

## Jordan Infrastructure Sector Overview

### 1.1 Economic Opportunity and infrastructure

The Government of Jordan's (GOJ's) biggest economic challenge is the management of adverse regional developments, in particular the Syria and Iraq crises, resulting in an unprecedented refugee influx, disrupting trade routes, lowering investments and tourism inflows in addition to applying additional pressure on Jordan's infrastructure. However, the GoJ utilised the majority of the GCC \$5bn grant towards infrastructure investment to ensure that it meets its development goals and Jordan is embarking on \$1.1bn worth of investment opportunities to continue upgrading its infrastructure in a way that prepares it to play a key role in regional reconstruction as the best hub and access point for the MENA region. Other major challenges facing Jordan include high unemployment, a dependency on grants and remittances from Gulf economies as well as continued pressure on natural resources, particularly water.

Jordan needs to increase its infrastructure to accommodate the surge in its population. Schools, hospitals and increased housing are all required in addition to investment in power and water. These projects have the benefit of job creation. Power and water also underpin the growth potential of other key sectors such as manufacturing and agriculture. Investments in power and water capacity can be financed via long term multilateral loans but risk being economically unviable if financed with debt alone. Both PPP and Build-Operate-Transfer models are also viable.

The following opportunities are key to promoting inclusive growth:

- **Growth and job creation:** Renewable energy provision is growing (Wind/solar). In 2017, solar and wind accounted for 6.5% of electricity generated and imported in Jordan<sup>20</sup>, Jordan ranked 3<sup>rd</sup> in renewable energy growth globally in 2018. Limited by grid capacity constraints. ICT sector generates 12% of GDP and is one of the fastest growth sectors in the country, accounting for >80,000 jobs and there are >500 companies in the sector. There is a lack of consistent policy decision and lack of in-county technical expertise.
- **Inclusion and poverty reduction:** Poverty reduction strategy linked to infrastructure. Provision of essential infrastructure and services to poor and disadvantaged communities is needed to improve their living conditions. Access to affordable housing for the poor requires targeted measures for the rural pockets of poverty as well as for overcrowded urban areas. Better transportation is crucially needed for the development of poor localities in order to link them to markets and thus create better economic opportunities.
- **Investment in infrastructure:** Jordan's infrastructure spending gap in 2017 was estimated to be just under half a billion dollars. This gap is expected to gradually increase leaving the country with a cumulative investment gap of just under 18 billion dollars by 2040<sup>3</sup>. The most significant gaps by 2040 are expected to occur in: road transport (\$10bn); rail transport (\$2.3bn); and water (\$1.9bn).
- **Climate and environmental resilience:** Jordan has one of the lowest levels of water availability per capita in the world at 150 cubic meters per capita. The UN states countries with less than 500 will face absolute scarcity. Renewable water supply only meets half of total water consumption. Jordan is expected to experience a one-third drop in annual winter rainfall, alongside a 4.5 degree Celsius rise in average annual temperatures by 2100. Water scarcity is a key concern for Jordan.

### 1.2 Stakeholder Analysis

This section sets out in short bullet points the relative engagement of key players in infrastructure.

Public sector	<ul style="list-style-type: none"> <li>• The Government of Jordan has introduced social protection systems and reformed subsidies, creating the conditions for public-private partnerships in infrastructure and making tax reforms.</li> <li>• Jordan has several development zones, offering the right environment for businesses to prosper, including incentives that exempt investors from all taxes and customs duties (except for 5% income tax).</li> </ul>
Private sector	<ul style="list-style-type: none"> <li>• Total investment committed to PPPs since 1990 in Jordan is \$9,542m.</li> </ul>
Donors	<ul style="list-style-type: none"> <li>• On August 24, 2016, the IMF Board of Directors approved a three-year extended arrangement under the Extended Fund Facility (EFF) for Jordan to support the country's economic and financial reform program (\$723m). Austerity measures and economic reform, led by the IMF, has led to nationwide protests.</li> <li>• As of March 2018, the World Bank's active portfolio in Jordan included 12 projects valued at \$745m in loans and grants. These projects cover a number of key sectors, including education, health, environment, social protection, youth, access to finance, and the business environment.</li> <li>• Saudi Arabia, the UAE and Kuwait are providing the \$2.5bn (which includes a 5yr budget, a deposit to the central bank and the financing of development projects). The</li> </ul>

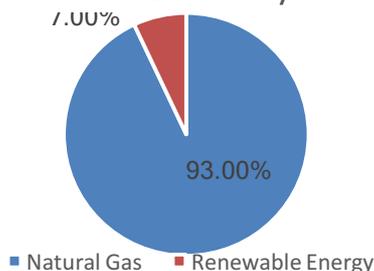
# 1. Sectoral analysis

## 2.1 Energy

### Overview

- Jordan imports 96% of its energy (mainly natural gas), accounting for 25-30% of its total imports. This leaves it vulnerable to price fluctuations.
- Large potential to increase domestic energy production from: oil shale (estimated reserves of 90-100 bn barrels of oil in shale deposits), solar (located in the sunbelt where direct solar radiation intensity is 5-7 kWh/m<sup>2</sup>), and wind (wind speeds in certain ranges are 7-9 m/s).
- To diversify its energy mix and boost its energy security, Jordan is embarking on several conventional and unconventional projects in the field of power generation, renewable energy, energy efficiency oil shale and nuclear power. Currently, over 1,500MW of solar and wind projects are being implemented, transforming Jordan into a regional leader in renewable energy and energy efficiency.
- Substantial opportunities, worth \$9bn, still exist, especially in the renewable energy and energy efficiency fields, as Jordan seeks to increase renewables' contribution to power generation to 15%, natural gas to 29% and local resources (oil shale and others) to 20% by 2020.
- Over 99% of the Kingdom's population has access to electricity and the grid is reliable. This is reaffirmed by its ability to integrate over 230MW of solar and wind projects to date without the need for a major grid-upgrade.

Jordan's Electricity Mix<sup>4</sup>



### Current Generation Capacity

- Total installed capacity: 4.382 million kW.
- Fossil fuel % of installed capacity: 96.3%
- Hydroelectric % of installed capacity: 0.3%
- Other renewables % of installed capacity: 9.5%

### Energy Access for households and business

- % of population with access to electricity: 99.5%.
- Affordability: In June 2018 King Abdullah II ordered a freeze on fuel derivatives and power. Electricity tariffs increased 23.5% as part of government efforts to lower debt. Cost of energy has increased sharply since regional unrest in 2011.
- Energy access is very reliable in Jordan.

### Major investments planned

- Iraq-Jordan Pipeline (\$3bn on Jordanian side)
- Solar and wind projects: 200MW of wind projects in the north and east of Jordan; 700MW solar projects in the south and east of Jordan (\$1.5bn)
- Jordan Petroleum Refinery Company Expansion Project (\$1.64bn)
- Exploration of petrol and gas resources in parts of Jordan (\$150m)
- Utilisation of shale gas and shale oil at Al Risha and Sarhan areas (\$500m)
- Central Jordan Uranium Project (\$550m)
- Oil Shale Surface Retorting (\$1.5bn)

## 2.2 Transport

### Overview

- Transport infrastructure is relatively well developed in Jordan and managed effectively by the Ministry of Transport.
- Jordan's most significant infrastructural investment gap by 2040 is expected to be in the transport sector, with road transport reaching a \$10bn gap and rail transport \$2.3bn.
- Jordan's geographical location could give it the potential to be a key transport hub for the region.
- There are three main civil airports: Queen Alia International Airport (QAIA), 35km south of Amman, Marka's Amman Civil Airport and Aqaba's King Hussein International Airport. QAIA opened in 1983, was originally designed for 3m passengers and capacity was increased to 9m passengers annually following a 2013 PPP. The second phase of the QAIA expansion took capacity to 12m.
- Jordan has 80,000 sq.km of road network, connecting it with all its neighbours. Jordan also has a 510km railway that is used mainly for transporting raw material to the southern Port of Aqaba. The port is strategically positioned to serve Jordan's market, the Levant, the Gulf, East Africa and potential reconstruction efforts in the Middle East
- The transport sector plays a key role in Jordan's economy and contributes over 10% of the GDP. It is growing at an annual rate of 6% and employs nearly 7% of the labour force. Land and air transport infrastructure is well developed, with plans to improve maritime and railway infrastructure. The Government of Jordan has developed a national transport strategy to upgrade the country's infrastructure and enable the Kingdom to capitalise on its strategic geographical advantages.
- The Port of Aqaba and newly expanded Queen Alia International Airport (QAIA) are Jordan's two major gateways

**Import / Export of goods**

Top 5 Exports	% GDP	Top Destination
Potassic Fertilizers	1.72	China – 32%
Knit Sweaters	1.31	USA – 87%
Calcium Phosphates	1.28	India – 56%
Packaged Medicaments	1.25	Iraq – 13%
Knit Garments (other)	0.91	USA – 83%

**Trade corridors**

- The Green Growth Corridor is a project set along the backbone of Jordan – between Aqaba and Amman – which aims to improve Jordan's energy resilience and provide new economic growth opportunities along the route<sup>5</sup>.
- Bilateral trade agreements: USA, EU, Singapore, Canada.
- Jordan serves as an important regional transport hub between Gulf Cooperation Council (GCC) countries and Turkey and Europe, and also between Iraq and the Red Sea and the Mediterranean. The volume of transiting commodities passing through Jordan reached a peak of 83.6 million tonnes (or \$20.6bn) in 2011 and is expected to pick up again once conflicts in neighbouring countries recede.
- Regional trade agreements: GAFTA, EFTA, EMFTA, Agadir

**Transport network**

- 18 airports; 2 unpaved.
- 510 km of railways.
- 7,203 km of roadways – 100% paved.
- Major port: with just 26 km of coastline, the Port of Aqaba is Jordan's only port and is therefore extremely important for the country's economy.

**Cross border trade**

- Doing business rating: 103/180
- Average time through customs: 4.6 hours
- Barriers to trade: Jordan is a relatively open economy with few notable tariff and non-tariff barriers.

**Major investments planned**

- The Ministry of Transport is planning to contract Chinese company Touchstone to deliver a US\$4.23 bn rail project through a build-own-operate-transfer agreement; this will connect the major cities, industrial zones and logistical hubs in the country to Aqaba and the borders with Syria, Iraq and Saudi Arabia<sup>16</sup>.
- The Port of Aqaba is under expansion and a bus rapid transit (BRT) project is being developed for the greater Amman area.
- Jordan Railway Project (JRP) Package (1) (\$615bn)
- JRP Package (2) (\$346-398m) (cost dependent on Scenario selection)
- JRP Package (3) (\$634m)

- Amman Queen Alia International Airport Tram (\$75m infrastructure; \$25m rolling stock)
- Bethany and Marka Airports Development (\$230m)
- Amman – Zarqa Bus Rapid Transit (BRT) Operation (\$51m)
- BRT Amman – Salt Infrastructure and Rolling Stock (\$212 infrastructure; \$25m rolling stock)
- Municipal Bus Companies Irbid, Salt, Zarqa (\$65m)
- Tram in the city of Irbid (\$76m)
- Brt Sweileh -8<sup>th</sup> Circle – 7<sup>th</sup> Circle – Queen Alia International Airport (\$75m infrastructure; \$25m rolling stock)

**2.3 Digital Connectivity****Overview**

- ICT is one of the fastest growth sectors and a government priority for growth. There are currently 500+ companies in telecom, IT, online and mobile content, business outsourcing and games development. Accounts for >80,000 jobs and 12% of GDP.
- The sector is managed by the Ministry of Information and Communications Technology. In 2005 the monopoly over fixed-line services ended and the telecommunications sector was opened to competition. The government has launched REACH2025 to boost the ICT sector and digital economy.
- Amman is recognised as one of the 10 best destinations to start a technology firm worldwide and a leading centre for developing Arabic internet content.
- Jordan is embarking on several investment opportunities, worth over \$175m, which will enable the country to shift to an advanced stage of digitisation and capitalise on the enormous regional potential.
- The sector has a reliable and robust broadband network with affordable services and wireless nationwide access. Jordan has a skilled, tech-savvy, connected and cost-effective labour force, providing the sector with a competitive edge at the regional level.
- Jordan's ICT exports grew eight-fold since 2001 and currently reach over 40 countries around the globe. Amman is recognised as one of the 10 best destinations to start a technology firm worldwide and a leading centre for developing Arabic internet content.

**Mobile Connectivity**

2G Network Coverage	GSMA index	94.44
	Rank (/170)	=67
3G Network Coverage	GSMA index	99.00
	Rank (/170)	=19
4G Network Coverage	GSMA index	95.00
	Rank (/170)	=46
Cost of entry level basket (100 MB)	GSMA index	46.38
	Rank (/170)	107
Cost of entry level handset	GSMA index	88.36
	Rank (/170)	79
# of Mobile apps in national language	GSMA index	81.26
	Rank (/170)	=58
Mobile phone subscriptions per 100 people		103.84

## 2.4 Water and Sanitation

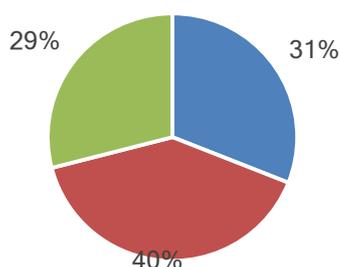
### Internet Connectivity

% of individuals using the internet		62.30
Internet Bandwidth per user	GSMA index	46.60
	Rank (/170)	101
E-Government Score	GSMA index	45.65
	Rank (/170)	=99
Mobile banking	Just 8% of Jordanian banking customers have used mobile banking services for making transactions (2016) <sup>6</sup> .	

### Sector landscape

#### Market share %

- Orange Jordan
- Zain
- Umniah



### Major investments planned

National Broadband Network (NBN) – North (\$48m)

NBN – South (\$44.5m)

NBN – Middle (\$73m)

Government e-services: for Department of Lands and Survey (\$1.79m); for Ministry of Labour Work Permits (\$2.29m) and Civil Status and Passport Department (\$2.86m)

## 2.4 Water and Sanitation

### Overview

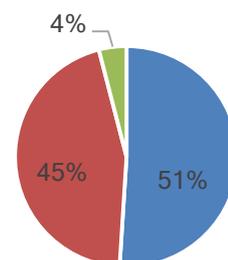
- Jordan has a significant problem with water security and ranks 4<sup>th</sup> in the world in terms of water poverty. By 2025, water demand will exceed available water resources by more than 26%.
- With the construction boom in Amman and Aqaba, improving the water supply and infrastructure through non-traditional water resources and reclaimed water measures will be essential for long-term water security.
- Jordan is currently implementing the National Water Strategy 2016-2025. The Ministry of Water and Irrigation (MWI) is responsible for national leadership on policy, strategic direction and planning. The Water Authority of Jordan (WAJ) is responsible for the operational management of the water sector. The Jordan Valley Authority (JVA) is primarily manages water supply for irrigation, domestic and industrial purposes in the Jordan Valley.

- Despite Jordan's severe water scarcity, more than 98% of Jordanians have access to the water network and 63% have access to sanitation services - one of the highest rates in the Middle East and North Africa.
- Demand for water exceeds available water resources, and the water deficit exceeds 450bn litres each year and groundwater is being exploited at about twice its recharge rate.
- Demand for water rose by 21% in 2014 alone and 40% in northern regions.

### Water use and reliance

#### % water withdrawal use

- Agriculture
- Domestic
- Industry



### Agricultural water use

- Primary crops; Irrigated vegetables, cereals and fruit-trees
- Only 4% pop deriving livelihoods from agriculture
- 9% population rural and 16.8% rural poor
- The land suitable for cultivation is 886,400 ha (10% of the total area of the country). Total cultivated area is estimated at 270 000 ha (30.46%).

### Water security

- Jordan suffers from: highly limited natural freshwater resources; a declining water table; and deteriorating water quality – all of which are being exacerbated by its high population growth (its population is expected to almost double by 2050).
- Water supply is intermittent with rooftop tanks being an integral part of the system. The water sector is also highly energy intensive, accounting for 15% of Jordan's electricity consumption.
- Groundwater contributes ~61% of total water supply; of the 12 major groundwater basins, 6 are over-extracted, 4 are at capacity, and 2 are underexploited. Jordan is also now accessing non-renewable water resources from fossilised deep-water aquifers.

### Infrastructure condition and investment

- Nearly 65 litres/capita/day is lost due to physical and administrative gaps.
- There is currently \$4bn worth of planned investment in the sector by 2040<sup>3</sup>. The country requires \$5.8bn, leaving a cumulative investment gap of \$1.9bn by 2040.
- Treated wastewater is an important component of Jordan’s water resources – it reuses 91% of its treated wastewater in agriculture to reallocate fresh water for domestic purposes<sup>18</sup>; therefore increasing sewage coverage and ancillary water treatment capabilities will help Jordan’s water security.
- The combined revenues for WAJ and the water companies currently exceed 100% of operation and maintenance costs, but account for only 60-70% of total costs when capital costs (depreciation and recovery) are included.

### Transboundary dependencies

The question of water sharing in the Jordan River basin is inextricably linked to the ongoing conflicts between Israel and Syria, Israel and Lebanon, and Israel and Palestine, and while a wide range of issues are at stake, control over water in the basin has added to existing regional tensions. The Joint Jordanian–Syrian Higher Committee is discussing how to make use of the Yarmouk River Basin water and how to protect Yarmouk water against depletion.

### Major investments planned

The Disi Water Conveyance Project from the non-renewable Disi aquifer to the capital Amman opened in July 2013, and increased available resources by about 12%. In addition, Jordan plans to bridge the remaining gap between demand and supply through increased use of reclaimed water and desalinated sea water to be provided through the Red Sea-Dead Sea Water Conveyance Project (Red-Dead). Improvements in this will reduce the sector’s running costs and provide larger quantities of water to citizens around the Kingdom. It will also encourage economic and agricultural development, as well as development in industrial and trade sectors and more, since water forms a fundamental pillar of development and is necessary for improving the environmental quality of life for citizens.

## 2.5 Urban Infrastructure

### Overview

- Migration pressure: City services are being put under pressure by refugees. As of Feb 2018 there 740,160 refugees in Jordan (657,628 from Syria), 81.1% of which live in cities. 80% of Syrian refugees in cities live below the poverty line.
- Cities in Jordan are growing rapidly. With a high rate of population growth and unique geography, municipalities face both

unprecedented challenges in managing the cities’ lands and infrastructure as well as being offered exceptional opportunities in revitalising neighbourhoods and enhancing quality of life for all residents.

- Cities in Jordan are increasingly competing for FDI, talent, skilled labour, start-ups and innovation.
- Green growth — i.e. designing and marketing (new) products and services that lead the way in resources and energy efficiency — is one of the great opportunities for urban economic development. Jordan is offering \$2.7bn in investment opportunities that contribute to its overall urban development.
- The country is looking into redesigning cities on multiple fronts and in several dimensions, including: Improving urban resilience and modernity; Fueling innovation and promoting wellbeing; Creating more liveable, inclusive and sustainable cities.

### Urban Structure

% urbanised	91%
# urban residents	8,645,000
% living in informal settlements	15.8%
Urban poverty (%)	13.9%
Urban employment (%)	
- Total	85% [national]
- Youth	75% [national]
- Female	66% [national]

City size	# Cities	% Nat pop.	Tot pop.
Over 1m	1	17.4%	1,650,000
500k-1m	0	0	0
100-500k	4	10.5%	1,000,000
50-100k	1	0.95%	90,000
20-50k	6	1.9%	177,500

### Urban infrastructure overview

Energy	% of urban population with access to electricity  Power reliability: power is very reliable in Jordan, with firms experiencing on average less than 0.9 power outages per month	99% <sup>1</sup>
Water	% access to improved water % access to improved all piped water  Water and sanitation service costs are subsidised; combined water and sewer bills are <0.92% of total household annual expenditures across urban and rural areas <sup>18</sup> . Flash flood in Amman in November 2015 killed 3 people and meant nearly 1,000 had to be rescued <sup>8</sup>	97.8% 77.9%

Solid waste	% households receiving SWM	90%
	% waste recovered	5-10% [national]
Urban transit	Air pollution deaths in cities	700

Sewerage	% access to improved sanitation	98.6%
	% with household toilet: Almost all households in Jordan have a private flush toilet	
	% access to piped sewer system	66.5%

### ***3.0 Ongoing x-HMG Engagement***

<b>Dpt / Org</b>	<b>Initiative</b>	<b>£ value</b>
DFID	Contribution to EIB trust fund	25m
	Economic Resilience Initiative in the Syria region	25m
BEIS	Clean Technology Fund	701m