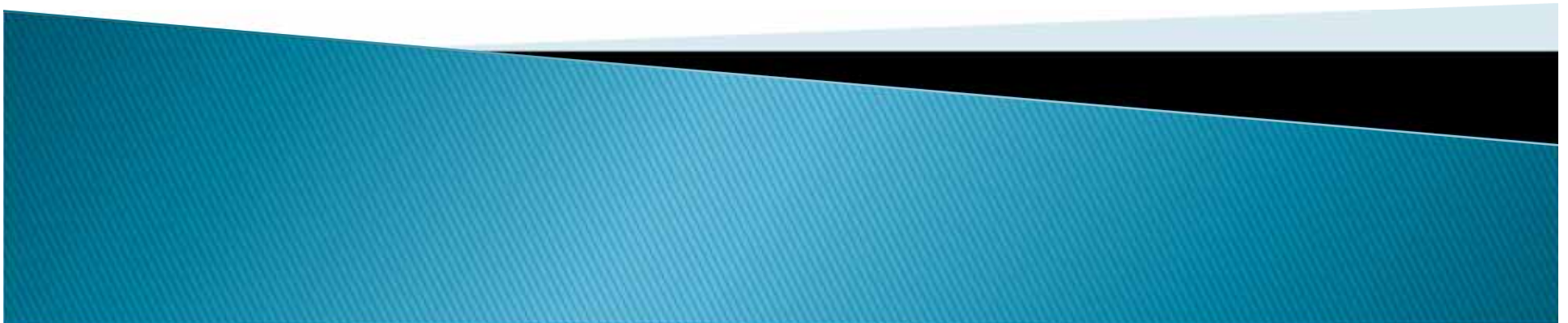


Government of Nepal
Ministry of Physical Infrastructure and Transport
Department of Railways

Railway Projects in NEPAL (Game Changer Projects)

Aman Chitrakar
Senior Divisional Engineer



Presentation Outline

- ▶ 1. East West Railway
- ▶ 2. Kathmandu Metrorail
- ▶ 3. Kerung (China) – Kathmandu (Nepal) Railway
- ▶ 4. Raxaul (India) – Kathmandu (Nepal) Railway



Nepal became a member of Trans Asian Railways (TAR)

GoN signed on 10 November, 2006
Ratification on 6 March, 2012



East West Railway

- ▶ Priority of Project – National Priority
- ▶ Location – 21 Terai districts
- ▶ Feasibility Study completed in 2010



East West Railway

- ▶ Project Implementation Modality
 - ▶ not yet decided
 - ▶ DPR cost under GoN Budget
 - ▶ Construction and Land Acquisition expenditure till date under GoN Budget



East West Railway

- ▶ Project Specific
- ▶ DPR completed in nine packages (1056km including links)
- ▶ Construction started in Bardibas-Nijgadh section (70km)

Salient Features

- ▶ Total Length 943km (including links Kohalpur-Nepalgunj, Butwal-Bhiraha-Lumbini, Itahari-Biratnagar 1056km)
- ▶ Design Speed 200km/hr
- ▶ Standard Gauge **1435mm**
- ▶ Passes through major towns along East West Highway like Birtamod, Damak, Itahari, Inaruwa, Lahan, Rajbiraj, Bardibas, Chapur, Hetauda, Narayanghat, Butwal, Lamahi, Kohalpur, Attariya, Mahendranagar etc
- ▶ Electric Traction
- ▶ Single Track

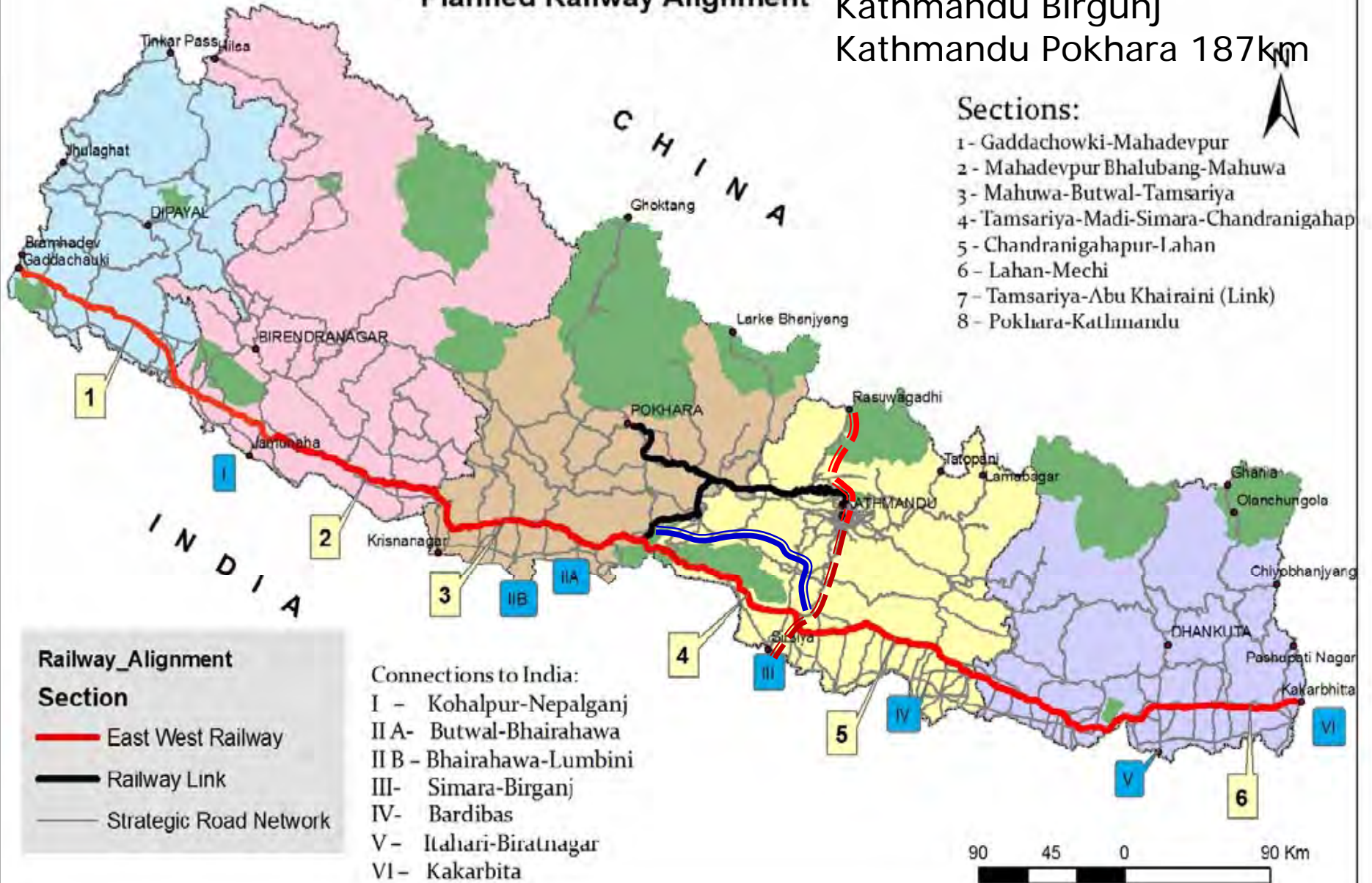


East West Railway 943km
 Kathmandu Kerung 72km
 Kathmandu Birgunj
 Kathmandu Pokhara 187km

Planned Railway Alignment

Sections:

- 1 - Gaddachowki-Mahadevpur
- 2 - Mahadevpur Bhalubang-Mahuwa
- 3 - Mahuwa-Butwal-Tamsariya
- 4 - Tamsariya-Madi-Simara-Chandranigahap
- 5 - Chandranigahapur-Lahan
- 6 - Lahan-Mechi
- 7 - Tamsariya-Abu Khairaini (Link)
- 8 - Pokhara-Katmandu



East West Railway

Justification of Project Selection for implementation

- ▶ Link of Trans Asian Railway
- ▶ Beneficial to the whole country
- ▶ Can be a milestone for replacement of fuel based transportation and saving huge amount of money spent on import of fuels



East West Railway

Project Implementation Status

- ▶ Construction work started in Bardibas-Nijgadh section (70km)
- ▶ 28km Trackbed and Two Bridges completed
- ▶ 42km Trackbed and 14 Bridges under construction
- ▶ EIA of Simara-Bardibas approved, EIA of other sections under approval process
- ▶ 20 km land acquisition completed, 20km forest area clearance completed,
- ▶ 16 km forest clearance and 12km land acquisition under process



East West Railway

Project Cost

- ▶ Original Estimate : Appx. NPR100000 Crore (Appx USD10 Billion)
(Including land acquisition)
- ▶ Date of Estimate :2019
- ▶ Actual Expenditure till FY 075/76 : 1440 Crore (including land acquisition)

Project Viability

- ▶ Economic Internal Rate of Return (EIRR) >12%
- ▶ Financial Internal Rate of Return (FIRR) 2.75%



East West Railway

S.No.	Sections	Length In Km.	Estimated Cost In NRs. (in the Year)
1	Kakarbhitta - Inaruwa	126.763	90,028,286,240 (2017)
2	Inaruwa - Bardibas	139.425	116,194,171,910 (2017)
3	Bardibas - Simara	136.4	70,968,055,770 (2013)
4	Simara - Tamsariya	127.09	108,265,158,481 (2014)
5	Tamsariya - Butwal	107.824	64,504,062,699 (2014)
6	Butwal - Lamahi	105.94	74,272,914,908 (2018)
7	Lamahi - Kohalpur	113.70	100,110,878,676 (in 2018)
8	Kahalpur - Sukkhad	94.1	72,698,769,962 (in 2018)
9	Sukkhad - Gaddachowki	89.08	72,425,184,362 (in 2018)



East West Railway

S.No.	Sections	Length In Km.	Estimated Cost In NRs.	Estimated Cost Calculated in the Year A.D.
1	Kakarbhitta - Inaruwa	126.763	90,028,286,240	2017
2	Inaruwa - Bardibas	139.425	116,194,171,910	2017
3	Bardibas - Simara	136.4	70,968,055,770	2013
4	Simara - Tamsariya	127.09	108,265,158,481	2014
5	Tamsariya - Butwal	107.824	64,504,062,699	2014
6	Butwal - Lamahi	105.94	74,272,914,908	2018
7	Lamahi - Kohalpur	113.7	100,110,878,676	2018
8	Kahalpur - Sukkhad	94.1	72,698,769,962	2018
9	Sukkhad - Gaddachowki	89.08	72,425,184,362	2018

Kathmandu Metrorail

- ▶ Priority of Project – level not decided yet
- ▶ Location – Two districts Kathmandu and Lalitpur
- ▶ Feasibility Study completed



Kathmandu Metrorail

- ▶ Project Implementation Modality
 - not decided yet
 - Feasibility Study Cost under GoN Budget



Kathmandu Metrorail

Project Specific

- ▶ Construction of Electrified Kathmandu MetroRailway
- ▶ Total Length 77.28km
- ▶ Five Lines
- ▶ Line 1 Satdobato-Ratna park-Narayangopalchowk 12.10km
- ▶ Line 2 Kirtipur-Kalimati-NewBaneshwor Airport 11.15km
- ▶ Line 3 Koteshwor-Chabahil-Swayambhu-Koteshwor 28.53km
- ▶ Line 4 Swoyambhu-Dillibazar-Boudha 11.70km
- ▶ Line 5 Dhobighat-Singhadurbar-Naksal-Gonggabu 13.8km

- ▶ Line 1,2 & 3 Elevated
- ▶ Line 4 & 5 Underground

- ▶ Design Speed 60km/hr



Kathmandu Metrorail



Kathmandu Metrorail

Justification of Project Selection for implementation

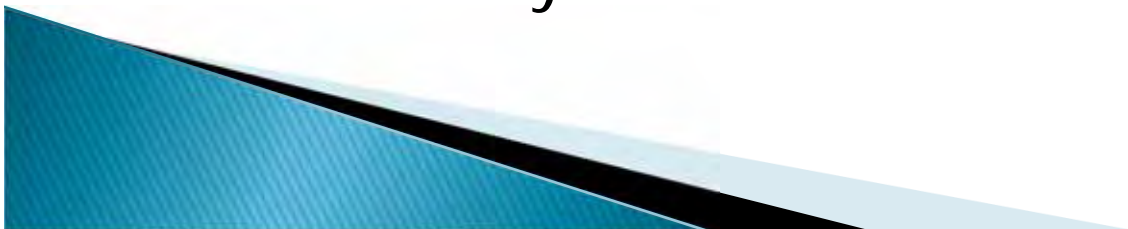
- ▶ Best way to fulfill traffic demands of current Kathmandu valley population of around 4 million
- ▶ Best alternative to provide traffic congestion free public transportation
- ▶ Encourage people to use public transportation thereby reducing the number of personalized vehicles mainly cars and two wheelers



Kathmandu Metrorail

Justification of Project Selection for implementation

- ▶ Reduce air pollution as it is an electrified railway line and also reduces import of fuel to some extent
- ▶ Provide safe , reliable, economic and environmental friendly mode of mass transportation
- ▶ Saves travel time which can be utilized in other economic activities
- ▶ Improves quality of life in capital city thus enhances pride of country and better image of the country for the tourists



Kathmandu Metrorail

Project Implementation Status

- ▶ Feasibility Study completed
- ▶ Selection of Consultant for DPR in Line 1 (Satdobato Ratnapark Narayangopalchowk) under process
- ▶ IBN also selecting consultant for DPR of Nagdhunga Dhulikhel line



Kathmandu Metrorail

Project Cost

- ▶ Original Estimate : 330 billion(Appx USD3.3 Billion)
- ▶ Date of Estimate :2012 (Feasibility Study)

Project Viability

- ▶ Benefit-Cost Ratio (BCR) 1.01



Kerung–Kathmandu Railway

- ▶ Priority of Project – level not decided yet
- ▶ Location – Three districts Rasuwa, Nuwakot and Kathmandu



Kerung–Kathmandu Railway

- ▶ Project Implementation Modality
 - not decided yet
 - Pre Feasibility Study including its Cost
 - by Government of China



Kerung–Kathmandu Railway

Project Specific

- ▶ Construction of Kerung-Kathmandu Electrified Railway Line starting from Kerung at China and ending at Tokha at Kathmandu in Nepal.
- ▶ Four stations namely Rasuwagadi, Shyfrubesi, Bidur and finally Kathmandu station
- ▶ Total Length 72km
- ▶ 98.8% Railway line consist of tunnels and bridges
- ▶ Design Speed 120km/hr
- ▶ Standard Gauge 1435mm
- ▶ One of the most complex and challenging project in terms of its alignment terrain, geological complexity, seismic hazard , and other operational issues



Kerung-Kathmandu Railway

Total L=599.4km, 527.2km in China, 72.2km in Nepal.

Lake Peiku-Kathmandu=170.4km.

10 stations

China: L=98.2km , Bridges

L=5.8km/18, Tunnel L=85.8km/13,

Bridge & Tunnel Ratio=93.3%, 6 stations.

Nepal: L=72.2km, Bridges

L=2.7km/9, Tunnel L=68.6km/7,

bridge & Tunnel ratio of 98.8%, 4 stations.



Kerung–Kathmandu Railway

Justification of Project Selection for implementation

- ▶ Opens direct railway connectivity to China, one of the biggest economy of the world
- ▶ Direct access to the population of more than 1 billion, huge potential for tourism
- ▶ Can be a good alternative for reliable trade besides India
- ▶ Beneficial to the whole country
- ▶ Can be a milestone for replacement of fuel based transportation and saving huge amount of money spent on import of fuels



Kerung–Kathmandu Railway

Project Implementation Status

- ▶ Pre Feasibility Study completed
- ▶ An understanding reached for conducting the feasibility study during the recent visit to Nepal paid by the Highest Leadership of PRC (12th-13th Oct 2019)



Kerung–Kathmandu Railway

Project Cost

- ▶ Original Estimate : 293 billion(Appx USD 2.93 Billion)
- ▶ Date of Estimate :2018 (Pre-Feasibility Study)
- ▶ Construction period 9 years



Kerung-Kathmandu Railway

	Total estimated cost (billion RMB)	Cost per km (billion RMB)	Static investment (billion RMB)	Cost per km (billion RMB)
Lake Peiku-Border	19.56	0.2	16.81	0.17
Border-Kathmandu	17.77	0.25	13.74	0.19



It is estimated that the external power supply from Kerung (Lake Peiku) to Kathmandu will be 700 million yuan, including 300 million yuan in China and 400 million yuan in Nepal.

Total cost of Kerung(Lake Peiku) -Kathmandu 38 billion RMB.

Total cost for Nepal Section is 18.2 billion RMB.



Raxual–Kathmandu Railway

- ▶ Priority of Project – level not decided yet
- ▶ Location – Four districts Parsa, Bara, Makwanpur and Kathmandu



Raxual–Kathmandu Railway

- ▶ Project Implementation Modality
 - not decided yet
 - Preliminary Engineering cum Traffic (PET) Survey under Government of India Support



Raxual–Kathmandu Railway

Project Specific

- ▶ Construction of Electrified Raxual–Kathmandu Railway Line starting from Raxaul in India and ending at Chovar at Kathmandu
- ▶ Total Length 135 km
- ▶ Railway line consist of many tunnels and bridges
- ▶ Design Speed 120km/hr
- ▶ Maximum Gradient 1 in 50
- ▶ Broad Gauge 1676mm
- ▶ Complex and challenging project in terms of its alignment terrain, geological complexity, seismic hazard , operational issues



Raxual–Kathmandu Railway

Route : Raxaul – Jitpur – Nijgadh – Shikharpur
– Sisneri – Sathikhel – Kathmandu

Route Length : 135.886 kms

Important Bridges : 41 nos.

Tunnels : 39 nos. (Length- 41870 m)

Curves : 40 nos. (Length- 42271 m)

Grade Separators : 85 nos.

Stations : 13 nos.

R & R : 85 nos.

Land Requirement : 892 Ha

Cost : INR 16550.446 crore

(Appx NPR 264 Billion) (Appx USD 2.64 Billion)



Raxual-Kathmandu Railway



Route	Length
Raxaul - <u>Jitpur</u> - Nijgadh - <u>Shikharpur</u> - <u>Sisneri</u> - <u>Sathikhel</u> - Kathmandu	135.886 kms

Raxual–Kathmandu Railway

Justification of Project Selection for implementation

- ▶ Opens direct link from capital city to India through Railway network
- ▶ Direct access to the huge population in South Asia through rail line, enormous potential for increase in tourism and other businesses
- ▶ Will link to East West Railway as well as the Second International Airport to be constructed in Nijgadh
- ▶ Beneficial to the whole country
- ▶ Can be a milestone for replacement of fuel based transportation and saving huge amount of money spent on import of fuels



Raxual–Kathmandu Railway

Project Implementation Status

- ▶ PET Survey completed
- ▶ Bilateral communication in process for further detail study



Raxual–Kathmandu Railway

Project Cost

- ▶ Original Estimate : 264 billion
- ▶ Date of Estimate :2019 (PET Survey)
- ▶ Construction period 5 years

☐ Rate of Return

The project route has financial **Rate of Return of (+) 5.65%** on the gross capital investment of **INR 16550.466 crore.**





THANK YOU ALL !

