Net Zero Meets Green Growth: How GCC Countries Can Transition to Net Zero While Growing Their Economies

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By: Shelly Trench and Annalena Hagenauer
5 Recommendations for Net Zero Plans in the GCC

01 Build a Dynamic, Country Specific Net Zero Model

02 Choose a Just Net Zero Pathway Suited for Climate Ambition and Economy

03 Look at Green Economic Growth Opportunities, Not Just Investment Costs

04 Establish Effective Stakeholder Engagement and Governance

05 Design Policies That Bring Net Zero Strategies to Life
The impact of climate change is intensifying around the world, with GCC average temperatures increasing even faster than the global average. The science and the Paris Agreement are clear: as a global community, we must roughly halve emissions by 2030 and reach Net Zero around mid-century to keep the 1.5-degree target within reach. More than 90% of global GDP is already covered by Net Zero pledges, but only a small group of countries, representing approximately 10% of global carbon emissions, have put forward clear roadmaps and a comprehensive set of sector-specific policies to achieve this goal.

The GCC has made enormous progress in recent years, with most GCC countries committing to Net Zero, and starting to pursue green growth opportunities. However, the majority of GCC countries have not yet published comprehensive plans for how to achieve their commitments and leverage green economic growth opportunities in a focused way, supported by policies. This will be the next step for many governments, and it will be critical to meet their obligations under the Paris Agreement, which requires both 2030 targets (‘Nationally Determined Contributions’) and ‘Long Term Strategies’ (leading to 2050 or beyond).

This article distills learning and shares five key recommendations for preparing Net Zero plans, to help decision makers make Net Zero a success for their countries and economies. These recommendations are: 1) build a dynamic, country-specific Net Zero model; 2) choose a just Net Zero pathway suited for the country’s climate ambition and economy; 3) consider green economic growth opportunities, not just financial investment costs; 4) establish effective stakeholder engagement and governance; and 5) design policies that bring Net Zero strategies to life.
1. Build a Dynamic, Country-Specific Net Zero Model

Net Zero is a comprehensive transformation program with implications throughout the economy. It is much more than a ‘climate strategy’ and requires fundamental shifts to be embedded in all national sector strategies. Preparing a cross-sector, country-specific Net Zero model is the first step for countries to become climate leaders and meet Paris targets in ways that respect their unique characteristics and benefit their economies.

Transitioning to Net Zero means decarbonizing every sector in a coordinated way. The GCC’s major carbon emitting sectors are power (including for buildings), industry, transport, and waste (Exhibit 1). The composition of industry sectors varies across GCC countries, but oil & gas, cement, metals, refining, and chemicals tend to constitute large shares of overall emissions.

Exhibit 1: Emissions in the GCC are primarily from power, industry, transport, and waste

Illustrative breakdown of GHG emissions for a GCC country (composition varies across countries)

Source: High-level estimates based on BCG experience. Industry, transport, agriculture, and waste emissions do not include emissions from grid electricity used in those sectors (counted in power). Shows CO₂e emitted on country territory only i.e. excludes aviation and shipping emissions outside territory.
Sector decarbonization requires coordination, as there are strong linkages between sectors (Exhibit 2). For example, decarbonizing the power sector itself is central to achieving Net Zero – and it provides critical inputs and support to other sectors’ efforts. Decarbonizing other sectors often involves electrification, e.g., switching from gasoline or diesel to electric vehicles in transport. Reducing transport, building, and industry emissions can therefore lead to a steep increase in electricity demand. Managing this is key to ensuring the power sector can deliver a secure and increasingly green electricity supply on the country’s road to Net Zero.

Exhibit 2: Mind the sector linkages - Net Zero measures have cross-sector impacts

An effective Net Zero model will be country-specific, cover all sectors in the economy, and explicitly model cross-sector linkages. The journey to Net Zero will take three decades or more, so the model must also be dynamic. countries and governments should update their model periodically as new data and technologies become available, and also to make their periodic submissions under the Paris Agreement.
2. Choose a Just Net Zero Pathway Suited for Climate Ambition and Economy

How each country will reach Net Zero is the most important choice governments will need to make within the coming years. GCC countries have many different paths available, each with different emissions reductions, investment costs, green economic growth opportunities, and social and health benefits. All decisions, however, must be grounded in the reality that greenhouse gas emissions are cumulative. This means that it matters not only what countries do by 2050 or 2060, but in the interim years (2025, 2030, 2035, etc.). To be ‘Paris compatible’ or ‘1.5 degree compatible’, the world must already have halved its emissions by 2030, and continue rapid reductions thereafter.

It is helpful to model multiple options for Net Zero pathways (Exhibit 3), including the following:

**Least-financial-cost pathway** – i.e., the pathway to Net Zero with the lowest financial investment cost relative to the baseline. Following this path, decarbonization measures are usually taken as late as possible, when technologies are cheaper, and the delay means that 2030 Paris targets are more likely at risk of not being met.

**2-degree compatible pathway** – This provides the minimum required to be compatible with Paris targets and demands a much steeper reduction in the short term than the least cost pathway. It also implies earlier and faster growth of new green industries, more jobs created in new industries, and likely better environmental and health outcomes.

**Paris compatible / 1.5 degree compatible pathway** – Under this option, the country will need to go even further, at least halving its emissions by 2030, with higher investment costs but also significantly higher benefits in terms of green growth, jobs, and the environment.

### Exhibit 3: GCC governments should consider different pathways to Net Zero and their implications

**Illustrative GHG emission pathways and temperature impact**

- Current emissions levels, pathways, and temperature implications vary across countries.

1. Nationally Determined Contributions; 2016 is the base year for NDCs;
2. Temperature ranges shown assume a similar reduction per GDP across all countries worldwide (using Climate action trackers 'Domestic pathway’s approach). This does not necessarily reflect the illustrative country's ‘fair share’ of emissions contributions.

**Source:** Climate Action Tracker, BCG analysis
From an international perspective, country-level commitments will also be assessed based on their ‘fair share’ of greenhouse gas abatement. The ‘fair share’ relates to the concept of ‘Common but Differentiated Responsibilities’ (CBDR) as stated in the Paris Agreement, which acknowledges that countries that have contributed more to climate change should also abate more. There is no official definition of CBDR in the Paris Agreement, but it is usually assessed along four dimensions: responsibility (historical emissions per capita), equality (current emissions per capita), capability (GDP per capita and development levels), and cost-effectiveness (cost of emission abatement) (Exhibit 4).

GCC countries typically rank above the world average on these dimensions, as their economies tend to be emission-intensive and wealth levels are relatively high. Most GCC countries have strong economic fundamentals and high development levels, and often low abatement costs (e.g., below average cost of renewables). These characteristics mean that GCC countries are well positioned to transition to Net Zero – but also that the world may expect them to move faster in doing so.

Exhibit 4: GCC countries score high across the four dimensions of ‘fair share’ contribution to addressing climate change

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>Equality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larger cumulative emissions per capita should lead to larger/faster emission reduction</td>
<td>Higher current emissions per capita should lead to faster emission reduction</td>
</tr>
</tbody>
</table>

Cumulative per capita CO₂ emissions¹
(000 tonnes, 1750-2021)

<table>
<thead>
<tr>
<th>Year</th>
<th>GCC</th>
<th>World average</th>
</tr>
</thead>
<tbody>
<tr>
<td>2021</td>
<td>0.2</td>
<td>0.7</td>
</tr>
<tr>
<td>2040</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>2030</td>
<td>0.5</td>
<td>0.7</td>
</tr>
<tr>
<td>2016</td>
<td>0.7</td>
<td>0.8</td>
</tr>
<tr>
<td>2010</td>
<td>0.8</td>
<td>0.8</td>
</tr>
</tbody>
</table>

GCC historical per capita emissions at 1.5-4x world average

<table>
<thead>
<tr>
<th>Per capita CO₂ emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>(tonnes, 2021)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>GCC</th>
<th>World average</th>
</tr>
</thead>
<tbody>
<tr>
<td>2021</td>
<td>36</td>
<td>5</td>
</tr>
<tr>
<td>2018</td>
<td>18</td>
<td>5</td>
</tr>
<tr>
<td>2019</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>2017</td>
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<td>5</td>
</tr>
<tr>
<td>2016</td>
<td>25</td>
<td>5</td>
</tr>
<tr>
<td>2015</td>
<td>27</td>
<td>5</td>
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GCC’s current per capita emissions at 3-7x world average

<table>
<thead>
<tr>
<th>Capability</th>
<th>Cost effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>More 'capable'² countries should have larger/ faster emission reduction</td>
<td>Countries with cheaper emission reductions should reduce them faster</td>
</tr>
</tbody>
</table>

GDP per capita
(000 USD, 2022)

<table>
<thead>
<tr>
<th>Year</th>
<th>GCC</th>
<th>World average</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022</td>
<td>88</td>
<td>58</td>
</tr>
<tr>
<td>2018</td>
<td>54</td>
<td>36</td>
</tr>
<tr>
<td>2017</td>
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<td>27</td>
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<td>2016</td>
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<td>25</td>
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<td>2015</td>
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<td>25</td>
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<td>2014</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>2013</td>
<td>13</td>
<td>13</td>
</tr>
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</table>

GCC GDP per capita at 2-7x world average
All GCC countries with "very high" HDI
(i.e. >0.8, range: 0.39-0.96)

<table>
<thead>
<tr>
<th>Human Dev. Index (HDI)</th>
</tr>
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<tbody>
<tr>
<td>(2021)</td>
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</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>GCC</th>
<th>World average</th>
</tr>
</thead>
<tbody>
<tr>
<td>2021</td>
<td>0.91</td>
<td>0.73</td>
</tr>
<tr>
<td>2016</td>
<td>0.86</td>
<td>0.83</td>
</tr>
<tr>
<td>2015</td>
<td>0.88</td>
<td>0.83</td>
</tr>
<tr>
<td>2014</td>
<td>0.83</td>
<td>0.82</td>
</tr>
</tbody>
</table>

GCC renewable energy costs are among the world’s lowest for solar PV

1. Calculated as cumulative CO₂ emissions since 1750 divided by 2021 population. 2. E.g., countries with higher gdp/capital or human development index
Note: four dimensions refer to the most common interpretation of the cbdr (common but differentiated responsibilities) concept introduced in the paris agreement, yet the language displayed here is not explicitly used in the agreement.

Source: höhne et al. 2014; ipcc 5th assessment report; cat; global carbon project (friedlingstein et al 2021, 2022); oxfam; world bank; undp; bcg analysis
Managing the financial cost of the Net Zero transition is understandably a concern for many countries, but it should not be the only focus. Instead, governments should take the full macroeconomic picture into account, encompassing the necessary investments in new technology as well as the value of green economic growth opportunities available to early movers. Identifying green growth opportunities starts by identifying competitive advantages in a world that will transition to Net Zero, followed by an assessment of the financial costs versus economic and other benefits of the new green industry (i.e. job and GDP growth, better health outcomes, etc.). Once promising opportunities for green industry localization have been identified, it is critical to set ambitious targets and find the right partners and off-takers for the projects. During the scale-up, countries should put in place effective governance and monitoring mechanisms, and periodically reassess targets and partnerships. Exhibit 5 below provides an overview of the key steps involved.

Exhibit 5: Five key steps to design and implement green economic growth strategies

1. Identify competitive advantage
   Identify technologies and solutions with high emission reduction and green industry localization potential
   Focus: prioritize solutions with high competitive advantage (e.g., based on land availability or renewable power potential), identify synergies and clusters (e.g., green steel using green hydrogen)

2. Develop targets & ecosystem plan
   Set ambitious targets for for 2030, 2040, 2050
   Align with Net Zero strategy, balance domestic vs export use
   Identify and plan for required ecosystem changes (e.g., new partners and off-takers, new port infrastructure)

3. Assess costs vs economic potential
   Understand the additional financial investments required (incremental CAPEX and OPEX)
   Compare investments to GDP, job, and other benefits across different scenarios, ensure benefits outweigh investments across most scenarios – if not, revisit points 1 and 2

4. Put in place critical enablers
   Critical enablers include a clear governance mechanism (e.g., an independent national entity to champion the new sector)
   Ensure access to financial capital and put in place enabling policies to build up new economic sectors quickly and effectively

5. Develop the sector & partnerships
   Build up capacity and capabilities, and enter into partnerships with national and global technology suppliers and experts (where relevant)
   Enter into offtake agreements for exported green products
   Reassess plans and partnerships periodically, as new information becomes available

Source: BCG experience
The GCC has many opportunities for green economic growth. One example is green hydrogen, which requires large amounts of (ideally cheap) renewable energy. Several countries in the GCC have already signed Memoranda of Understanding to kickstart partnerships around green hydrogen (including the UAE, Oman, and KSA), leveraging their competitive advantage in land availability and high renewable potential (solar radiation, wind speeds). Oman provides a good example of a comprehensive green hydrogen strategy (see Exhibit 6): Based on its current plans, by 2050, hydrogen exports will be almost twice as high as the country’s current LNG exports in energy equivalent terms. Oman is also an example of how a Net Zero strategy and Industrial Policy can be combined to maximize synergies and value: scaling up renewables as fast as possible helps meet Oman’s targets under Net Zero, and at the same time allows the country to build a new export industry and ecosystem around green hydrogen, with a projected GDP and job growth that far outweighs investment costs.

Saudi Arabia’s investment in Carbon Capture, and Storage (CCS) is another example (see Exhibit 6). Leveraging its competitive advantages, i.e. industrial clusters with concentrated CO2 emissions and ample geological storage capacity, the country is planning to build one of the world’s largest CCS hubs in the Jubail industrial zone (9 million tons of CO2 to be captured yearly from 2027, growing to 44 million tons by 2035). The investment in CCS is intended to reduce the Kingdom’s emissions, and at the same time enable the country to export lower-carbon industrial products. This is especially relevant as some regions in the world are starting to place taxes on carbon-intensive imports, the most well-known example being the EU’s Carbon Border Adjustment Mechanism (CBAM) that came into effect in 2023.

In both examples, the ecosystem approach is key: central management and master planning, and shared infrastructure development for clusters are key to reducing risk for investors and leveraging economies of scale.

Timing is important when it comes to green growth opportunities: new industries are emerging globally, offering large early-mover benefits. These can be secured by entering into deals and markets early, locking in offtake agreements, and being ahead on the learning curve for new technologies. GCC governments may find that by accelerating certain Net Zero measures (like green hydrogen and CCS) and building additional capacity for green product export, they can create new industries and ecosystems that will increase future GDP by far more than the short-term cost premium.

Exhibit 6: Two examples of GCC countries pursuing green growth & reinventing ecosystems

<table>
<thead>
<tr>
<th>Net Zero target year</th>
<th>Oman</th>
<th>Saudi Arabia</th>
</tr>
</thead>
<tbody>
<tr>
<td>2050</td>
<td>High solar radiation and wind speeds (est. renewable potential: 7,000 TWh/year), vast land, favorable location for global trade</td>
<td>Large &amp; concentrated industrial clusters, vast geological CO2 storage opportunities (e.g., oil &amp; gas fields, aquifers)</td>
</tr>
<tr>
<td>2060</td>
<td>Carbon capture and storage (CCS)</td>
<td>Jubail CCS hub will capture up to 9 mn tons of CO2 per year from 2027 (Aramco: 6 mn tons per year; other industrial emitters: 3 mn tons). 2035 target: 44 mn tons captured</td>
</tr>
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**Net Zero opportunity (examples)**
- **Oman**: Renewable & Green hydrogen (H2), for domestic use & export
- **Saudi Arabia**: Large & concentrated industrial clusters, vast geological CO2 storage opportunities (e.g., oil & gas fields, aquifers)

**Competitive advantage**
- **Oman**: High solar radiation and wind speeds (est. renewable potential: 7,000 TWh/year), vast land, favorable location for global trade
- **Saudi Arabia**: Large & concentrated industrial clusters, vast geological CO2 storage opportunities (e.g., oil & gas fields, aquifers)

**Targets**
- **Oman**: Renewables: 20% by 2030, 35%+ by 2040 (Oman Vision 2040); Green hydrogen: 1-1.25 mn tons by 2030, 7.5-8.5 mn tons by 2050 (i.e. 2x today’s LNG exports in energy-equivalent terms)
- **Saudi Arabia**: Jubail CCS hub will capture up to 9 mn tons of CO2 per year from 2027 (Aramco: 6 mn tons per year; other industrial emitters: 3 mn tons). 2035 target: 44 mn tons captured

**Ecosystem development**
- **Oman**: Created a national champion (Hydrom) to master plan the sector, developing shared infrastructure assets (H2 pipeline, electricity grid, water supply, storage), advanced plans for domestic green steel cluster (fueled by green H2)
- **Saudi Arabia**: Industrial emitters share CO2 transport & storage infrastructure, reducing risks and cost while leveraging economies of scale

**Estimated impact**
- **Oman**: Costs: Cum. capex by 2030 of >$33bn (>20bn for renewables, >$13bn for electrolysis and ammonia conversion, see IEA); Benefits: +50% GDP by 2050 vs 2021 from hydrogen (2/3) and renewables (1/3); 20-30% increase in jobs (see National Strategy)
- **Saudi Arabia**: Build up of capacity of 44mn tons of CO2 per annum will likely create tens of thousands of direct jobs, with even higher indirect job impact. CCS helps extend ‘license to operate’ for high-emission industries (e.g., chemicals, cement, metals).

**Deals/Partners to date**
- **Oman**: Hydrom runs open auctions to award land to H2 developers: 5 projects in Round 1, i.e. $30bn capex, 18 GW renewables, 750 ktpa H2, Round 2 ongoing. Potential offtakes for >15% of 2030 export volumes so far (IEA, June 2023)
- **Saudi Arabia**: Partnering with SLB and Linde to build one of the world’s largest CCS hubs in the Jubail industrial zone

Note: These are select examples. Other GCC countries are also exploring green H2 and CCS (among others); some already have advanced targets as well as partnerships. Source: IEA 2023 (Renewable Hydrogen from Oman), Oman’s National Strategy for an Orderly Transition to Net Zero (November 2022), Saudi Aramco, Hydrom, CCS Institute (2020) The value of CCS.
4. Establish Effective Stakeholder Engagement and Governance

Given its transformative nature, developing a country’s Net Zero strategy is a multi-month effort, and involves broad and deep stakeholder engagement. This includes stakeholders from national and subnational levels, and from the public as well as private sector. To gather stakeholder inputs efficiently and foster productive discussion, we recommend setting up sectoral working groups that meet at regular intervals while the Net Zero strategy is being developed. The working groups provide input at every key step of strategy development, e.g.:

1. **Initial data collection** – relevant country-specific data is often dispersed across many stakeholders

2. **Baselining of emissions until 2050/2060** – stakeholders can provide the latest corporate and policy initiatives to be reflected in the baseline (i.e. what will emissions be under current decarbonization plans)

3. **Net Zero measures** – obtain country-specific and technical input from stakeholders to select the highest-impact decarbonization actions for each sector in the economy

4. **Target setting** – involve sector stakeholders when setting targets per sector per year on the road to Net Zero (public and private sector)

5. **Policy development** – understand country preferences across policy options (e.g., bans versus incentives), leverage stakeholder expertise on past and current policies to maximize effectiveness

Countries should aim for broad consensus among stakeholders, especially given the many linkages between sectors (see Exhibit 2 above). However, securing 100% consensus and buy-in is not realistic, and trying to do so may lead to roadblocks and delays. This is why countries need clear governance and decision mechanisms for Net Zero strategy adoption and implementation, and should also foster a collaborative mindset among key stakeholders. Examples include setting up an overarching committee, and/or establishing a dedicated office under the leading Ministry. Given the importance of Net Zero, ultimate decision-making should sit at the highest level of government.

When it comes to implementation, clear accountability is key to success. This often means that national and sector targets have to be cascaded down to the relevant entities (e.g., companies, local authorities, etc.). The leading Ministry or equivalent should oversee the implementation, instituting regular updates to track progress and intervene where required.
5. Design Policies That Bring Net Zero Strategies to Life

Effective Net Zero strategies will be based on solid techno-economic modeling, but it is the policies that bring them to life. Achieving Net Zero demands a comprehensive set of policies, some sector-specific (e.g., renewables investments, electric vehicle purchase bonuses, infrastructure regulation), and others cross-sector (e.g., carbon pricing, electrification support).

An effective Net Zero policy mix typically includes (Exhibit 7):

1. **Market-based policies** – e.g., carbon pricing, efficiency support mechanisms
2. **Subsidies and public investments** – e.g., electric charging infrastructure investment, land provision for renewables
3. **Laws and regulations** – e.g., green building codes, mandatory recycling

The strategy should start from Net Zero decarbonization levers, and identify the policies best suited to bring each lever to life. However, there is also an element of choice and country-specific preferences. For example, green road transport could be enabled with a ban on fossil-fuel-powered vehicles, electric vehicle subsidies, or a higher VAT on fossil-fuel-powered vehicles, or a combination of these policies. What is effective in one country may be less so in another.

Policies should explicitly support green growth opportunities, including new export industries. In the GCC these may include green hydrogen, carbon capture and storage, renewables, or new industrial technologies. Some of these technologies have significant green premiums relative to conventional solutions. They often require substantial investments and a strong industrial policy in the short term to accelerate their uptake and help them become financially sustainable in the medium to long term.

**Exhibit 7: Policies bring the Net Zero strategy to life**

Three types of policies

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GCC countries have made significant progress in setting climate targets and taking decisive action. But to meet their obligations under the Paris Agreement while leveraging opportunities for green growth, GCC countries must also develop clear and comprehensive strategies that address Net Zero and green economic growth jointly.

This article has highlighted the importance of developing a country-specific Net Zero model and pathway, considering green economic growth opportunities as well as investment costs, and activating Net Zero ambitions through effective governance and policy.

Overall, GCC countries are well placed to become pioneers in climate action, not only because of their ability to do so but also because the potential for building new green industries can secure a strong economic future. With the right approach and industrial policies, they can succeed and lead global climate efforts, as showcased by the UAE hosting COP28.
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