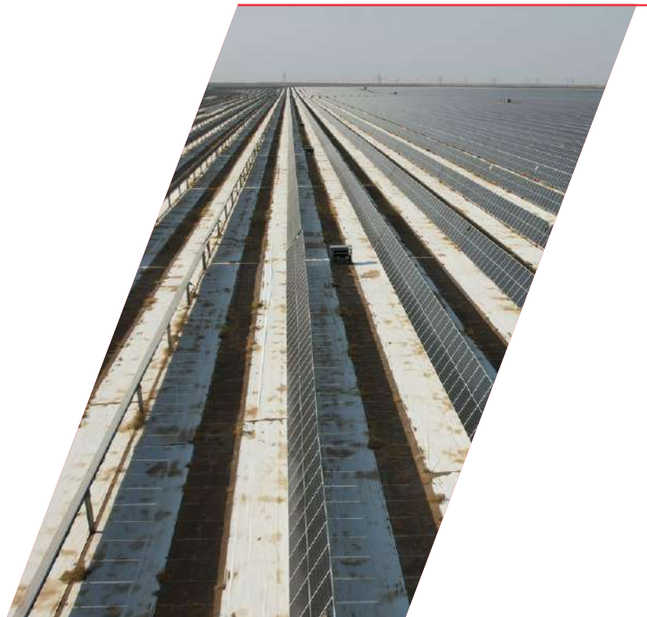


	Actual 2024	2025	2026	2027	2028	2029	2030	2031	Average Growth (%)
Expected Case									
Average Demand (MW)	52	56	59	62	65	68	71	73	5%
Annual Energy (GWh)	453	491	520	545	570	594	618	641	5%
Peak Demand (MW)	91	101	107	111	116	120	125	130	5%

[2] *National Centre of Statistics & Information Data Portal, – Musandam total population registered in March 2025.*

SECTION 2

DECARBONIZATION & RENEWABLE ENERGY PROJECTS



Overview

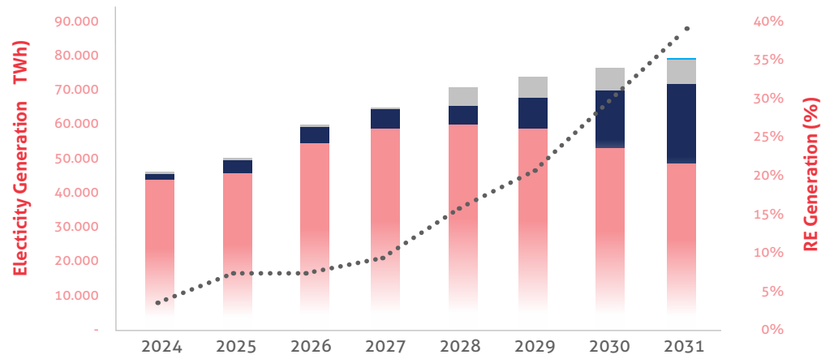
The Sultanate of Oman is advancing decisively toward a more sustainable and resilient energy future. In support of Oman Vision 2040 and the national net-zero emissions target by 2050, Nama Power and Water Procurement Company (PWP) is taking a central role in steering the transformation of the electricity sector. As the single buyer and long-term planner for power generation capacity in Oman, PWP's focus is to ensure adequate, reliable, and least-cost power supply while accelerating the shift toward low-carbon technologies.

Through the 7-Year Statement, PWP outlines the generation capacity required to meet national electricity demand and identifies the optimal technology mix to meet future needs. In recent years, this planning has increasingly prioritized clean energy sources. Building on Oman's excellent solar and wind resources, the power system has begun a gradual transition away from full reliance on gas-fired generation toward a more diversified and cleaner energy mix.

2.1 Projected Energy Mix (2025–2031)

F-07 below illustrates the expected evolution of the national generation mix, with an accelerated increase in renewable energy (solar, wind, and emerging clean technologies) and a declining share of natural gas. This visual representation shows PWP's outlook for achieving over 30% renewable energy by 2030.

F-07 Projected Energy Mix in Oman (2023–2031)



	2024	2025	2026	2027	2028	2029	2030	2031
Waste to Energy	-	-	-	-	-	-	-	0.76
Wind	0.12	0.12	0.12	0.97	5.12	6.34	6.75	6.75
Solar PV	1.54	3.43	4.38	5.25	6.30	9.00	16.16	23.26
Gas-fired Plants	43.55	45.46	54.79	58.74	59.44	58.55	53.46	48.52
••••• RE Generation (%)	4%	7%	8%	10%	16%	21%	30%	39%

Oman's renewable energy development is supported by a detailed and forward-looking project timeline that outlines the addition of capacity across key technologies. T-01 summarizes the projected capacities of major solar and wind IPPs from 2023 to 2031:

T-01 Renewable Energy Projects

Renewable Energy Projects	SCOD	2023	2024	2025	2026	2027	2028	2029	2030	2031
Dhofar I Wind IPP	In Operation	50	50	50	50	50	50	50	50	50
Ibri II Solar IPP		500	500	500	500	500	500	500	500	500
Manah I Solar IPP				500	500	500	500	500	500	500
Manah II Solar IPP				500	500	500	500	500	500	500
Ibri III Solar IPP	Q2, 2027					500	500	500	500	500
JBB Wind IPP	Q3, 2027						105	105	105	105
Duqm II Wind IPP	Q4, 2027						300	300	300	300
Mahout Wind IPP	Q1, 2028						800	800	800	800
Al Kamil Solar IPP	Q2, 2027						400	400	400	400
Marsa Solar IPP	Q1, 2028						280	280	280	280
Dhofar II Wind IPP	Q3, 2027						132	132	132	132
Sadah Wind IPP	Q4, 2027						120	120	120	120
Sinaw Solar IPP	Q2, 2028							400	400	400
Solar IPP 2029	Q1, 2029							1,000	1,000	1,000
Shaleem Wind IPP	Q2, 2029							100	100	100
Al Jazir Wind IPP	Q2, 2029							100	100	100
Duqm III Wind IPP	Q2, 2029							300	300	300
Solar PV IPP I 2030	2030								1,000	1,000
Solar PV IPP II 2030	2030								1,000	1,000
Solar PV IPP III 2030	2030								1,000	1,000
Solar PV IPP I 2031	2031									1,000
Solar PV IPP II 2031	2031									1,000
Solar PV IPP III 2031	2031									1,000
Barka WTE	2031									95
Total MW		**550**	**550**	**1,550**	**1,550**	**2,050**	**4,187**	**6,087**	**9,087**	**12,182**

Note:

(1) The project capacity in megawatts (MW) may be adjusted based on site allocation and the results of detailed resource assessments. The SCODs will be finalized accordingly.

2.2 International Renewable Energy Certificates

Oman has recognized the International Renewable Energy Certificates (I-REC) Standard to validate and track renewable energy consumption. An I-REC represents a megawatt per hour of renewable electricity generated in Oman. PWP registers eligible renewable projects under its procurement portfolio against the I-REC Standard, then I-REC issues to be offered through auctions to the market to be used for corporate and national decarbonization targets, as organizations increasingly seek to offset their Scope 2 emissions through a credible and internationally recognized certification scheme.

PWP successfully completed three I-REC Auction Rounds, resulting in the sale of more than 250,000 I-REC to the local market. PWP had worked closely with regulatory authorities to successfully register Manah I and Manah II Solar projects against the I-REC Standard to expand I-REC availability to more than 3 million I-REC to be issued and offered to the market in 2025.

2.3 Energy Efficiency

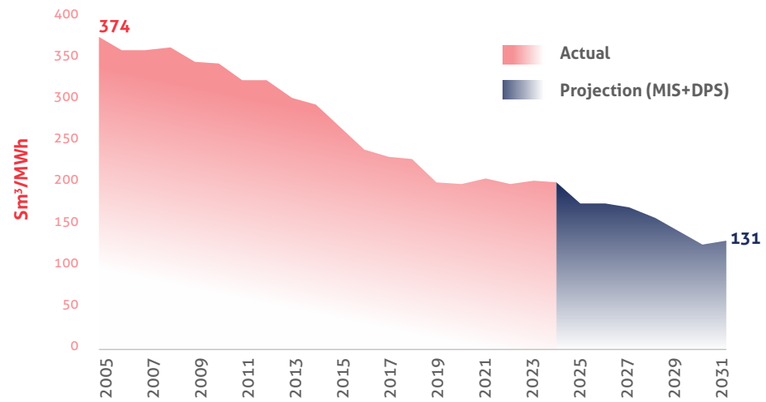
Since 2005, PWP has made significant strides in improving energy efficiency across the power generation sector. Through the deployment of progressively more efficient generation technologies, the gas required to produce one megawatt-hour (MWh) of electricity has been reduced by 47%, from 374 standard cubic meters (Sm^3/MWh) in 2005 to just 200 Sm^3/MWh in 2024.

These results have been achieved through a multifaceted strategy that includes the integration of renewable energy projects, the procurement of advanced combined-cycle gas turbine (CCGT) plants commissioned in 2019, and the introduction of more efficient reverse osmosis (RO) desalination plants, which have begun to replace older, energy-intensive multi-stage flash (MSF) technology. Additionally, ongoing efforts to enhance dispatch efficiency in coordination with the OETC have contributed to overall system optimization.

Building on these achievements, PWP continues to play a central role in advancing Oman's national decarbonization agenda. In close coordination with the Ministry of Energy and Minerals (MEM), the Authority for Public Services Regulation (APSR), and the Oman Net Zero Centre, PWP ensures that energy efficiency, fuel utilization, and emission reduction objectives are fully reflected in long-term electricity planning. This includes monitoring fuel consumption across the generation fleet, supporting national CO_2 emission factor studies, and aligning demand forecasting with efficiency measures such as demand-side management and building retrofits. PWP is also actively exploring alternative technologies in the renewable energy space including utility-scale battery storage, hybrid systems, and green hydrogen to support system flexibility and lower carbon intensity. Through this integrated and collaborative approach, PWP contributes to ensuring that electricity sector planning remains economically viable and environmentally aligned with Oman's 2050 net-zero target

Looking ahead, with the planned commissioning of utility-scale solar and wind projects and the interconnection of the MIS with the DPS by Q4 2026, PWP forecasts a further decline in gas intensity. By 2031, gas consumption for electricity generation is expected to fall to approximately 131 Sm^3/MWh representing a 65% reduction compared to 2005 levels.

F-08 Gas Required per Unit of Electricity Generation – MIS + DPS



2.4 Decarbonization and (CO_2) Emissions

A critical component of Oman's energy transition is the reduction of carbon dioxide (CO_2) emissions from the power sector. Between 2019 and 2025, PWP's renewable energy initiatives have contributed to a measurable decline in emissions intensity, as clean energy projects began to displace gas-fired generation.

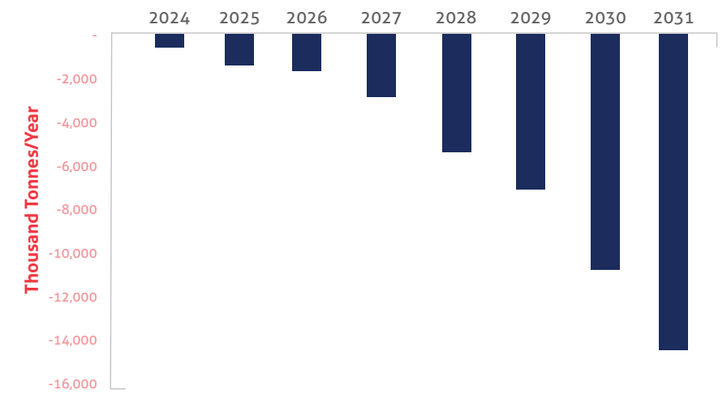
The deployment of projects such as Ibri II Solar IPP (500 MW) and Manah I & II Solar IPPs (1,000 MW combined) has enabled Oman to avoid thousands of tonnes of CO_2 annually. Preliminary estimates suggest that for every 1,000 MW of solar PV replacing thermal generation, Oman could reduce CO_2 emissions by over one million tonnes per year, assuming an average displacement factor and emissions intensity of gas-fired plants.

PWP has developed a tool to calculate the Grid Emissions Factor (GEF) and Residual Emissions Factor (REF) for power plants under its contracts. The GEF helps grid-connected entities estimate their CO_2 emissions based on electricity consumption, while the REF will reflect ongoing grid decarbonization as more renewable energy projects are added.

The tool follows international best practices, using primary fuel and electricity data, and applies Intergovernmental Panel on Climate Change (IPCC) standard emission and conversion factors to calculate CO_2, CH_4, N_2O, and CO_2 - equivalent emissions. These calculations support entities in determining their Scope emissions. The tool is currently under review with key stakeholders.

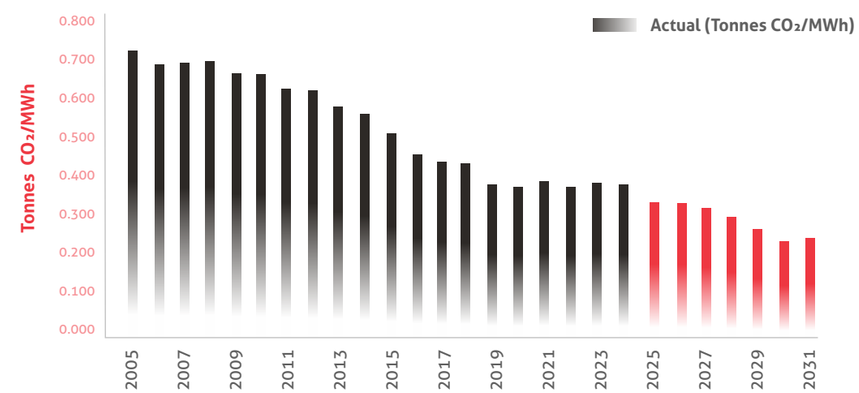
As more renewable capacity and storage technologies are integrated into the national grid, Oman is expected to continue achieving significant reductions in CO_2 emissions contributing both to national environmental goals and broader global climate efforts. F-09 below shows estimated CO_2 reduction from 2024 to 2031 due to deployments of RE projects. The estimates are based on the current planned energy mix, demand projections, measured grid emissions factor, and thermal plant efficiency. The estimates will change according to any changes in the mentioned factors.

F-09 Estimated CO_2 Reduction due to Deployments of RE Projects 2024-2031



PWP has achieved substantial reductions in the carbon intensity of electricity generation through improved gas efficiency and the integration of cleaner technologies. As shown in F-10 below, CO_2 emissions intensity has decreased by 47% from 0.722 tonnes CO_2/MWh in 2005 to 0.386 tonnes CO_2/MWh in 2024, corresponding to a drop in gas consumption from 374 to 200 Sm³/MWh. By 2031, this figure is projected to fall further to 0.253 tonnesCO_2/MWh, based on a forecasted gas intensity of 131 Sm³/MWh. Overall, this represents a 65% reduction in CO_2 emissions intensity between 2005 and 2031, underscoring PWP's role in supporting national decarbonization goals through cleaner power generation.

F-10 Estimated CO_2 Emissions Intensity of Power Generation (2005–2031)



**Based on a factor of 0.00193 tonnes CO_2 per Sm³ of natural gas.*

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