

F R O S T & S U L L I V A N



# Infrastructure & Construction

Industry in Dubai, UAE

Contents



Dubai Economy in collaboration with Frost & Sullivan have undertaken detailed studies of key industry and business segments in Dubai with a focus on trends and opportunities



# INFRASTRUCTURE AND CONSTRUCTION INDUSTRY IN DUBAI



Dubai is one of the most futuristic cities in the world, ranked 4<sup>th</sup> in the world for the overall quality of the infrastructure



UAE ranked 4<sup>th</sup> for  
**OVERALL QUALITY OF  
INFRASTRUCTURE**  
globally (2016)

- Dubai is one of the most futuristic cities in the world and has a remarkable skyline. It has a diversified economy and has established itself as a major hub in the Middle East for several economic activities.
- The Dubai Government had allocated ~AED 8 Billion (17% of its AED 47.3 Billion 2017 budget) for infrastructural development.
- The Dubai Government is planning to spend ~AED 30 Billion between 2016 and 2020 on infrastructure projects in preparation for the EXPO in Dubai.
- Apart from developing new projects, the Government also plans to improve the capacity and efficiency of its existing infrastructural facilities. This is expected to be cost-efficient and save time for the Government, while also catering to the growing demand for infrastructure.

Source: Dubai Statistics Center; Government of Dubai; Frost & Sullivan



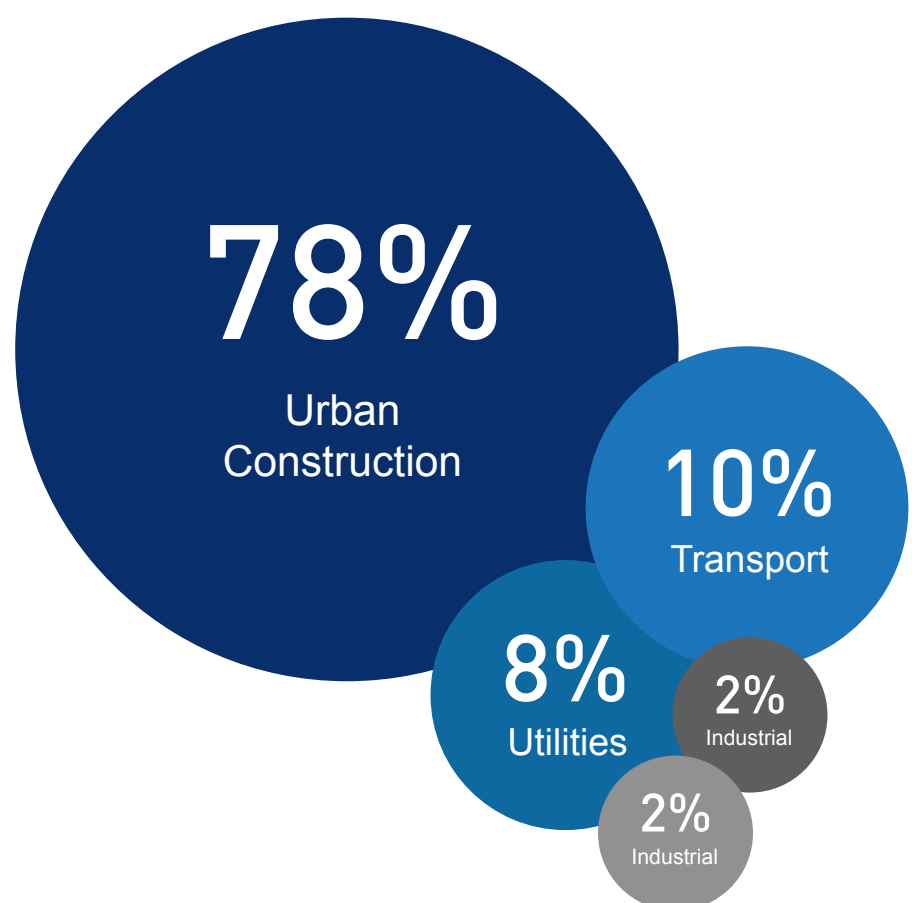
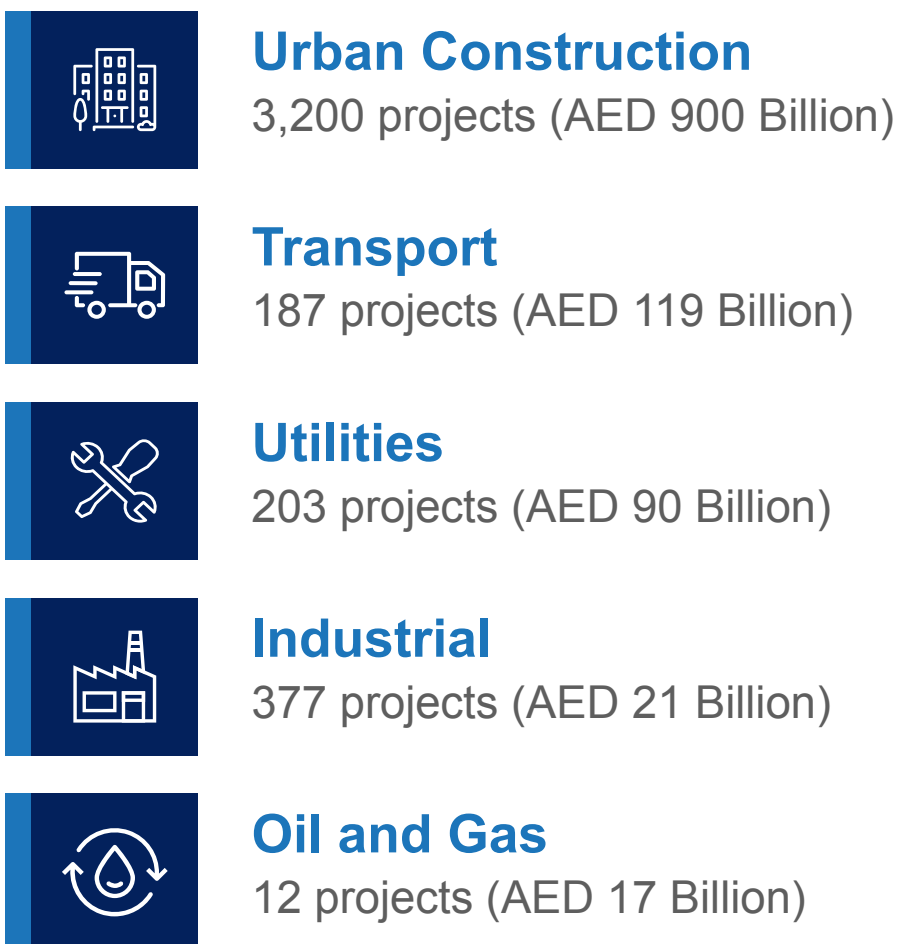


Dubai had approximately 4,000 active infrastructure projects worth ~AED 1.15 Trillion in 2016 with a major share of projects in the urban construction sector

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## MEGA PROJECTS UNDER DEVELOPMENT IN DUBAI

- 1 Dubai Metro Red Line Expansion
- 2 Al Maktoum International Airport
- 3 Dubai International Airport Expansion
- 4 Dubai Harbour
- 5 Mohammed bin Rashid Al Maktoum SolarPark
- 6 Jebel Ali Port Terminal Expansion
- 7 Royal Atlantis Resort
- 8 Palm Jumeirah Residences
- 9 EXPO 2020 site development



Source: Government of Dubai; Frost & Sullivan





# URBAN CONSTRUCTION



The EXPO is expected to have 25 Million visitors, due to which Dubai plans to build 40,000 more hotel rooms by 2020



**Burj Khalifa** (828 m) in Dubai is the **world's tallest building** and was developed by EMAAR properties

 **Al-Futtaim engineering**



- The city's skyline is largely filled with sky scrapers and has an ever-growing demand for urban infrastructure. Dubai had approximately 3,200 active construction projects worth AED 900 Billion in 2016.
- Construction mainly comprises of residential, commercial, religious, education, leisure and recreation, hospitality, health and retail buildings.
- Almost 80% of the urban construction projects were residential and commercial developments.
- High demand for urban construction mainly due to the EXPO 2020 and World Cup in Qatar.
- EXPO is expected to have 25 Million visitors, due to which there is a requirement of 140,000 hotel rooms by 2020 of which only 100,000 rooms are currently available.
- Growth in tourism is also expected to boost the demand for hospitality, retail, leisure and recreation projects in Dubai.
- Dubai ranked 26th amongst global cities for construction cost per sq. m. (~AED 6,300). This is due to availability of cheap labour, energy and building materials in the Emirate.

Source: Dubai Statistics Center; Government of Dubai; Frost & Sullivan



# Automated construction techniques and other innovative technologies are expected to be adopted by developers to increase their efficiency and maximise profits

## 3D Printing Technology

- Dubai Government has launched the 3D printing strategy, with focus on infrastructure and construction.
- By 2030, Dubai aims to have 25% of its buildings to be 3D printed.
- The technology is expected to reduce the construction costs by 50% to 70% and labor costs by 50% to 80% for project developers.
- Office of the Future' in Dubai was built using 3D printing technology.

## Green Buildings

- Green Buildings are 'built environment' that are efficient in terms of use of energy, water and other materials that reduce the building related impact on human health and the surrounding environment.
- Al Safat Green building rating system by Dubai Municipality rates buildings on green standards implemented.
- Ratings are based on 4 classifications:
  - Buildings have to get at least bronze to get permits.
- Dubai is ranked 3<sup>rd</sup> globally with ~550 green buildings.
  - Platinum
  - Gold
  - Silver
  - Bronze
- Buildings have to get at least bronze to get permits.
- Dubai is ranked 3<sup>rd</sup> globally with ~550 green buildings.

Source: Dubai Municipality; Dubai Statistics Center; Frost & Sullivan



# TRANSPORT INFRASTRUCTURE

Land Transport Infrastructure (1/3)



Increasing traffic congestions and RTA's aim to increase share of public transport are expected to result in investments on road infrastructure development projects



UAE ranked 1<sup>st</sup> for  
**ROAD INFRASTRUCTURE**  
globally (2016)



Dubai  
Population,  
2016 –  
~2.7 Million

Total Length of Roads in Dubai – 13,594 kms  
(~5,400 m of roads per 1,000 residents)



Taxis  
10,216



Private cars  
~1,390,900

Source: Dubai Statistics Center; RTA; Frost & Sullivan



# TRANSPORT INFRASTRUCTURE

## Land Transport Infrastructure (2/3)



- The primary modes of land transport in Dubai are public transport such as buses, metro, trams, public and private taxis and private cars.
- Dubai has highest car ownership rate in the world – 540 cars per 1,000 residents (2016). This is resulting in traffic congestions in major parts of the city.
- To address this, the RTA has invested heavily on road development. Close to 5,000 kms have been developed with an investment of AED 40 Billion during 2006-2016.
- The vehicular population in the Emirate had grown at a rate of 8% in 2016.
- Dubai also has the highest share of reserved routes in the GCC (35 m reserved routes per 1,000 residents).

### Some key developers, contractors and operators of Metro and Tram facilities in Dubai

**serco**

**MITSUBISHI**  
HEAVY INDUSTRIES, LTD.  
Registered Installer

الغريير  
Al Ghurair

**ALSTOM**

### Public Transport in Dubai



**Bus- 1,518 buses**  
(125 routes)

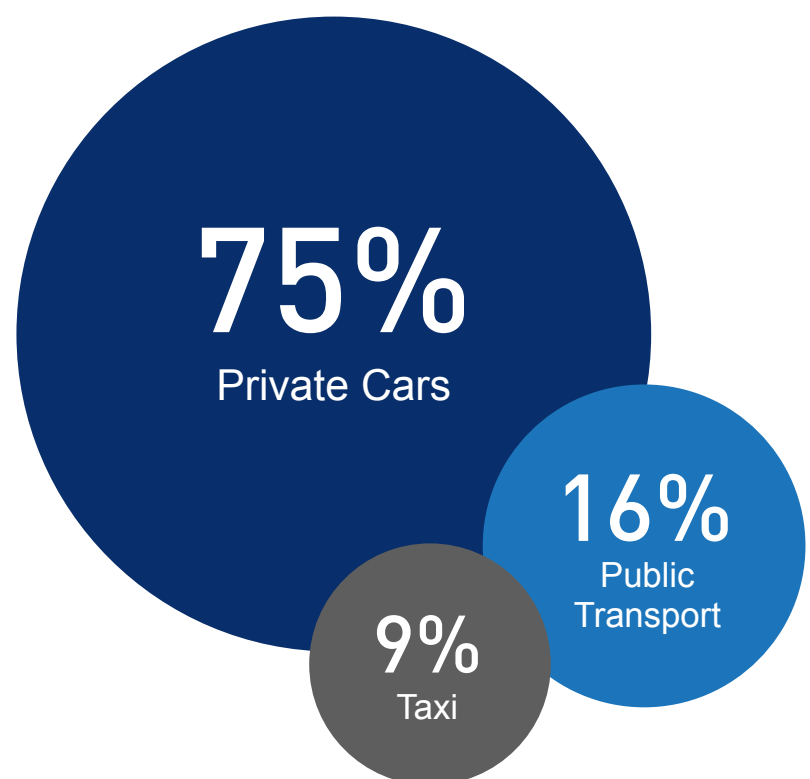


**Tram – 11 trains**  
(11km route)



**Metro- 129 trains**  
(74.6km route)

### Modal Share of Motorised Trips, 2016



Source: Dubai Statistics Center; RTA; Frost & Sullivan



# TRANSPORT INFRASTRUCTURE

## Land Transport Infrastructure (3/3)



Metro and Tram are expected to become the most comfortable option for city's travellers in the future with focus on integration of transport network

Some key developers, contractors and operators of Metro and Tram facilities in Dubai



### Metro

- Dubai Metro is the most widely used transport in Dubai
- Dubai has two metro lines that are operational stretching to 75 km operated by Serco.
  - Red Line – 29 stations – 52.1 km
  - Green Line – 20 stations – 22.5 km
- The Route 2020 project is the extension of the Red Line by 15 kms from Nakheel Harbour and Tower Station to the EXPO site.
- As a part of the master plan, the RTA plans to increase the metro services to 421 km by 2030 through the inclusion of 4 new lines (Blue Line, Purple Line, Pink Line and Gold Line).

### Tram

- The tram runs for 11 kms (from Jumeirah Beach residence to Dubai Marina).
- The RTA is planning to expand the tramway in the Emirate to reduce the traffic congestion on roads.

Source: Dubai Statistics Center; RTA; Frost & Sullivan



# PORT INFRASTRUCTURE



Dubai is positioning itself as a trading hub in the Middle East and is expected to have high demand for advanced port technologies to increase its productivity



UAE ranked 3<sup>rd</sup> for  
**Port Infrastructure**  
globally (2016)

## Dubai Maritime City (DMC)

- It is a cluster dedicated to the maritime sector in Dubai that supports the development of maritime industry in Dubai and the GCC.

## Dubai Harbour – Meraas Holding

- The project was launched by the Government due to high demand for luxury yachts in the region and will have a new marina with 1,400 berths for yachts.
- It will have a cruise terminal built at an area of 150,000 sq.ft and can handle 6,000 passengers.

- Ports contribute both directly and indirectly to Dubai's GDP and is expected to play a crucial role in the growth of the economy.
- Dubai's strategic location and growth of the industrial sector have resulted in rapid growth of ports in Dubai.
- Major ports in Dubai - **Port Rashid** and **Port Jebel Ali**; both the ports are operated by DP World.

## Jebel Ali Port

- Jebel Ali port is the largest container port in the Middle East and is the DP World's flagship facility.
- Most productive port in the world with a productivity\* of 131 moves/hr.
- The port has 3 terminals with 67 berths and has a well-developed logistics facility.
- It handled 15.7 Million TEUs in 2016 and is expected to handle approximately 19 Million TEUs by 2020.
- Due to increasing trade activities in the port, DP World is expected to invest ~AED 5.8 Billion to expand the port's capacity from 17 Million TEUs in 2016 to 22 Million TEUs by 2018.

## Port Rashid

- Port Rashid caters mainly to demand from the tourism sector.
- It can accommodate 7 large cruisers and transport 25,000 passengers simultaneously.

Source: DP World; Dubai Statistics Center; DMC; Frost & Sullivan

# AIR TRANSPORT INFRASTRUCTURE



Dubai's connectivity and world-class air transport infrastructure has helped Dubai cement its position as a major aviation hub in the world



UAE ranked 2<sup>nd</sup> for Air Transport Infrastructure globally (2016)

2/3<sup>rd</sup> of the global population live within 8 hours flight time from Dubai

Emirates Airlines is the largest airline in the Middle East

- Air transport infrastructure has seen a massive growth mainly due to its geographical location connecting East and West and the increasing level of economic activities in the Emirate.
- Dubai has two airports - **Dubai International Airport (DXB)** and **Al Maktoum International Airport (DWC)**.

## Dubai International Airport

- DXB has 3 terminals with a capacity to handle ~90 Million passengers annually.
- It is the **world's busiest airport** in terms of international passenger traffic - Terminal 3 in DXB is the largest airport terminal in the world.
- A total of 420,870 aircrafts were handled in DXB (2016).
- It handled 83.7 Million passengers in 2016 and is expected to handle more than 120 Million passengers by 2020.
- Total cargo handled in the airport was 2.42 Million tonnes.
- **Planned investments** for infrastructure development in DXB - **~AED 30 Billion**.

## Al Maktoum International Airport – under development

- DWC expected to become the **world's largest airport** in terms of passenger and cargo handling capacity **by 2020**.
- It handled 0.85 Million passengers in 2016 and is expected to handle more than 160 Million passengers by 2020.
- Emirates Airlines owned by the Dubai Government is expected to shift its base to the DWC by 2025.
- **Planned investments** for infrastructure development in DXB - **~AED 120 Billion**. Increasing competition from its neighbors is posing a threat for the industry, but is expected to overcome the challenge with the development of the air transport infrastructure

Source: Dubai Statistics Center; Dubai Airports Website; Frost & Sullivan



# UTILITY INFRASTRUCTURE

Energy Infrastructure

Dubai aims to increase share of renewables, which is expected to present significant opportunities especially for solar developers

## SOME KEY PROJECTS

1

Mohammed  
bin Al Maktoum  
Solar park

2

Hassyan  
Clean Coal  
Power Plant

3

Expansion of  
Jebel Ali Power  
Station

- High per capita electricity consumption in Dubai (25 kWh) compared to the global average (15kWh) has made Dubai energy intensive.
- Dubai had a demand of 7.98 GW in 2016 and almost 80% electricity is generated using natural gas.
- Energy consumption in the Emirate is expected to grow further due to increasing economic activities and growing population.
- The Government is investing on oil and gas projects such as the expansion of the Jebel Ali refinery due to increasing demand for fuel - The refinery's processing capacity will be increased from 140,000 bpd to 210,000 bpd at a cost of ~AED 3.7 Billion.
- Some of the projects developed by DEWA to meet the growing energy demand are Mohammed bin Al Maktoum Solar park, Hassyan Clean coal power plant and expansion of Jebel Ali plant.
- The Dubai Government launched the Dubai Clean Energy Strategy 2050, which aims to diversify the energy mix and increase the share of clean energy sources to 7% by 2020, 25% by 2030 and 75% by 2050, in line with its vision to become a green economy.
- Renewable energy technologies that are proven and cost effective are increasingly available – Since 2010, prices of Solar PV have fallen by 80%.
- Availability of proven renewable energy technologies at low costs are expected to lead the transformation of the energy systems in Dubai by focusing more on clean energy in line with the sustainability goals.

Source: DEWA; Frost & Sullivan





# UTILITY INFRASTRUCTURE

Energy Infrastructure

Renewable energy, Clean energy and demand side management are the focus areas in energy sector

## Mohammed bin Al Maktoum Solar Park

- DEWA is building the solar park in multiple phases - touted as the world's largest solar project based on the Independent Power Producer (IPP) model.
- The solar park will generate 1,000 MW by 2020 and 5,000 MW by 2030.

## Hassyan Clean Coal Power Plant

- DEWA has awarded the project to China's Harbin Electric and Saudi Arabia's ACWA Power to develop, construct, and operate Phase 1 of the 1,200 MW plant. Cost - AED 6.6 Billion.
- DEWA would be the major stakeholder with 51%, it will be operational by March 2023 and will generate 2,400 MW.

## Retrofitting – Demand Side Management

- DEWA has established the Super Energy Service Company (Super ESCO) to facilitate retrofitting 100,000 buildings by 2030.

Source: DEWA; Frost & Sullivan

# UTILITY INFRASTRUCTURE

## Water Infrastructure



## Solar powered water production and wastewater treatment projects to get more focus in order to reduce environmental foot print

### Wastewater Treatment

- Treated wastewater is expected to relieve some pressure on desalinated water and ground water for certain applications and enhance sustainability of water resources.
- Wastewater treatment facilities in Dubai - **Al Aweer Sewage Treatment plant and Jebel Ali Sewage Treatment plant.**
- DEWA has planned expansion of Jebel Ali plant, which will increase the capacity to 675,000 M3 per day and serve ~1.35 Million people.
- **Deep tunnel wastewater treatment system** planned by the Government for collection of sewerage using gravity technology is expected to facilitate reuse and generation of wastewater and will replace 121 sewerage pumping stations.

- Dubai has sparse water resources. Despite this, per capita water consumption in Dubai was 550 litres, which was double the global average.
- **Desalination** is the **major source of water supply in Dubai** and contributes 98.8%, while the groundwater contributes 1% and treated wastewater contributes the meagre rest.
- There is a growing need to invest in more desalination facilities to meet the growing demand.
- However, high cost of water production in Dubai is a major concern.

### Solar powered RO desalination plant:

- High investments in R&D has led to innovations such as solar powered Reverse Osmosis (RO) desalination plants, which are expected to reduce the production costs and environmental impact.
- DEWA aims to produce 100% desalinated water from clean energy resources by 2030.
- Installed desalination water capacity In Dubai was 470 MIGD in 2016 and is expected to reach 750 MIGD by 2030.
- RO desalination plants, which have only a 5% (20 MIGD) share 2016 are expected to have a 41% (305 MIGD) share in capacity by 2030.

Source: DEWA; Dubai Statistics Center; Frost & Sullivan



# INDUSTRIAL INFRASTRUCTURE

## Dubai Industrial Strategy 2030 to develop Dubai as a global platform for innovative and sustainable industries seeking growth

### Dubai Industrial Strategy 2030

#### Strategy

Aims to develop Dubai as a global platform and destination choice for innovative and sustainable industries seeking growth and sustainability.

#### Focus

To develop Aerospace, Maritime, Pharmaceuticals & Medical Equipment, F&B, Aluminium & Fabricated Metals and Machinery and Equipment sectors in order to attract companies from around the world for investments in the Emirate, thereby boosting the economy and creating job opportunities.

**Expected Revenue** - AED 165 Billion by 2030

### Dubai Industrial Park

- It is located within the Dubai Wholesale City.
- It aims to attract light and medium manufacturers with focus on chemicals, food and beverage, base metals, machinery and mechanical equipment, logistics and mineral products.

- Dubai had 377 active industrial projects worth AED 21 Billion in 2016.
- Some of the industrial areas in Dubai are Ras Al Khor, Al Quoz, Jebel Ali and Al Quasais.
- Some of the key industrial projects in Dubai are
  - GAC Dubai is building a warehouse facility in Dubai South's Logistics district. The facility will handle F&B goods, health goods and dangerous goods.
  - Unilever is establishing a manufacturing plant in Dubai Industrial Park at a cost of AED 1 Billion.
- The key advantages for companies in Dubai are
  - The world-class infrastructure facilities
  - Business friendly environment
  - Clearly defined legislative framework
  - Strategic location and connectivity

Source: Government of Dubai; Frost & Sullivan





# INFRASTRUCTURE AND CONSTRUCTION OUTLOOK AND MEGA TRENDS IN DUBAI



## Increasing spend on Smart Infrastructure and rise in demand for infrastructure due to EXPO 2020 to result in the growth of the industry

- The Dubai Government has invested heavily on R&D and is spending more on Smart infrastructure and has launched the 'Smart Dubai' initiative to make Dubai the Smartest city in the world.
- This is expected to enhance the efficiency of facilities and services, while also reducing the operational costs.
- This has also resulted in Government's focus on sustainable development of infrastructural facilities in the Emirate to reduce the environmental footprint.
- Growing population, EXPO 2020 and growth in tourism sector are some key drivers that drive the demand for infrastructure and construction in the Emirate.
- Use of Internet of Things (IoT) is expected to play a vital role in the development of smart infrastructure in transportation, environment and economy.
- Some of the future plans of the Government in the sector are
  - 3D printing technology - To have 25% 3D printed buildings by 2030
  - Automated Transportation - To have 25% Smart and Driverless transportation in the Emirate by 2030 - it is expected to reduce traffic congestions
  - Smart Grid technology - In the energy sector, the Government plans to focus more on technologies such as Smart grid technology, smart meters, operational integration to enhance the efficiency and reduce costs.
  - Retrofitting more buildings in the Emirate as a part of demand side management.
  - Dubai Industrial Strategy to boost the development of the focus sectors by 2030.
- Apart from the increasing demand for new infrastructural facilities, there is a increasing trend of revamping existing infrastructural facilities – these projects are cost-efficient for the Government and saves time, while meeting the growing demand.
- High investments on infrastructure and construction projects in preparation for the EXPO and shift towards Smart infrastructure are expected to drive the growth of the infrastructure and construction industry.

Source: WAM; Frost & Sullivan



# INFRASTRUCTURE AND CONSTRUCTION OUTLOOK AND MEGA TRENDS IN DUBAI



## Macro-to-micro Implications of Infrastructure and Development on Future Industries, People, and Businesses



### Open Business Model Financing

With the need for an increase in private finance, infrastructure spending will become more inclusive with open business models of financing, where the public sector develops infrastructure for long-term planning while placing the burden of delivery and maintenance on the private sector. This risk-sharing approach provides autonomy and oversight to the public sector while providing a financial opportunity for the private sector to develop revenue-generating assets.



### Creation of Logistics Hubs and Freight Villages

Cities and countries will aim to create logistics hubs by concentrating all functions of logistics such as transportation, storage, packaging, and labeling in one place. Multimodal transportation can also be a part of the logistic center as well, which is expected to drive tremendous growth for the economies. For example, the Jebel Ali Free Zone (Jafza) logistics hub in Dubai contributed approximately 20% of Dubai's GDP in 2012.



### Intermodal Infrastructure and Sustainable Transport Modes

There will be an increase in development of intermodal supply chains at either a state or national level, with cross-border transportation that will shorten transit times and poor reliability on logistics services.



### Application of Smart Infrastructure to Mitigate Negative Effects

Governments are increasingly using technologies to improve infrastructure conditions and to mitigate the negative effects of poor infrastructure conditions. For example, by implementing computerized customs systems, governments have significantly decreased delays at ports and land border crossings. Transport management systems and logistics management systems are expected to be more widely used.

Source: WAM; Frost & Sullivan



# APPENDIX





# Glossary

Abbreviation	Expansion
AED	United Arab Emirates Dirham
DEWA	Dubai Electricity and Water Authority
DHA	Dubai Health Authority
DIES	Dubai Integrated Energy Strategy
DSCE	Dubai Supreme Council of Energy
EV	Electric Vehicles
FEWA	Federal Electricity and Water Authority
F&B	Food and Beverage
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
IPP	Independent Power Producer
KHDA	Knowledge and Human Development Authority
NTA	National Transport Authority
PPP	Public Private Partnership
RERA	Real Estate Regulatory Authority
RTA	Roads and Transport Authority
UAE	United Arab Emirates

Definition	
Middle East	Bahrain, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, the United Arab Emirates and Yemen
Gulf Cooperation Council	Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates
United Arab Emirates	Emirate of Abu Dhabi, Emirate of Ajman, Emirate of Dubai, Emirate of Fujairah, Emirate of Ras al-Khaimah, Emirate of Sharjah, and Emirate of Umm al-Quwain

# Government's initiatives strive to create world-class infrastructure; Key objective to have a sustainable development

## 1 EXPO 2020

- The EXPO 2020 is expected to have 25 Million visitors, which is expected to boost the demand for transportation and hospitality infrastructure.
- The Government has launched infrastructure projects in line with the EXPO 2020 such as the metro extension, residential developments, shopping malls, etc.

## 2 Tourism Vision 2020

- The objective of the strategy is to position Dubai as the 'first choice' for the international leisure and business traveller.
- The Government aims to support the tourism vision by improving Dubai's tourist attractions, infrastructure, events and services.

## 3 Dubai Clean Energy Strategy 2050

- The strategy aims to diversify the energy mix and increase the share of clean energy sources to 7% by 2020, 25% by 2030 and 75% by 2050.
- The strategy consists of five main pillars: infrastructure, legislation, funding, building capacities and skills, and an environment-friendly energy mix.
- Dubai Green Fund is a part of the infrastructure pillar worth AED 100 Billion, which is expected to provide funding for investors in the clean energy sector through loans at reduced interest rates.

## 4 Salik- Smart Infrastructure

- This initiative by the RTA enables free flow of transport in Dubai's highways without needing to pay tolls manually.
- Salik tag fixed in the cars helps identifying using scanning technology and deducts AED 4 from the prepaid Salik toll account, while passing through.

## 5 UAE Vision 2021

- Set of key themes that showcases UAE's vision for socio-economic development in the next decade.
- One of the themes is 'Sustainable Environment and Infrastructure' for which the Government plans to improve the quality of air, preserve natural resources, use innovative methods for waste treatment, and increase contribution of clean energy in line with its vision to become a Green economy.

## 6 Dubai Plan 2021

- The plan is built on six different themes and the theme that focuses on sustainability is 'The Place: A Smart & Sustainable City'.
- Objective of the theme is to develop human capital by providing adequate social infrastructure for its citizens to increase their contribution to the economy.

Image Source: Frost & Sullivan      Source: DEWA; Frost & Sullivan

