Skills for Green Jobs in the
United Arab Emirates
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## Abbreviations and Acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/C</td>
<td>Air Conditioning</td>
</tr>
<tr>
<td>ADQCC</td>
<td>Abu Dhabi Quality and Conformity Council</td>
</tr>
<tr>
<td>AED</td>
<td>United Arab Emirates Dirham</td>
</tr>
<tr>
<td>BREEAM</td>
<td>Building Research Establishment Environmental Assessment Method</td>
</tr>
<tr>
<td>CDM</td>
<td>Clean Development Mechanism</td>
</tr>
<tr>
<td>CEA</td>
<td>Certified Energy Auditor</td>
</tr>
<tr>
<td>CEM</td>
<td>Certified Energy Manager</td>
</tr>
<tr>
<td>CMVP</td>
<td>Certified Measurement and Verification Professional</td>
</tr>
<tr>
<td>CSP</td>
<td>Concentrated solar power</td>
</tr>
<tr>
<td>DEWA</td>
<td>Dubai Electricity and Water Authority</td>
</tr>
<tr>
<td>DIES</td>
<td>Dubai Integrated Energy Strategy</td>
</tr>
<tr>
<td>DSCE</td>
<td>Dubai Supreme Council of Energy</td>
</tr>
<tr>
<td>EES</td>
<td>Etihad Energy Services</td>
</tr>
<tr>
<td>EGGS</td>
<td>Environmental goods and services</td>
</tr>
<tr>
<td>EHS</td>
<td>Environmental Health and Safety</td>
</tr>
<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
</tr>
<tr>
<td>ESCO</td>
<td>Energy Services Company</td>
</tr>
<tr>
<td>FCSA</td>
<td>Federal Competitiveness and Statistics Authority</td>
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<tr>
<td>GCC</td>
<td>Gulf Cooperation Council</td>
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<tr>
<td>GHG</td>
<td>Greenhouse gas emissions</td>
</tr>
<tr>
<td>GRI</td>
<td>Global Reporting Initiative</td>
</tr>
<tr>
<td>GWh</td>
<td>Gigawatt Hour</td>
</tr>
<tr>
<td>IG</td>
<td>Imperial Gallon</td>
</tr>
<tr>
<td>IRENA</td>
<td>International Renewable Energy Agency</td>
</tr>
<tr>
<td>ISO</td>
<td>International Standards Organization</td>
</tr>
<tr>
<td>KPI</td>
<td>Key Performance Indicator</td>
</tr>
<tr>
<td>LED</td>
<td>Light Emitting Diode</td>
</tr>
<tr>
<td>LEED</td>
<td>Leadership in Energy and Environmental Design</td>
</tr>
<tr>
<td>MBR</td>
<td>Mohammed bin Rashid Al- Maktoum</td>
</tr>
<tr>
<td>MENA</td>
<td>Middle East and North Africa</td>
</tr>
<tr>
<td>MoE</td>
<td>Ministry of Economy</td>
</tr>
<tr>
<td>MoHRE</td>
<td>Ministry of Human Resources and Emiratization</td>
</tr>
<tr>
<td>MRV</td>
<td>Monitoring, reporting and verification</td>
</tr>
<tr>
<td>MW</td>
<td>Megawatt</td>
</tr>
<tr>
<td>O&amp;G</td>
<td>Oil and Gas</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operation and Maintenance</td>
</tr>
<tr>
<td>PMP</td>
<td>Project Management Professional</td>
</tr>
<tr>
<td>PQP</td>
<td>Pearl Qualified Professional</td>
</tr>
<tr>
<td>PV</td>
<td>Photovoltaic</td>
</tr>
<tr>
<td>QAD</td>
<td>Qualifications and Awards in Dubai</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>Research and Development</td>
</tr>
<tr>
<td>RSB</td>
<td>Dubai Regulatory and Supervisory Bureau</td>
</tr>
<tr>
<td>TVET</td>
<td>Technical Vocational Education and Training</td>
</tr>
<tr>
<td>UAE</td>
<td>United Arab Emirates</td>
</tr>
<tr>
<td>VAT</td>
<td>Value Added Tax</td>
</tr>
<tr>
<td>ZEB</td>
<td>Zero-Energy Building</td>
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</table>
Abstract

The UAE is already moving towards a greener economy, driven by ambitious government goals and technological advances. The present report analyses skills and occupational needs in the transition to a green economy in the UAE and identifies best practices. The findings of this study and of equivalent studies in a number of countries all over the world will be used as background information for the configuration of the second edition of the Global Skills for Green Jobs report produced by the International Labour Organization. A synthesis document will provide evidence-based policy advice to tackle skills bottlenecks and potential mismatches to ensure a smooth and efficient transition to a green economy.

Acknowledgment

This country report has benefited from the participation of a number of interviewed entities in the UAE, which provided deeper knowledge of the situation with a view to a better understanding of the current status and best practices. A word of appreciation is due to Sustainable Recruitment Solutions, Abu Dhabi Quality and Conformity Council, Emirates Green Building Council, Ernst & Young UAE and the Dubai Regulatory & Supervisory Bureau for their efforts in supporting this research as part of their commitment to greening the UAE’s economy.

This study was conducted by Mercedes Durán Haro as a part of set of national studies on skills for green jobs conducted in some thirty countries globally. The set of studies is the result of collaboration between the ILO and the European Centre for the Development of Vocational Training (Cedefop). Overall methodological guidance was provided by Olga Strietska-Ilina (ILO Employment Policy Department, Skills and Employability Branch). Coordination of country studies and technical backstopping was provided by a team led by Catherine Saget (ILO Research Department), Tahmina Mahmud (ILO Skills and Employability Branch) and Takaaki Kizu (ILO Research Department). Moustapha Kamal Gueye and Marek Harsdorff (ILO Enterprises Department, Green Jobs Programme) contributed to the studies’ implementation on behalf of the ILO Green Jobs Programme. Alena Zukersteinova and Stelina Chatzichristou from Cedefop’s Department for Skills and Labour Market coordinated studies among the participating EU countries. Valuable inputs were provided by the ILO colleagues: Patrick Daru, Christine Hoffmann, Laura Brewer, Maria Ilca Lima Webster, Alvaro Ramirez Bogantes, Hassan Ndahi, Fernando Vargas Zuñiga, Patrick Daru, Akiko Sakamoto, Mikhail Pouchkin, Gabriel Bordado, Julien Magnat, Kanae Tada, Tendy Gunawan, Bolotbek Orokov, Gwyneth Anne Palmos, Georginia Pascual, Badiane Cheickh and Kishore Kumar Singh. Solveig Boyer (ILO Green Jobs Programme), Annette Brandstater (ILO Skills and Employability Branch), Massimiliano Leone, Ana Buzdugan (International Training Centre ILO Turin) and Manuela Flamini (Edizioni Retrò.r.l.) were responsible for editing and design.
1. Introduction

The UAE government is transforming its economy at high speed by heavily investing in renewables, energy efficiency, nuclear energy, public transport and electric vehicles, and the labour market needs to catch up in respect of its skills balance.

The UAE has announced ambitious goals for greening its economy. The Energy Strategy 2050 aims to increase the contribution of clean energy in the total energy mix to 50 per cent by 2050 and reduce the carbon footprint of power generation by 70 per cent. It also seeks to increase the consumption efficiency of individuals and corporates by 40 per cent.

Sectors such as renewable energy and energy efficiency are expected to experience substantial employment growth across all types of occupations. However, the lack of skilled professionals, given the relatively recent adoption of this strategy, may create a barrier to the implementation of greening policies and hamper a smooth transition to a green economy. Until now, foreign recruitment has been undertaken by most companies, bringing in talent from abroad. However, lower-than-ever bidding prices in renewable energy tenders, low electricity prices that make retrofitting non-profitable in some Emirates, and the recent introduction in 2018 of Value Added Tax (VAT) in the UAE, may place some economic burden on the hiring of skilled professionals from abroad.

Governments at regional and federal levels have developed comprehensive green policies and, in some cases, put in place interesting institutional set-ups that have led to success. These policies occasionally include skills development strategies and involve stakeholders in their preparation. It is a matter of retrofitting in Dubai, which has resulted in the creation of a growing Energy Services Company (ESCO) market and has closed the skills gap. Learning from best practices and leveraging on existing successful case studies may help achieve the full potential of a green economy.

This country report draws a preliminary picture of the situation, focusing on major changes in the economy and employment shifts in the green transition, key policies and regulations, current skills provision, major skills and occupational needs, and institutional set-ups in place for skills for green jobs.

Desk research was conducted and a number of stakeholders were interviewed during the preparation of this report, ranging from private green recruitment companies specialized in providing resources for the Middle East, public entities that provide quality standards for the industry, educational providers, green building industry associations, climate change consulting firms, and regulators.

Even though this country report also introduces initial conclusions and recommendations for policy-making, further and more in-depth research and analysis is recommended in order to harness the full potential of green jobs and provide the government with comprehensive evidence of the situation so as to enable it to make informed decisions. Strong leadership and a coordinated, coherent and comprehensive green jobs strategy are needed, as relevant green jobs and skills policies will be vital for supporting the timely and efficient implementation of government plans.
2. Major changes in the economy and employment shifts in the green transition since 2009/10

2.1 Economic and labour market context from 2000 to the present day

In the early 2000s the UAE enjoyed impressive economic growth propelled by soaring oil prices. The amount of foreign labour increased dramatically, driven by the construction of huge mega-structures such as the Palm Jumeirah, the World Islands, the Burj Khalifa, landmark shopping malls, hotels and housing projects, with the ultimate goal of reducing dependency on fossil fuels and diversifying the UAE’s economy.

In 2008 the global financial downturn led to massive job losses in the UAE and without warning foreign employees had to return to their home countries, leaving a number of construction projects unfinished. Since 2009 the economy has recovered and more construction and infrastructure work is currently under way. Per capita GDP increased between 2009 and 2017 from US$33,072 to US$40,698. In 2016 the population of the UAE was estimated by the Federal Competitiveness and Statistics Authority (FCSA) at 9,121,167 compared to 8,073,626 in 2008. However the UAE’s economy is still heavily dependent on a foreign working population. A breakdown of the population by nationality is publicly unavailable at UAE level but, according to the Dubai Statistics Centre, non-nationals made up 92 per cent of all residents in 2017 in Dubai, with Indians, Pakistanis and Bangladeshis among the most represented nationalities.

As regards the labour market structure, in Dubai most elementary craft and related trade workers and plant and machine operators are non-national males from African and Asian countries (see Figures 1 and 2 below). On the other hand legislators, senior officials, managers, professionals and technicians tend more frequently to be North Americans, Europeans, non-GCC (Gulf Cooperation Council) Arabs and nationals.

UAE nationals excel in education. The UAE Labour Force survey of 2016 indicates that 58.6 per cent of the UAE workforce have undergone either secondary or tertiary education, increasing to 78.2 per cent if only UAE nationals are considered. It is interesting to note that, when it comes to tertiary education, 47.3 per cent of female nationals have a post-University Higher Diploma, which is the highest among all groups (be they nationals or not). In 2016 the unemployment rate was as low as 1.6 per cent, national females being the group with the highest rate (12 per cent), which is surprising compared to the elevated number of female nationals with higher qualifications. According to the World Economic Forum, as women begin to have equal levels of educational attainment compared to men - and in some cases higher - the MENA region’s women represent a large body of latent talent. It is estimated that closing the female employment gender gap would increase the UAE’s economy

5 European University Institute (EUI) and Gulf Research Centre (GRC), 2018. Demography, Migration, and the Labour Market in the UAE.
2. MAJOR CHANGES IN THE ECONOMY AND EMPLOYMENT SHIFTS IN THE GREEN TRANSITION SINCE 2009/10

Skills for Green Jobs in the UAE

**Figure 1.** Percentage Distribution of Employed Persons 15 Years and Over by Nationality, Gender and Occupation

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Emirati Males</th>
<th>Emirati Females</th>
<th>Non Emirati Males</th>
<th>Non Emirati Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managers</td>
<td>1.8</td>
<td>12.2</td>
<td>15.2</td>
<td>10.3</td>
</tr>
<tr>
<td>Professionals</td>
<td>24.7</td>
<td>28.7</td>
<td>27.4</td>
<td>20.3</td>
</tr>
<tr>
<td>Technicians and associates professionals</td>
<td>6</td>
<td>20.3</td>
<td>29</td>
<td>15</td>
</tr>
<tr>
<td>Clerical support workers</td>
<td>11.8</td>
<td>17</td>
<td>10.8</td>
<td>4</td>
</tr>
<tr>
<td>Service and sales workers</td>
<td>25.1</td>
<td>10.3</td>
<td>13.3</td>
<td>15</td>
</tr>
<tr>
<td>Skilled agricultural, forestry and fishery workers</td>
<td>15.2</td>
<td>10.3</td>
<td>13.3</td>
<td>14.2</td>
</tr>
<tr>
<td>Craft and related trades workers</td>
<td>9.6</td>
<td>8.9</td>
<td>25.9</td>
<td></td>
</tr>
<tr>
<td>Plant and medicine operators, and assemblers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary occupations</td>
<td></td>
<td></td>
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<td></td>
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</table>


**Figure 2.** Percentage Distribution of Employed Persons 15 Years and Over by Occupation and Nationality Groups in Dubai (selected nationality groups)

<table>
<thead>
<tr>
<th>Occupation</th>
<th>U.A.E</th>
<th>GCC countries</th>
<th>Other arabs</th>
<th>Asian</th>
<th>African</th>
<th>European</th>
<th>North American</th>
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<tr>
<td>Managers</td>
<td>17.7</td>
<td>40.5</td>
<td>19.5</td>
<td>27.1</td>
<td>3.5</td>
<td>38.6</td>
<td>28.3</td>
</tr>
<tr>
<td>Professionals</td>
<td>5.1</td>
<td>12.8</td>
<td>15.3</td>
<td>9.8</td>
<td>17.6</td>
<td>38.8</td>
<td>46.7</td>
</tr>
<tr>
<td>Technicians and associates professionals</td>
<td>5.1</td>
<td>10.3</td>
<td>14.4</td>
<td>10.7</td>
<td>5.1</td>
<td>4.3</td>
<td>5.4</td>
</tr>
<tr>
<td>Clerical support workers</td>
<td>14.4</td>
<td>4.2</td>
<td>12.8</td>
<td>7.1</td>
<td>6.2</td>
<td>17.1</td>
<td>19.6</td>
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<td>25.7</td>
<td>4.2</td>
<td>18.9</td>
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<td>6.2</td>
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<tr>
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<td>18.9</td>
<td>32.3</td>
<td>10.7</td>
<td>5.1</td>
<td>4.2</td>
<td>4.2</td>
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<td>Craft and related trades workers</td>
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<td>7.1</td>
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<td>19.6</td>
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<td>Plant and medicine operators, and assemblers</td>
<td>14.3</td>
<td>3.6</td>
<td>18.9</td>
<td>7.1</td>
<td>6.2</td>
<td>17.1</td>
<td>19.6</td>
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<td>Elementary occupations</td>
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<td>1.4</td>
<td>1.4</td>
<td>1.4</td>
<td>1.4</td>
<td>1.4</td>
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</table>

by over 12 per cent. The need to increase the employability of female nationals has already been highlighted in the Abu Dhabi Economic Vision 2030 that openly states the necessity to “further increase national women participation in the labour force" as the means to “ensure a balanced social and regional economic development approach that brings benefits to all”. In general most of the national population is employed in the public sector. The UAE government is now implementing new strategies, such as focusing on national private sector employment (Emiratization policies), in order to deflate its bloated structure.

The UAE’s economy has always been extremely reliant on the oil sector despite its being the most diversified economy in the GCC region. Diversification policies to promote non-oil related growth in sectors such as tourism, construction, infrastructure, aviation, investment and services have been developed during the past two decades. The Federal Competitiveness and Statistics Authority (FCSA) uses both ISIC and ISCO at single-digit level for its Labour Force and Establishment surveys at UAE level. The latest data published by FCSA on economic activities is from 2008. In that year data showed that the construction sector was the sector with the highest number of workers. The Ministry of Human Resources and Emiratization (MoHRE) shows more updated labour statistics by industry and the associated number of establishments on the website, the construction sector being the top employer in 2016. The level of disaggregation of economic activities at UAE level is too basic for it to be possible to extract relevant statistics for green jobs. Currently green employment is not being monitored in the UAE but a new Key Performance Indicator (KPI), recently launched in line with the UAE Green Agenda 2015-2030, establishes quantification of the number of green jobs as the key to measuring the complex and multi-dimensional nature of the green economy and monitoring its implementation. The Ministry of Climate Change and Environment announced the launch of the UAE Green Jobs Programme at the first stakeholder workshop on the subject, held at its headquarters in Dubai on 13 December 2017. No follow-up has been reported on these aspects of green jobs. When it comes to employment forecasts, the ministry’s earlier scenario indicated that investment of 1-2 per cent of GDP per year in greening the economy could create up to 165,000 new jobs by 2030.

2.2 The transition to a greener economy – sectoral review

Renewable energy

As early as 2007 the UAE took its first initial steps towards a more sustainable economy, albeit in a rather scattered manner with the development of isolated projects here and there. The Bee’ah waste management company started operating the 30 MW Sharjah Thermal waste-to-energy gasification plant in the Emirate of Sharjah. Then in 2009 the Abu Dhabi-based Masdar Institute built the country’s first solar-powered plant; it is a 10MW solar PV power plant dedicated to supplying the required electricity to the iconic environmentally-friendly Masdar City which was built between 2008 and 2010.

The UAE Vision 2021 launched by His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai in 2010, was the inflexion point that inspired the important green developments that followed in subsequent years in a more coordinated manner. In 2013 the Emirate of Dubai made public its intention to build the largest solar park in the world in phases: the Mohammed bin Rashid Al-Maktoum (MBR) solar park (Phase I) started operation that year with a total of 15MW of PV installed capacity. It was also in 2013 that Masdar built in Abu Dhabi Shams 1 with a total of 100MW, another solar power plant much larger than the...
previous one and using different technology, namely solar thermal power. In 2015 ambitious goals were clearly established in the renewables arena in Dubai in line with the Paris Agreement: a 7 per cent share for clean energy in Dubai’s total power output by 2020, 25 per cent by 2030, and 75 per cent by 2050. Clear vision, strong government leadership, lowest bidding prices and excellent meteorological conditions are the enabling conditions for the proliferation of renewable energy projects in the UAE, particularly of solar energy.

A number of developments followed, driven by the government, and nowadays renewable energy is enjoying massive potential in the UAE. The Dubai Electricity and Water Authority (DEWA) is leading the way with, so far, total planned capacity for MBR Solar Park of 1,500 MW by 2020 and 5,000 MW by 2030, along with a plan for hydropower in the Hatta mountains, the plant being expected to start operating by 2022.

The share of the Clean Energy contribution was 0.54 per cent in 2017 as reported by the Ministry of Energy and Industry. Official employment figures in renewables are not available. Up until the reported date projects had been rather small, therefore probably not contributing significantly to the total workforce in the UAE. However, as more tenders were floated and awarded, American, Spanish, French and Saudi renewable energy companies opened regional offices in the UAE. The renewable sector has taken a while to take off in the UAE, but it is expected that employment in renewables will increase very quickly during the coming years, given the UAE’s goal of renewables penetration. It is important to note that much of the temporary employment generated in this area is linked to

<table>
<thead>
<tr>
<th>COMPLETION</th>
<th>PROJECT</th>
<th>CAPACITY</th>
<th>OPERATOR</th>
<th>EMIRATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>Sharjah Thermal Waste to Energy Gasification Plant</td>
<td>30 MW</td>
<td>BEE’AH</td>
<td>Sharjah</td>
</tr>
<tr>
<td>2009</td>
<td>Masdar City Solar PV Power Plant</td>
<td>10 MW</td>
<td>MASDAR</td>
<td>Abu Dhabi</td>
</tr>
<tr>
<td>2013</td>
<td>MBR Al Maktoum Solar PV Park (Phase I)</td>
<td>13 MW</td>
<td>DEWA</td>
<td>Dubai</td>
</tr>
<tr>
<td>2013</td>
<td>Masdar Shams 1 Solar thermal Power Plant</td>
<td>100 MW</td>
<td>MASDAR, TOTAL</td>
<td>Abu Dhabi</td>
</tr>
<tr>
<td>2017</td>
<td>MBR Al Maktoum Solar PV Park (Phase II)</td>
<td>200 MW</td>
<td>DEWA, ACWA, TSK</td>
<td>Dubai</td>
</tr>
<tr>
<td>Expected by 2019</td>
<td>ADWEC Solar PV IPP (Sweihan)</td>
<td>1,177 MW</td>
<td>ADWEC, Marubeni, Jinko</td>
<td>Abu Dhabi</td>
</tr>
<tr>
<td>200MW in 2018, 300 MW by 2019 &amp; 300 MW by 2020</td>
<td>MBR Al Maktoum Solar PV Park (Phase III)</td>
<td>800MW</td>
<td>DEWA</td>
<td>Dubai</td>
</tr>
<tr>
<td>Expected by 2020</td>
<td>Dubai Waste to Energy Plant</td>
<td>60 MW</td>
<td>DM</td>
<td>Dubai</td>
</tr>
<tr>
<td>Expected by 2020</td>
<td>Sharjah Waste to Energy - Bee’ah Gasification Plant Extension</td>
<td>30 MW</td>
<td>BEE’AH, MASDAR, EWEC</td>
<td>Sharjah</td>
</tr>
<tr>
<td>Expected in phases between 2020 -2022</td>
<td>MBR Al Maktoum Solar CSP Park (Phase IV)</td>
<td>700MW</td>
<td>DEWA</td>
<td>Dubai</td>
</tr>
<tr>
<td>Expected by 2022</td>
<td>Al Hattawi Hydroelectric Project</td>
<td>250MW</td>
<td>DEWA</td>
<td>Dubai</td>
</tr>
</tbody>
</table>

Source: Author from online sources
the construction phase of the projects. However, given the increased interest in renewables across the MENA region and the establishment of regional offices in the UAE as a potential hub for renewable energy companies, this temporary employment may become permanent through increasing the mobility of workers. On the other hand, Operation and Maintenance (O&M) jobs are permanent and are expected to increase as renewable energy plants enter the operation phase.

**Building retrofit**

Over the last decade electricity consumption has increased dramatically in the UAE, largely due to population growth. This is especially true in the residential and commercial sectors, given the extremely arid weather conditions and the permanent need for air conditioning. No official data is available but some authors estimate that buildings are responsible for almost 90 per cent of electricity consumption in the country. Newer building codes have been gradually introducing environmentally-friendly requirements and green standards, but the older building stock is heavily inefficient and possesses great energy-saving and water-saving potential.

In 2011 the Dubai Supreme Council of Energy (again in line with the UAE Vision 2021 launched in 2010) created the Demand Side Management Strategy aimed at reducing Dubai’s electricity and water consumption by 30 per cent by 2030. The institutional set-up formed in 2013-2014 to achieve that goal consisted of the Dubai Regulatory and Supervisory Bureau (RSB), Etihad Energy Services (EES) and, one year later, Taqati. The first is the regulator of Dubai’s water and electricity sector which established an accreditation scheme for Energy Services companies, commonly known as ESCOs, with minimum skills requirements. The second is a public company in charge of developing large-scale retrofit projects which are then implemented by the RSB’s accredited ESCOs using the performance contracting concept based on future savings. The third is the entity in charge of coordinating the implementation of the Demand Side Management strategy and reporting back to the Dubai Supreme Council of Energy which created the Energy Efficiency Training Programme (see Case Study 1).

All this has facilitated dramatic growth in the retrofit market in Dubai since 2014, and it is still growing as shown in RSB’s latest report, with investment topping AED452m in 2017 (see Table 2). In Dubai alone ESCOs reported in 2017 a total of 135 projects, 57 of them new. Around 500 buildings were newly identified for retrofitting in 2017, with estimated savings of 210GWh per annum once all retrofitting work is complete. The total number of buildings retrofitted since the beginning of the scheme has reached almost 2,500.

On the other hand, the drop in water savings from 2016 to 2017 is attributed to bad consumer habits, lack of relevant skills and other challenges that go beyond the ESCO market. The water challenge is admittedly tough; work needs to be done on the awareness front to communicate the shared responsibility for water conservation but more can also be done to bring new technology that delivers water savings without reducing users’ experience and their ability to implement it. The other challenge that the UAE may face is its transitional population. Little incentive is perceived by tenants to invest in home maintenance given the common practice of 1-year tenancy contracts and the low level of long-term certainty for expatriates.

Statistics on the number of individuals working in the retrofitting sector in Dubai are non-existent. However interviews with experts suggest that with increased investment comes increased work and therefore it would be safe to assume that the number of workers is growing each year. Unlike the case of renewables, retrofitting companies are often local and create mostly permanent employment, although often energy engineers are hired from abroad (India, Pakistan, etc). In addition, new rating schemes recently launched could further promote the ESCO market in the form of energy audits and the subsequent job creation.

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It is important to note that the business of financing retrofit projects based on future savings has up until now only made sense in Dubai as compared to the other Emirates, owing to higher electricity prices. Abu Dhabi has recently reduced energy subsidies and is in the process of developing a similar set-up to that in Dubai, which could deliver increased activity in the retrofitting sector in future years. At present the Emirate is focusing on government buildings and will commence work on residential buildings in 2019. The Emirate of Ras-Al-Khaima is currently working on a demand-side management strategy and has adopted the Dubai ESCO accreditation scheme which recognises Dubai-accredited ESCOs without the need for reassessment.

The 2017 report Economic and Environmental Benefits of Improving UAE Building Stock Energy Efficiency forecasts employment potential under three scenarios in the UAE’s retrofitting sector (see Table 3 below). Scenario 1 presupposes a low investment level in retrofitting, limited to lighting and weatherization, scenario 2 assumes a more in-depth retrofit process including A/C and insulation; and scenario 3 increases the estimated investment to conduct deep retrofits in UAE buildings. Under those three scenarios, jobs created per year range from 300 to 5,600. Moreover it is important to take indirect employment into consideration since retrofitting devices (LEDs, variable frequency drives, etc.) are frequently provided by foreign companies established in the UAE, despite being manufactured abroad, examples being Siemens, Philips Lighting, and Carrier, among others.

**New green(er) buildings and SMART cities**

The UAE is ranked amongst the top 10 countries to hold LEED (Leadership in Energy and Environmental Design) certifications outside the United States and it represents a green building success in the Middle East. The trend is for this path to continue. As an example, DEWA’s new headquarters is under construction which will be the tallest, largest, and smartest government Zero-Energy Building (ZEB) in the world. Similarly, Abu Dhabi developed the Estidama Guidelines as a building design methodology for constructing and operating buildings and communities more sustainably in the Emirate. In addition, a number of smart residential areas have been created in the last few years. A few examples that might sound familiar internationally are Masdar City in Abu Dhabi and Sustainable City in Dubai. The first relies on solar energy and other renewable energy sources and hosts the headquarters of IRENA (International Renewable Energy Agency); it is the base for the Masdar Institute of Science and Technology and a hub for clean-technology.

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**Table 2. Growth in savings, investments and number of accredited ESCOs in building retrofit**

<table>
<thead>
<tr>
<th>YEAR</th>
<th>CUMULATIVE INVESTMENT (MILLION AED)</th>
<th>TOTAL ACHIEVED ENERGY SAVINGS (MILLION KWH)</th>
<th>ACHIEVED WATER SAVINGS (MILLION IG)</th>
<th>NUMBER OF ESCOS ACCREDITED</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>4.5</td>
<td>4.4</td>
<td>2.2</td>
<td>9</td>
</tr>
<tr>
<td>2015</td>
<td>109.3</td>
<td>12.1</td>
<td>2.4</td>
<td>14</td>
</tr>
<tr>
<td>2016</td>
<td>194.1</td>
<td>86.2</td>
<td>246.1</td>
<td>18</td>
</tr>
<tr>
<td>2017</td>
<td>452</td>
<td>194</td>
<td>132</td>
<td>18</td>
</tr>
</tbody>
</table>

Source: RSB. Annual Report 2016 and 2017

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14 Arabian business. 2017. Article Dubai ranked third in list of most green building in world.
companies. The second, being a residential area, is the first operational net-zero-energy city in Dubai. It includes 500 villas, 89 apartments and a commercial area. The development is a car-free area powered by solar energy, built with UV-reflective paint to reduce the thermal heat gain inside the houses and a number of other environmentally-friendly features.

The above examples show the increasing UAE interest in green design and construction, international certifications such as LEED and BREEAM playing an important role in employability as well as Estidama in Abu Dhabi.

### Greener Transportation

Greener transportation is a major focus for Dubai’s government. The Dubai Green Mobility strategy encourages the use of sustainable transport and electric vehicles. The Dubai Supreme Council of Energy issued a directive in 2016 to all government organisations to the effect that between 2016 and 2020 at least 2 per cent of their vehicle purchases must be of hybrid or electric vehicles. This target will then increase to 10 per cent by 2030. In addition, a large part of today’s taxi fleet in Dubai is hybrid and government plans aim at 50 per cent of the taxi fleet being hybrid by 2021.

The first section of the Dubai metro was inaugurated in 2009. Since then a total of 75 kms have been delivered. Accurate employment numbers are not available, but the media indicate that as early as 2008 there were 24,000 engineers, technicians and workers involved in the construction of the project, as well as others.

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**Table 3.** An evaluation of building energy efficiency retrofit investments for the UAE

<table>
<thead>
<tr>
<th>RETROFIT PROGRAM</th>
<th>RESIDENTIAL</th>
<th>TOTAL</th>
<th>RESIDENTIAL</th>
<th>TOTAL</th>
<th>RESIDENTIAL</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BUILDING</td>
<td>STOCK</td>
<td>BUILDING</td>
<td>STOCK</td>
<td>BUILDING</td>
<td>STOCK</td>
</tr>
<tr>
<td><strong>INVESTMENT LEVEL 1</strong> (BASIC RETROFIT: LIGHTING AND WEATHERIZATION)</td>
<td>0.13</td>
<td>2.0</td>
<td>1.25</td>
<td>10.7</td>
<td>2.5</td>
<td>21.4</td>
</tr>
<tr>
<td><strong>INVESTMENT LEVEL 2</strong> (STANDARD RETROFIT: LEVEL 1 WITH A/C AND INSULATION)</td>
<td>2,660</td>
<td>7,550</td>
<td>7,650</td>
<td>21,700</td>
<td>16,600</td>
<td>47,200</td>
</tr>
<tr>
<td><strong>INVESTMENT LEVEL 3</strong> (DEEP RETROFIT: LEVEL 2 WITH WINDOWS AND CONTROLS)</td>
<td>0.13-0.4</td>
<td>0.4-1.1</td>
<td>0.4-1.2</td>
<td>1.3-3.3</td>
<td>0.8-2.4</td>
<td>2.4-7.1</td>
</tr>
<tr>
<td><strong>Avoided Electricity Consumption (GWh/year)</strong></td>
<td>500</td>
<td>1,400</td>
<td>1,450</td>
<td>4,000</td>
<td>3,100</td>
<td>8,000</td>
</tr>
<tr>
<td><strong>Value of Avoided Electricity Consumption ($0.05–$0.15/kWh (USD Billion/year))</strong></td>
<td>0.6</td>
<td>1.7</td>
<td>1.8</td>
<td>4.8</td>
<td>3.7</td>
<td>10.6</td>
</tr>
<tr>
<td><strong>Investment Simple Payback Period ($0.05–$0.15/kWh (Years))</strong></td>
<td>0</td>
<td>0.3-0.8</td>
<td>0</td>
<td>1.8-5.4</td>
<td>0</td>
<td>1.5-4.5</td>
</tr>
<tr>
<td><strong>Jobs Created (per year for a 10-year period)</strong></td>
<td>300</td>
<td>900</td>
<td>1,000</td>
<td>2,500</td>
<td>2,000</td>
<td>5,600</td>
</tr>
<tr>
<td><strong>Reduced Carbon Emissions (Million Metric Ton/year)</strong></td>
<td>1.60</td>
<td>4.568</td>
<td>4.633</td>
<td>13.134</td>
<td>10.071</td>
<td>28.553</td>
</tr>
</tbody>
</table>

*Source: Kankana Dubey, Moncef Krarti. 2017. Economic and Environmental Benefits of Improving UAE Building Stock Energy Efficiency*
as 105 sub-contractors. The Roads and Transport Authority announced that in September 2017 the total number of passengers to have used it had cleared the 1 billion mark. In addition, light rail tracks have been in operation since 2014. Expansion plans include 400 km of metro lines and 268 km of tram lines. However, for the moment the only extension under construction is the 15 km link to the EXPO 2020 site, along with seven new stations to be completed by 2020. This has driven employment demand in the last couple of years for electrical, mechanical and civil engineers, project managers with previous railway experience, and other railway specialists such as track engineers. It remains to be seen whether these new jobs will be sustained in the future as construction sections are completed. Further investment in stages may help in that regard. Nevertheless, once construction is finished, additional permanent O&M jobs will be created.

**Water Management**

One of the major environmental challenges to the UAE’s economy is, and will continue to be, the issue of water resources. Average precipitation ranges from 8 to 15 days per year. In the absence of fresh water supply, desalination and waste water reclamation are some of the critical means of ensuring water availability in the UAE. At the moment desalination is done through Combined Cycle CoGeneration which is considered more efficient. Local governments are adopting a clear strategy to ensure that by 2030 100 per cent of desalinated water will be produced by a mix of clean energy that uses both renewable energy and waste heat. Employment in this area is limited to individuals working for the local water authorities who are the entities in charge of generation, distribution and commercialization of water. More efficient water conservation technologies are planned to be explored by the UAE in order to sustain its economy.

**District Cooling**

Air-conditioning accounts for a significant share of energy consumption, given the UAE’s harsh climate. Comprehensive infrastructure investments are being undertaken to move towards district cooling vis-à-vis decentralized cooling in order to improve efficiency. District cooling is one of the nine strategic pillars for achieving power savings, the government aiming at 40 per cent market penetration for district cooling. According to RSB’s Dubai Market Share and Efficiency Study, district cooling’s share of the overall cooling market is currently 18 per cent. Hence if investment continues more green employment in this area will be created.

**Waste management**

The UAE generates more than 6.5 million tonnes of waste per annum. Per capita waste generation is around 1.2-1.3 kilogrammes per day, one of the highest rates in the world. A recent policy launched in 2018 aims at recycling 75 per cent of municipal solid waste generated.

The Ministry of Economy (MOE) in its annual statistical report indicates that for the year 2015 some 500 workers belonged to the waste management industry. Surprisingly, even though the sector is currently rather small, employment quantification has been undertaken and the sector is considered a separate sector in its own right. The recent policy developments may exacerbate the need for skilled professionals in the waste management arena.
3. Key policies and regulations

3.1 National Policies

UAE Vision 2021

The UAE Vision 2021 was launched by H.H. Sheikh Mohammed bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai, at the closing of a Cabinet meeting in 2010. The Vision aims to make the UAE among the best countries in the world by the Golden Jubilee of the Union and is summarized as follows:

“In a strong and safe union, knowledgeable and innovative Emiratis will confidently build a competitive and resilient economy. They will thrive as a cohesive society bonded to its identity, and enjoy the highest standards of living within a nurturing and sustainable environment.”

The vision’s pillars have been mapped into six national priorities including greening and education:

- Sustainable environment and infrastructure;
- World-Class healthcare;
- First-rate education system;
- Competitive knowledge economy;
- Safe public and fair judiciary;
- Cohesive society and preserved identity.

The UAE Government wishes to ensure sustainable development while preserving the environment, and to achieve a perfect balance between economic and social development. To achieve that aim it focuses on improving the quality of air, preserving water resources, increasing the contribution of clean energy and reducing total waste generated. In addition, the vision states that education is a fundamental element in the development of a nation and the best investment in its youth. It also states that local students rank among the best in the world in reading, mathematics and science exams. Moreover the Agenda will aim to elevate the rate of graduation from secondary schools to international standards and for all schools to have exceptional leadership and internationally-accredited teaching staff.

The vision is considered an overarching strategy promoted by the rulers to enable regional and national governments to direct their efforts in the same direction. The vision contains a skills-related pillar but it is not directly linked to greening.

UAE Energy Strategy 2050

In 2017 the UAE launched the Energy Strategy 2050. The strategy aims to increase the contribution of clean energy to the total energy mix to 50 per cent by 2050 and to reduce the carbon footprint of power generation by 70 per cent. It also seeks to increase the consumption efficiency of individuals and corporates by 40 per cent.

The strategy targets an energy mix that combines renewable, nuclear and clean energy sources to meet the UAE’s economic requirements and environmental goals as follows:

- 44 per cent clean energy;
- 38 per cent gas;
- 12 per cent clean coal;
- 6 per cent nuclear.

The UAE government aims to invest AED 600 billion by 2050 to meet the growing energy demand and ensure sustainable growth for the country’s economy. The UAE Energy Strategy does not contain any component on green jobs and skills to meet the above goals.

UAE Green Agenda 2015-2030

In January 2015 the UAE Cabinet approved the UAE Green Agenda 2015-2030 as the

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20 UAE Energy Strategy 2050.
main framework for Green Economy action. The Green Agenda consists of six Strategic Directions (Green energy, Green investment, Green city, Climate change, Green life and Green technologies) and five Strategic Objectives with 12 main programmes and 31 subprogrammes as described below:

1) Competitive Knowledge Economy:
   a. National Green Innovation Programme
      i. Licensing and accrediting professional training programme in green fields;
      ii. Student scholarships for environmental courses in higher education;
      iii. Financing studies and research on green specialities;
      iv. Research initiatives that support the emergence of a knowledge-based green economy.
   b. Green Diversification Programme
      i. Incentive packages for supporting green manufacturing;
      ii. National programme on awareness-raising and education in green manufacturing;
      iii. Inclusion of focus on green industries in industrial development strategies;
      iv. Development of rules and national indicators on green manufacturing;
      v. Financing programme for green industries;
      vi. Policy on integrated management of industrial waste.
2) Social Development & Quality of life:
   c. Integrated Green Infrastructure Programme
      i. Continued development of integrated urban planning;
      ii. Study on environmentally-sensitive areas and the heat island effect;
      iii. National programme on sustainable buildings and construction;
      iv. Legislation on sustainability and environmental consideration in road infrastructure;
      v. Application of international standards and sustainable energy for public housing projects;
      vi. Policy support for procuring and developing green building materials;
      vii. Legislation for rationalization of energy and water consumption in existing buildings;
      viii. Project on autonomous houses;
      ix. Application of sustainability standards in residential complexes;
      x. Global partnerships for energy conservation.
   d. Green Workforce & Talent Programme
      i. Integration of green economy and sustainable development in school curricula;
      ii. Classification of green jobs under the existing job categorization;
      iii. Introduction of new vocational training courses at national and local levels;
      iv. Incentives and promotion of green jobs for new graduates;
      v. Promotion of partnership between academia and industry.
3) Sustainable Environment & Valued Natural Resources:
   e. Natural Capital & Resilience Programme
      i. Monitoring and control of groundwater level and quality;
      ii. Regulation of groundwater exploitation through drilling permits;
      iii. Environmental impact assessment of development projects;
      iv. Development and implementation of a climate change adaptation strategy;
      v. Monitoring and management of terrestrial and marine habits;
vi. Blue Carbon projects;
vii. National Smart Natural Capital and Resilience programme;
viii. Fisheries sector’s change management;
ix. Management and monitoring of coastal and marine environment;
x. Regulation and monitoring of sewage discharge;
xi. Air quality monitoring and control.

f. Environmental Goods & Services Programme
i. Development of national eco-labels for products and services;
ii. Programme for improving added value in the global value chain of environmental goods and services (EGS);
iii. Safeguarding of policies for the emerging EGS sector;
iv. Promotion of EGS exports and capacity development;
v. Green public procurement policy.

4) Clean Energy and Climate Action:
g. Integrated Power & Water Management Programme
i. Integrated energy management strategy;
ii. Integrated water management strategy;
iii. Promotion of optimal design in power stations;
iv. Upgrading of gas turbines in water desalination units;
v. Reduction of transmission loss in electricity networks.
h. National Renewable Energy Programme
i. Mega solar PV projects;
ii. Advancing of concentrated solar power (CSP) deployment;
iii. Programmes promoting rooftop solar energy;
iv. Water and electricity tariff review;
v. Further dissemination of district cooling systems;
i. National Green Economy Data Programme
i. Energy Data Management and Automation project;
ii. Monitoring, reporting and verification (MRV) system on greenhouse gas (GHG) emissions;
iii. National Communications on GHG emissions to UNFCCC;
iv. Periodic public reports on GHG emissions and other data;
v. Identification and collection of environmental data;
vi. Identification and collection of economic and social data;
vii. Development of integrated electronic database on economic, social and environmental data;
viii. Further refinement and regular monitoring of Green KPIs;

5) Green Life & Sustainable Use of Resources:
j. National Energy and Water Efficiency Programme
i. National programme on efficiency of water and electricity consumption;
ii. Monitoring system for water control equipment;
iii. Water and energy efficiency standards and labelling;
iv. Demand-side water and energy management strategies and policies;
v. Smart metering and smart grid projects;
k. National Waste-to-Resource Programme
i. Strategies and legislation for integrated waste management;
ii. Legislation on environmental requirements in landfills;
3. KEY POLICIES AND REGULATIONS

Skills for Green Jobs in the UAE

### 3. Key Policies and Regulations

- **Setting of environmental requirements in waste-to-energy plants;**
- **Legislation on safe disposal of used batteries;**
- **Legislation on proper disposal of obsolete pesticides;**
- **Integrated waste management projects in the Northern Emirates.**

**I. National Sustainable Transport Programme**

- **Integrated transport plans;**
- **Low-emission zones;**
- **Consideration of alternative modes of transport in urban planning;**
- **Introduction of Intelligent Traffic Management Systems;**
- **Specification of efficiency and emissions of cars and phasing-out of inefficient vehicles;**
- **Development of technical standards that support the introduction of green vehicles;**
- **Promotion of responsible behaviour and sustainability in road transport;**
- **Incentive schemes for the use of alternative fuels;**
- **Awareness campaigns on sustainable transport.**

As one can see, green jobs and skills development strategies are an important component of the UAE Green Agenda to the extent of fully devoting two of the twelve programmes (the Green Workforce and Talent Programme and the National Green Innovation Programme) to topics such as greening TVET provision, green jobs classification, integration of green subjects in the curricula at school level, collaboration between industry and educational providers, youth employment for greening, licensing and accreditation of professional training programmes, scholarships in higher education, and green research incentives. In addition the Agenda recognises in two other programmes the need for raising awareness in the areas of sustainable transport and green manufacturing.

- **The Emirates Green Development Council,** which was formed in June 2015, coordinates and monitors implementation of the Green Agenda. The Green Agenda is a product of collaboration between six ministries and the seven Emirates. 2016 was the first year of implementation. Five Committees have been constituted to tackle particular issues, among them the Committee on Knowledge-based Economic Diversification (coordinator: Ministry of Economy) in charge of student scholarships for environmental studies, and the Committee on Development and Quality of Life (coordinator: Ministry of Infrastructure Development) in charge of vocational training for green jobs.

A number of initiatives have already been put in place. For instance the US$27 billion Dubai Green Fund, a programme for educating youth for tackling climate challenges; the Green Jobs Programme to assess the challenges of quantifying green employment; and the creation of 41 Green Key Performance Indicators that include the “number of green jobs”. However no comprehensive information is available for any of the programmes nor has information yet been made available on the work undertaken by the Committees.

### The National Environmental Education and Awareness Strategy 2015-2021

In 2015, the Ministries of Education and Environment decided to work together to raise awareness of environmental issues among school-children. The Environmental Awareness Strategy[21] aims to:

- **Educate youth to drive the UAE to a sustainable future**
- **Improve community’s commitment to sustainability and environmental protection**
- **Encourage active involvement of businesses and industries in moving towards environmental sustainability**
- **Engage key government stakeholders in supporting environmental sustainability**
- **Ensure alignment and effectiveness of**

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environmental education and awareness efforts in the UAE

- Build adequate capabilities in the UAE to facilitate delivery of the strategy.

A number of programmes and initiatives were conceived to accomplish the above goals, but to date not much work has been undertaken on reporting the achievements.

Apart from the Green Agenda, most existing laws and policies in the UAE do not directly address the concept of green jobs or skills development strategies. A non-comprehensive compilation of relevant regional policies is described below.

**Regional policies**

**Abu Dhabi**

- Abu Dhabi Economic Vision 2030, that aims to build a sustainable economy and puts the focus on energy/water efficiency and sustainability.
- Abu Dhabi Environment Vision 2030 and a number of policies focusing on urban planning, the built environment and waste management, which include the Estidama guidelines. Estidama is a mandatory building design methodology for constructing and operating buildings and communities more sustainably in Abu Dhabi that includes a certification programme for qualified professionals.
- Abu Dhabi Tarsheed programme, launched by Abu Dhabi Water and Electricity Authority to promote the efficient use of energy, launched the Kafa’ati programme in March 2017 to introduce energy-efficient and water-efficient technologies in commercial, government and institutional buildings, aiming to save 446 GWH of electricity annually and covering 5 million square metres of air-conditioned space. The initiative initially focuses on government buildings with plans to cover private buildings in 2019.

**Dubai**

- Dubai Integrated Energy Strategy (DIES) 2030, developed by Dubai Supreme Council of Energy (DSCE) to secure uninterrupted energy supply and moderate the growing energy and water demands of Dubai, and to increase the sustainability and competitiveness of its economy.
- Dubai Clean Energy Strategy 2050, which targets a 7 per cent share for clean energy in Dubai’s total power output by 2020, 25 per cent by 2030, and 75 per cent by 2050.
- Dubai Demand Side Management Strategy, to reduce energy and water demand by 30 per cent by 2030. A training programme has been recently developed as part of this initiative to avoid skills gaps.
- Dubai Green Mobility strategy, to encourage the use of sustainable transport and electric vehicles.
- Dubai Carbon Abatement Strategy 2021, to reduce carbon emissions by 16 per cent by 2021.

**Ras Al Khaimah**

- Ras Al Khaimah Demand Side Management Strategy (in process of being created).

**Important events**

**EXPO 2020**

In addition to the above policies and regulations, an important event constituted a catalytic reaction that boosted the greening of the UAE’s economy. In November 2013 the general assembly of the Bureau International des Expositions in Paris awarded Dubai the rôle of host of the next EXPO 2020 under the theme “Connecting Minds, Creating the Future”. EXPO 2020 will take place from 20 October 2020 until 10 April 2021, and will focus on three main areas: opportunity, mobility and sustainability. EXPO 2020 has already triggered the construction of a new metro line 15 km long in addition to a solar park generating 4 GWh of electricity through solar panels. The sustainability pavilion will also produce up to 22,000 litres of water a day, extracted from atmospheric humidity.
and through recycling of grey water. Once the Expo ends, the pavilion itself will be recycled as a centre for science and for children. The pavilion will exceed Leadership in Energy and Environmental Design (LEED) Platinum standards and will be the centrepiece for Expo’s green theme. The aim of showing the world important advancements in sustainability in the UAE has been the motivation for rapidly embracing the greening of its economy.
4. Skills development measures for the green economy

4.1 Skills needs identification / anticipation

As described in Section 2, the green transformation of the UAE’s economy is slowly starting to take place. Sectors such as retrofitting, public transport and renewables are creating an increased number of jobs and will have enormous employment potential in the years to come.

Some institutions identified future skills needs with potential as a barrier to the transition and decided to put in place strategies to close the skills gap. This is the case with RSB, Dubai’s water and electricity regulator, which worked together with the industry to create an accreditation scheme for ESCOs. During the development of the ESCO accreditation system, RSB discussed the barriers to market growth with a number of stakeholders including the few ESCOs that were already operating in Dubai. The result of the discussions showed that barriers were finance, trust and confidence and knowing what to do when things went wrong. The accreditation scheme addresses each of these areas. Etihad ESCO was set up to provide access to projects and ease financing challenges, and standard contracts for Guaranteed and Shared saving contracts have been developed and are available on RSB’s website. To assist in consumer confidence, RSB provided the accreditation service and assistance in determining accreditation criteria, and also sought to provide potential consumers with confidence that accredited ESCOs were indeed energy professionals. The Association of Energy Engineers’ Certification for Energy Managers (CEM) and the Certification for Measurement and Verification Professionals (CMVP) were recognised by the ESCO community as reasonable qualifications that recognised people of sufficient ability and experience to work in the ESCO sector. Hence RSB included these criteria in the scheme, entailing having at least two qualified professionals among its permanent staff in the UAE. Nowadays the increased availability of CEM and CMVP training programmes has mitigated the lack of qualified professionals. As a result the energy efficiency labour market is enjoying momentum in the UAE. Certifications such as CEM, CMVP and Certified Energy Auditor (CEA) greatly increase the employability of individuals.

The recent Shams Dubai initiative launched in 2015 for installation by the Dubai Electricity and Water Authority (DEWA) of solar PV on rooftops has driven demand for Solar PV “Junior” and “Senior” experts. From the beginning DEWA realized the potential skills shortage and developed ad hoc training as part of the initiative. As a result a total of 352 engineers have been provided with the adequate skills to successfully install solar panels on UAE’s rooftops (see case study) and connect them to DEWA’s grid.

As such, ESCO/Energy management companies have flourished, creating green jobs in the positions of Energy Manager, Energy Auditor, Retrofitting Project Manager, Controls Engineer, LED Lighting expert, Solar Engineer, and Retrofitting & Solar Sale Professionals, among others. Dubai Municipality has recently launched its building rating scheme which may trigger further sudden demand for Energy Auditors if all UAE’s existing buildings are to be audited and rated. Other existing occupations required for greening of skills sets include Facility Manager (see case study). However, a shortage of water professionals in the UAE was identified during the interviews. Data from water savings achieved in retrofitted buildings has decreased from 2016 levels which is probably due more generally to a lack of availability of adequate skills.

The green new building sector also requires specific certifications, such as LEED and
Estidama. Abu Dhabi’s Estidama Pearl Building Rating System is another example of a green programme at local level that grasped the importance of closing the skills gap to avoid potential barriers in its implementation. Estidama is a mandatory building design methodology for constructing and operating buildings and communities more sustainably in Abu Dhabi. Individuals interested in working on Pearl Rated projects should become Pearl Qualified Professionals (PQPs); at least one PQP is mandatory per project planned for development within the Emirate of Abu Dhabi.

In renewables, according to the Thilanka M. et al. report by Masdar professors, R&D and manufacturing jobs are more likely to be foreign and stable jobs, while installation jobs are more likely to be local and temporary; O&M workers are also local and permanent. These are probably the key dynamics in the UAE. Currently the 100MW solar power plant Shams 1 in Masdar employs a total of 90 permanent workers in O&M. Professionals range from the more technical occupations of Plant Manager, Commissioner Engineer, Design Review Team and Site Manager to the more generic occupations of Finance Manager, HSE Manager and Project Control Manager. Masdar has created detailed job profiles for all current Shams 1 positions which may help educational providers draw up adequate curricula and researchers to collect occupational data and statistics.

The job profiles include:
1) Job details
2) Basic function
3) Health and safety
4) Main activities
5) Job context
6) Attitude and problem solving
7) Number of staff supervised and budget responsibilities
8) Qualifications, experience and skills
9) Key accountabilities

Other skills typically required in the UAE, albeit to a lesser extent than in the previous examples, have to do with air quality, EIA, ecology, EHS, ISO 14064, ISO 50001, CDM, and sustainability reporting, among others. However, these professionals are often required to have skills in multiple areas at the same time to be enable them to be allocated to different projects according to demand, otherwise employers argue that there is no economic justification for hiring many specialists who can only undertake a very narrow range of work. Skills related to waste management and recycling skills are reportedly not to be in demand which is reflected in the high rates of waste dumped in fields in the UAE. Increasing the availability of skilled professionals may drive the development of waste management and recycling projects.

In addition to those skills typically attributed to the green sector, transversal skills are also sought after. Currently the most wanted workers in the UAE are engineers to oversee design, construction and implementation of projects, whether they be for construction of new projects, retrofitting of buildings for ESCO contracts or standalone renewable energy (primarily PV) projects. Therefore mechanical and electrical engineering skills are the most sought-after, both quantitatively and qualitatively. For instance, Dubai’s metro extension to the EXPO 2020 site has created a large number of jobs in the construction of the new line. The works started in 2017 and will continue up to 2020. Mechanical and Electrical Engineers and Inspectors are the most common roles. However Civil Engineers, Designers, Project Managers are occupations that have also been filled.

In addition, Project Management Professionals (PMP) & Primavera qualifications are very much in demand in the UAE whenever timelines, resources, risk management activities, cost control and so forth are involved. Project management skills or certifications are requirements often demanded by the government in large tendered projects to avoid delays in execution.

Another frequently required skill is previous GCC experience. This is true for all trades and occupations but more so in the case of Business
Development Managers or other technical roles with a sales component in their job description. Typically, hiring someone based in the UAE is a preference, but most organisations are happy to hire from overseas for senior or highly specialist roles. Notably when hiring for commercial activities (sales, business development, client management), it is deemed essential that candidates are based in the UAE and able to demonstrate their in-country experience. **Multilanguage** skills are often an advantage, with preference for English, French and Arabic. In 2016 one of the largest online career portals in the region conducted an employer survey in the UAE23, which could be potentially extrapolated to the green scene. The following nine soft skills are those that companies listed as most desired:

1) Team player  
2) Bi-lingual communication skills  
3) Efficiency  
4) Leadership skills  
5) English fluency  
6) Ability to work under pressure  
7) Good negotiation skills  
8) Passion or ability to make a difference  
9) Ability to take on challenges

According to interviews, in the green sector individuals with up to five years of relevant experience are relatively easy to find at local level given the availability of high-quality university courses delivered locally. This has enabled projects to be developed and delivered, which in itself may be considered as a driver of green transformation. A smaller pool of available professionals exists when the required length of experience is 5-10 years. However, for individuals with 10 or more years of experience, given that greening is still a relatively new area of expertise, there tends to be a **lack of senior professionals with local experience available in the market.**

**Shortages among UAE nationals are found primarily at the mid-career level in the green sector.** The increase in the volume of dynamic, motivated and highly-educated Emiratis is evident in the increased ability of organisations to effectively hire Emirati’s at a Senior Managerial or Directorship level, but issues remain regarding development of a sufficient and sustainable volume of UAE nationals who are interested in and capable of undertaking mid-level roles – for which a **key challenge is combining technical knowledge and expertise with some project management responsibility.** At the junior and graduate end of the scale, this does not seem to be a significant constraint and organisations can often hire relatively easily given the natural affinity of many UAE Nationals with the ethos of the sustainability sector.

### 4.2 Education and training

#### Higher Education

The UAE hosts a large number of international universities and institutes of technology such as NYU, American University, British University, Sorbonne, RIT and others, and collaborates with top-ranked entities such as MIT. In addition, top business schools such as INSEAD and LBS have a presence in the country; these private institutions provide training for the majority of the students in the UAE. As shown in Table 4, the most popular specialities in higher education during the 2015/2016 term were business and economics followed by engineering for non-nationals and sharia and law for nationals. Environmental and health sciences attract fewer students, yet ranks fourth among non-nationals with a much lower rate of success among nationals. In government universities the percentages are similar to those of private universities (see Table 5).

#### TVET Training

Currently, UAE ‘s TVET provision does not contain any green component whatsoever. However a large number of green jobs are positions that have existed for many years but are simply being applied in the green economy; for instance, Facility Managers have existed for decades but their focus on energy conservation is comparatively recent. Therefore within this context new TVET courses or the upgrade of
existing courses can offer a practical way for people to modify their skills (up-skilling), improve their employability and contribute to the greening of the UAE´s economy (see case study).

### Short Courses

**Lifelong learning is one of the main pillars in which the retrofitting sector in Dubai has achieved success.** Employers´ organizations such as the Emirates Green Building Council for Sustainable Development currently offer a series of professional training programmes aimed at supporting the Green Building industry in the UAE. Building Retrofit Training, WELL training and LEED are offered both on-line and in-classroom. Universities in the UAE also provide short courses. For instance, Hamdan Bin Mohammed Smart University delivers the course “Designing and developing Smart Cities”; and the British University is one of the pioneers in providing CEM, CEA and LEED courses. Short courses also have space in government initiatives, for example DEWA for PV panel installers on rooftops as part of the Shams initiative and the Abu Dhabi government´s Estidama Pearl Qualified Professional as part of the Estidama Guildelines. Lifelong learning in capacities other than green building and retrofitting may exist in the UAE, but the predominance is in these two areas.

### Raising awareness among youth

The importance of raising awareness and building capacity among young UAE nationals to prepare the younger generations to work for a brighter and more sustainable future is key for the UAE government. Some pioneering work has already been done but much more still needs

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**Table 4. Higher education. Number of students at private higher education institutions by specialist, nationality and sex, 2015/2016**

<table>
<thead>
<tr>
<th>SPECIALISTS</th>
<th>NON–NATIONAL</th>
<th></th>
<th></th>
<th>NATIONAL</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TOTAL</td>
<td>FEMALE</td>
<td>MALE</td>
<td>TOTAL</td>
<td>FEMALE</td>
<td>MALE</td>
</tr>
<tr>
<td>Arts &amp; Design</td>
<td>1,746</td>
<td>1,390</td>
<td>356</td>
<td>245</td>
<td>225</td>
<td>20</td>
</tr>
<tr>
<td>Engineering</td>
<td>12,193</td>
<td>4,160</td>
<td>8,033</td>
<td>5,703</td>
<td>3,000</td>
<td>2,703</td>
</tr>
<tr>
<td>Information Technology</td>
<td>2,441</td>
<td>864</td>
<td>1,577</td>
<td>1,272</td>
<td>550</td>
<td>722</td>
</tr>
<tr>
<td>Business &amp; Economics</td>
<td>15,465</td>
<td>7,120</td>
<td>8,345</td>
<td>12,457</td>
<td>4,759</td>
<td>7,698</td>
</tr>
<tr>
<td>Education</td>
<td>2,559</td>
<td>2,100</td>
<td>459</td>
<td>784</td>
<td>695</td>
<td>89</td>
</tr>
<tr>
<td>Sciences</td>
<td>339</td>
<td>256</td>
<td>83</td>
<td>136</td>
<td>109</td>
<td>27</td>
</tr>
<tr>
<td>Foreign languages</td>
<td>377</td>
<td>332</td>
<td>45</td>
<td>219</td>
<td>132</td>
<td>87</td>
</tr>
<tr>
<td>Environment &amp; Health Sci.</td>
<td>3,900</td>
<td>3,264</td>
<td>636</td>
<td>849</td>
<td>799</td>
<td>50</td>
</tr>
<tr>
<td>Medical Sciences</td>
<td>4,104</td>
<td>2,759</td>
<td>1,345</td>
<td>684</td>
<td>612</td>
<td>72</td>
</tr>
<tr>
<td>Communication &amp; Media Science</td>
<td>2,799</td>
<td>1,775</td>
<td>1,024</td>
<td>5,596</td>
<td>1,975</td>
<td>3,621</td>
</tr>
<tr>
<td>Sharia &amp; Law</td>
<td>2,963</td>
<td>1,245</td>
<td>1,718</td>
<td>6,873</td>
<td>2,379</td>
<td>4,494</td>
</tr>
<tr>
<td>Hum &amp; Social Sciences</td>
<td>3,495</td>
<td>2,824</td>
<td>671</td>
<td>2,125</td>
<td>1,620</td>
<td>505</td>
</tr>
<tr>
<td>Agriculture</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Foundations</td>
<td>620</td>
<td>290</td>
<td>330</td>
<td>2,234</td>
<td>1,307</td>
<td>927</td>
</tr>
<tr>
<td>Undeclared major</td>
<td>668</td>
<td>329</td>
<td>339</td>
<td>299</td>
<td>95</td>
<td>204</td>
</tr>
<tr>
<td>Total</td>
<td>53,669</td>
<td>28,708</td>
<td>24,961</td>
<td>39,476</td>
<td>18,257</td>
<td>21,219</td>
</tr>
</tbody>
</table>

*Source: Ministry of Higher Education & Scientific Research*
Skills for Green Jobs in the UAE

4. Skills Development Measures for the Green Economy

4.3 ALMPs and retraining measures

Despite being the most diversified economy in the GCC region, the UAE is still heavily dependent on fossil fuels. In mid-2015 the oil price dropped, leading to massive job cuts among the foreign workforce in major State-owned and private oil companies, with no direct retraining strategy implemented by the government or social actors to absorb laid-off workers back into the labour market. Even though many were experienced engineers and managers, a majority had to leave the country. It is not documented whether or not this situation led to employment losses in other sectors such as transport, retail, banking and hospitality but sources estimate that this might be the case.  

Table 5. Number of students at government higher education institutions by specialist, nationality and sex, 2015/2016

<table>
<thead>
<tr>
<th>SPECIALISTS</th>
<th>NON-NATIONAL</th>
<th>NATIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TOTAL</td>
<td>FEMALE</td>
</tr>
<tr>
<td>Arts &amp; Design</td>
<td>24</td>
<td>23</td>
</tr>
<tr>
<td>Engineering</td>
<td>751</td>
<td>331</td>
</tr>
<tr>
<td>Information Technology</td>
<td>189</td>
<td>127</td>
</tr>
<tr>
<td>Business &amp; Economics</td>
<td>711</td>
<td>421</td>
</tr>
<tr>
<td>Education</td>
<td>150</td>
<td>139</td>
</tr>
<tr>
<td>Foreign Languages</td>
<td>106</td>
<td>106</td>
</tr>
<tr>
<td>Environment &amp; Health Sciences</td>
<td>223</td>
<td>203</td>
</tr>
<tr>
<td>Medical Sciences</td>
<td>22</td>
<td>13</td>
</tr>
<tr>
<td>Communication &amp; Media Sciences</td>
<td>172</td>
<td>133</td>
</tr>
<tr>
<td>Sciences</td>
<td>407</td>
<td>263</td>
</tr>
<tr>
<td>Sharia &amp; Law</td>
<td>97</td>
<td>46</td>
</tr>
<tr>
<td>Human &amp; Social Sciences</td>
<td>264</td>
<td>217</td>
</tr>
<tr>
<td>Foundations</td>
<td>1,158</td>
<td>782</td>
</tr>
<tr>
<td>Agriculture &amp; Food</td>
<td>42</td>
<td>14</td>
</tr>
<tr>
<td>Undeclared major</td>
<td>46</td>
<td>32</td>
</tr>
<tr>
<td>Total</td>
<td>4,362</td>
<td>2,850</td>
</tr>
</tbody>
</table>

Source: Ministry of Higher Education & Scientific Research

25 Gulf news. 2015. Article ‘Job cuts’ reported in oil and gas industry in UAE.
26 Reuters. 2016. Article Abu Dhabi lays off staff as Gulf austerity tightens.
27 Financial Times. 2016. Article Expats take flight as Abu Dhabi tightens purse strings.
### Table 6. Selected Higher Education programmes for greening in the UAE

<table>
<thead>
<tr>
<th>UNIVERSITY</th>
<th>BACHELOR</th>
<th>MASTERS</th>
<th>PHD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamdan Bin Mohammed Smart University</td>
<td>Excellence in Environmental Management</td>
<td>Renewable Energy Engineering</td>
<td>Engineering and Physical Sciences</td>
</tr>
<tr>
<td>Heriot Watt</td>
<td>Chemical Engineering</td>
<td>Engineering and Physical Sciences</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Energy, Geoscience, Infrastructure and Society</td>
</tr>
<tr>
<td>Amity University</td>
<td>Solar and Alternative Energy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American University of Sharjah</td>
<td>Environmental Sciences</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minor in Environmental Policy</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minor in Environmental and Water Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minor in Environmental Sciences</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minor in Renewable Energy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>British University</td>
<td>Sustainable design of Built Environment Programme</td>
<td>Architecture and Sustainable Built Environment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intelligent Buildings Design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canadian University</td>
<td>Environmental Health Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NYU</td>
<td>The Environment Minor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masdar</td>
<td>Health, Safety and Environmental Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sustainable Critical Infrastructure</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Water and Environmental Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Water and Environmental Technologies</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Water and Environmental Resources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paris-Sorbonne</td>
<td>Environment: Dynamics of Territories and Societies</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: Author from online sources*
Personnel who have been providing support services (HSE, Finance, HR, Admin) are often the easiest to transfer into green sectors, according to interviews. Nowadays it is very rare that one sees Oil and Gas (O&G) engineers successfully making the transfer – fundamentally because they lack the direct experience but still wish to maintain their previous earning levels.

Currently Masdar is conducting research on green restructuring in the UAE by identifying common occupations in both oil and gas and green sectors. The occupation title and full profile (job description) is analyzed to ascertain whether retraining programmes can be implemented for those professionals that will lose their jobs as the transition progresses.

Finance Departments and Business Owners (C-suite) have been highlighted during interviews as a potential target group for retraining policies. If these workers can be retrained to understand that going green is often a financially beneficial decision in the long term, then they will start to influence their organizations internally to focus on long-term savings rather than merely a short-term higher CAPEX, and this in turn will expand the industry and create more jobs. The Dubai Energy Efficiency Training Programme has realized this need and is currently providing training to executives and financiers to build capacity on potential energy and water savings for companies (see Case Study 1).

According to the consulted sources, no ALMP measures are being implemented in the UAE, and if they do exist it is expected that they are focused solely on UAE Nationals. Employment services and recruiters do not currently provide training for job seekers.

4.5 The role of institutional set-up

The development, coordination and monitoring of the UAE’s greening policy are undertaken by the Emirates Green Development Council, formed in June 2015 as a coordinated inter-agency effort to transform the economy into a more sustainable one. The Council’s members come from various federal agencies and representatives of local authorities including the Ministry of Climate Change and Environment, the Ministry of Energy, the Ministry of Public Works, the Ministry of Finance, the Ministry of Economy; the Environment Agency of Abu Dhabi, the Dubai Supreme Council of Energy, the Environment and Protected Areas Authority in Sharjah, the Executive Council of the Emirate of Ajman, Fujairah Municipality, the Environment Protection and Development Authority in Ras Al Khaimah, the Ministry of Foreign Affairs and the Executive Council.

As discussed in Section 3, two of the twelve programmes of the UAE Green Agenda 2015-2030 have been fully devoted to education for green jobs with topics such as greening of TVET provision, green jobs classification, integration of green subjects in the curricula at school level, and so forth. However, it is interesting to note that no representatives from labour or education authorities at federal or local levels seem to be involved in the Council. Nor does the Council seem to involve the industry sector or educational providers.

On a smaller scale, notably at local level, closer collaboration with the industry
and the education sector seems to occur occasionally. This collaboration is generally led by the local authorities. This is the case with the Abu Dhabi Quality and Conformity Council (ADQCC) which is currently working on a Personnel Conformity Scheme. It involves a certification programme that ensures that certified individuals meet the requirements of Abu Dhabi as set by both regulators and industry. The personnel certification is based on the results of a testing programme developed and designed by the training and testing centres recognized by the ADQCC, involving private and public entities. Therefore ADQCC’s current personnel conformity programmes will ensure that workers have passed minimum quality standards specified for each occupation covered. The Scheme covers mainly construction-related trades and includes minimum requirements relevant for greening, for example HVAC technicians to improve the operational efficiency of air conditioners, plumbers to retrofit buildings with water-saving devices, and Solar PV systems installers. The Scheme is currently launching its implementation process.

A successful case of institutional set-up with proven market creation is the retrofitting sector in Dubai which is fully described in Case Study 1, the skills anticipation section of Chapter 4 and the retrofitting section of Chapter 2. It is characterised by social dialogue with private sector involvement in the design of the ESCO accreditation scheme. Another important feature of this collaboration is the mix of coordinated entities working together in policy development, accreditation, facilitation and coordination, including an Energy Efficiency Training Programme created in collaboration with education providers.

On the education front, interviews and desk research did not entirely clarify the identification of the skills needs process followed in the UAE for the general economy or the green economy. There seems to be a requirement from authorities that higher education providers should prepare a justification study in order to be granted the relevant permit to provide new curricula. The required content of the justification study and the process for conducting such a study are unclear and it is uncertain whether or not a market analysis in collaboration with the public and private sectors is mandatory.

In TVET, the Qualifications and Awards in Dubai (QAD), recently formed in 2015, claims to have pioneered the evolution of TVET in the region. QAD works with stakeholders to safeguard the quality and integrity of TVET and to meet targets for skills development across Dubai and the UAE. Stakeholders include learners, employers, TVET providers and government. All together work in the development of qualifications. Nowadays no single TVET programme includes a green component, but QAD has expressed interest in learning from best practices in other countries. Similarly, its equivalent in Abu Dhabi has shown the same interest in greening TVET provision.
5. Analysis of case studies

Case Study 1 – Clear vision, institutional set-up, social dialogue and closing the skills gap led to a successful retrofitting sector in Dubai

The Dubai Demand Side Management Strategy created by the Dubai Supreme Council of Energy in 2011 established the objective of retrofitting 30,000 buildings by 2030. That means a reduction in energy consumption of 30 per cent by 2030. For that purpose a Super ESCO public company was created in 2013: Etihad Energy Services (previously known as Etihad ESCO). This government-owned company seeks large energy-saving projects among government buildings and large owners, facilitates access to financing, manages tendering and oversees project delivery by private ESCOs. The final aim is to create a private ESCO market, guaranteeing at the same time a good-quality service and advising owners on the best way to undertake a retrofit project as well as accompanying owners along the road to project delivery.

The Dubai Energy Efficiency Training Programme is a Dubai government initiative mandated in March 2018 by the Dubai Supreme Council of Energy and led by TAQATI (part of Etihad ESCO) in partnership with the British University in Dubai, the Association of Energy Engineers, and the International Institute for Energy Training. The Programme brings in a suite of internationally- and locally-certified training programmes and modules to cater for the learning and development needs of different audiences in Dubai’s energy sector. It has four objectives:

- Build the right capabilities to achieve Dubai’s ambitious target of 30 per cent reduction in energy consumption by 2030
- Improve understanding and adoption of new energy-efficient technologies
- Foster a community of innovators and thought-leaders on energy efficiency in Dubai
- Create value for Dubai through offering continuous professional development opportunities

The lifelong learning training programmes provided under this initiative (see Table 7 above) cover a large part of the value chain of the new green building and building retrofitting sectors, ranging from design, construction, commissioning, O&M, facility management, and so forth. The majority of programmes target architects and technical engineers (mainly electrical engineers) working in ESCO companies, design studios or even companies interested in reducing the energy and water consumption of their facilities. However the initiative does not overlook executives and financiers, both groups targeted by the performance contracting and funding programmes.

The initiative is a product of collaboration between the public sector (Dubai Supreme Council of Energy and Etihad ESCO), educational providers (British University in Dubai and the International Institute for Energy Training) and a professional association (Association of Energy Engineers). In addition, the training programmes respond to the regulator Dubai Regulatory and Supervisory Bureau (RSB) ’s skills requirements for the ESCO companies to become accredited. The RSB discussed with the industry the required skills before introducing them as part of the accreditation. Currently Etihad ESCO only allows RSB accredited ESCOs to take part in their tenders. Therefore, all accredited ESCOs have among their staff at least CEMs and CMVP accredited professionals as the minimum requirements set up by RSB.

Even though the partnership was formally established only recently, all the entities involved have now been collaborating in an informal manner for a few years. As a result, and according to the RSB Dubai in its Annual Report 2017, the achieved savings in Dubai have increased over time.
The retrofitting of existing building continues to grow healthily in Dubai thanks to coordination between all relevant parties and the integration of training programmes as a fundamental part of achieving the 2030 goals, as well as to adequate electricity tariffs that make business sense for retrofitting projects in Dubai.
5. ANALYSIS OF CASE STUDIES

Q Case Study 2 – Greening existing jobs: Facility Managers

It is interesting to notice how the above initiative, the Dubai Energy Efficiency Training Programme, includes facility managers as a target group and delivers training for them, namely the Building Operator Certification (Table 9). Given the fact that most of the buildings in Dubai are high-rise or large commercial buildings, a group of facility managers is permanently on site. This training teaches them how small changes in the daily management of the building can make big differences in the consumption patterns.

Table 9. Building Operator Certification training

| Overview | The Building Operator Certification (BOC®) programme has been developed by the Northwest Energy Efficiency Council (NEEC), based in Seattle, WA. It is a widely recognized training programme, with more than 14,000 certified professionals in North America, including 175+ in Canada. It is an eight module, nine-day competence-based training and certification programme, offering facilities personnel the improved job skills and knowledge needed to render workplaces more comfortable, energy-efficient and environmentally friendly. Each class consists of classroom training and project assignments, to be completed at the participant’s facility, and through in-class exams. |
| Course Outline | Energy Efficiency Operation of Building HVAC Systems  
> Measuring & Benchmarking Energy Performance  
> Efficient Lighting Fundamentals  
> Fundamentals of HVAC Controls  
> Indoor Environmental Quality  
> Common Opportunities for Low-cost Operational Improvements  
> Facility Electrical Systems  
> Operation & Maintenance Practices for Sustainable Buildings |
| Eligibility Criteria | High school diploma AND At least 2 years of experience working in operations and maintenance of a commercial or institutional facility OR 2 years of experience in energy management of facilities with a focus on operations and maintenance  
1-year technical college degree in a topic related to facilities engineering. AND At least 1-year of experience working in operations and maintenance of a commercial or institutional facility |

Q Case Study 3 – New green occupation Solar PV Expert Junior & Senior for rooftops: Shams Dubai

Shams Dubai encourages household and building owners to install PV panels on their rooftops to generate electricity and connect them to the grid. The electricity is used on site and the surplus is exported to the electricity network.

As part of this initiative minimum compliance requirements have been set up by the Dubai Electricity and Water Authority (DEWA) for consultants or contractor companies. As in the case of the ESCO accreditation scheme, the Shams Dubai compliance scheme includes the need to demonstrate that qualified employees are part of their permanent staff in the UAE. As such, the table below shows the number of employees certified by DEWA as Solar PV Experts required for consultants and contractors.
The objective of the Solar PV certification scheme is to ensure that Solar PV systems connected to DEWA grid are designed and constructed by professionals with adequate training and skills. This serves multiple purposes, helping to ensure:

- High standards of safety
- Compliance with required technical standards
- Quality of design and installation for customers
- Protection for the public and for DEWA

The requirements to obtain the Solar PV certification are for the nominated applicants to attend the full training programme organized by DEWA (which lasts 5 days) and successfully completing the final test. The details below are the prerequisites for being able to enroll in DEWA PV Solar Senior and junior training courses.

As a result, 435 buildings in Dubai have already installed photovoltaic panels on their roofs and generated a total capacity of...
Skills for Green Jobs in the UAE

15.6 megawatts (MW) of power since the Shams Dubai initiative was launched in 2015. By October 2017, 352 PV engineers had already been certified. The initiative is considered a product of collaboration between government and society by engaging people in a win-win situation. Sections of society become shareholders in generating solar energy, thus supporting the government’s ambitious clean energy goals. At the same time, the initiative does take into consideration potential skills mismatches and provides a certification to bridge the gap and ensure high standards of quality.

Case Study 4 - Carbon ambassadors: an engagement programme for young UAE nationals

The importance of committed youth among UAE nationals in the area of Climate Change has driven the government to implement engagement programmes such as the Carbon Ambassadors Programme. Young UAE nationals from all Emirates are voluntarily involved in a 1-year programme as an add-on to their ongoing university studies.

The programme was launched by the Dubai Electricity and Water Authority (DEWA), with the support of the United Nations Development Programme and the Ministry of Climate Change and Environment, and in cooperation with the Dubai Carbon Centre of Excellence.

Some of the workshops conducted throughout the year include greenhouse gas emissions quantification through teaching the ISO 14064 standard. Other sessions employ ESCO specialists to convey some of the notions of retrofitting. The concepts behind LEED and other rating schemes are also part of the programme. The PRINCE 2 foundation course for project management is also made available for UAE nationals interested in applying for the certification. In addition, it includes raising awareness on a number of climatic and environmental issues in the UAE.

A strategic partnership with the Ministry of Foreign Affairs and the Directorate of Energy and Climate includes exposing students to first-hand experience with negotiations through attending a series of international meetings, including the UN negotiations on climate change and the Conference of the Parties, giving an opportunity to some of the students to accompany the UAE delegation to the UNFCCC conferences around the world.

Along with the strategic partnerships, other public and private entities have participated in the programme (such as DP World, the International Humanitarian City, Consolidated Constructions Company, CH2M Hill, and Buro Happold Engineering among others) by guiding the students in hands-on projects such as transforming reused shipping containers into self-sufficient climatized bus stops as part of the programme.

The government aims with this programme to raise awareness, build capacity and enhance creativity among those who will be the future leaders of the UAE and climate change champions.

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29 DEWA. 2017. Article DEWA announces 453 buildings have photovoltaic installations as part of Shams Dubai with a total capacity up to 18.7 MW, 28 October 2017.
6. Conclusions and recommendations

6.1 Conclusions

Even though the UAE is considered as heavily reliant on fossil fuels, the government has set ambitious goals towards greening its economy and conveyed its commitment to sustainable living.

Considerable efforts have been put into place by the government to conceive comprehensive policies and institutional set-ups that still need to demonstrate success. In general, there is a lack of cooperation between the government, the industry and the educational providers which may cause a barrier in moving forward with UAE’s greening plans.

The transition process has been first - albeit in a rather uncoordinated manner - in the development of some isolated projects, particularly in the renewable energy sector, after which more coordinated policy developments and implementation have taken over, inspired by the UAE Vision 2021 launched in 2010 by HH Sheikh Mohammed bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai.

However, given the federal government structure, regional-level approaches for greening seem more successful and are being introduced for each Emirate in an independent fashion in time and form, Dubai being the Emirate leading the way, followed by Abu Dhabi. The other Emirates are lagging far behind in greening their economies.

Sectoral approaches at regional level have had proven success in the case of energy efficiency. A clear vision established by the ruler, strong leadership at government level, an efficient and coordinated institutional set-up, social dialogue, and a closing of the skills gap, have been key to this achievement.

Renewable energy and energy efficiency are currently the two sectors with greater potential in terms of green jobs creation, given the strong government focus, the special weather conditions, the growing population and the inefficient building stock.

However, other critical sectors for UAE’s sustainability seem to lag behind. This is the case with waste management and water management among others. Interviewees have given a number of reasons, including the lack of specialists and awareness-raising campaigns in both areas.

Green jobs and skills development strategies are an important component of the UAE Green Agenda launched in 2015 which includes topics such as greening TVET provision, green jobs classification, integration of green subjects in curricula at school level, collaboration between the industry and educational providers, youth employment for greening, licensing and accreditation of professional training programmes, scholarships in higher education, green research incentives, and awareness-raising. However, so far not much implementation has been reported, as demonstrated by the fact that TVET provision still does not have a green component in the UAE.

Leadership on green jobs issues seems to be inadequate and there is no comprehensive green jobs strategy with clear deadlines and owners.

Apart from the green agenda, most existing laws and policies in the UAE at regional and federal level do not directly address the concept of green jobs or skills development strategies.

The lack of available statistics at federal level has been a major drawback in the preparation of this report. The Federal Competitiveness and Statistics Authority (FCSA) uses ISIC and ISCO both at 1-digit level for its Labour Force and Establishment surveys at UAE level. The latest data published by FCSA on economic activities is from 2008, and is too aggregated for
6. CONCLUSIONS AND RECOMMENDATIONS

extraction of relevant statistics for green jobs. The UAE does not quantify green employment at federal or regional levels. The data gaps are found in terms not only of employment but also of environmental statistics, building stock, economic indicators, and others. Hence a difficulty in compiling information has arisen, with a need for frequent reliance on newspaper articles.

Existing available research on green jobs is almost non-existent. More understanding of the situation is needed to inform policy-makers.

Desk research and stakeholder consultations have not helped identify any entity or institutional set-up responsible for identifying and anticipating skills needs. As reported, higher educational providers produce their own analysis on skills needs before launching a training programme. It is not known whether educational providers consult employers and workers in this process.

There is a no inclusion of a green component in TVET training provision.

Tertiary education has developed an increasing number of new green programmes in the form of Masters, PhDs and Bachelor degrees, mainly in the areas of renewable energy engineering, environmental studies, sustainable built environment and, to a lesser extent, water studies. The inclusion of a green component in existing programmes is limited.

Short courses for lifelong learning take place mainly in the energy efficiency sector. International certifications related to energy management and auditing greatly improve the employability of individuals. Companies do not seem to provide training for their employees on a regular basis. Ad hoc training on the installation of solar structures is being set up.

There is a deficiency of information on the loss of jobs in non-green sectors such as oil and gas. However, job losses may not be attributed to green restructuring but rather to falls in oil prices. Difficulties have been found in absorbing workers from high-emitting sectors to growing green sectors owing to lack of experience and training and also to inadequate salaries. No retraining strategy has been put into place and laid-off workers tend to leave the country.

Incentives for green entrepreneurship do not exist.

An increased number of UAE nationals seem to have an interest in green-related occupations. Fresh UAE national graduates are available for recruitment. However, mid-senior level candidates are very difficult to find in this group. Hence there is a shortage of UAE nationals with green skills and experience.

According to the sources consulted, no ALMP measures are being implemented in the UAE, and if they do exist it is expected that they are solely focused on UAE Nationals. There are no public employment services, at any rate for the foreign population.

The transition to a green economy in the UAE has led to the creation of entirely new occupations such as Energy Manager, Energy Auditor, LED Lighting Expert, and Solar Panel Engineer among others, and greening of existing occupations is also taking place, examples being Project Managers, Control Engineers, Facility Managers, Plant Managers, and Commissioned Engineers, among others.

Mechanical and electrical engineering skills in the overseeing of design and construction of projects are much sought after in the greening of UAE’s economy, along with skills and experience in solar energy management, public transport, green building, air quality, EIA, ecology, EHS, ISO 14064, ISO 50001, CDM and others. In addition, the inclusion of certain project management credentials as part of government tender processes has increased the need for certified professionals. Core skills are also in demand in the areas of bi-lingual communication, leadership, negotiation, and so forth.

Wherever skills shortages have been found, foreign recruitment has occurred. However interviews have indicated that previous GCC experience is preferred. Ambitious goals and a fast-moving path in the greening of the
Skills for Green Jobs in the UAE

UAE’s economy may encounter a barrier in the provision of skilled professionals owing to an inability to find workers locally. Lower-than-ever bidding prices may lead to lower salaries and difficulties in recruiting experts from abroad.

6.2 Recommendations

It is recommended that, in the light of the above conclusions, consideration be given to the following:

Further structured research segmented by sector and Emirate, in order to shed more light on the present and future of the world of work in the UAE’s green economy.

Occupational analysis by green sector, taking into consideration the value chain, in order to provide information to policy-makers on potential gaps and shortages so that skills provision can be adapted accordingly. The analysis may include identification of occupations, job content, required skills, education, certificates, growth and decline forecasts, and so forth.

Quantitative forecasts of job creation or destruction in greening, which is essential information segmented by sector and Emirate.

Anticipation of future skills needs qualitatively and quantitatively, important for avoiding future barriers to the transition. Understanding is needed of which sectors and occupations are going to be required in the future, for instance in the renewable energy sector so as to be able to train local individuals instead of bringing them in from abroad.

Promotion of skills development initiatives in coordination with green policies to improve the performance of lagging sectors, such as waste and water management, which are considered critical for the sustainability of the UAE.

Creation of (sectoral) Skills Councils, which will facilitate the necessary focus. Data collection, analysis, recommendations, implementation, monitoring are some of the tasks associated with these councils. Social dialogue is central to the delivery of a Council’s mandate; and the involvement of the government, private sector and educational providers are key to understanding future employment and skills demand.

Leadership in the topic of green jobs as well as a comprehensive and coordinated green jobs strategy, along with creation and retention of talent at local level.

Coordination between federal and regional governments to avoid duplication and improve results. Given the multidimensional nature of green jobs, inter-ministerial collaboration is also needed.

Inclusion of skills development strategies in green policies to support policy implementation. Stakeholder consultation in policy-making is also necessary.

Learning from best practices, such as in the case of the energy efficiency sector in Dubai, which can help other Emirates establish the right policy mix and institutional set-up to bring about a successful transition to a greener economy and develop the private sector.

Inclusion of a green component across all existing programmes, and creation of new curricula at all levels of education. It is important to increase awareness from an early age so that curricula at school level can be updated to include global and local environmental issues, including power, water and waste management. TVET provision needs to be updated so as to integrate green concepts into existing programmes (such as in the case of Facility Managers) and create brand-new green programmes for solar panel installers and other trades. Higher education needs to be expanded to integrate green studies into existing programmes.

Entrepreneurship incentives, targeting all residents and in particular UAE nationals, for green business creation. This will underpin Emiratization policies in terms of attracting UAE nationals to the private sector. These incentives
can include access to credit, fiscal deductions, grants, and so forth.

**Increased availability of short lifelong learning courses**, free for UAE residents, in the areas of solar energy management, public transport, green building, air quality, EIA, ecology, EHS, ISO 14064, ISO 50001, CDM and others, as well as core skills.

**Transition to the green economy in the UAE** to counteract the destruction of jobs in sectors such as oil and gas and serve as a new paradigm for local youth and women. The last-mentioned hold the highest unemployment rates (and are, surprisingly, the group with the highest percentage of tertiary education holders).

**Targeting of women and youth** when creating incentives, including subsidies.

**Development of public employment services** to provide career guidance, targeted training and coaching options.

**Promotion of development of apprenticeships and scholarship programmes**.

**Creation of retraining programmes** for those workers who have been laid off from high-emitting sectors and can be absorbed by growing green sectors so as to retain talent in the country.

**Creation of upskilling programmes for finance departments and business owners** (C-suite). If these workers can be retrained to realize that going green is often a financially beneficial decision in the long term, they will start to influence their organizations internally to look at long-term savings rather than merely a short-term higher CAPEX, and this in turn will help the industry grow and create more jobs.

**Collection and analysis of information on labour mobility dynamics across sectors and GCC countries**, potentially taking advantage of the benefits of mobility and migration to work with other GCC countries on coordinated skills anticipation, skills provision and retraining measures.
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8. List of key resource persons

- Sustainable Recruitment Solutions, Private Green Recruitment in ME;
- AD Quality and Conformity Council, Public entity that provides quality and standards for the industry in AD;
- Emirates Green Building Council, Green building industry association in UAE;
- Ernst & Young, Climate Change and Sustainability consulting in ME;
- Regulatory & Supervisory Bureau, Regulator of Dubai’s water and electricity sector.
### Table 12. Percentage Distribution of Workforce by Educational Level, Nationality Group and Gender 2016

<table>
<thead>
<tr>
<th>EDUCATIONAL LEVEL</th>
<th>TOTAL</th>
<th>NON NATIONAL</th>
<th>NATIONAL</th>
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<tbody>
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<td></td>
<td>Total</td>
<td>Female</td>
<td>Male</td>
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<tr>
<td>Illiterate</td>
<td>4.6%</td>
<td>6.5%</td>
<td>4.2%</td>
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<tr>
<td>Reads and writes</td>
<td>11.8%</td>
<td>14.6%</td>
<td>11.1%</td>
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<tr>
<td>Primary</td>
<td>13.8%</td>
<td>12.3%</td>
<td>14.2%</td>
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<td>The first stage of secondary education</td>
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<td>17.5%</td>
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<tr>
<td>Short-term higher education</td>
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<td>1.7%</td>
<td>1.7%</td>
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<tr>
<td>Bachelor or equivalent</td>
<td>3.9%</td>
<td>4.4%</td>
<td>3.7%</td>
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<tr>
<td>Higher Diploma after university</td>
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<tr>
<td>Master or equivalent</td>
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<td>PhD or equivalent</td>
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<tr>
<td>Other</td>
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<td>Total</td>
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### Table 13: Unemployment Rate by Educational Level, Nationality Group and Gender 2016

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<td>Male</td>
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<td>0.1%</td>
<td>0.1%</td>
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<td>Reads and writes</td>
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<td>0.2%</td>
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<tr>
<td>Primary</td>
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<td>The first stage of secondary education</td>
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<td>2.6%</td>
<td>0.7%</td>
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<td>Post-secondary non-tertiary education</td>
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<td>Bachelor or equivalent</td>
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<tr>
<td>Higher Diploma after university</td>
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<td>7.2%</td>
<td>1.5%</td>
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<td>Master or equivalent</td>
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<td>PhD or equivalent</td>
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<td>Other</td>
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