وزارة الطاقة والمعادن
Ministry of Energy and Minerals

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"Global Energy Collaboration Powering a Sustainable Future - Beyond Competition to Co-Creation, then Concerted action"

Ministry of Energy and Minerals
Sultanate of Oman

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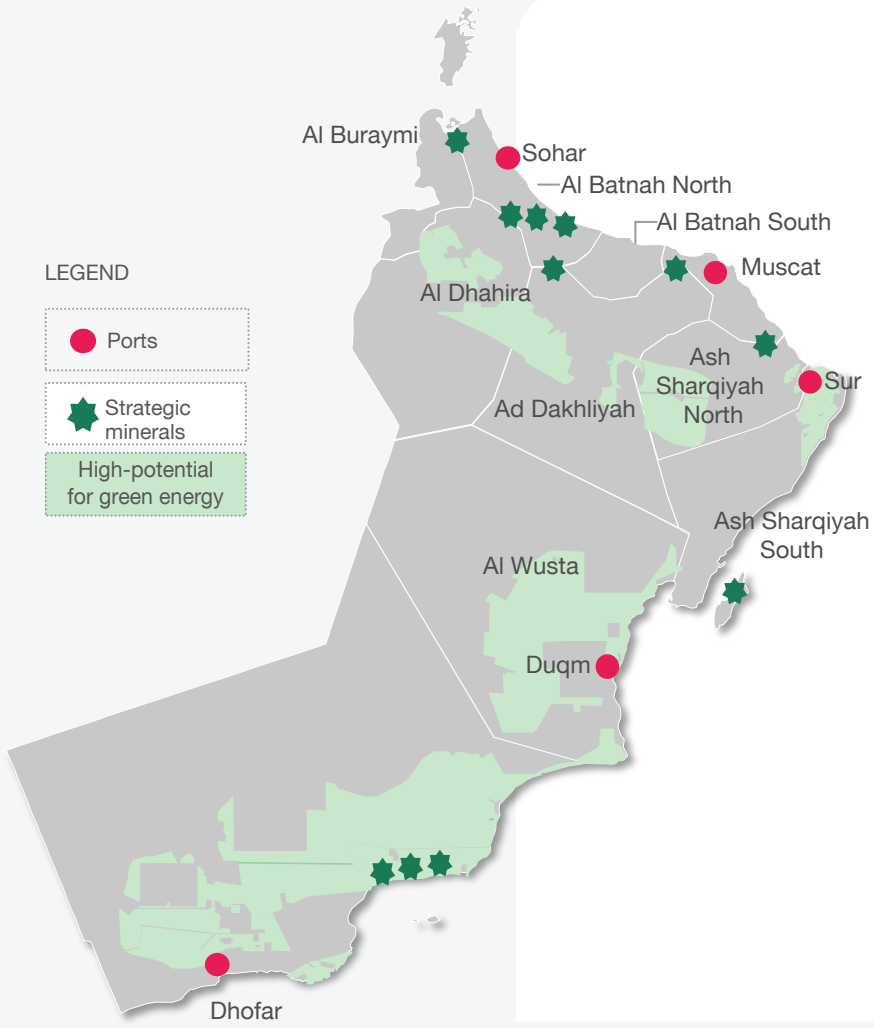
Topic

Ensuring the right capabilities and capacities in capital development in Oman’s energy transition

Objectives

- Give an overview of Oman’s current energy transition efforts
- Highlight future green job demand and evolution in Oman
- Discuss guiding principles to tackle the skill mismatch for a successful & collaborative transition

Oman has a strong position and competitive advantage to diversify & drive the energy transition



Affordable green energy

- 65,000 km2 of land with prime natural resources for green energy production (electricity & green H2)
- Up to 2500 kWh/m2 of solar irradiation & wind speed with capacity factor reaching up to 53%

Established transportation infrastructures

- Oman's roads (~60 000 km) ranked in the TOP-10 globally and 2nd in the GCC
- Best in class ports & maritime infrastructures (5 ports) and top-voted airports globally

Strategic location at the center of trade routes

- > 10% of all global trade passes through the Strait of Hormuz and Bab El-Mandeb
- > 40% of global container capacity passes through the Red Sea and Suez Canal
- Positive geopolitical outlook given relationship with all major trade clusters

Critical mineral reserves for energy transition

- Oman's wealth of mineral resources among which limestone, silica sand, copper, chromite, nickel, cobalt & carbonatite, that can be exploited for renewable equipment production such as solar cells, solar panels, batteries and electrolyzers, wind turbines, and related electricity infrastructure

Natural beauties and cultural heritage sites

- Oman is full of natural reserves, hosting >1,200 different type of plants & hundreds of animal species, ~1000 hectares covered by mangroves
- Oman has a rich cultural heritage with 5 UNESCO sites and several touristic attractions

Sources: World Bank; Oman MDO, Oman Mistry of Energy & Minerals,: Oman Ministry of Tourism; The Global Economy; BCG analysis

Oman is advancing its energy transition by implementing a series of pivotal national strategies

Oman Vision 2040

Setting vision for a sustainable future

- Align with Oman's vision for a low-carbon economy
- Drive economic prosperity, social stability, and environmental sustainability

Oman Net Zero Center

Refining and defining Oman's net-zero strategy

- Oversee the implementation of net-zero and energy efficiency projects
- Adopt, localize, and integrate latest global practices, technologies, and innovation

Oman Energy Transition Policy

Designing a strategic policy framework

- Design & implement robust framework / initiatives to support market needs
- Ensure leadership in the global green economy & contribute to socio-economic dev.

Hydrogen strategy

Detailing opportunities for H2 economy

- Identify opportunities to maximize in-country value from H2 economy
- Detail upstream (supply chain localization) & downstream (local gH2) opportunities

Green Economy Transition

Identifying green growth opportunities

- Identify green investment opportunities and potential socio-economic impact
- Identify green clusters to maximize green economic dev.

Deep-dive – Hydrogen strategy

Oman achieved significant milestones in less than 2 years with Phase A auctions

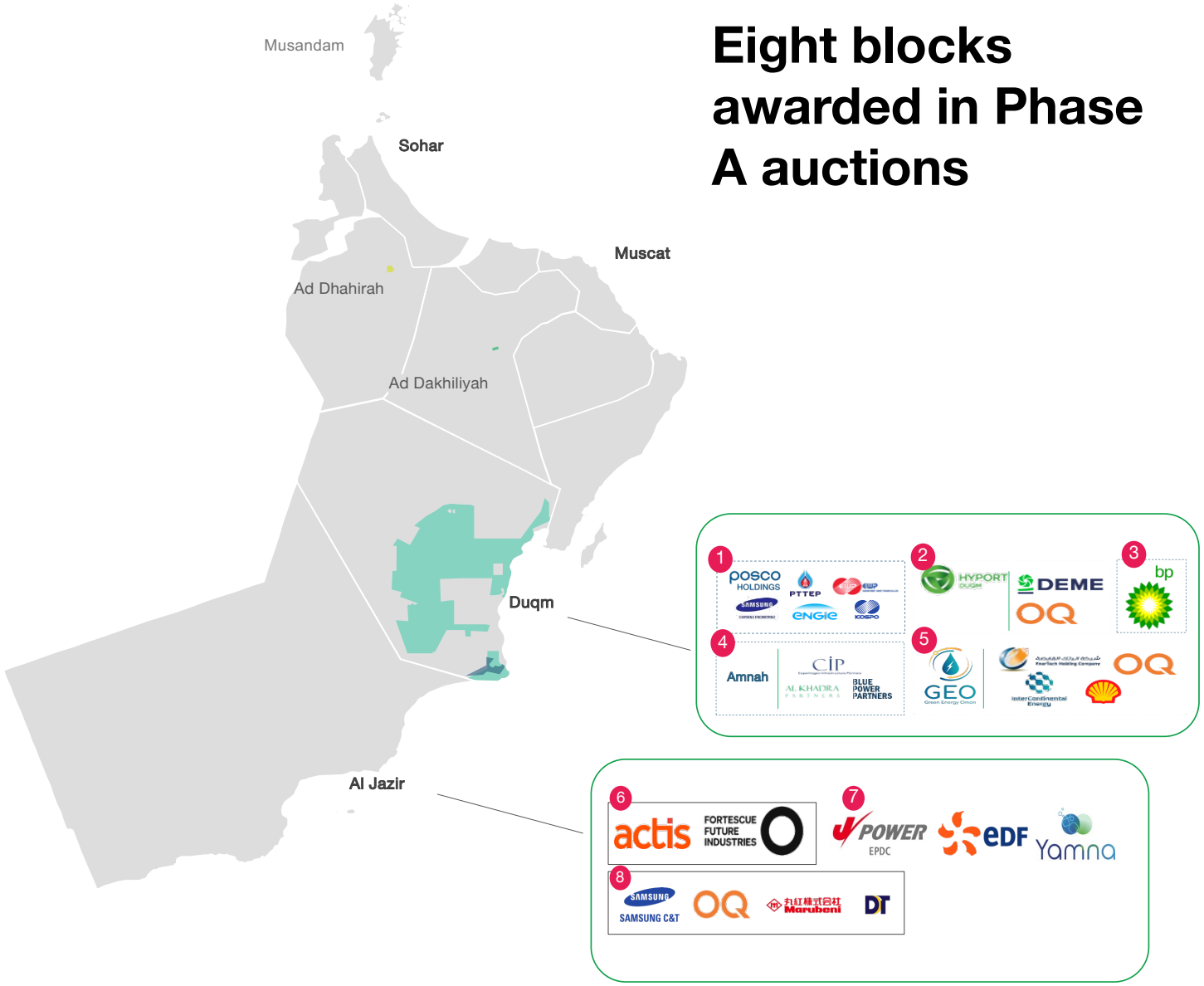
$50 Bn
Investment

18 GW
Electrolyzer capacity by 2030

35 GW
Renewables' capacity by 2030

1.4 Mtpa
H2 production by 2030

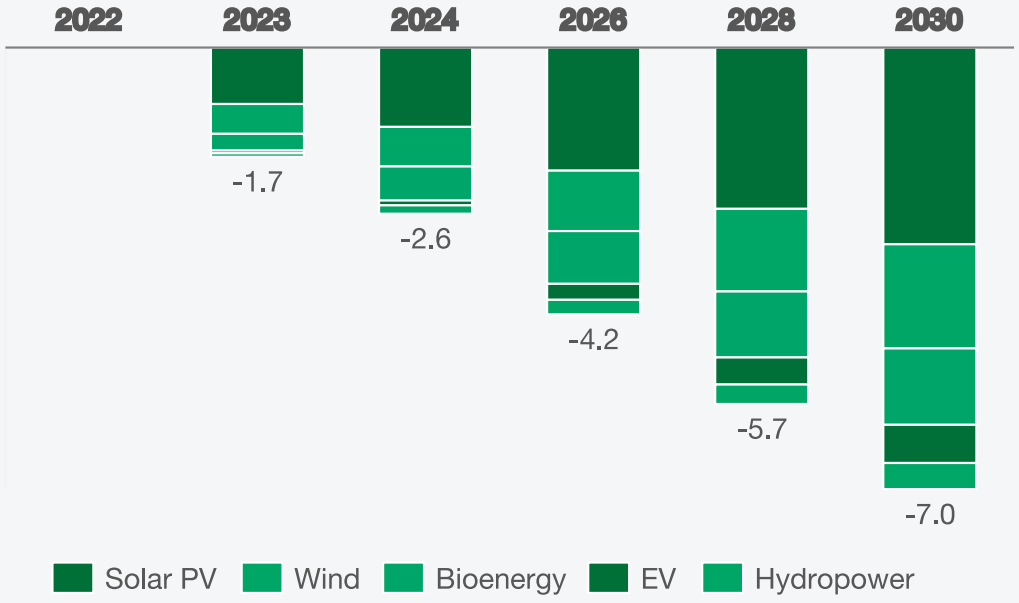
Eight blocks awarded in Phase A auctions



Transitioning to a green economy will create demand for green jobs, which will require different skill levels depending on the sectors

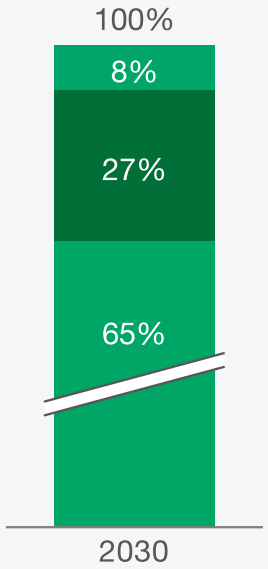
Green economy transition is already creating a shortage of green jobs globally

Global green jobs gap between supply & demand (Million workers)



Different proficiency of green skills required across the professions

Distribution of skills requirement in IEA NZE(%, 2030)



Included professions (examples)

- Machine / assembly operators
- Factory laborers

- Manufacturing managers
- Process control technicians

- Engineers (energy, mechanical, chemical, electronic, environ.)
- Chemists
- Geologists

High skills | Medium skills | Low skills

Note: Net Zero Emissions by 2050 scenario is commonly known as 'NZE'. Skill levels not defined in IEA publication. International Labor Organization classification was used instead. ILO's Standard Classification of Occupations defines high skills as including e.g., technical professions, senior officials; medium skills including e.g., trade workers, machine operators; low skills e.g., laborers in construction and manufacturing; 1. International Energy Agency; Source: IEA 'Net Zero by 2050 – A Roadmap for the Global Energy Sector'; ILO 'International Standard Classification of Occupations'; BCG 'Will a Green Skills Gap of 7 Million Workers Put Climate Goals at Risk?'

Skills Mismatch Problems On Top Of Human Capitaldevelopment Agenda

ILO launched Centenary Declaration for the Future of Work (2019)

Basic principles of human-centered approach

- Strengthening the capacities of all people
- Strengthening the institutions of work
- Promoting sustained, inclusiveand sustainable economic growth

WorldSkills will launch the Mission: Talent Declaration (2030)

Basic principles of human capital development

- Skills of the future for everyone
- Self-sustainability
- Freedom of opportunity
- Skills mobility
- Diversity of values

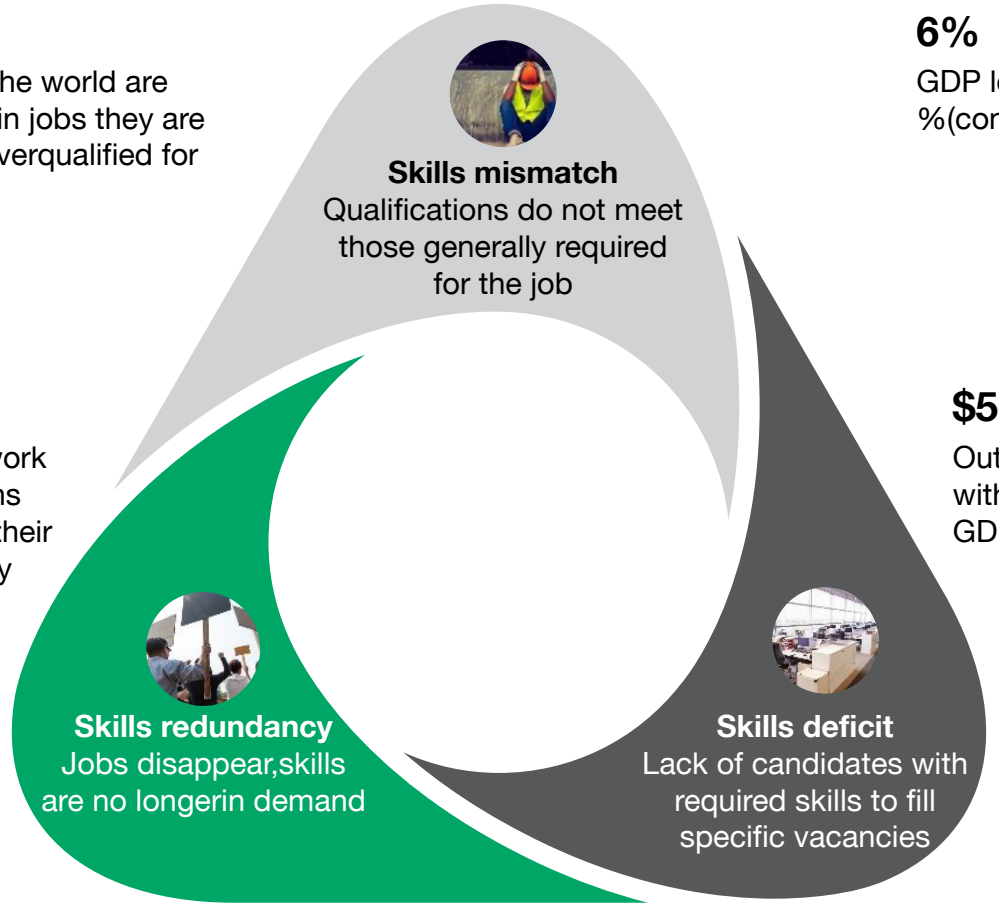
Skills Mismatch Is A Key Driver Of Skills Gap Affecting 1 Of Every 3 Employees Globally

1.3 Bn

People in the world are employed in jobs they are under-or overqualified for

6%

GDP loss, %(constant, 2010)



1 in 3

Employees work in occupations unrelated to their fields of study

$5 T

Out of $80.7 T withheld from global GDP (in 2017)

Oman has done extensive efforts in identifying skill mismatch and preparing the future on different fronts

Oman Labour market intelligence analysis:
Evaluating labour market trajectories and deriving education & skills roadmap

Oman Energy Transition Policy:
Developing Awareness, Skills, and Innovation (ASI) program for a successful Energy Transition

Oman Net Zero Center:
Building national capabilities to enable Net Zero and EE programs

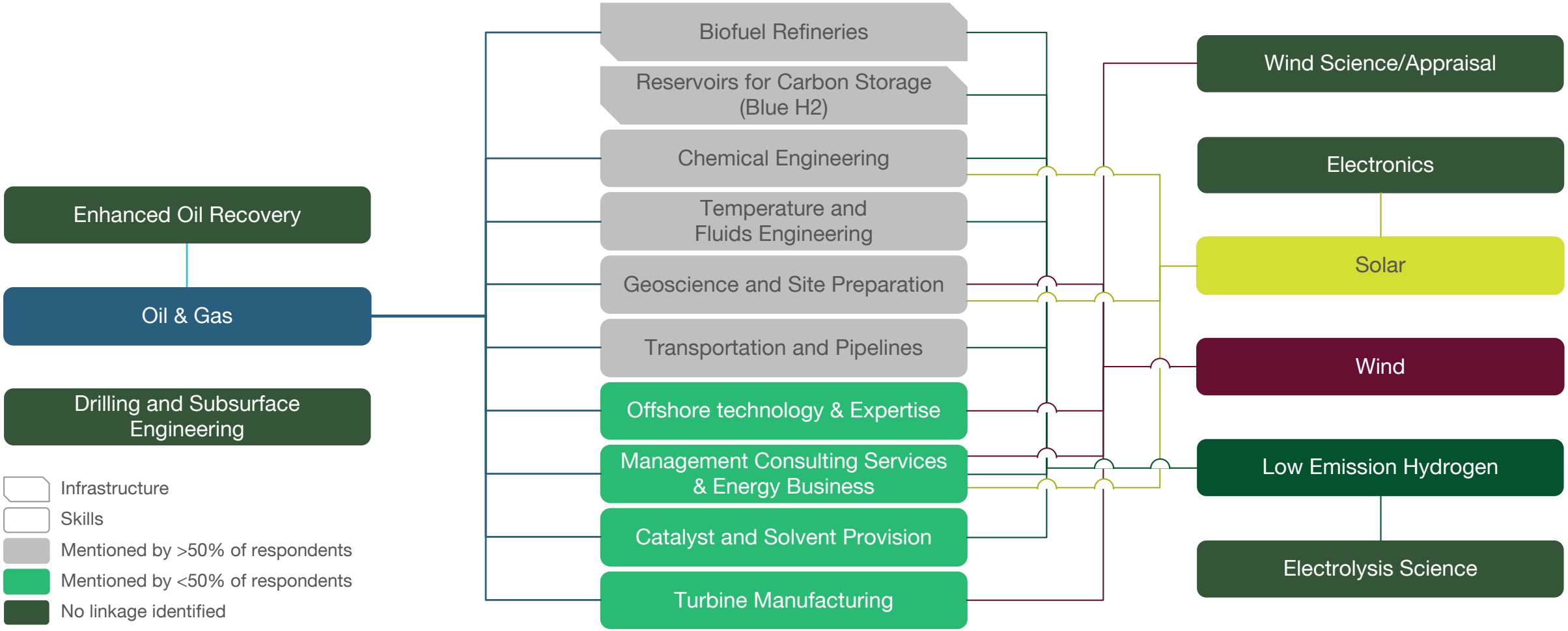
Green Economic Transition Strategy:
Studying various job opportunities from sectors and identifying green career skills

Oman Local Content Framework for Energy & Minerals (in progress):
Proposing capability and capacity building programs for priority opportunities in O&G, New energies and Mining & Minerals

Green Economic Transition Strategy:

Existing O&G capabilities can be used for energy transition with re-skilling

Mapping results of the transversal capabilities between fossil fuels and clean energy industries



Source:IEA Leaveraging Fossil Fuel Capabilites for Clean Energy Transition: Assessment of opportunities in Oman

Oman Energy Transition Policy:
Awareness, Skills, and Innovation (ASI) program to be set-up for a successful energy transition

Awareness, Skills, and Innovation (ASI) program

Promote, encourage, and lead

- **Drive Awareness**
- **Build Skills and Competencies**
- **Excel in Research and Innovation**

Key actions

Set-up program and define owner to achieve goals:

- **Drive Awareness** in general public and businesses, e.g., for green decision making
- **Build Skills and Competencies** for Energy Transition by quantifying gaps and building capabilities and upgrading workforce
- **Excel in Research & Innovation** by promoting and incentivizing research and innovation in academia and private sector

Source: Oman Energy Transition Policy project

Re-skilling and wider workforce development critical, but insufficient without collaboration across companies and sectors

Workforce development is critical for energy transition…

Collaboration across companies & sectors needed for success:

Upskill & reskill

- Equip the existing workforce, especially from Oil & Gas sector, with technical skills required for clean energy roles

Educate future workforce

- Develop tailored education/vocational programs within Oman to build a sustainable talent pipeline

Import new skills

- Attract global expertise to bridge immediate skill gas and accelerate clean energy project deployment

… but workforce development without collaboration is insufficient

Collaboration across companies & sectors needed for success:

Diverse skills

- Clean energy projects require diverse expertise (e.g., technology, finance, regulation) which no single company can truly master

Shared resources

- Collaboration allows companies to share resources, distribute risks, and pool knowledge to address complexity of projects

Enhanced efficiency

- Partnerships across industries and sectors are essential to accelerate innovation, enhance efficiency, and ensure project success

Collaboration required with each stakeholder playing a role to drive clean energy projects

Each stakeholder has a key role to play

Companies

Identify skill needs, collaborate with training providers, and offer opportunities like on-the-job training to equip the workforce for energy transition roles

Government

Create policies, provide funding and incentives, and facilitate public-private partnerships to ensure comprehensive workforce development for the energy transition

Training providers

Develop flexible, industry-aligned programs using innovative methods to address current and future skill demands in the energy sector

Individuals

Embrace lifelong learning, participate in re-skilling opportunities, and adapt to evolving industry requirements to remain competitive in the green energy workforce

The energy transition requires collaboration, innovation, and a shared commitment to equip our workforce for a sustainable future

Collaboration is essential across industries, governments, and individuals to bridge skill gaps

Reskilling and upskilling the workforce are pivotal to achieving energy transition goals

Oman is committed to building a skilled workforce, fostering partnerships & leading the charge toward sustainable energy

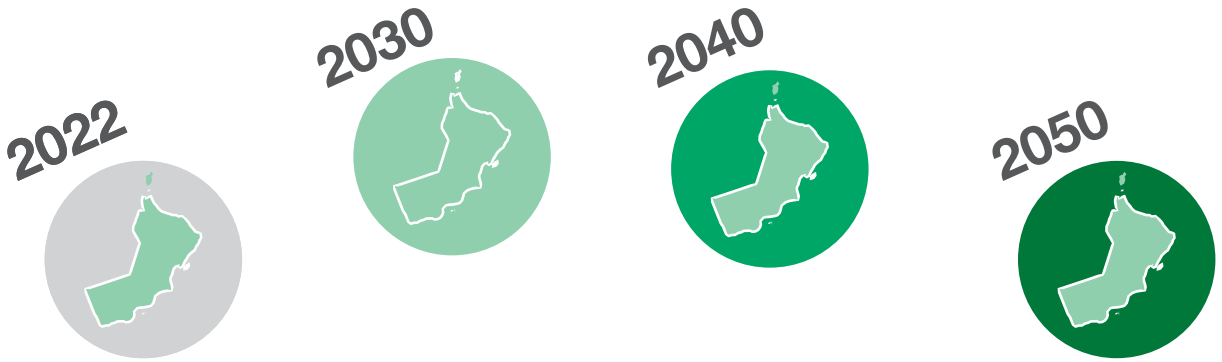
Thank you

The Ministry of Energy and Minerals acknowledges the assistance of BCG in the preparation of this presentation

Appendix

Oman Energy Transition Policy project started to drive national energy transformation

Oman Energy Transition: Guiding principles and strategic goals



Ensure Energy Security

(Timely investments inline with economic developments and environmental needs)

Decarbonize Orderly

(Adoption of Green Technologies and CCUS)

Develop transition enabling capabilitie

Grow low-Carbon Economy

(Clean Hydrogen for Export and local use)

Enhance competitiveness in energy sector

(Free-up Natural Gas for other uses)

Project objectives

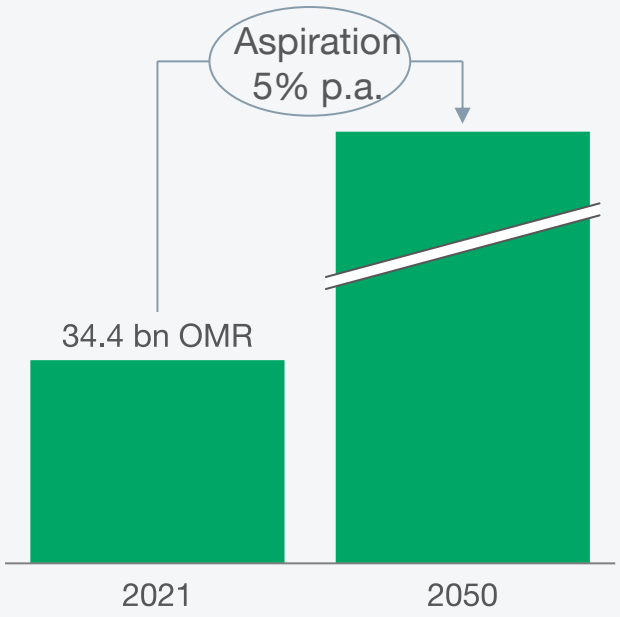
1. **Define Energy Transition Vision for Oman**
2. **Develop Strategy & Targets and outline Policy Instruments for key Energy Transition building-blocks1):**
   - Renewable Energy
   - Fossil Power & CCUS2)
   - Hydrogen Economy
   - Energy Efficiency
3. **Derive implementation roadmap & policy outlook**

1) Potential additions of building blocks to be discussed separately
2) Utilization to be determined in target slide; Source: Oman Energy Transition Policy project

Vision 2040 sets high aspirations for Oman's development (5% p.a. GDP growth); Energy transition & a green economy are key to meet aspirations

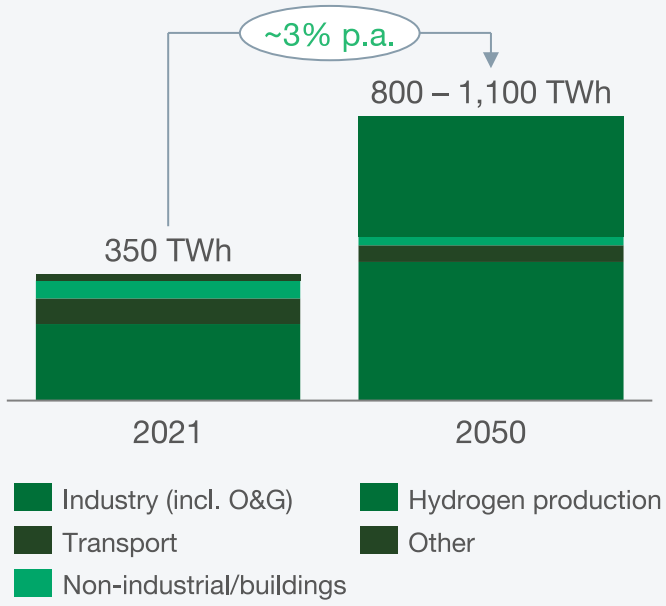
GDP growth in Oman

Vision 2040 targets 5% p.a. GDP growth



GDP growth in Oman

GDP growth leads to an increase inenergy demand



Energy Transition & Green economy is needed to support economic growth & diversification

- Diversified and growing economy
- Sustainable industry based on energy-intensive activities, as well as on knowledge and innovation
- High value jobs and growth in household incomes

Including feedstock; 2050 figure assumes energy efficiency improvement, electrification of transport and industry; w/o export of natural gas and crude oil; Source: Oman Energy Transition Policy project, NCSI GDP Data, Vision 2040

A holistic Awareness, Skills, and Innovation (ASI) program reinforces the societal effort in Energy Transition

Drive Awareness

- Make green decisions
- Support Energy Transition
- Shift to E-mobility
- Attract people for job market
- Information on Energy Transition targets, rules, and regulations

Build Skills and-Competencies

- Quantify the gaps in job market
- Build capabilities for Energy Transition
- Train and upgrade workforce
- Provide certification for job market

Excel in Researchand Innovation

- Promote and incentivize research and innovation in academia
- Form and promote integration between corporates and research groups
- Spot and fund innovative start-ups in Energy Transition
- Establish platforms for knowledge shar-ing

Source: Oman Energy Transition Policy project

Three main phases in the evolution of Oman's green job landscape

Three main strategies to source green skills	Initiate	Expand	Consolidate
	~0-5 years Focus mostly on importing skills	**~5-10 years** Balance upskill/ reskill with importing	**~10+** years Focus mostly on local job evolution
Upskill/reskill Develop and enhance existing skills to perform new tasks	• Use mostly for low skills (easier to leverage existing capabilities)	• Expand coverage - use mostly for low and medium skills, with some share for higher skills	• Deprioritize – more developed market, less need to upskill/reskill
Import new skills Import a new skillset which already exists in other economies	• Use mostly for medium and high skills (gaps in local talent)	• Decrease pace of import – e.g., focus only on high skill sets	• Deprioritize skill import – e.g., use only in urgent cases or for low skill sets (less strategic)
Create new skills Within Oman (educate future workforce)	• Design and kick-off initial educational programs (e.g., senior uni. cohorts, strategic oppt.)	• Increase scope of educational programs – e.g., cover more opportunities, junior cohorts	• Expand educational programs – e.g., covering all opportunities, pre-university cohorts as well

Assumes Skills are naturally occurring in the market as a result of previous efforts
Source: BCG analysis

Guiding principles in Oman for closing the skill mismatch in energy transition

Identify skill gaps effectively	Use labor market analysis and gather insights from companies to pinpoint the most critical skill shortages
Set clear strategic priorities	Establish national and sector-level goals to focus capability and capacity-building efforts
Upskill & reskill the workforce	Equip the existing workforce with the skills needed for new energy technologies through targeted training programs
Educate the future workforce	Build local talent by integrating energy transition skills into education systems and vocational training
Leverage international expertise	Import specialized skills and knowledge from abroad to facilitate skill transfer and innovation
Balance short & long-term goals	Develop evolving strategies that address immediate workforce needs while planning for future transitions
Foster PPPs1	Collaborate between governments, industries, and educational institutions to align resources and objectives
Build a collaborative ecosystem	Establish cross-sector cooperation and create hubs that support innovation and workforce development for the energy transition

1 Public- private partnerships