



Qatar Railways Development Company
شركة تطوير السكك الحديدية القطرية



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Qatar Integrated Railway Network

Qatar Railway Development Corporation

Martin Bay

15.04.2011

Qatar

How it all began

Framework conditions for the project


Metro project

Passenger transport / freight transport

Outlook



At present, Qatar has no railway network

- Qatar has the **third-largest gas reserves in the world** and, with 95,000 US dollars, the **highest GDP per capita** in the world
 - The government has launched a consistent **modernisation and diversification campaign** in all areas of the economy and society in Qatar
 - The objective is to **reduce the country's economic dependence on gas and petroleum** exports
 - Qatar plans to invest **approximately 100 billion US dollars** in education, health care, industry and above all the infrastructure between now and the year 2014
 - Establishment of Qatar as a **regional centre** for research, training and large-scale international events
- 
- Qatar has a well-developed road network, but so far **no railway network**
 - Qatar has recognised that rail transport is the **backbone of a successful economy**
 - **And the fact that the country is to host the FIFA World Cup 2022** has increased the pressure on the government to implement these measures
 - **Financing** for the infrastructure measures has been secured **by Qatar**



Qatar - rigorous modernisation and diversification campaign with numerous large-scale projects

Examples of ongoing projects

- **New Doha Airport** - capacity 50 mio passengers per year
- **Lusail** - urban construction project on the Arabian Gulf with accommodation for 200,000 people, tourism and entertainment facilities
- **Education City** - centre for education and research with an area of 14 square kilometres
- **Westbay** - urban development project with a business and conference centre
- Port expansion **Port Mesaieed**

Rail transport: **Doha Metro** and **long-distance**

transport network



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Qatar selected DB as its partner for the railway infrastructure projects

- The Qatari government was looking for a strong partner for the realisation of a railway system
- The potential partner needed to be able to offer an open system not limited to the railway industry of the respective country
- At the end of 2007, Qatari Diar was commissioned to establish contact with DB
- In 05/2008, an initial study (examination of the Qatar Transportation Surface Masterplan) was commissioned
- DB International was subsequently commissioned to draw up an integrated rail transport concept for Qatar (QIRP - Qatar Integrated Railways Project)
- QIRP presented to the Emir and his ministers in the Railway Exhibition Hall in 02/2009
- Partnership agreement on the establishment of a joint venture (QRDC - Qatar Railways Development Company) for the realisation of the QIRP was concluded on November 22nd 2009



The Qatar large-scale project gets underway



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2009

- **Development of an integrated transport concept**



2010

- **Preliminary planning**
- **Business Plan**



02.12.2010

Selection of the host country for the FIFA World Cup 2022

"And the winner is... Qatar"



"A new era"

2011 ff

- **Definition of the service portfolio**
- **Definition of time frame**

(**2021:** Confederations Cup = commercial go-live)



Agenda



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Overview of Qatar Integrated Railways Project (QIRP)



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- Integrated railway transport concept, comprising a **fully-automated metro system** and a **long-distance railway network**
- QIRP will ensure **urban mobility** with an **availability of 98%** for the metro network in Doha
- QIRP will provide **regional connections** within Qatar and **international long-distance routes** in passenger and freight transport between Qatar and the neighbouring states of Bahrain and Saudi Arabia
- The railway system must meet the **highest international standards** with regard to safety and comfort
- The **investment volume** for the QIRP is between **20 and 25 billion euros**





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Qatar's Integrated Railway Network will set standards for the region



A modern long distance and urban railway transport system

- 325 km long distance network as an integral part of the overall GCC network, connecting Qatar to its neighboring countries



- 342 km urban and regional metro system, linking Doha's hot spots

Qatar will develop a world class transportation system, serving its economic, financial and educational goals



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The planned rail infrastructure supports Qatar's modernisation campaign

Taking the load off the roads

- Cutting travelling times for residents and guests
- Reduction of CO₂ emissions
- Fast and easy freight transport by rail

Qatar aims to position itself as the prime education location in the region

- Long-distance rail connections allow students from Bahrain to attend universities in Qatar

The mobility offering makes Qatar more attractive

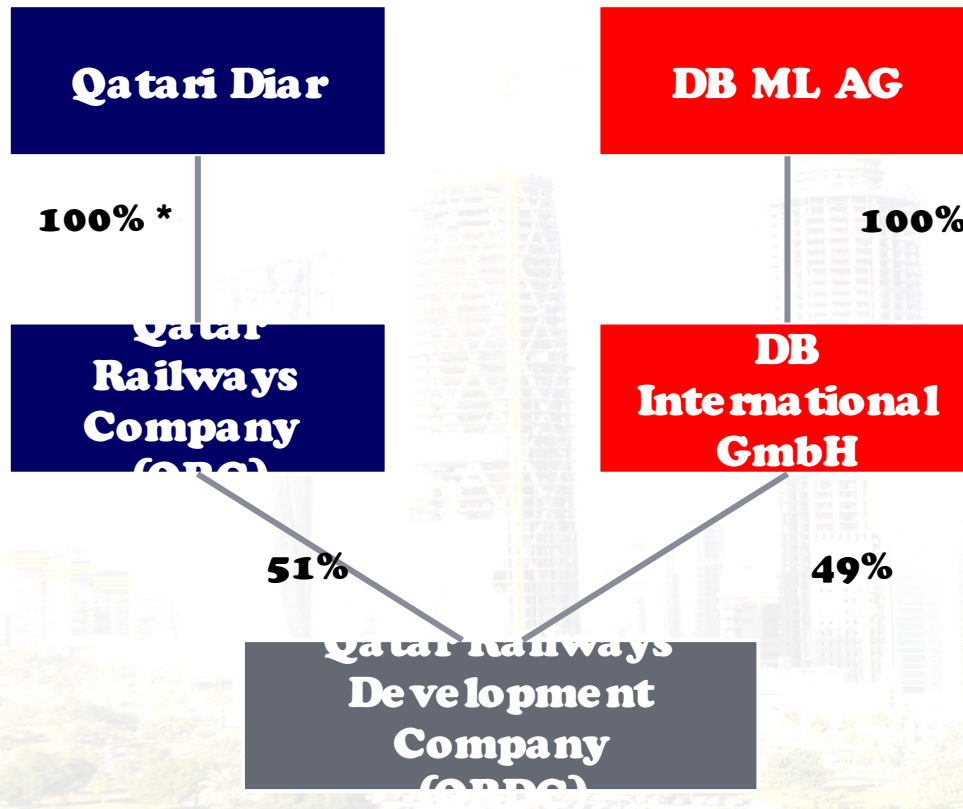
- Safe, fast and convenient travel
- Enhancement of the cityscape by taking traffic off the roads
- Airport link



The Qatar Railways Development Company was founded to realise the rail infrastructure measures



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* Share of ownership modifications possible



Four Metro Lines and Long-distance Services

1 Metro

- Red Coast Line
- Golden Historic Line
- Green Education Line
- Blue City Line

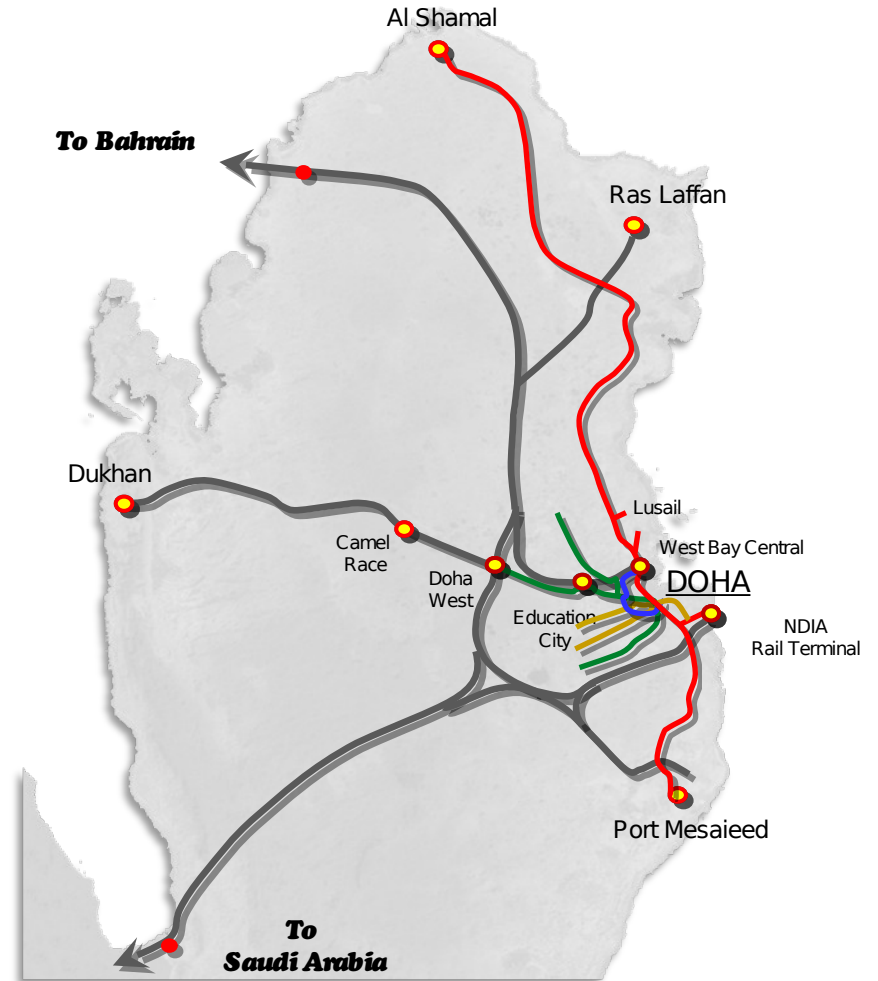
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Long distance

- Passenger Train Service
- Freight Railway System

3 General Infrastructure

- Passenger Stations
- Freight Terminals
- Maintenance Facilities
- Central Control Room



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In its final form, the metro network for the steadily growing capital Doha will have a total length of around 350 kilometres

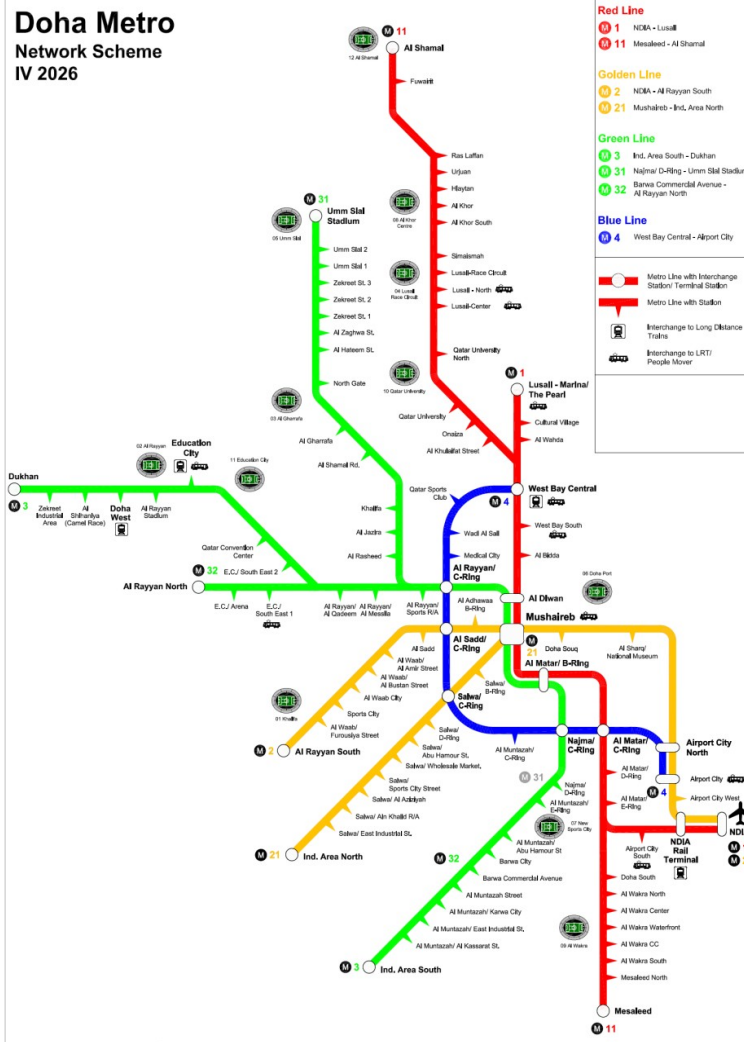


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Doha Metro Network Scheme IV 2026



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Burkhard Unterters II / Atkon AG

Detailed information on the planned metro network in Doha



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Data for the metro network (Status 03/2011)

Total line length	342 km
of which in tunnels	116 km
of which elevated	72 km
of which at ground level	154 km
Maximum speeds	
Urban	80 km/h
Suburban	130 km/h
Headways (min.)	
Urban (operational)	3.75 - 10
Urban (technical)	2 - 10
Suburban	30 - 60
Stations	approx. 98
Trains	100
Connected stadiums	12





A state of the art Metro network links Doha's "hot spots"

Four Metro lines allowing fast connections within the city



Red Coast Line

North- South line, from Ras Laffan via Doha downtown to Mesaieed, also serving NDIA , West Bay, Lusail and The Pearl

Golden Historic Line

East-West direction, connecting NDAI with Doha Souq, Doha with Al Rayyan South, and following Salwa Road

Green Education Line

Al Rayyan Road connecting Dukhan and Education City with the Heart of Doha

Blue City Line

semi-circular ring line, linking the new quarter West Bay with Airport City North

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Detailed information on long-distance and freight transport



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Passenger transport (HSR) to Bahrain (Manama) (Status 2010)

Design speed	max. 350 km/h
Rail stations (in Qatar)	4
Axle load (line design)	25 tonnes
Power supply	25 kV AC
Doha Airport - Manama	213 km in 55 min
West Bay Central - Manama	180 km in 63 min
Education City - Manama	162 km in 50 min
Tunnel sections in Doha	25 km

Passenger transport to Saudi Arabia (Status 2010)

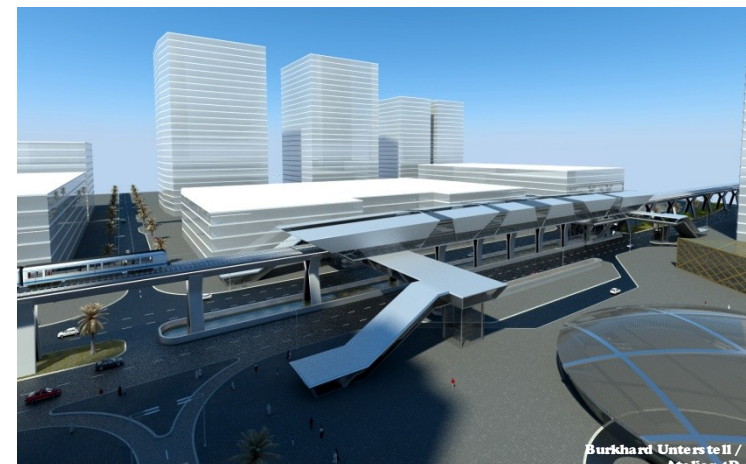
Design speed	220 km/h
Rail stations (in Qatar)	1
Axle load Qatar (Saudi Arabia)	25 t (32.4 t)
Power supply Qatar (Saudi)	

Freight transport, diesel 32.4 t (2010)

Op. speed	max. 120 km/h
Train length	2,200 m

Freight transport, electric 21.5 t (2010)

Op. speed	max. 120 km/h
Train length	1,000 m



Burkhard Unterstell / Atelier 11



Burkhard Unterstell / Atelier 11

Long Distance Passenger and Freight Transport

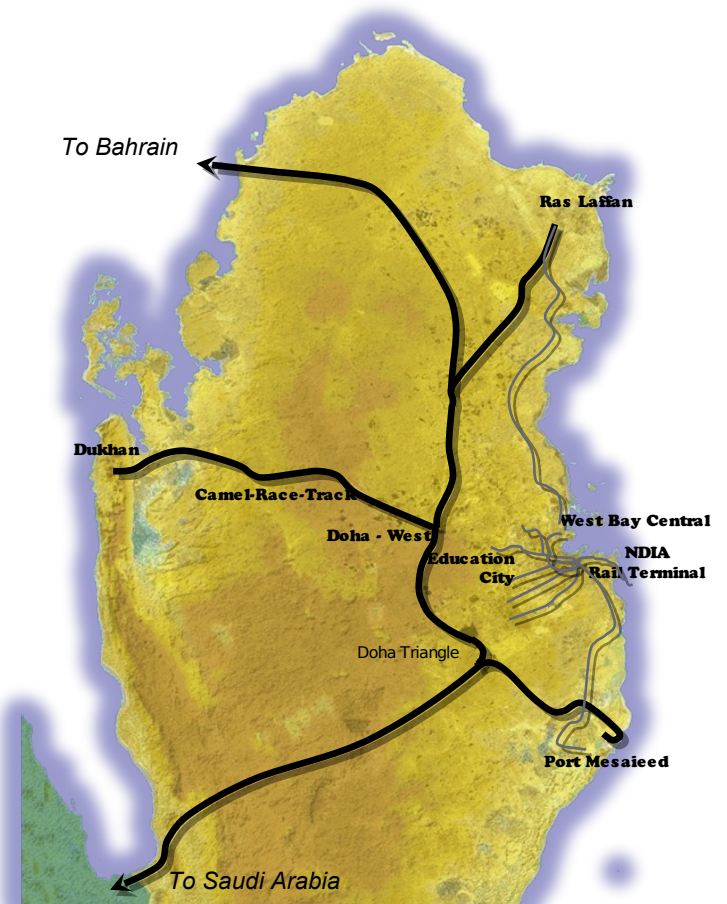


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Long Distance Passenger



Freight Transport



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Metro project

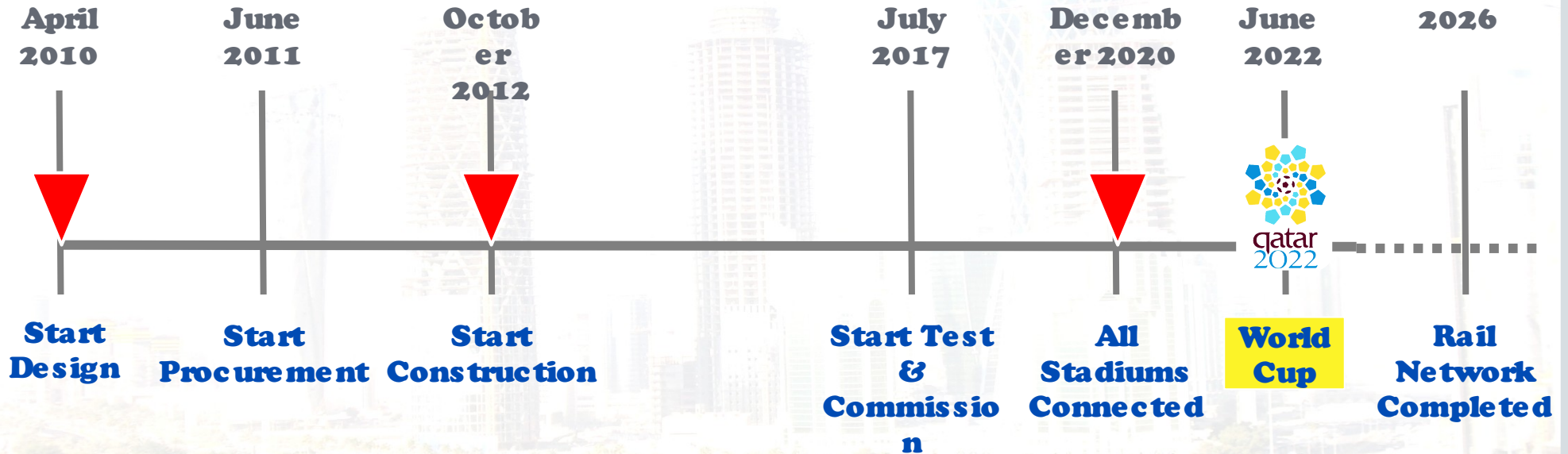
Passenger transport / freight transport

Outlook

Milestone plan for the Qatar Integrated Railways Project



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FIFA 2022 is achievable



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Al Gharafa Stadium



Khalifa Int'l Stadium



Hassim Bin Hamad Stadium



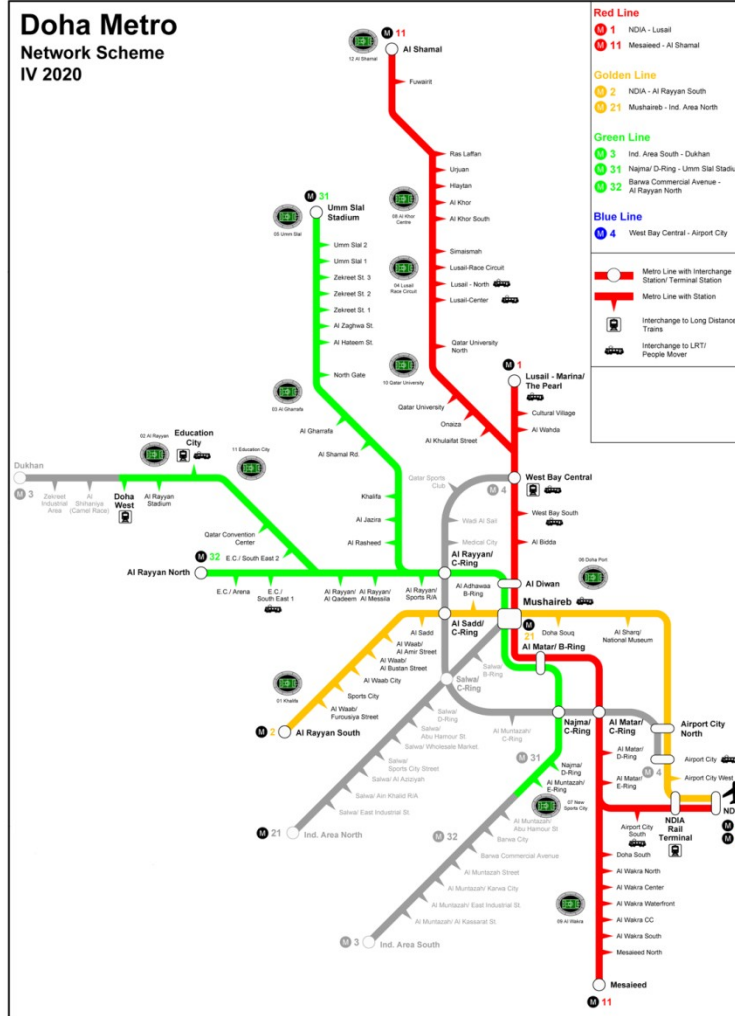
Qatar SC Stadium



Grand Hamad Stadium



Al Ahly Stadium



Thank you for your attention



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qatar
2022



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BACK UP

Lusail is a major urbanisation project in the middle of the desert north of Doha



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Geotechnical conditions in Qatar (1/3)



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Sand dune in Um Said



Excavation in Doha with anchored pile wall

- The Persian Gulf Basin consists of up to 10 km thick carbonate sediments from different geological eras
- Coasts are flat and locally marine terraces and sabkhas (salt pans) are exhibited
- The largest part of the land surface is composed of marine deposits (limestone and dolomite) which are frequently covered by a 0,5 m to 2,0 m thick layer of silty sands.
- Barchans (crescent dunes) with a height of up to 30 m can be mobilized by the influence of wind
- Qatar is a desert area – but water can still cause major erosion effects

Geotechnical conditions in Qatar (2/3)



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Torrential rain in Doha



Surface (dam with limestone and mortar bed)
Salwa Road

- Rare torrential rains cause severe short-term flooding
- Average rainfall is less than 100 mm / year
- Leaching causes karst formation in the limestone layers
- Some coastal areas in Doha are artificial islands, such as the peninsula "Pearl" or 50% of the New Doha International Airport surface area
- Ground water levels near the coast correspond to the the average sea level in the Persian Gulf and show tidal influences
- Groundwater in some parts is very salty (sometimes it has a higher salinity than the seawater)

Impact on the Metro tunnel in Doha (3/3)



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- Previous findings:
 - Rock strengths vary
 - High salinity of groundwater
 - Ground water and geohydraulic conditions vary
- Before the construction tenders an extended geotechnical and hydrological investigation program is carried out
- Karst caves filled with quaternary sediments have to be localized and investigated
- Possible impact of concrete/steel aggressive groundwater on tunnel lining segments and other constructional elements has to be considered
- The choice of construction methods, such as the use of “cut and cover” or by tunnel boring machine (TBM) depend on the depth of the underground construction below ground level



Loosening limestone by chiselling



Excavation on a main road to the north

The opening match and the final of the World Cup 2022 are to take place in the Lusail Stadium; the largest of the total of 12 stadiums



Many of the stadiums are still in the planning phase or are due to be extended for the World Cup 2022



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