RAILWAY CORPORATE STRATEGY
CLOSE CORPORATION

COMPETITIVENESS AND SUSTAINABILITY: FOUR SCENARIOS FOR LINE HAUL RAIL IN SOUTH AFRICA

Dr. Dave van der Meulen

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INTRODUCTION

INTRODUCTION

The Role of Scenarios

- **Develop views**
  - **on significant future outcomes**
    - **that may fundamentally change an industry**
- **Enable stakeholders**
  - **to identify interactions among forces**
    - **and the outcomes of such interactions**
- **Reduce the number of forces**
  - **to those that materially contribute**
    - **to significant scenarios**

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DRIVERS OF SCENARIOS

DRIVERS OF SCENARIOS

Forces Affecting Competitiveness and Sustainability

- **Research on global data* identified three factors relevant to railway Competitiveness and Sustainability**
- **The factor *Positioning Passenger Rail* speaks to high-tech railway solutions**
- **The factor *Positioning Freight Rail* speaks to heavy axle load, heavy intermodal, heavy haul, private infrastructure ownership, and competing infrastructure routes**
- **Standard gauge track and private ownership underpin both factors**

*Van der Meulen & Möller, World Congress on Railway Research, 2008

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Forces Affecting Competitiveness and Sustainability

- **The factor *Pursuing Competition***
  speaks to infrastructure-operations separation,
  train operator diversity, private rolling stock
- **Private ownership plays a positive role**
  in facilitating contestable markets
- ***NB Sustainability in the present context***
  is the ability to self-fund asset renewal—
  it follows from competitiveness

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Forces Affecting Competitiveness and Sustainability

- **Two fundamental forces drive SA railway scenarios—**
- **First, narrow track gauge**
  impedes inherent railway competitiveness
  - **Colonial-standard sunk investments have been expended but self-sustaining asset renewal seems beyond reach**
  - **Many assets are antiquated and obsolete—some mistakenly believe them to be *underutilized***
- **Second, state ownership**
  impedes private participation,
  intra-industry competition and industry vitality

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Competitiveness: Standard Gauging

- **Standard gauge outclasses narrow gauge in supporting railway competitiveness**
- **South Africa has stretched the *Bearing* and *Guiding* genetic technologies to their narrow gauge limits**
- **Yet it is unable to enter naturally competitive container double stacking (32.4 tonnes/axle) and very high speed intercity (350-380km/h)**
- **Its railways are relegated to competitive disadvantage until it implements a sufficient standard gauge network**

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Competitiveness: Standard Gauging

- **The competitive disadvantage is escalating— narrow gauge undertakes insignificant R&D**
- **South African freight rail is outclassed by heavy axle load standard gauge railways—**
  - **in domestic market against trucks bred to compete against standard gauge rail**
  - **in export markets against standard gauge heavy haul railways**

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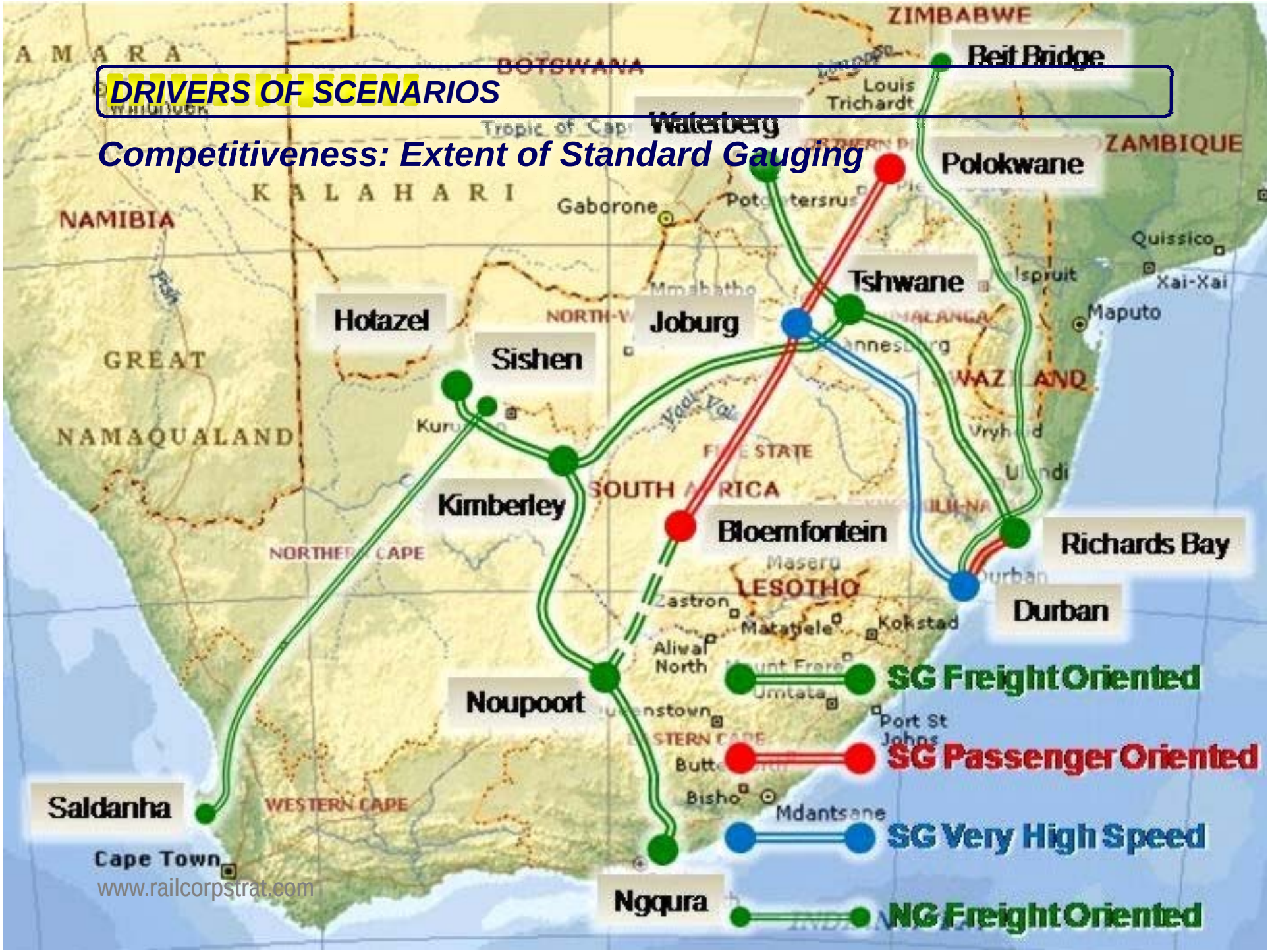
Competitiveness: Standard Gauging—a Measuring Scale

- **Pushback against standard gauging exists—**
  converting the entire SA network seems unaffordable
- **Is it really necessary to convert the entire network—**
  a standard gauge network of ≤6000km should suffice*
- **The critical amount of standard gauging**
  is that which is sufficient
  to build an aggressively competitive core network
- **A simple dichotomous scale will differentiate scenarios—**

None **Sufficient**

EXTENT OF STANDARD GAUGING

*Van der Meulen, SATC, 2010


DRIVERS OF SCENARIOS
Competitiveness: Extent of Standard Gauging
ZIMBABWE
Beit Bridge
Louis Trichardt
Waterberg
Polokwane
ZAMBIQUE
BOTSWANA
Gaborone
NAMIBIA
KALAHARI
GREAT
NAMAQUALAND
Quissico
Xai-Xai
Maputo
Tshwane
Joburg
Hotazel
Sishen
Kimberley
Bloemfontein
Richards Bay
Durban
LESOTHO
Noupoort
Saldanha
Cape Town
Ngqura
SG Freight Oriented
SG Passenger Oriented
SG Very High Speed
NG Freight Oriented
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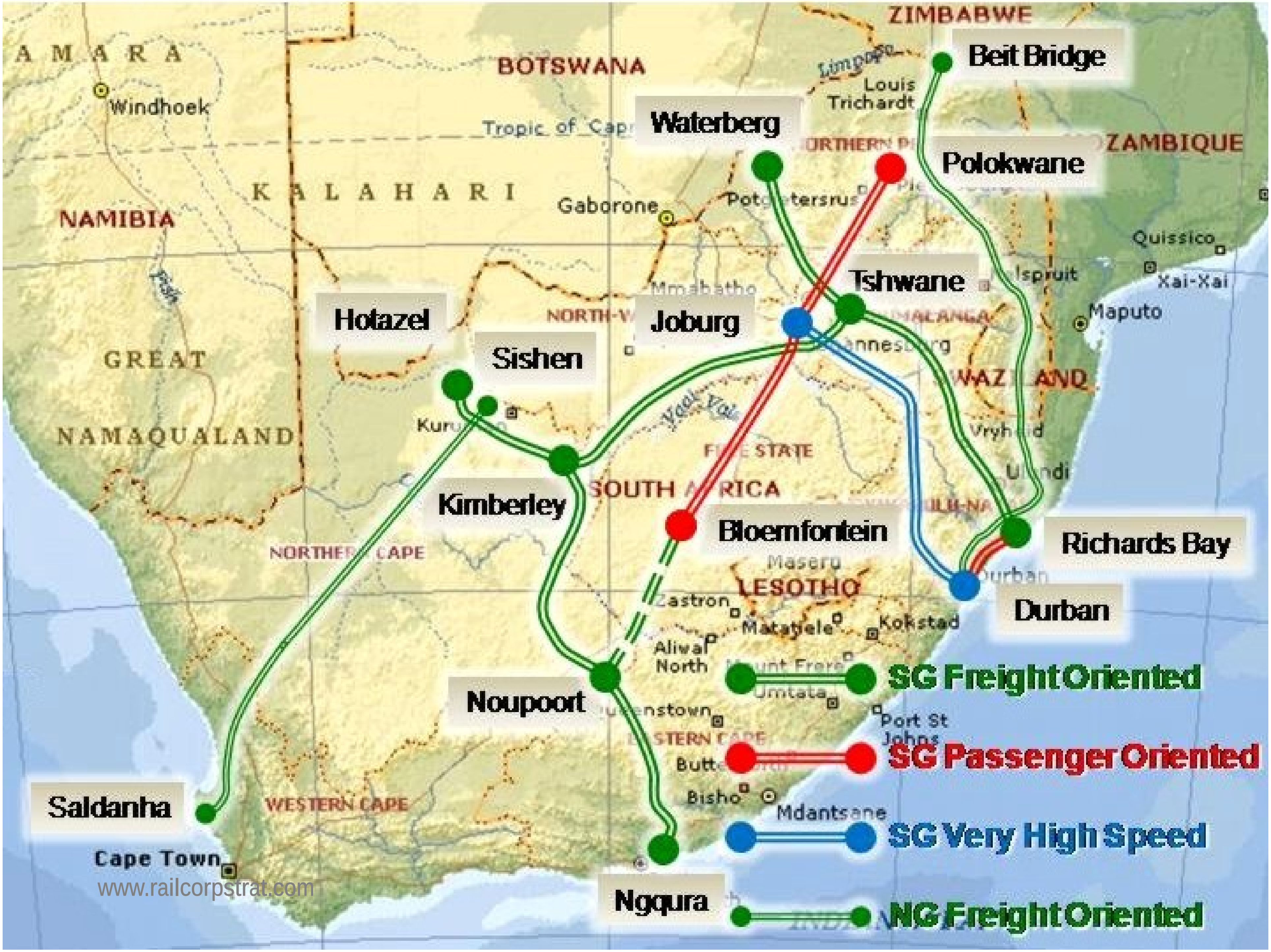
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SOUTH AFRICA
LESOTHO
NORTHERN CAPE
WESTERN CAPE
FREE STATE
Windhoek
Gaborone
Louis Trichardt
Tropic of Capricorn
Maputo
Quissico
Xai-Xai
Vryheid
Ulundi
Maseru
Zastron
Matatiele
Kokstad
Aliwal North
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Competition: Private Participation

- **The first scenario driving force, track gauge, relates to railway competitiveness**
- **Does the second force relate to competition in the market in which railways exercise their competitiveness?**
- **Even where intra-industry competition is well developed, railways typically face a small number of competitors**
- **Hence railway customers and prospective customers seek *contestability* as a proxy for *competition*, to assure fair pricing**
- **Competition associates with private participation**

DRIVERS OF SCENARIOS

Competition: Private Participation—a Measuring Scale

- **Private participation can range from**
  0% (e.g. a state owned railway) to
  100% (e.g. a mine-to-port heavy haul railway)
- **The critical amount of private participation**
  is that which is sufficient
  to influence strategic direction
- **Once again,**
  a simple dichotomous scale will differentiate scenarios—

None **Sufficient**

EXTENT OF PRIVATE PARTICIPATION

DRIVERS OF SCENARIOS

Competition: Private Participation—Significant Perspectives

- Railway privatization has generally improved business efficiency, service performance and markets*
- Freight transport is ruthless, low margin, very competitive and not well suited to a government player*
- It is difficult to see why some governments continue to see freight transport as a core government function*
- Private participation gives greatest benefit to the community when it is accompanied by competition (freight) or periodic contestability (passenger)**

*World Bank 2006 [1]; **World Bank 2006 [3]

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Competition: Private Participation Examples

Multiple

NETWORK OPTIONS

Single

Monopolistic **Contestable**

MARKET STRUCTURE

- **Rail originated in the Industrial Revolution by private enterprise**

DRIVERS OF SCENARIOS

Competition: Private Participation Examples

Multiple

NETWORK OPTIONS

Single

- **Forced amalgamation in 1923**

Monopolistic **Contestable**

MARKET STRUCTURE

DRIVERS OF SCENARIOS

Competition: Private Participation Examples

Multiple

NETWORK OPTIONS

Single

❖ State intervention

1948 Nationalization, 1963 Beeching Reshaping

Monopolistic Contestable

MARKET STRUCTURE

DRIVERS OF SCENARIOS

Competition: Private Participation Examples

Multiple

NETWORK OPTIONS

Single

1948 Nationalization, 1963 Beeching Reshaping

Monopolistic **Contestable**

MARKET STRUCTURE

- **Post 1948—**
  take it
  or leave it

British Rail standard locomotive

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Competition: Private Participation Examples

Multiple

NETWORK OPTIONS

Single

1948 Nationalization, 1963 Beeching Reshaping	
	

Monopolistic **Contestable**

MARKET STRUCTURE

- **Mid 1990s— partial competition re-introduced**

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Competition: Private Participation Examples

Multiple

NETWORK OPTIONS

Single

1948 Nationalization, 1963 Beeching Reshaping	
	

Monopolistic **Contestable**

MARKET STRUCTURE

- **Reintroduction of parallel competition mooted**

CILT World, December 2003/January 2004

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Competition: Private Participation Examples

Multiple

NETWORK OPTIONS

Single

1948 Nationalization, 1963 Beeching Reshaping	
	

Monopolistic **Contestable**

MARKET STRUCTURE

- **Parallel competition is the rule in North America**

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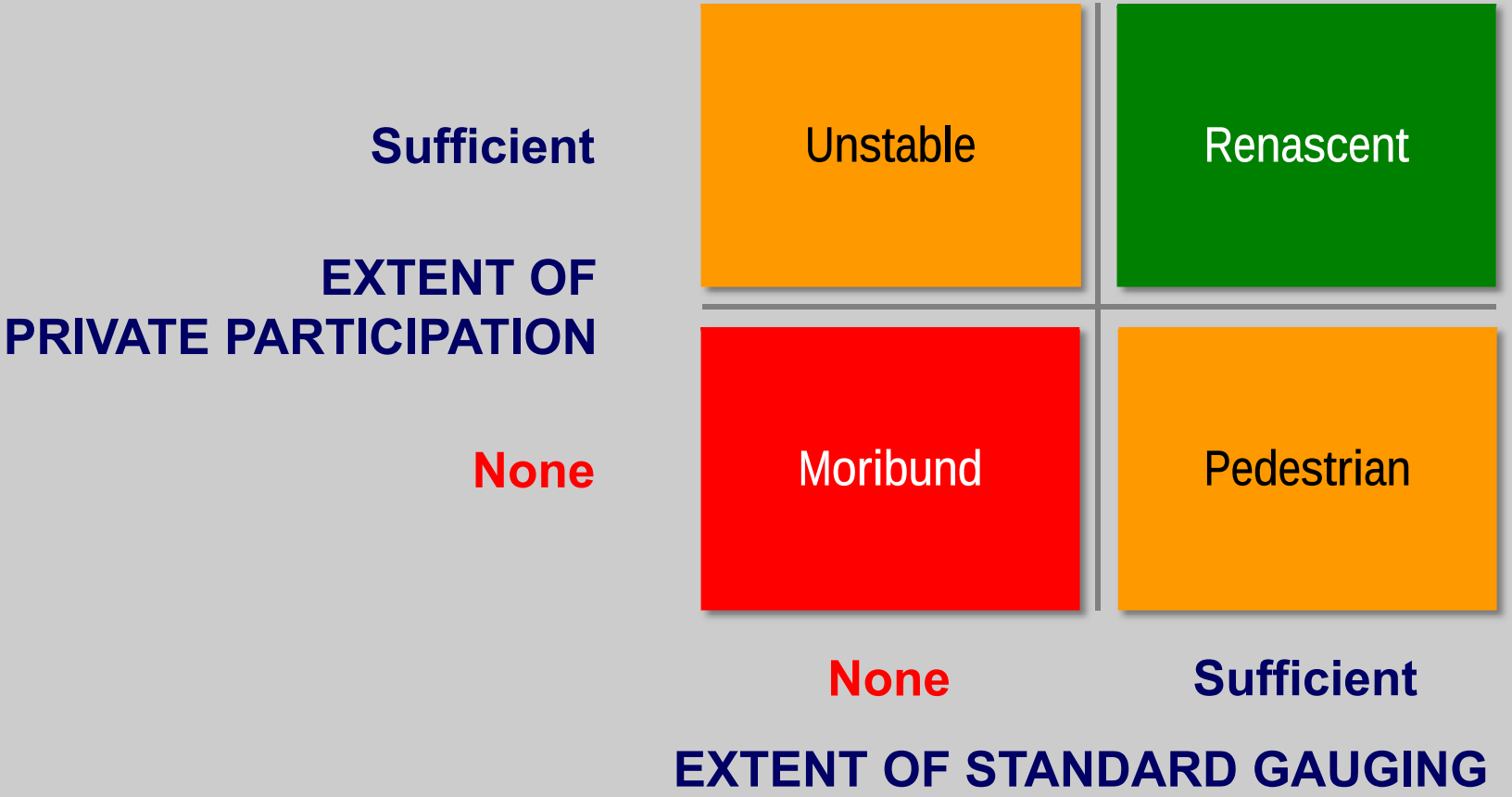
Cross-breaking the Two Forces Yields Four Scenarios …



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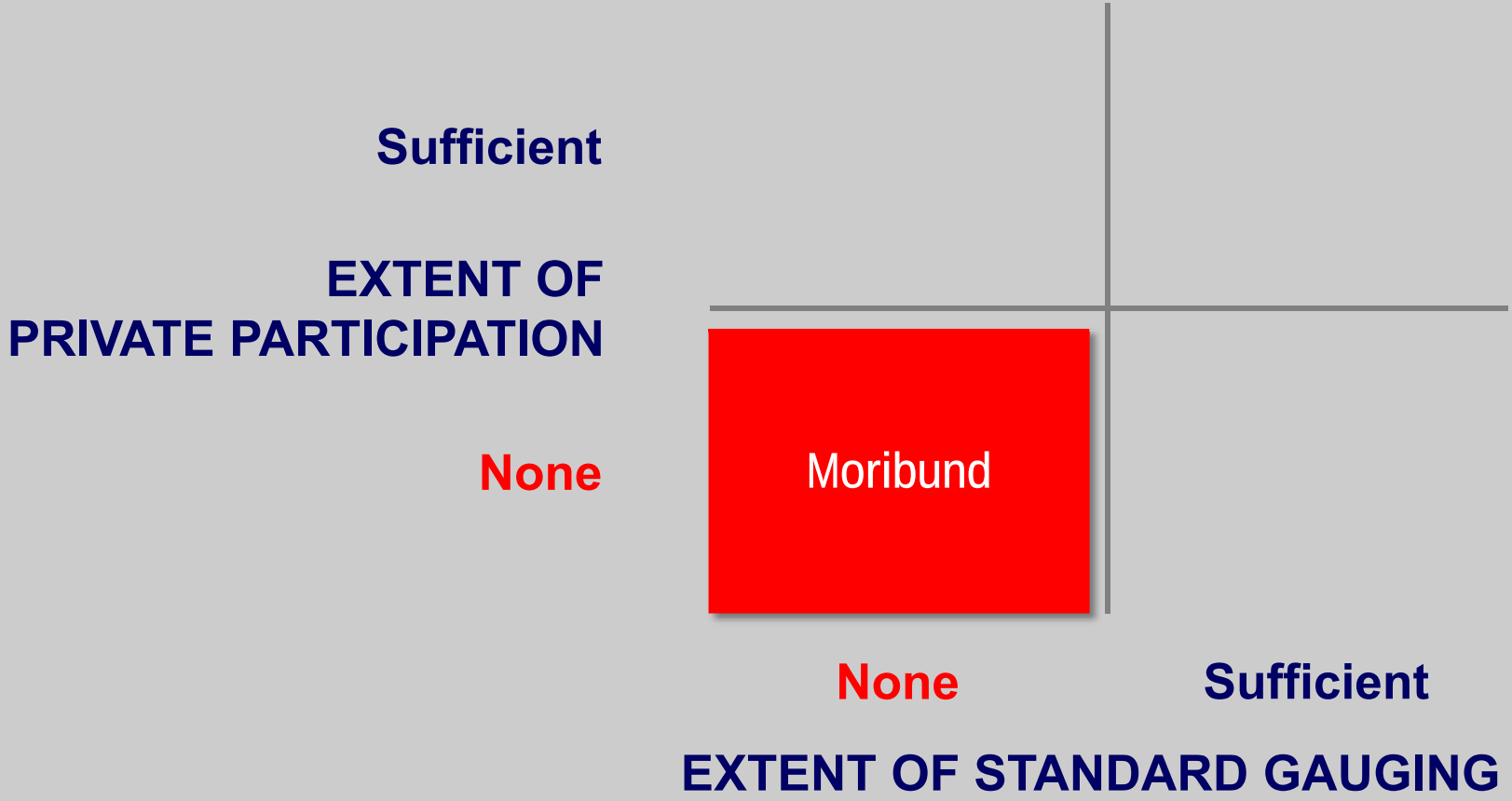
SCENARIO 1: MORIBUND RAILWAYS

SCENARIO 1: MORIBUND RAILWAYS

Description



SCENARIO 1: MORIBUND RAILWAYS

Description

- **The *do nothing* scenario—**
  present line haul railways in South Africa
- **No standard gauge infrastructure,**
  no private participation
- **Ermelo-Richards Bay and Sishen-Saldanha heavy hauls have slipped from world leadership,**
  the rest is moribund
- **Consider Gautrain the first fruit of SA's railway renaissance in the present context**

SCENARIO 1: MORIBUND RAILWAYS

Constraints—Fundamental

- **Absence of standard gauge prevents SA entering railway market spaces that are renascent in other countries**

- **Narrow gauge track is not industry standard—SA cannot access state-of-the-art technology at competitive prices and short lead times**

SCENARIO 1: MORIBUND RAILWAYS

Constraints—Rolling Stock

- Narrow gauge locomotives attract a price premium and haul smaller loads than standard gauge
- NG wagon load-to-tare ratios lag standard gauge industry leaders
- Performing a given task on NG requires more resources than on standard gauge
- More resources drive up both capital costs and operating costs

*TFR Jumbo 4.15:1

SCENARIO 1: MORIBUND RAILWAYS

Constraints—National Competitiveness

- **Narrow-gauge state-owned railways**
  cannot compete on a level playing field against trucks
  bred to compete with standard gauge railways
- **Restricting the axle load of trucks in South Africa**
  so that inherently uncompetitive railways can survive
  is perverse *in extremis*
- **Narrow gauge railways have done more than enough damage**
  to the South African economy—
  exacerbating that damage
  by making trucks less efficient
  is unconscionable

SCENARIO 1: MORIBUND RAILWAYS

Constraints—High Price, Low Quality

- **Absence of private participation means that**
  railway service cannot admit intra-modal competition
- **Competition reduces price and raises quality**
- **The consequences in South Africa**
  of high-priced and low-quality line haul railway service
  are self-evident
- **Absent intra-modal competition,**
  railway customers and prospective customers
  have no trustworthy proof
  that they are not being gouged

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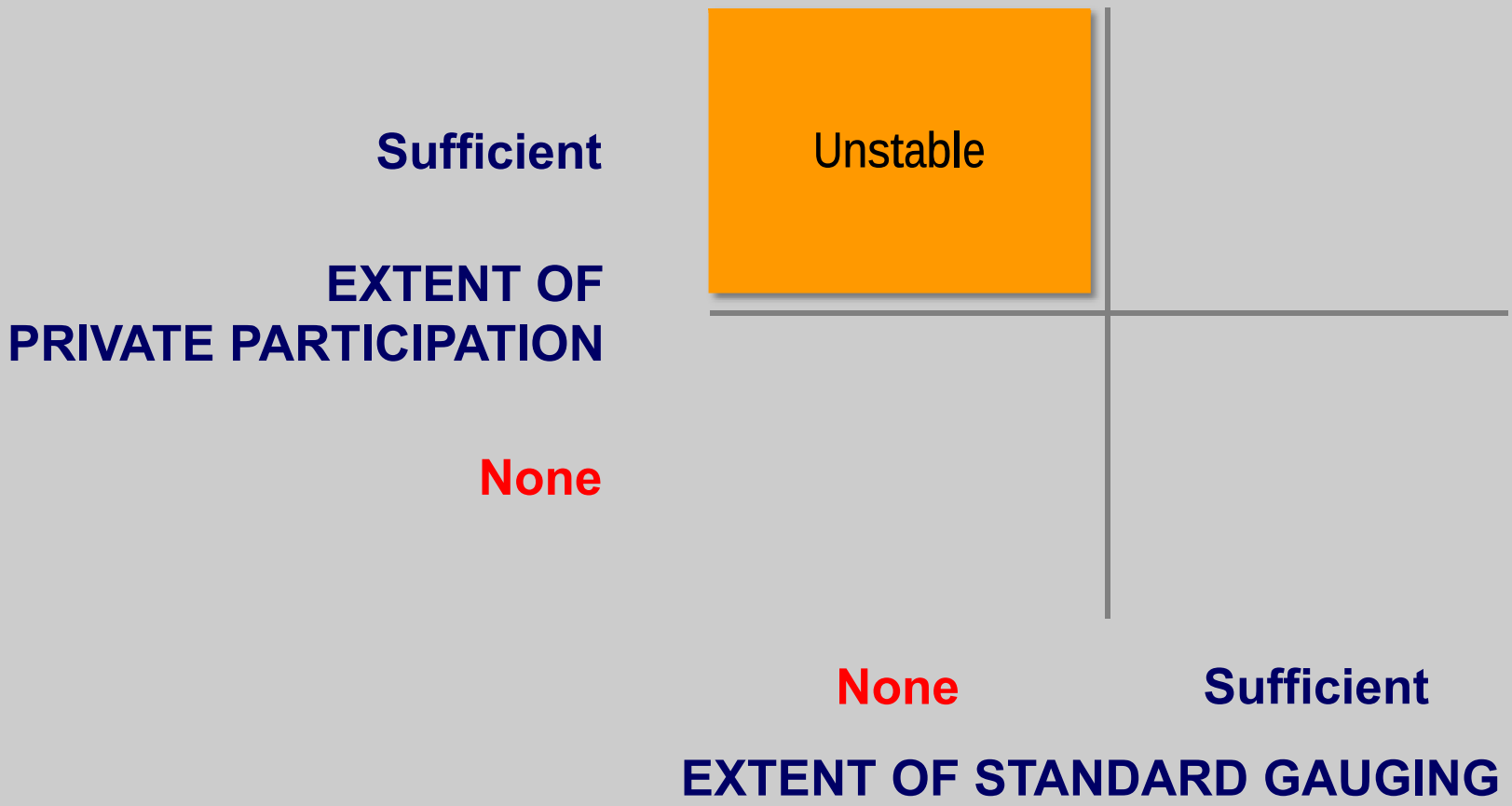
SCENARIO 2: UNSTABLE RAILWAYS

SCENARIO 2: UNSTABLE RAILWAYS

Description 1 of 2



SCENARIO 2: UNSTABLE RAILWAYS

Description 1 of 2

- **Liberalized railways**
  allow sufficient private participation
  to determine strategic direction
- **However, absence of standard gauge infrastructure**
  renders them inherently uncompetitive
- **Strategy can be viewed *ex ante* or *ex post*—**
  actual outcome may differ from initial intent
- **The outcome may miss objectives**
  and the process may prove irreversible—
  hence the name *Unstable*

SCENARIO 2: UNSTABLE RAILWAYS

Description 2 of 2

- **Liberalized narrow gauge railways**
  typically concession existing assets
- **A railway concession is a form of PPP—**
  a concessionaire operates the railway
  while the state retains infrastructure ownership*
- **The assets already exist**
  because few new narrow gauge railways
  have been built for several decades
- **They now seek sustaining intervention**
  in the face of aggressive competition from other modes

*World Bank, 2003

SCENARIO 2: UNSTABLE RAILWAYS

Challenges

- **Railway privatization is accepted as the way to go,**
  but substantial evidence suggests
  that efforts to revitalize narrow gauge railways
  through concessioning
  have frequently been
  less than successful

- **By contrast, several successful concessions**
  over standard- or broad gauge railways
  in South America
  have advanced remarkably
  since the 1990s

SCENARIO 2: UNSTABLE RAILWAYS

Challenges

- **Privatization is not a financing solution**
  to investment in low-density freight lines
  or in most passenger networks*
- **Only the very busiest railway networks**
  generate sufficient financial returns
  to attract risk capital
  in long-term railway infrastructure*
- **Few private entities have succeeded in making sustainable**
  narrow gauge railways formerly operated by a state—
  i.e. renewing assets as a going concern
  from self-generated funds

*World Bank 2006 [1]

SCENARIO 2: UNSTABLE RAILWAYS

Examples and Illustrations—South Africa

- **Orange River Rail Company and Alfred County Railway are South African case studies on operating concessions**
- **Revenue underperformance shortened their operating distances salami-style, until revenue ultimately failed to cover unavoidable operating costs**

SCENARIO 2: UNSTABLE RAILWAYS

Examples and Illustrations—Kei Rail

- Kei Rail in operation since 2008
- A project of the Eastern Cape Provincial Government
- Passenger traffic is rising
- Stakeholders seem happy
- Does the subsidized operation support long-term stability?

SCENARIO 2: UNSTABLE RAILWAYS

Examples and Illustrations—Africa

- **Vertically integrated concessions are in place in the following countries ...**
- **Côte d'Ivoire + Burkina Faso**
- **Cameroon**
- **Madagascar**
- **Senegal**
- **Mali**
- **Zambia**
- **Malawi**
- **Mozambique**
- **Tanzania**
- **Kenya**

SCENARIO 2: UNSTABLE RAILWAYS

Examples and Illustrations—Africa

- **Productive efficiency improved, freight service improved, traffic attracted, passenger service obligations met, but substantial investments in infrastructure were almost fully funded by donors, little private network investment—unsustainable without public capital***

- **Challenges in some areas—declining performance and infrastructure, retrenchments; business cooperation, service frequency, and capacity were reduced****

*World Bank 2006 [5]; **USAID 2009 [4]

SCENARIO 2: UNSTABLE RAILWAYS

Examples and Illustrations—Rest of World

- The problem of investment in low density lines remains—
  Governments will need to be
  the investor of last resort*
- The railway ownership process in New Zealand
  went full circle,
  from privatization in 1995
  to renationalization in 2008
  - Maintenance had been deferred for the duration
  - Renationalization
    required major new government funding commitment*

*World Bank 2006 [6]

SCENARIOS 1 and 2: MORIBUND AND UNSTABLE

From Research, they Align with the Insecure Railways Cluster*

*Van der Meulen & Möller, World Congress on Railway Research, 2008

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SCENARIO 3: PEDESTRIAN RAILWAYS

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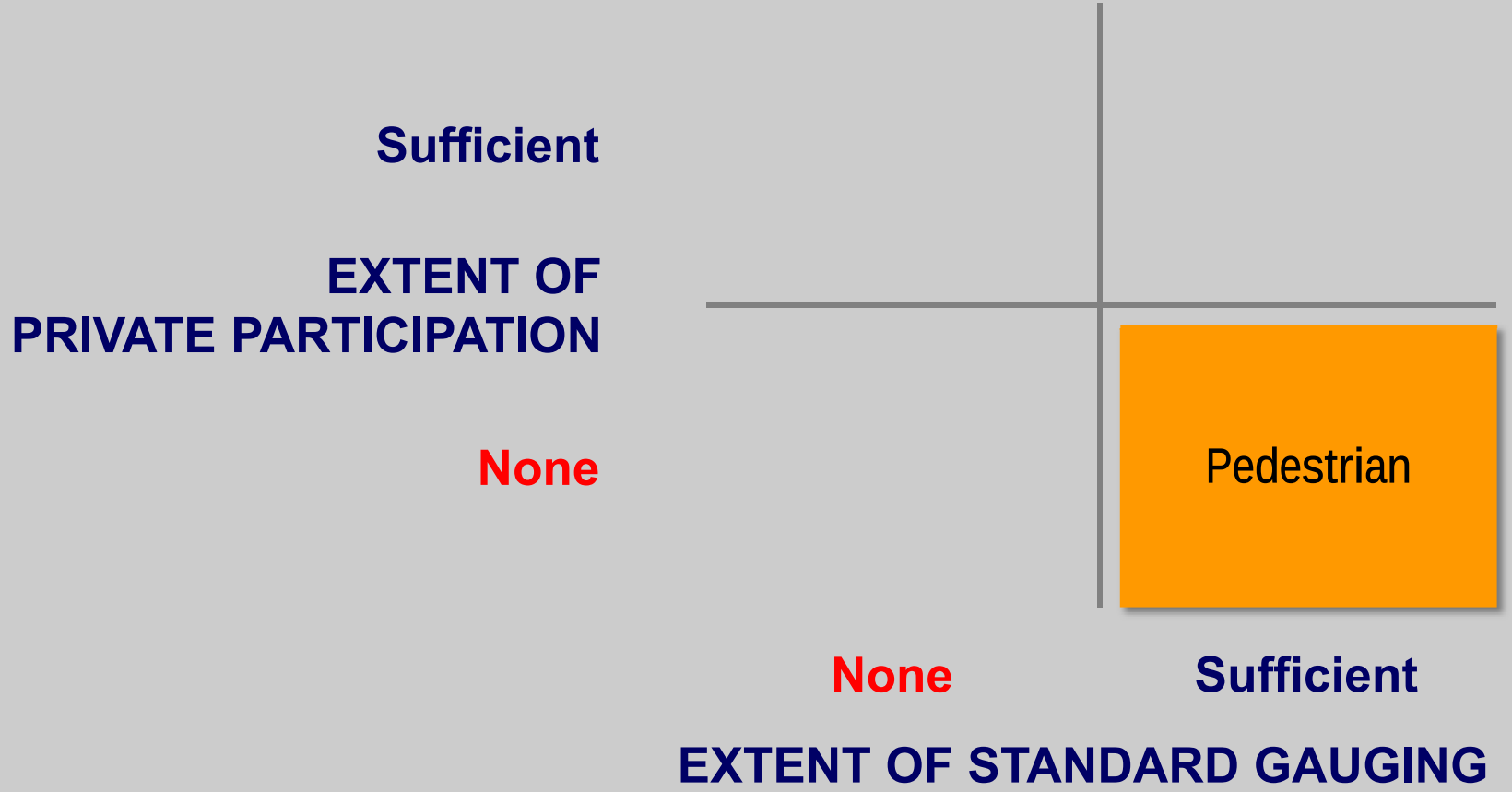
Description



SCENARIO 3: PEDESTRIAN RAILWAYS

Description

- **Sufficient standard gauge infrastructure**
  to support inherently competitive railways,
  but no private participation
- **A potentially competitive scenario,**
  but the ability of state owned enterprise
  to exploit that potential is questionable
- **In South Africa this would be state-funded standard gauging**
  with institutional arrangements intact
- **Absent private sector allocative- and productive efficiency,**
  the business approach is *pedestrian* rather than *vibrant*

SCENARIO 3: PEDESTRIAN RAILWAYS

Examples and Illustrations

- **From research*, the *Fortuitous Railways* cluster**
  identified standard- or broad gauge
  state-owned railways whose redeeming quality
  was sufficiently high axle load
  to support mild competitiveness

- **Notwithstanding their fortuitous positioning,**
  and despite their potential to become highly competitive,
  state ownership desensitized them
  to opportunities to
  position themselves competitively

*Van der Meulen & Möller, World Congress on Railway Research, 2008

SCENARIO 3: PEDESTRIAN RAILWAYS

From Research, they Align with the Fortuitous Railways Cluster*

*Van der Meulen & Möller, World Congress on Railway Research, 2008

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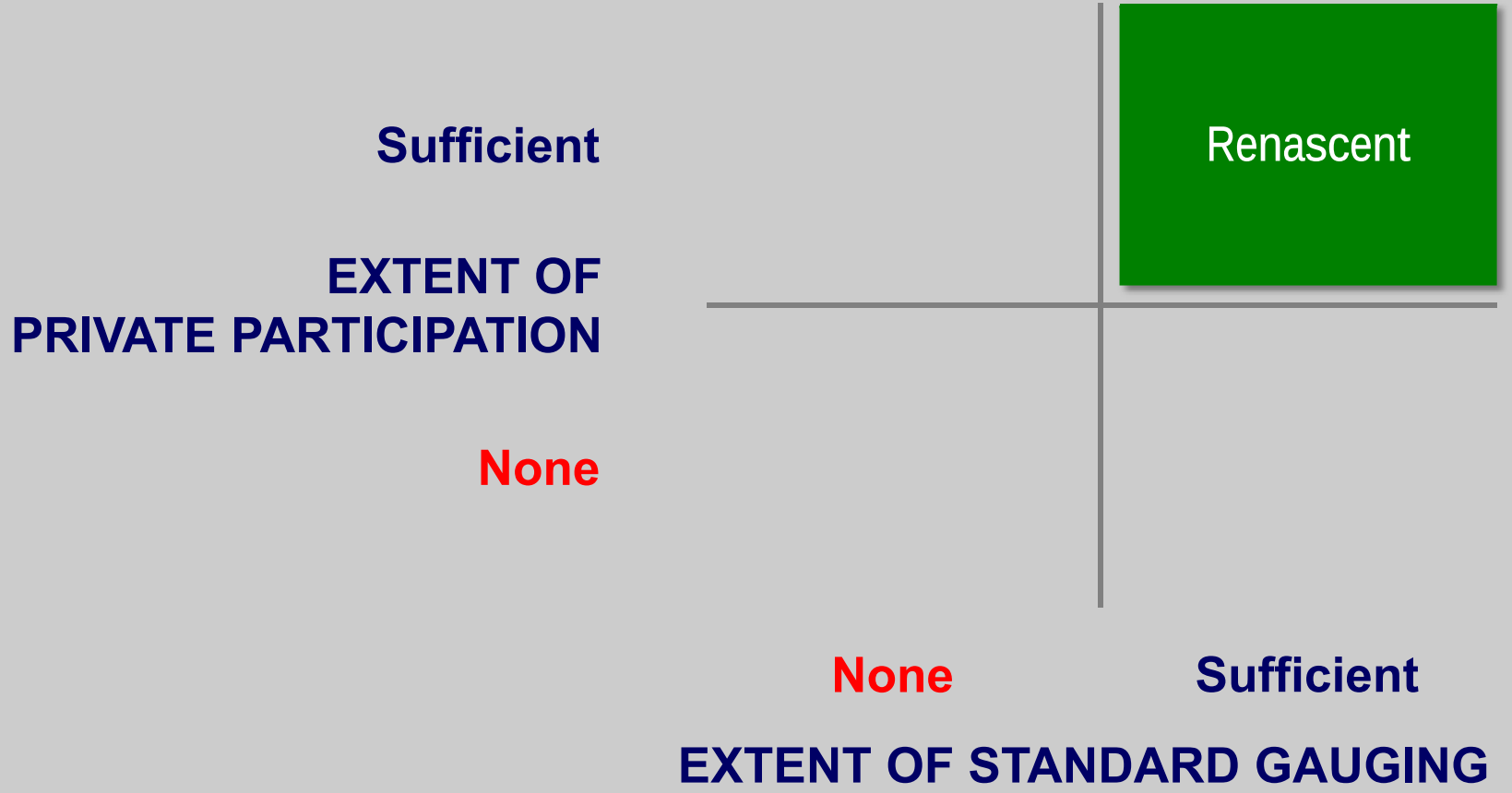
SCENARIO 4: RENASCENT RAILWAYS

SCENARIO 4: RENASCENT RAILWAYS

Description



SCENARIO 4: RENASCENT RAILWAYS

Description

- **This scenario depicts**
  sufficient standard gauge infrastructure
  and sufficient private participation
  to realize rail's full potential
- **It positions railways**
  to exploit all the competitive strengths
  that their genetic technologies can leverage
  from standard gauge track
- **Private participation allows strategic freedom**
  to pursue entrepreneurial objectives

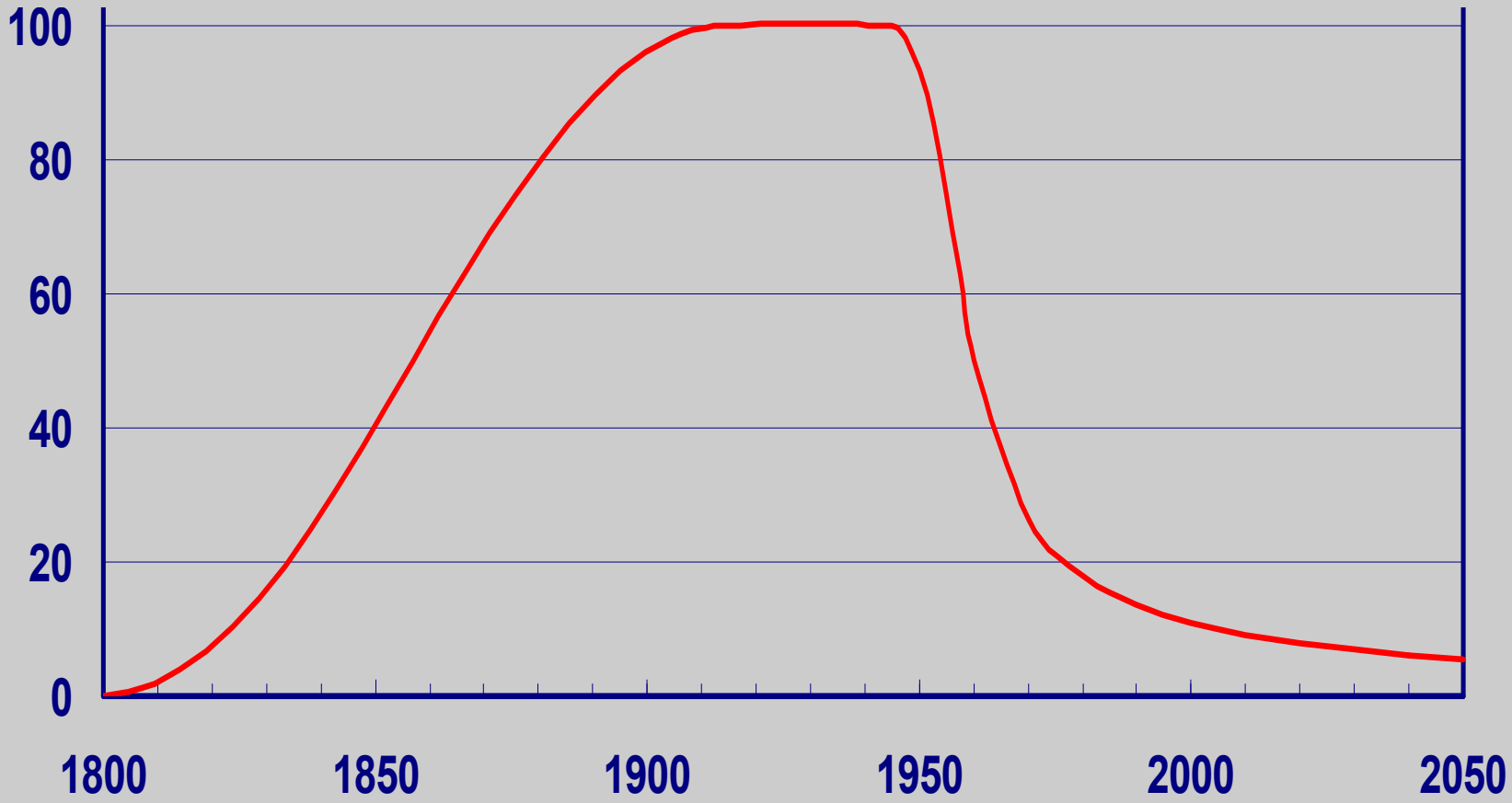
SCENARIO 4: RENASCENT RAILWAYS

Description

- **In developed and developing countries,**
  renascent railways are clawing back
  market share lost to competitive modes
  during decades of state ownership
- **They have become respected corporate citizens**
  in the societies they serve
- **The cost to government should be**
  no more than the cost of regulation
  in return for a tax on the profits

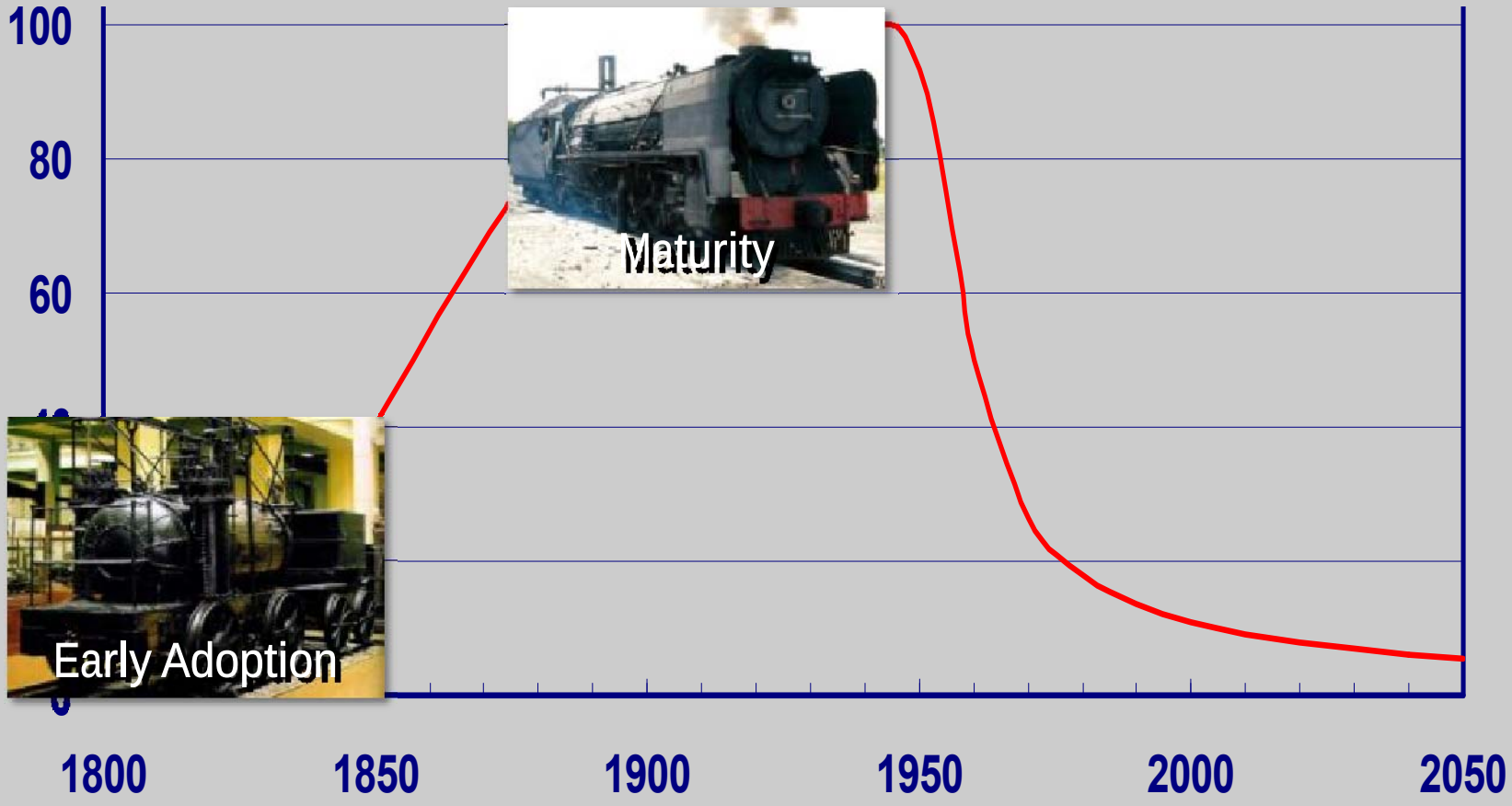
SCENARIO 4: RENASCENT RAILWAYS

The Railway Renaissance Timeline



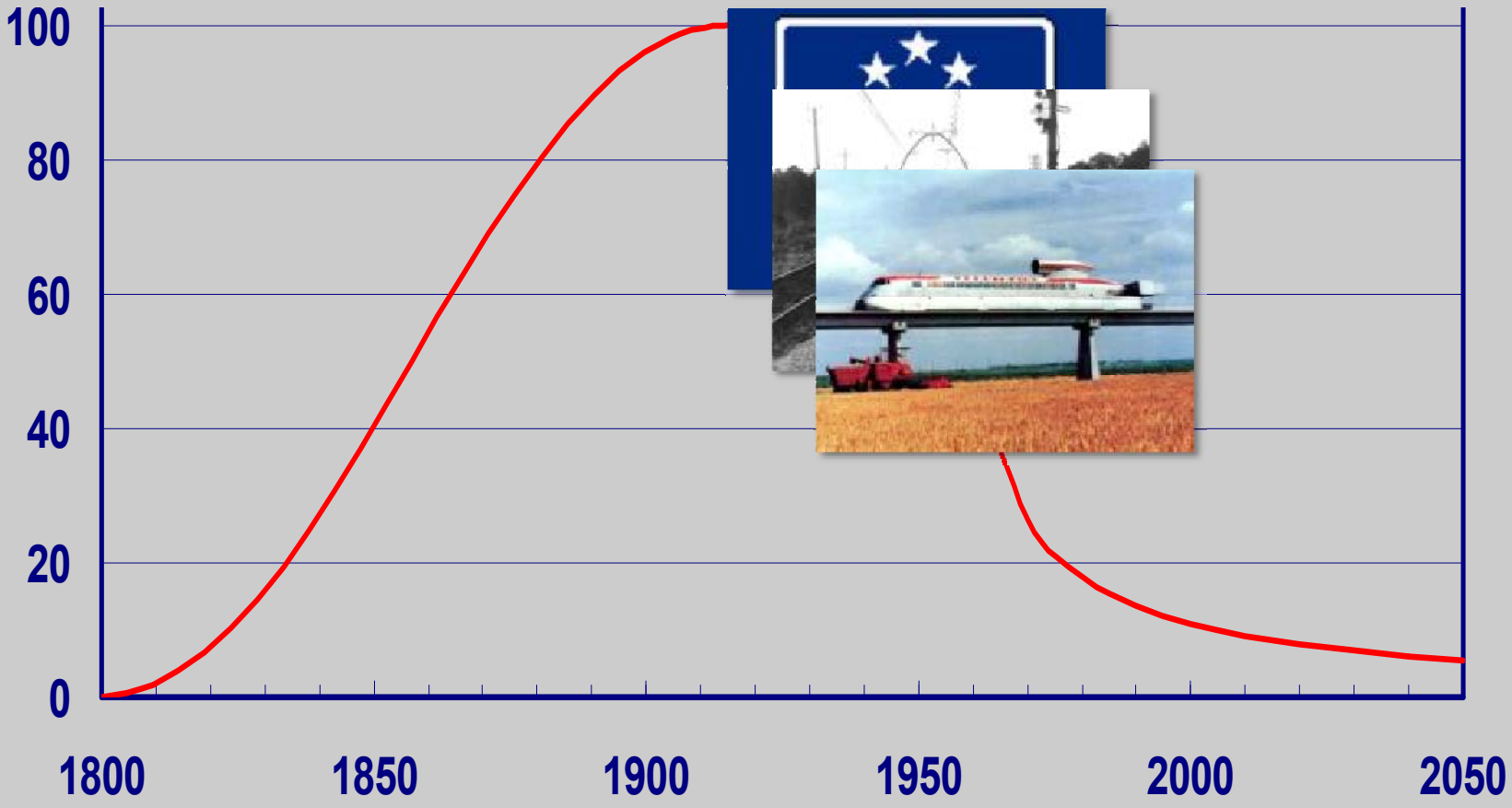
SCENARIO 4: RENASCENT RAILWAYS

The Railway Renaissance Timeline



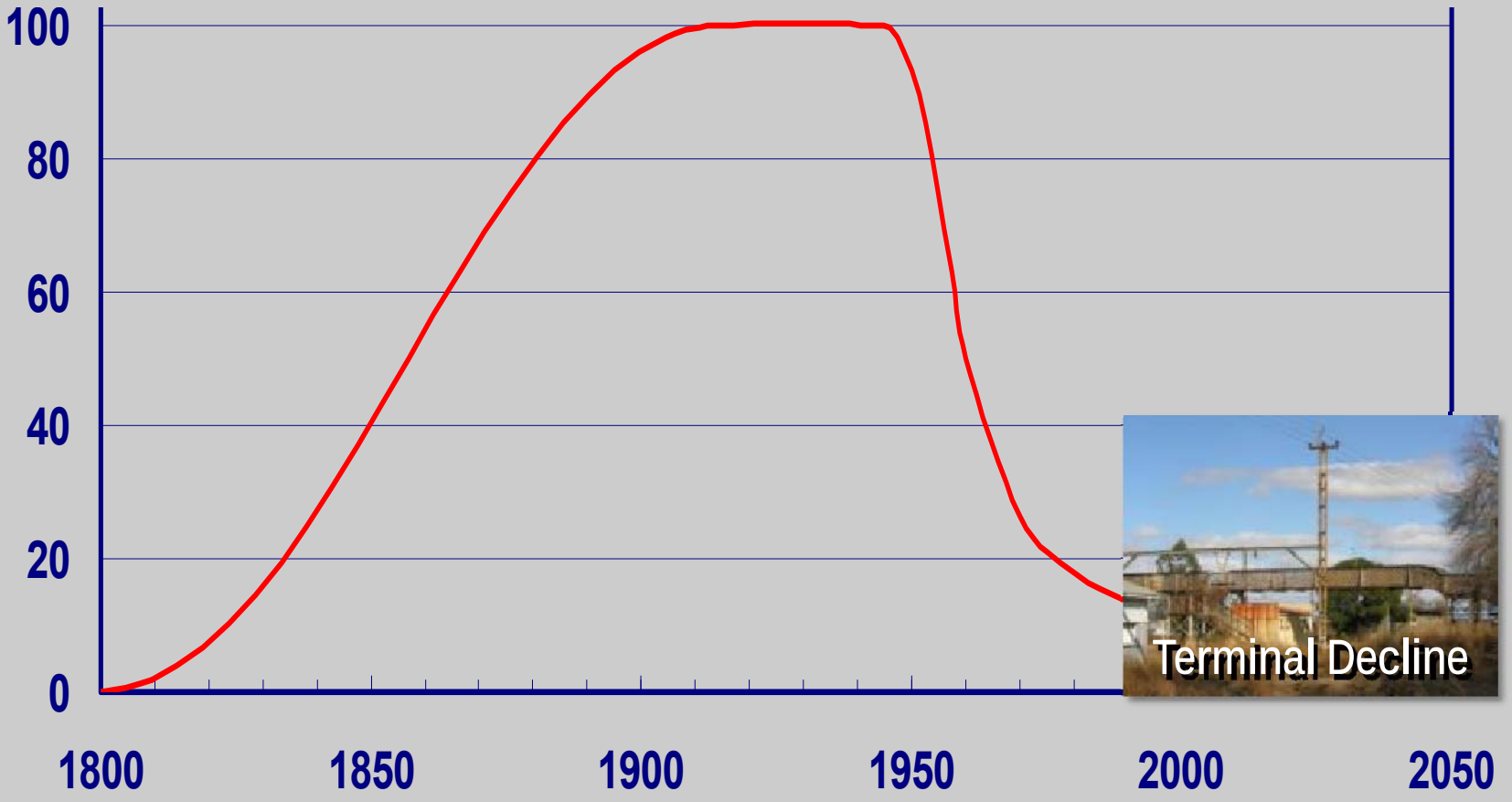
SCENARIO 4: RENASCENT RAILWAYS

The Railway Renaissance Timeline—Near Death after WWII



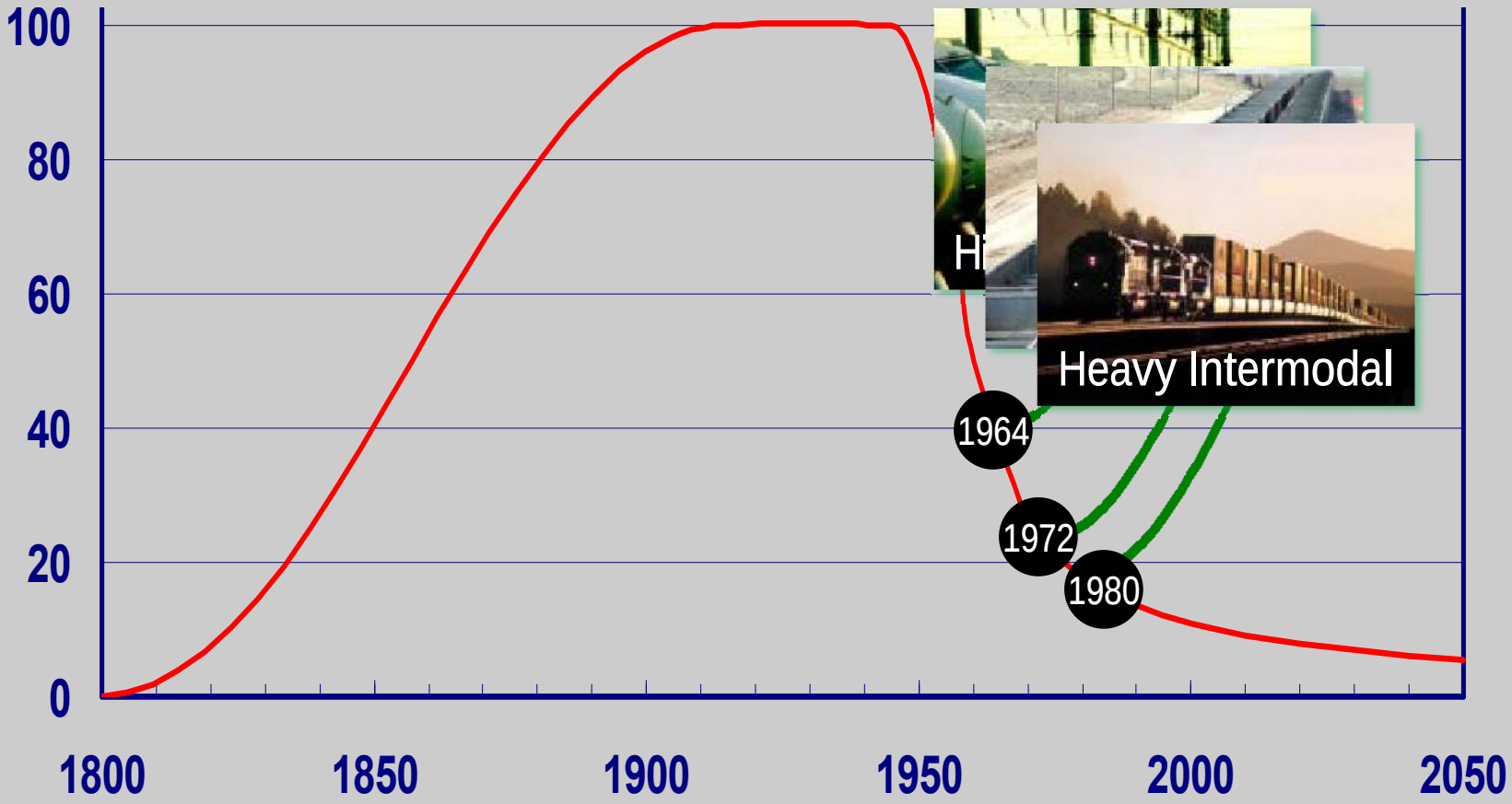
SCENARIO 4: RENASCENT RAILWAYS

The Railway Renaissance Timeline



SCENARIO 4: RENASCENT RAILWAYS

The Railway Renaissance Timeline



SCENARIO 4: RENASCENT RAILWAYS

Global Spread of the Railway Renaissance

- **High-speed Intercity spread from Japan to France,**
  then the rest of western Europe,
  China, Korea, Taiwan, Turkey, the US, Russia,
  and now developing countries,
  including South Africa's
  economic peers
- **Heavy haul—the International Heavy Haul Association**
  now has nine member countries
- **Heavy Intermodal has spread**
  from the US to the NAFTA bloc,
  then Australia, the Middle East, China, and India

7

BRIEF DISCUSSION

BRIEF DISCUSSION

The Role of Scenarios—Shaping Stakeholder Thinking

- **This presentation has applied scenario methodology to propose four railway scenarios for South Africa**
- **They provide a framework within which railway stakeholders may contemplate their future**
- **Stakeholders have been sensitized to desirable and undesirable outcomes**
- **They can now adapt their perspectives and behaviour to pursue desirable outcomes and avoid undesirable outcomes**

BRIEF DISCUSSION

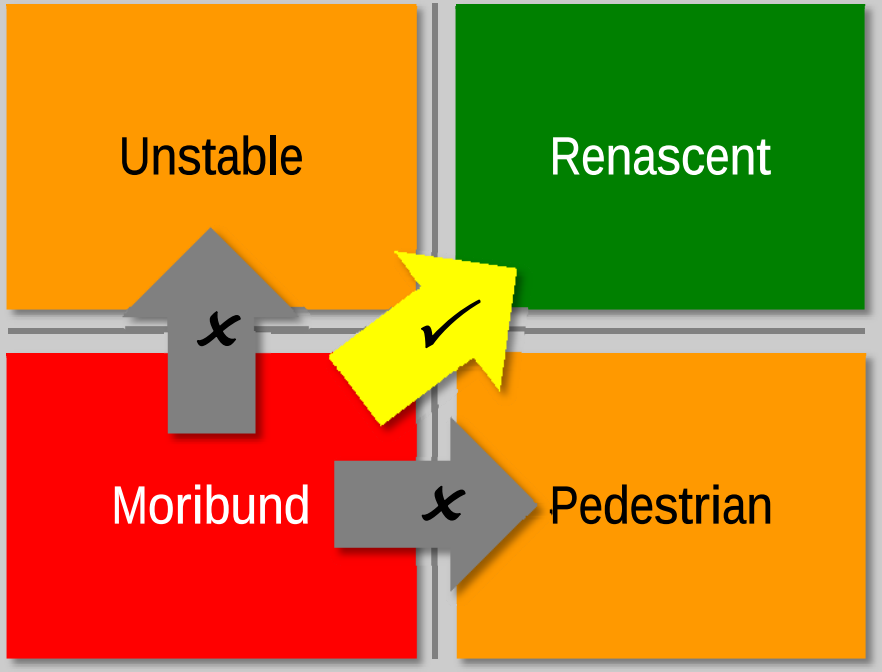
The Role of Scenarios—Driving Future Investment

- State railways are a state creation—
  only the state can reposition railways for
  competitiveness and sustainability
- When fundamental railway industry reform is indicated,
  and investment backlog must concurrently catch up
  the state dare not abdicate its responsibilities
  to the private sector
- Abdication will play into the Unstable Scenario,
  rather than address competitiveness and sustainability
- Careful integration, sequencing of interventions is important

BRIEF DISCUSSION

Modalities

- **Moving directly from Moribund to Renascent requires linking standard gauging to liberalization**
- **A precedent exists—Spain* and Portugal are now using infrastructure PPPs to design, build and fund new standard gauge high speed lines**



*Spain is converting its railway network from broad gauge to standard gauge

BRIEF DISCUSSION

South Africa's High Challenge

- Some countries have changed track gauge
  while others have liberalized their railways
- Spain appears to be the only country to date
  that changed track gauge and liberalized concurrently
- The railways of Southeast Asia seem set to follow
  a similar development trajectory
- If and when Kenya's standard gauge railway takes off
  it is set to combine gauge change and liberalization
- Standard gauge liberalized railways are the way to go—
  is South Africa ready to rise to the challenge?

8

CONCLUSIONS

CONCLUSIONS

Integration and Sequencing are Critical

- **Even if a minimum rail network were standard gauged, substantial capital investment would be required**
- **If privatization leads, reluctance to invest in inherently uncompetitive assets could stall standard gauging and drive the end state into the Unstable Scenario**
- **If standard gauging leads, dependence on public funding could mire the reform process in the Pedestrian Scenario**

CONCLUSIONS

Getting Traction

- South Africa needs a process
  to engage all railway stakeholders
  on standard gauging and liberalization
- Some stakeholders prefer the Moribund Scenario—
  privatization of any stripe
  seems anathema to organized labour
- They fear job losses—
  that might happen within affected unions
- However, continued railway decline
  could in aggregate destroy more jobs at national level

CONCLUSIONS

Support for Economic Growth

- South Africa has begun to appreciate
  that its economic growth rate
  is lower than many other developing countries
- Many of its income-per-capita peers
  are stimulating railway renaissance
- They deploy inherently competitive railways
  to support their high economic growth
- South Africa will fall behind its present economic peers
  if it procrastinates on raising railway competitiveness
  and on liberalizing its railway ownership

CONCLUSIONS

Challenge and Opportunity

- **Narrow gauge railways around the world are not inherently competitive**
- **South Africa should therefore contemplate the Unstable Scenario with caution— it can miss expectations and prove irreversible**
- **It should also be wary of the Pedestrian Scenario— railways may fail before the intervention is complete**
- **SA faces its biggest railway opportunity since inception— will it make the call to reform its railway industry to be competitive and sustainable?**

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REFERENCES

[1] World Bank www.euromedtransport.org/fileadmin/download/maincontract/ts4/ts4_amos_day3.pdf, Slide 18

[2] Phang, S.Y. 2009. Transformation of the urban rail sector through PPP. *Journeys*, November, pp. 23-35

[3] World Bank www.euromedtransport.org/fileadmin/download/maincontract/ts4/ts4_amos_day3.pdf, Slide 19

[4] USAID www.satradehub.org/assets/images/Regional%20Forum/Larry%20Phipps%20on%20Review%20of%20Railway%20Concessions%20Study.pdf

[5] World Bank www.euromedtransport.org/fileadmin/download/maincontract/ts4/ts4_amos_day3.pdf, Slide 12

[6] World Bank www.euromedtransport.org/fileadmin/download/maincontract/ts4/ts4_amos_day3.pdf, Slide 13