

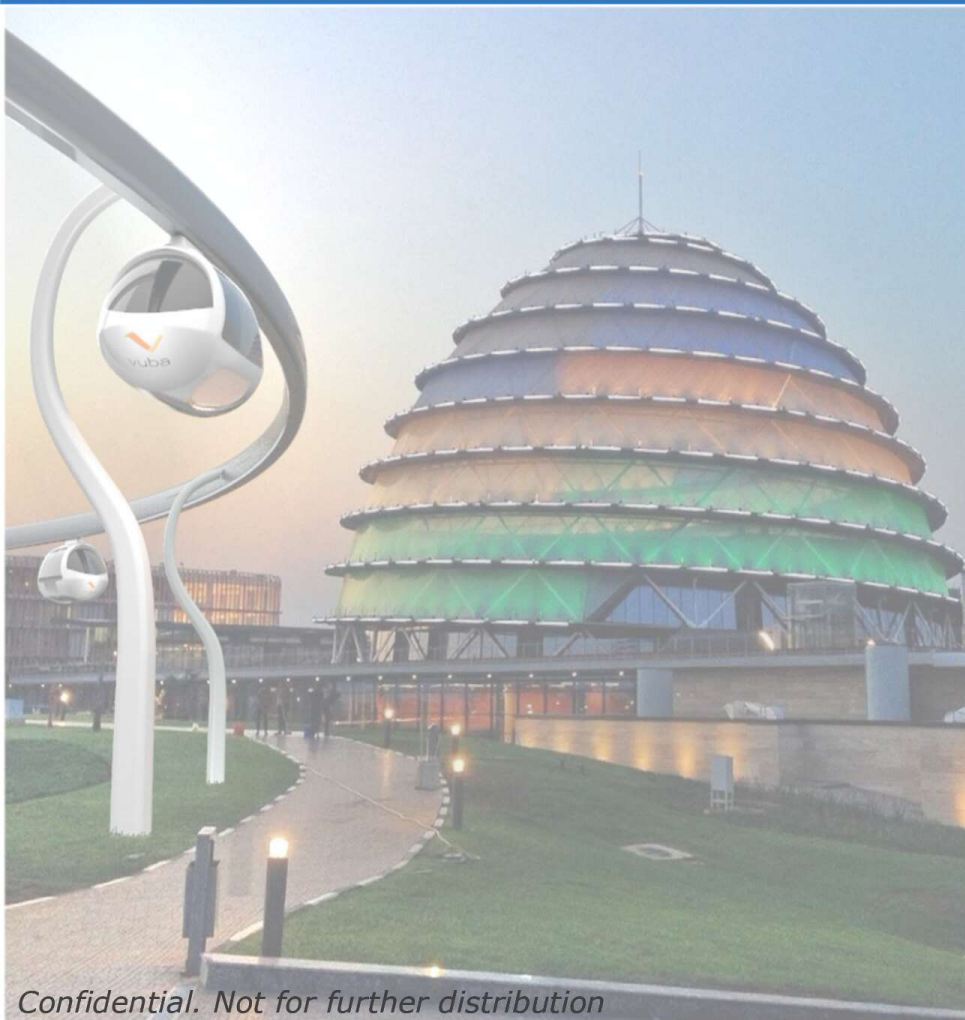


# Kigali PRT System Overview

September 2020



# Information deck contents



## The Vuba Personal Rapid Transit (PRT) Kigali Project:

- C21 PRT Introduction
- Kigali Project Description
- Kigali Project Impacts
- Participants, Transaction Status & Risk Management



# Personal Rapid Transit (PRT) vehicles on fixed guideways are emerging as a viable urban transit mode

Personal Rapid Transit (PRT) is a transport mode that originated in the 1970s featuring small automated vehicles operating on a network of dedicated guideways. There are several PRT systems operating worldwide with different technologies and configurations.

There is currently renewed interest in on-demand PRT systems, and the Vuba leadership team has been involved in, and is aware of, several planned system developments in the USA and Asia.

No clear industry leader has yet emerged in a \$200+ billion potential market that can accommodate several players.

## PRT Configurations



Vectus, South Korea



Vuba Kigali Concept



Ultra, Heathrow UK



SkyTran, USA

Autonomous vehicles on  
a fixed guideway or  
dedicated track

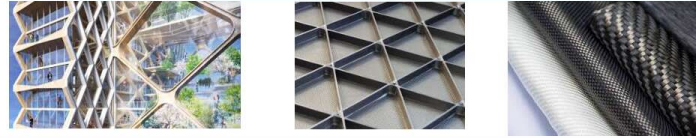
Autonomous vehicles  
suspended from an  
elevated guideway





# Renewed interest in PRT is partly driven by converging technologies that lower cost and improve performance

## Cheaper and Stronger Structural Components

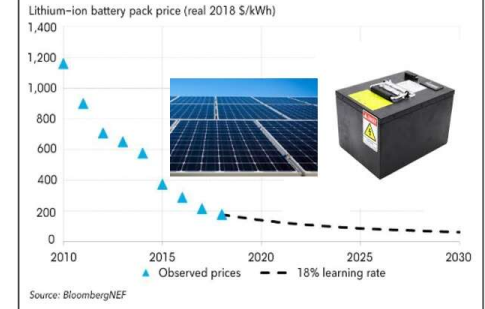


## Small & Inexpensive Electric Motors



Small automated vehicles  
using both an inexpensive  
power supply and track  
structure

## Declining Electricity Generation & Storage Prices



## Self-driving Control Systems



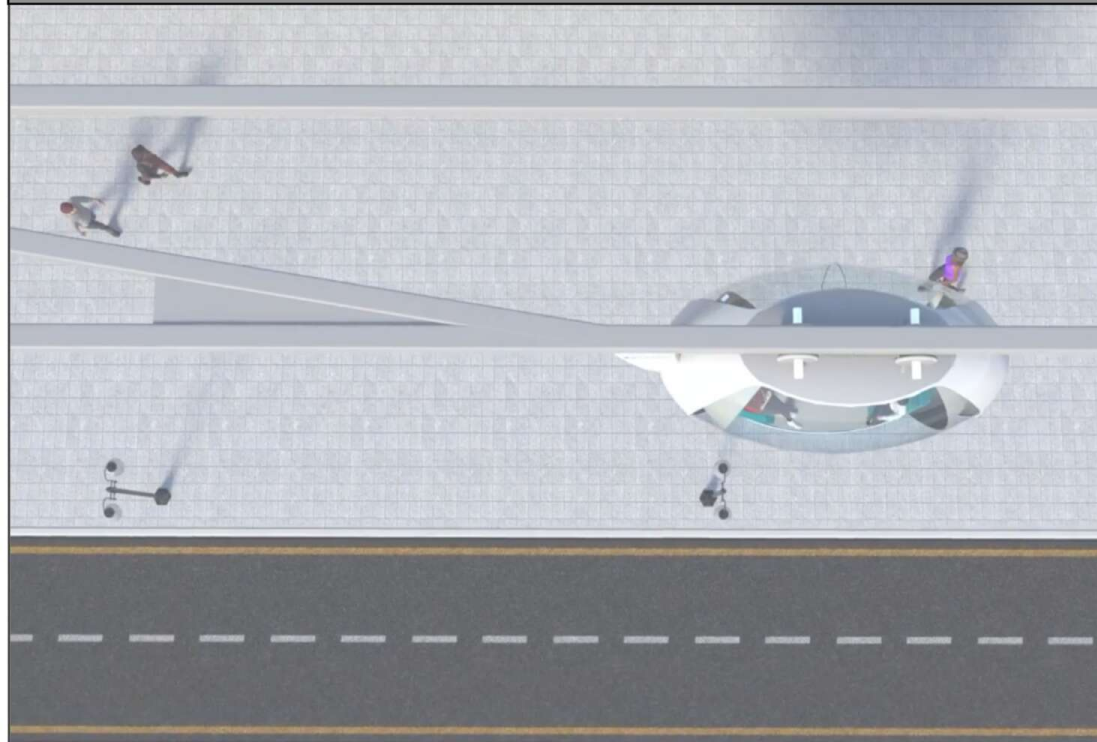




# PRT systems like Vuba's planned Kigali network integrate these C21 transportation technologies



Top View of an Automated Vehicle Approaching a Track Switch



PRT Delivers C21 Transport Technology

- Numerous small driverless vehicles are suspended from an elevated guideway (4 to 5 meters high) that extends over an existing road and road shoulder
- The self-driving vehicles are routed by a central control system. This combination enables fast (up to 80km/h), safe and comfortable trips
- Many small and unobtrusive offline stations (elevated or at-grade) are spaced for easy walking access (<5 minutes from any city point)
- Point to point, on-demand travel: vehicles that don't need to stop at stations speed by
- The vehicles are solar powered and almost silent

*"PRT is a double paradigm shift from individual devices to networks that system integrate transportation and power generation"* Seeking Alpha 2008

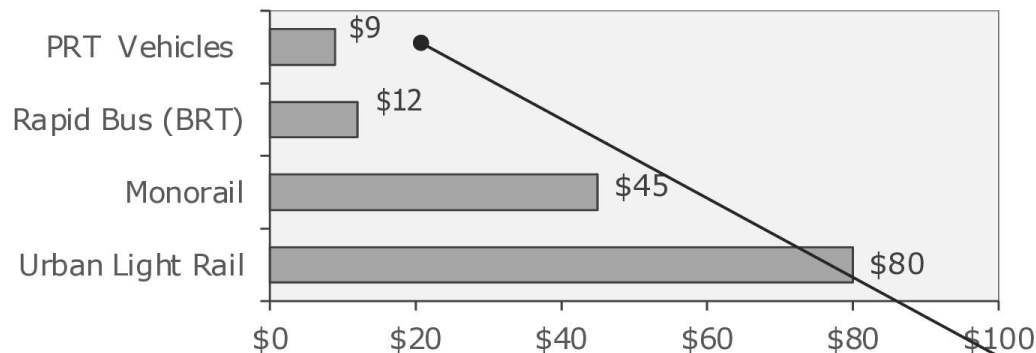
Sources: Various including Vuba, Futran



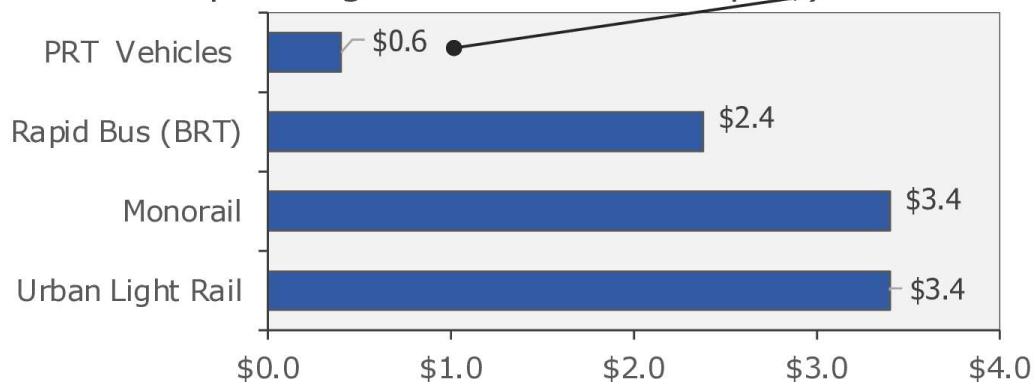
# The result of these C21 technologies is a transit system that is inexpensive to both develop and operate



Capital Cost Per Kilometer (\$ Mill)\*



Operating Costs Per 10km Trip (\$)



PRT is significantly lower cost to both develop and operate than other urban transit modes

\*Various sources including APTA, NTD, UNIFE



Aside from low cost, PRT has several other advantages over bus, train and light rail transit

<b>Attribute / Characteristics<sup>^</sup></b>	<b>Typical stations per kilometer</b>	<b>Ridership per hour per single track and direction</b>	<b>Average urban route speed</b>	<b>Green / Renewable energy efficiency</b>
PRT Vehicles	1 to 1.5	20,000+	40-60 km/h	High
BRT (Bus)	1.5	<10,000	15-30 km/h	Medium
Subway Rail	0.5 to 1	<50,000	40-60 km/h	Low
Light Rail	0.5 to 1	<30,000	30-50 km/h	Medium

<sup>^</sup>Various sources including Global BRT data, APTA, ATRA, NTD, UNIFE



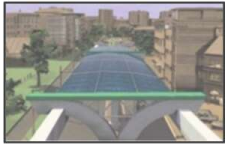


# PRT networks have infrastructure development and other revenue opportunities beyond track deployment

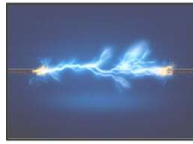


## Multiple PRT Network Revenue Opportunities

### Energy:



Solar Panels  
1MW per mile



Power



Storage &  
Distribution

### Telecomm:



Optical Fiber Network



Mobile Towers

### Transit System:



Development, Operations &  
Maintenance



Logistics & Supply Chains

### Real Estate:



Real Estate Options & Speculation



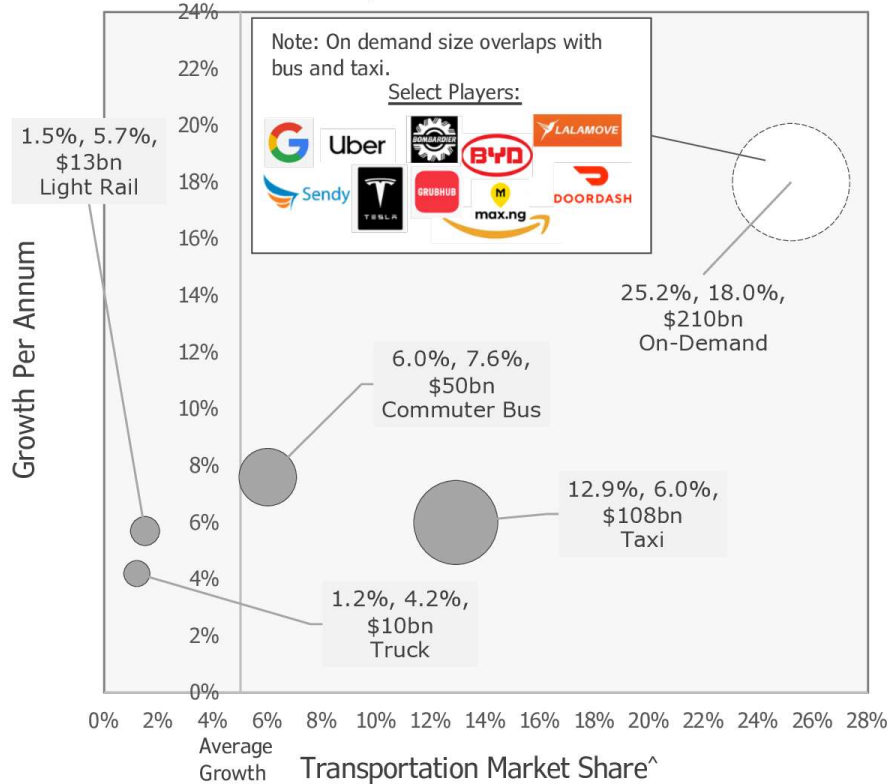
Development



Taken together, PRT's benefits are disruptive to a \$200+ bill. worldwide market, of which ~\$40 bill. is in Africa



Global Transport Growth-Share Matrix



The Transit Market Prize Is \$200+ Billion Per Year

The on-demand transport market is \$200+ billion dollars currently p.a. and growth is estimated at 16-20% p.a. to 2025. This transportation segment includes the likes Uber, Lyft, Sendy, Tesla and Google.

The market size is due to shifting demographics: there are 1000+ global cities of over 500k people, and ~900 urban areas with a 3k+ p/km density. And McKinsey\* estimates urbanization will increase city density by 30% by 2030.

This results in an addressable market of 250+ cities that need new transit solutions per year.

We estimate there are 20 to 30 PRT system opportunities in Africa alone in a \$30-50 billion regional market.

\*McKinsey Quarterly 2016  
Sources: Mordor Intelligence; Global BRT Data; Quora.com; NYU Damadoran; APTA; UITP; IEA; OEM Off-Highway Technavio; Credence Research; Global Market Insights and Demographica  
^Not included in this chart is automotive and heavy rail transportation



# Investors and financiers have taken note of PRT's disruptive potential and ability to be privately financed



## **Investors Believe In PRT**

Two commercial PRT companies are very valuable already without having delivered a single commercial track. Investors believe the PRT model will succeed.

The earnings from a single commercial track like Kigali's proposed PRT system will add \$200-300m to a PRT company's equity value.



skyTran™

Value ~\$180 mill.  
Value/Investment ~3.05x

PRT firm name is confidential.  
The investment specifics are known by Vuba Leadership

*Confidential PRT Firm*  
Value \$150 mill.  
Value/Investment ~5.3x

*"Our partnership with SkyTran reflects our commitment to invest in futuristic technologies"* Ambani, Reliance Industrial

## **PRT Systems Can Be Financed With Private Capital**

Elevated driverless transit tracks can be profitable and produce 10-20% inflation adjusted (real) returns p.a. for investors. Such projects will hence attract private capital.

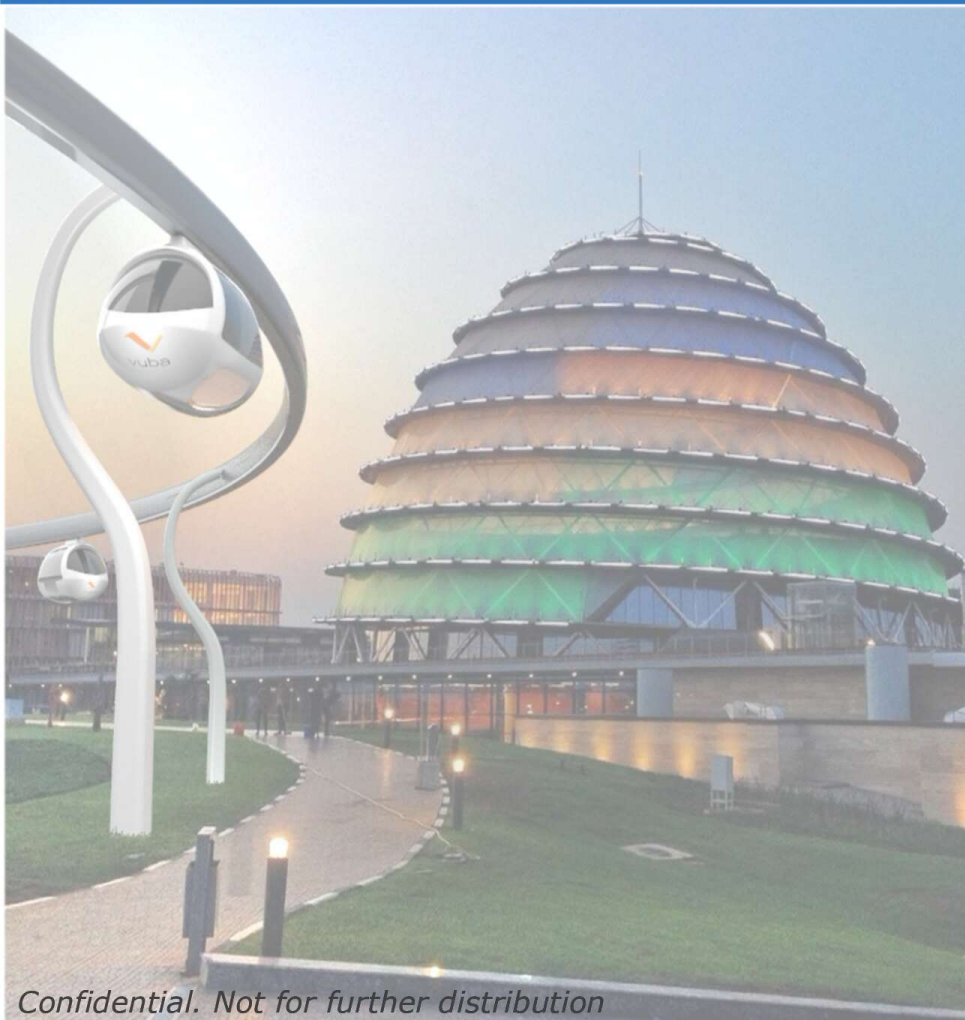
Cities that spend hundreds of millions of dollars on transit losses can now obtain a track with little or no capital and without operating losses.







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# Kigali PRT system vision: Solving congestion, pollution & immobility problems



From congested & polluted...



...to clean and efficient

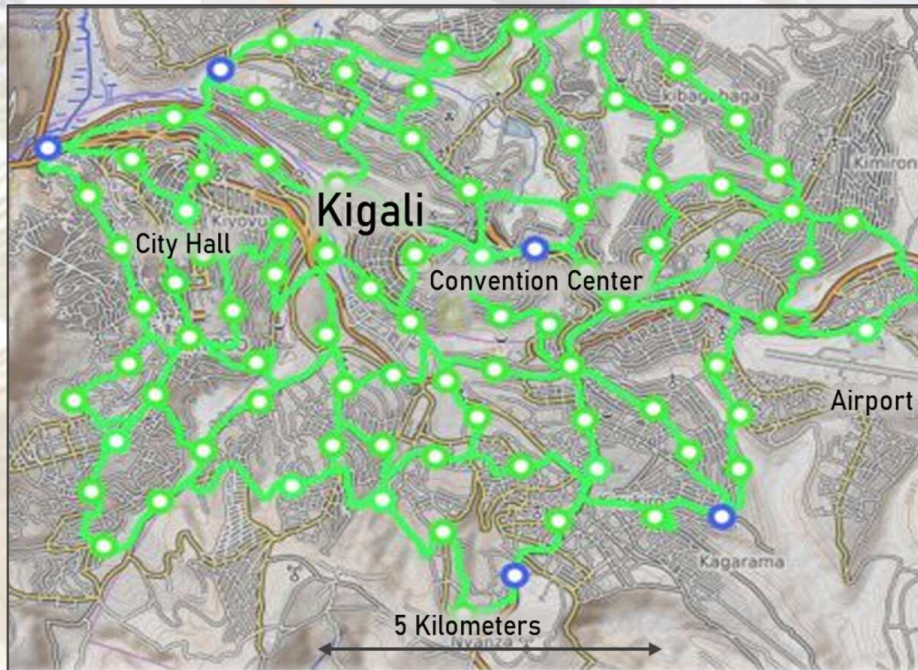




# The proposed Kigali system is 144km of track with 98 stations uniquely suited to the city's needs



## Proposed Kigali PRT System



Kigali is growing rapidly with the 2017 population of 1.5 million anticipated to increase to 4.8 million by 2040. With its pedestrian, car and moto traffic and winding roads, Kigali is rapidly becoming heavily congested and its roads unsafe.

The hilly terrain is not suited to rail, and bus rapid transit (BRT) will do little to alleviate the growth in traffic. Motorcycle taxis (motos) provide door-to-door service but are a noisy and unsafe option that increases congestion.

The proposed Vuba PRT system of 144 km (66 km<sup>2</sup>) with 98 stations can attract significant ridership volumes from cars and motos, reducing traffic congestion, while providing safe, affordable on-demand non-stop service. Every point in the network can be accessed in less than 30 minutes from any other point.

Intermodal points are positioned at the edges of the system to facilitate transfers from bus or moto transit as part of an integrated Kigali *Transportation Plan*.

The Kigali system will be a PPP SPV entity, developed and operated by Vuba.





# Vuba's proposed Kigali elevated PRT system is low cost, aesthetically pleasing and with zero emissions



## Low Capital Cost Structures

- Inexpensive small composite columns and beams that can be manufactured locally
- Existing road rights of way to avoid expensive land purchases
- Precision design allows for fast overnight assembly

## Zero Emission Electric Vehicles

- The vehicle hangs from the bogey (wheels, propulsion system and motor) on bars that extend down to the vehicle
- Comfortable seating for up to 6 passengers and accessibility
- Durable composite structure does not rust or corrode
- Poly-carbonate windows have tinting and electronic occlusion

## Low Operating Costs

- Solar powered, highly efficient vehicles: 1.2 Liter/100 km
- 20k Riders per hour per direction capacity lowers cost-per-km
- Automated 24/7 operation (no drivers)
- On-demand means few empty pods operating
- Low maintenance electric motors



# Many stations will be elevated but some will be at-grade or attached to buildings



## At-Grade Station

- Vehicles not coming to this station can bypass it
- Vehicles remain level as they descend/ascend



## Station Attached to Building

- Vehicles remain outside
- Sliding building doors are synchronized with vehicle doors
- Level boarding (roll on, roll off)



# Vuba's proposed system will provide a greatly improved customer transit experience

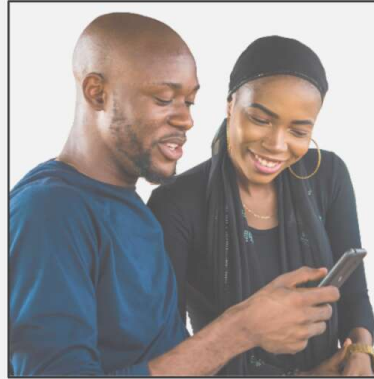


## Vuba PRT Trips Will Be a Seamless Customer Experience



Step 1.

Walk to any of 98 stations that are within 5 minutes of any point in Kigali



Step 2.

Use a smartphone app or kiosk to request a ride.



Step 3.

A driverless electric vehicle arrives at a station, usually within a minute or less.




Step 4.


Ride non-stop from origin to destination, above the traffic on an elevated guideway.

*"Five Country Transit Industry Survey Finds Customer Experience is Vital"* Metro 2018





# Vuba's value proposition: PRT is faster, safer, more reliable and comfortable than other modes, but has similar fares



Legend: Best is all-green fill





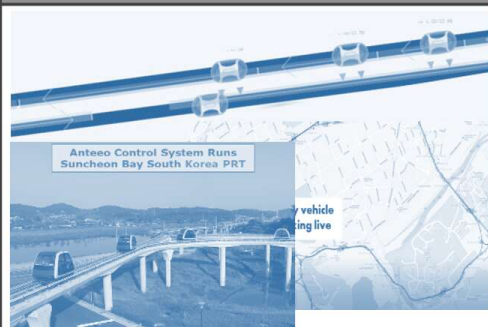

Mode	Description	Walk Time	Wait Time	In Vehicle Travel Time*	Total Trip Time	Comfort
Bus	Tightly packed Kigali busses, to ensure fare revenue is maximized, result in long waits	25 mins	15 mins	35 mins	75 mins	
Moto	The passenger sits on the back of a motorcycle or scooter wearing a helmet	3	2	17	22 mins	
Car / Taxi	May require a parking charge	3	2	17	22 mins	
Vuba Economy	<ul style="list-style-type: none"> <li>• Must share seated ride</li> <li>• Wait 5–10 minutes plus stops en-route</li> <li>• Fare price benchmark is bus \$0.025 per km</li> </ul>	5	10	10	25 mins	
Vuba Standard	<ul style="list-style-type: none"> <li>• Possibly share seated ride</li> <li>• Short wait time; possible stops</li> <li>• Fare price benchmark: moto taxi \$0.17 per km</li> </ul>	5	5	8	18 mins	
Vuba Premium	<ul style="list-style-type: none"> <li>• Private vehicle (for individual or group)</li> <li>• No waiting, non-stop travel</li> <li>• Fare price benchmark: taxi \$1.13 per km</li> </ul>	5	1	6	12 mins	



# Vuba's Kigali system designs and technologies are advanced but not yet full scale - more R&D to complete



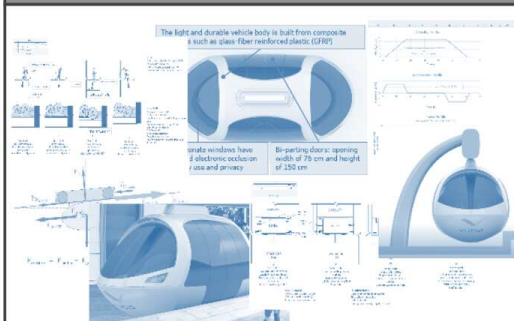
## Control System



- The control system is the most critical and technically complex element of the PRT system
- Status is complete: The Anteeo control system that Vuba is contracted to utilize is already in service controlling a PRT vehicle fleet in S-Korea. The Anteeo control system has a perfect operating and safety record
- Control system video complete

Continue to develop and upgrade the Anteeo system as Vuba's own IP (already contracted). This will enable speeds of 100 km/hr. and headways of 1 second (providing a capacity of 21,600 passengers per hour per direction)

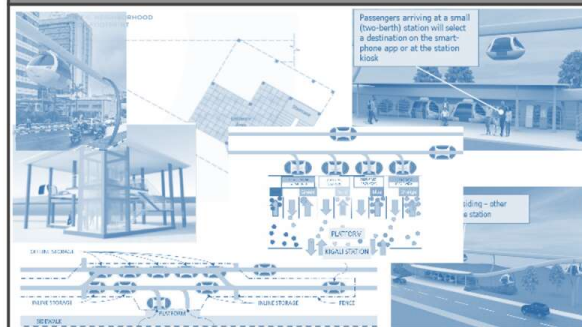
## Vehicle Design & Bogey/ Switch



- Vehicle and bogey design concepts complete as part of overall System Technology Description (August - September 2020)
- Switch, suspension requirements and concepts complete
- Scale test track for control system and bogey integration and stations under development (Colorado)
- Preferred vendor discussions with CC Equity

- Complete 1/4 scale Colorado test track
- Co-developer/vendor discussions and selection
- Assembly of the bogey and switch prototypes
- Vehicle hardware and software integration with Anteeo system design and testing
- First self-driving vehicle prototypes

## Track Structure & Stations



- Initial Kigali track route design complete
- Track and station design and function concepts complete (part of System Technology Description)
- Stations passenger boarding simulations complete
- Kigali operational animation video under development
- Kigali booking system and app vendor discussions
- Discussions ongoing on composite guideway prototype 'spinning' in Kigali manufacturing facility

- Revisit track route in business case / due diligence to confirm suitability and obstacles
- Develop full scale composite guideway columns and beams prototype in Kigali
- Complete Kigali simulations / emulation
- Technology and component vendor selection

Vuba R&D Images:

Status September 2020:

Upcoming R&D:

Source: PRT Consulting; Vuba Analyses

Confidential. Not for further distribution



# Vuba will establish a large advanced manufacturing and assembly facility in Kigali



## Best of Breed Approach to Kigali Manufacturing & Assembly

- An in-house R&D capability will be required for design, testing and continuous improvement
- Design tolerances and manufacturing practices will well exceed Rwanda's RURA safety standards (Automated People Mover Standards ANSI/ASCE/T&DI 21-19 issued by the American Society of Civil Engineers)
- Advanced manufacturing (robotics, IoT) will be supplemented with mostly manual vehicle and track structure assembly
- Sourcing from global foreign suppliers that have a cost and technology advantage (e.g. electric motors)
- Certain designs will prove most effective once tested and deployed, and these can be outsourced to Rwandan partners or developed with them
- Maintenance and other system services can be optimized on self-made equipment

## Illustrative: Facility To Be Developed







# Vuba's leadership team combines several world-class PRT professionals with Rwanda transport market experts

**Paul Klahn**  
Co-Founder  
& CEO



- BS Aerospace Engineering
- Former USAF Officer and pilot
- Composite materials aircraft design specialist
- Fmr. Leadership team of several aerospace vehicle design firms
- Owner of Beyond Limits
- Fmr. COO For two US-based PRT system developers



**Peter Muller**  
Co-Founder  
& CTO



- MS Civil & Environmental Eng.
- Founder and President of PRT Consulting since 2005
- President Advanced Transit Association
- Career Project Engineer, Planner & Manager for PRT, rail, road, airport and other
- Developed ATN simulation software



**Phionah Nyangoma**  
Co-Founder



- Native Rwandan / Ugandan who is fluent in English and several African languages
- Co-founder of 3 start-ups in the USA and in East-Africa
- Skilled in business development, marketing, and networking
- Brings African business & cultural insights



**Irene Iradukunda**  
Rwanda  
Manager



- MSC Environmental Science & Sustainable Dev.
- MBA
- Worked with Rwanda Govt RURA, RDB, Ministry ICT, Kigali City
- Fmr. Business Development Manager for on-demand transport Co. Yego Innovation
- Rwanda environmental impact and market intelligence specialist
- Fmr Beno Holdings Rwanda Project Manager







Vuba's PRT System development partners will be world-class companies like ABB, QCM and Volvo



## Vuba



## Financing & EPC



## Planning & Technology



## Rwandan Firms





# Vuba's experience, suppliers and plan to place Rwanda first makes it the preferred PRT system vendor

## Vuba



### Five Reasons Why Vuba Is The Preferred PRT Provider For Rwanda

- 1** Vuba places Rwanda first and plans to become 'Rwanda's Tesla'
  - Rwandan-owned company and PRT System (SPV)
  - Rwanda-first approach means locating most of Vuba's operations in Rwanda and sourcing locally
  - Vuba plans to become 'Rwanda's Tesla'
- 2** Vuba will work with leading global companies

Vuba is the system assembler and operator. However it will work closely with leading companies who will supply and co-develop the system. See previous slides.
- 3** Vuba's PRT experience can't easily be replicated
  - Modern PRT industry has few experts worldwide, and Vuba has the best of them
  - Vuba's 'best of breed' approach requires many years of PRT tech. experience i.e. what works 'on the rail'
- 4** Other providers will take several years longer than Vuba to develop a system
  - Vuba has several years head-start on Kigali PRT system design, engineering & tech.
  - Vuba has extensive transit demand modeling consulting experience in addition to tech. expertise
- 5** Comprehensive project insurance coverage equalizes small and large companies
  - Comprehensive investment grade firm insurance coverage protects small companies and their partners just as well as large companies



# Kigali PRT System Impact: Economic Growth

Thousands of new jobs created as part of a 4x multiplier



## Kigali's Future\* Per The Rwandan Government



Source: Kigali PRT Pre-feasibility Study 2019: PRT Consulting; Vuba Analyses  
\* Courtesy Kigali Master Plan 2011

## Multiple Rwandan Economic Benefits

Direct PRT system-related economic growth and income:

- A profitable transit system and company which the Rwandan people jointly own and tax
- Foreign direct investment in a \$1,3bn development program creating thousands of jobs
- Several hundreds of permanent new manufacturing and managerial jobs with Vuba and the Kigali SPV. Manufacturing is understood to have an economic multiplier of ~10x

Indirect economic growth and income:

- New transit services provide a ~4x economic multiplier
- Transit hubs drive retail development
- Real estate values rise in areas served by public transit, boosting property tax revenue
- Faster commutes (including far fewer non-motorized) drives Kigali center development and boosts productivity
- A financial services boost due to hedging and forex volumes



Note: Kigali PRT System Impact's primary source is PRT Consulting's research: 'Kigali PRT Pre-feasibility Study' of 2019 for the Rwanda Government





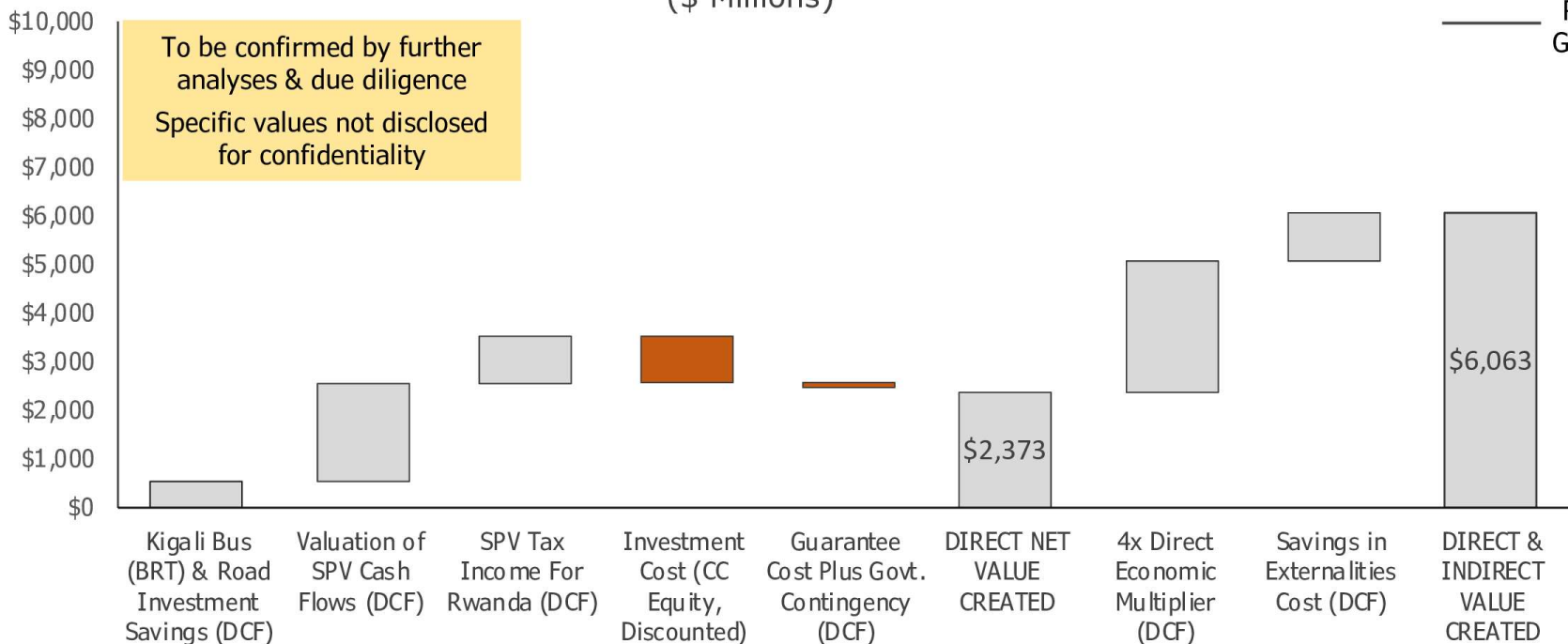
# Kigali PRT System Impact: Economic Growth

## A direct and indirect benefit of \$8.5 billion

### Direct & Indirect Value of Kigali PRT Program (\$ Millions)

Rwanda 2019  
GDP: \$10.1 bill.

To be confirmed by further  
analyses & due diligence  
Specific values not disclosed  
for confidentiality





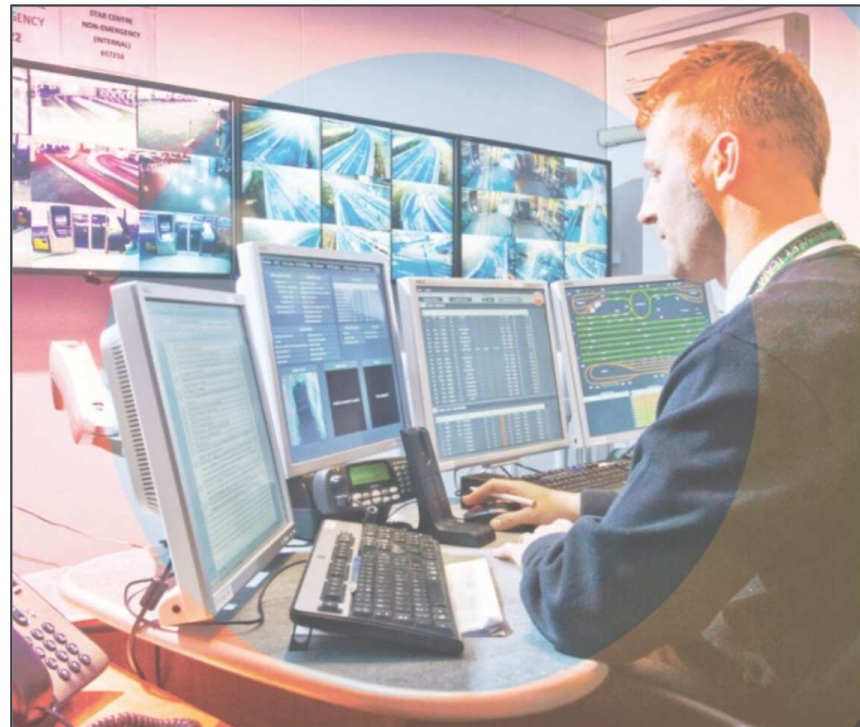


# Kigali PRT System Impact: Health & Safety

## Several benefits provide a combined large positive impact

### The proposed PRT system will have a significant positive impact on public health and safety in Kigali

- PRT systems around the world are very safe and have completed over 300 million injury-free passenger kilometres globally. The control and self-driving systems have fail-safe mechanisms that enable this record
- PRT passengers will be drawn from other Kigali modes that have poor safety records. Kigali has 28 road fatalities p.a. per 100,000 population\*. Based on ~40% of the 2040 service area population switching to PRT, ~140 lives can be saved annually
- Air pollution is a contributor to poor health, and combustion engine transportation emits CO<sub>2</sub>, PM 2.5, PM 10, NOX and unburnt hydrocarbons. As indicated previously, PRT is solar powered with zero emissions.
- PRT stations will have in-person attendants and both stations and vehicles will have cameras connected to an artificial intelligence system that alerts attendants to issues.
- Few people within the Kigali service area will have to walk more than half a kilometer to a PRT station, reducing some pedestrian-related dangers



Track and Station Monitoring at Ultra's Heathrow PRT System

\*Kigali Transportation Master Plan  
Source: Vuba Analyses, Kigali PRT Pre-feasibility Study 2019: PRT Consulting



Note: Kigali PRT System Impact's primary source is PRT Consulting's research: 'Kigali PRT Pre-feasibility Study' of 2019 for the Rwanda Government



# Kigali PRT System Impact: Climate Change

## Solar provides a CO<sub>2</sub> emissions savings of 12 mill. tonnes



Kigali Solar-powered PRT eliminates 12 million of this: a visualized tonne of CO<sub>2</sub> emissions



### CO<sub>2</sub> Emissions Savings Of 12 Million Tonnes

Transportation is the largest global contributor to CO<sub>2</sub> emissions. It's widely known\* that it contributes more CO<sub>2</sub> to the atmosphere than all other sources combined.

Emissions savings estimates from the solar-powered Kigali PRT system indicates a reduction of approximately twelve million tonnes (12,000,000) of CO<sub>2</sub> over the 50-year project life. That is equivalent to the carbon sequestration of 12 million tree lives or 67 km<sup>2</sup> of forest.

This reduction is largely due to an estimated 20% reduction of traffic over the project period and excludes the carbon emitted from roads or the additional emissions effect of congested traffic.

The solar powered-track will be connected to the Kigali power grid for load balancing and excess power provision. Electric vehicle charging stations can also be connected to the system.

For illustration: If we assume the Rwandan Government incurs costs of about 2% percent of the estimated \$1.3-billion-dollar capital costs of this privately-funded project (indirectly and directly), the public cost per tonne of CO<sub>2</sub> reduction will be US \$2.34. This compares very favorably with Rwanda's Green Climate Fund Project FP073<sup>^</sup>, where the public cost was US \$121 per tonne.

In addition, the PRT system will help alleviate the heat-island effect caused by expanded asphalt roads and parking lots.



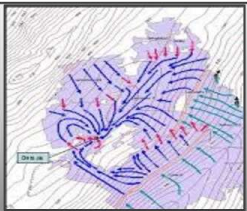
Note: Kigali PRT System Impact's primary source is PRT Consulting's research: 'Kigali PRT Pre-feasibility Study' of 2019 for the Rwanda Government



# Kigali PRT System Other Impacts: Minimal impacts on hydrology & vulnerabilities



## Aquatic Impacts Few Hydrology Impacts



With a two-meter wide guideway, there is negligible concentration of stormwater. Rainwater can be allowed to pass over the edges of the guideway and fall to the ground with no noticeable impacts.

Therefore:

- The guideway adds no new impermeable surface as a new or widened roadway would.
- There is no increase in stormwater runoff beyond a small increase at each station

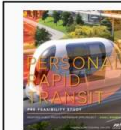
## Helps Force Majeure Vulnerabilities



The PRT system will be designed to withstand present and projected severe weather (up to 100 km/hr. winds) and earthquake conditions.

The self-powered, elevated system will be partly immune to flooding.

The PRT system will be able to operate independently of surface transportation systems during emergency conditions. This is proven in the case of extreme winter storms in the vicinity of the Morgantown PRT system in the USA.



Note: Kigali PRT System Impact's primary source is PRT Consulting's research: 'Kigali PRT Pre-feasibility Study' of 2019 for the Rwanda Government





# Kigali PRT System Other Impacts: Minimal impacts on hydrology, land use & vulnerabilities



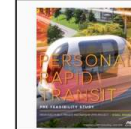
## Minimal Land Use System



The entire PRT system will require less than 10 hectares in Kigali. A bus (BRT) land footprint will be about 100 times larger than PRT's footprint. Every kilometer of PRT occupies ~0.007 surface hectares. PRT using elevated guideways frees up surface level space for alternative uses such as pedestrian zones, bicycle paths, and green space. Since PRT reduces the need for extra traffic lanes, real estate can be reclaimed for business and recreational purposes. Further, the distributed network allows planners to reduce parking spaces in high-value areas, moving them instead to the outskirts of the PRT service area.

## Iconic Kigali Aesthetics

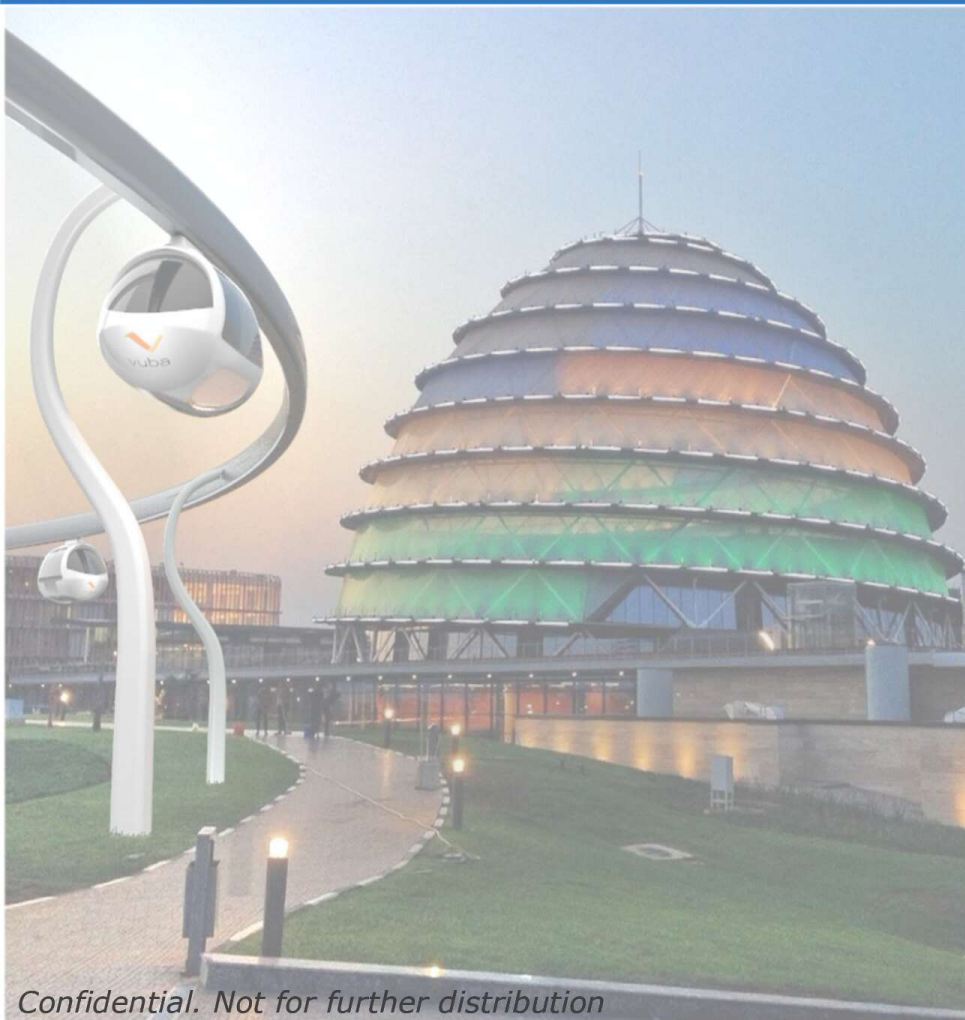
As an elevated system, PRT can't be hidden. Instead, the PRT system could become an iconic and symbolic feature of Kigali and Rwanda, showing its bold technological future. At the Kigali PRT workshop in 2018, the transportation professionals participating were in favor of making the PRT system iconic.



Note: Kigali PRT System Impact's primary source is PRT Consulting's research: 'Kigali PRT Pre-feasibility Study' of 2019 for the Rwanda Government



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# There are several partners in the Kigali system transaction with clear contributions and roles



## Rwanda



### Rwanda Provides:

- The Kigali PRT concession
- Kigali SPV fare regulation
- State financial guarantee
- State and local government performance guarantees (removing obstacles; traffic demand management)
- Matching early-stage equity capital in Vuba (not to exceed \$15m)

## Vuba

USA &  
Rwanda



### Kigali-based Company Vuba Provides:

- Management expertise
- System IP development
- Kigali PRT system development. Vuba sells the system (turn-key) to the SPV
- System operating services

## CC Equity

Abu Dhabi &  
London



### CC Equity Holdings:

- LOI to provide \$1.3bn Kigali system development capital
- Provides Swedish state and company connections, as well as SPV participants like QCM

## Kigali PRT System SPV



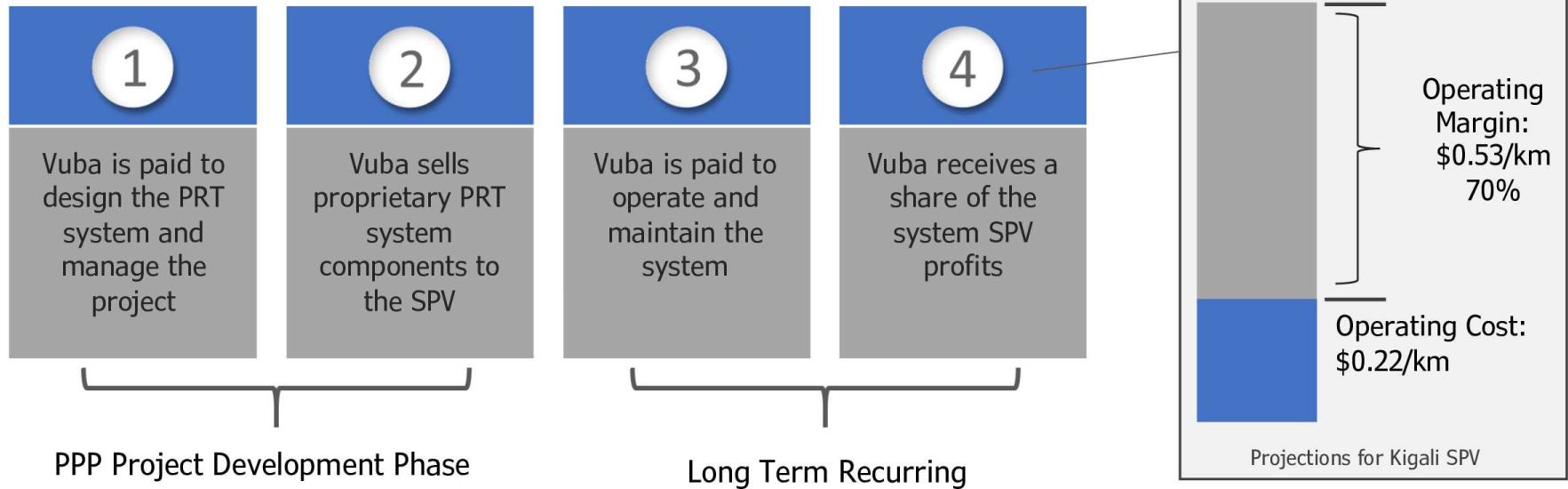
### The Kigali System Special Purpose Vehicle (SPV):

- Public Private Partnership
- Purchases the PRT system from Vuba and its development partners
- Is the owner of the 144 km Kigali PRT system (track)
- Is a RURA\* regulated utility (fare regulation and will comply with all licenses, tariffs QOS KPIs).





# Vuba has four revenue streams: one of which is income from the highly profitable PRT SPV

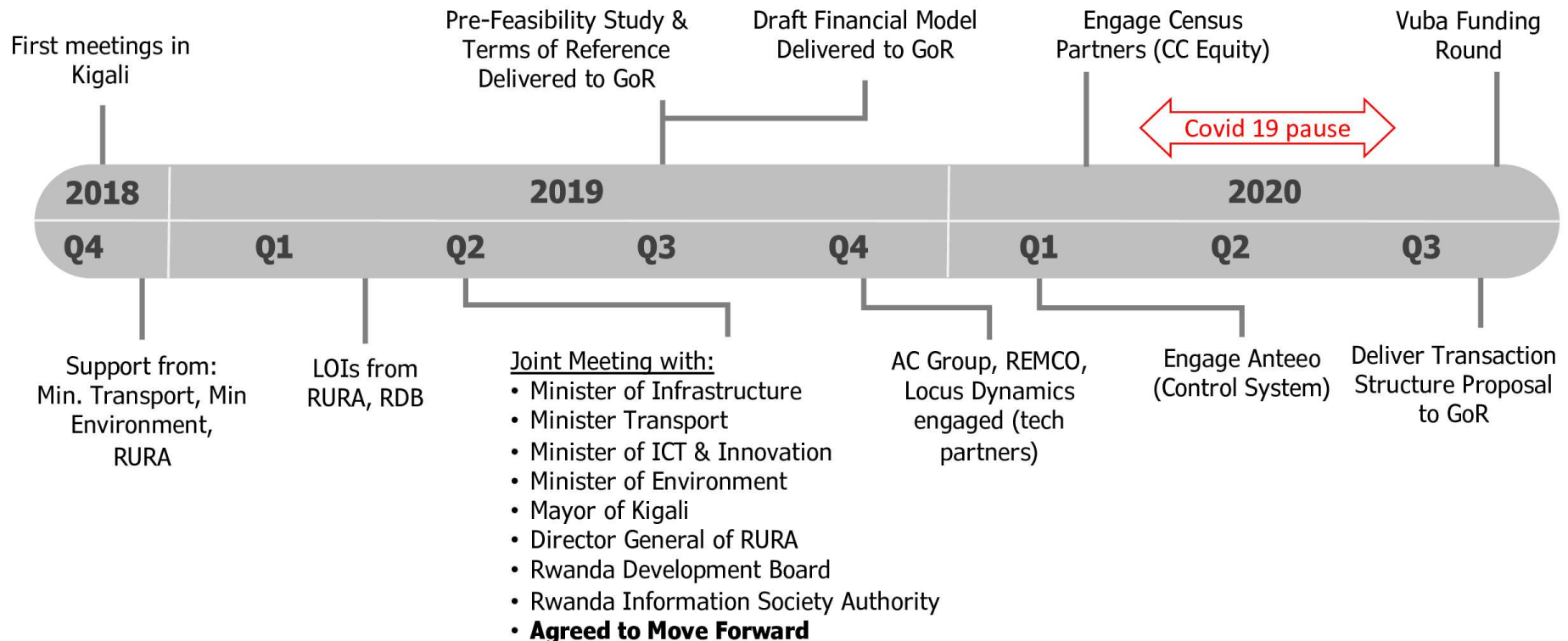




# Kigali PRT System Time-Line of Progress to date

Rwandan Law no. 14/2016 of 02/05/2016 governs Public Private Partnerships (PPP).

The PRT System development path to date follows the typical path for a public private partnership (PPP) project 'resulting from an unsolicited proposal' and will continue to follow that defined process.





# The transaction has the support of the Rwandan Government and several Ministers can verify this



Vuba has developed relationships with Rwanda's:

- Minister of Infrastructure
- Minister Transport
- Minister of ICT & Innovation
- Minister of Environment
- AGACIRO Sovereign Wealth Fund

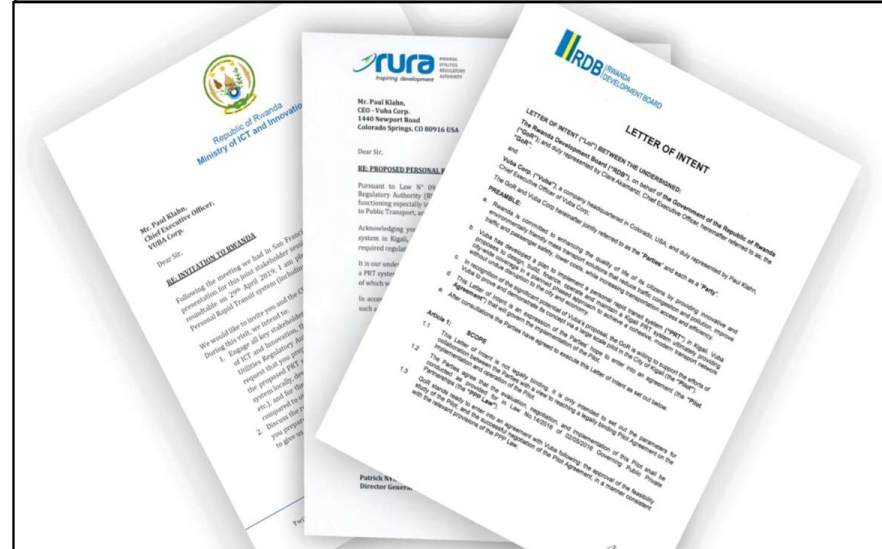
- Mayor of Kigali
- Director General of RURA
- Rwanda Development Board
- Rwanda Info. Society Authority

## Building Relationships



Vuba CEO Mr. Klahn  
With Rwanda President  
Mr. Kagame

## Letters of Intent (LOIs) and Support



Transdev CEO: "We were encouraged (in our 2018 survey) by how many leaders see that public-private partnerships can help them capitalize on new, emerging challenges and opportunities — particularly when it comes to developing options and the implementation of autonomous vehicles to supplement their networks in an equitable way"





# Initial risk management approach framework 1 of 2

RISK CATEGORY	RISKS		RISK MANAGEMENT APPROACH / MITIGATION	
PRT System Development Risk (Project Risk)	Project execution risks: <ul style="list-style-type: none"><li>• Technology / technical risks</li><li>• Vendor risks</li><li>• Construction risks</li><li>• Other project</li></ul>	➔	<ul style="list-style-type: none"><li>• Engineer to high tolerances and well beyond the ANSI/ASCE/T&amp;DI 21-19 ASCE required standards</li><li>• Comprehensive insurance where possible</li><li>• World-class comprehensive enterprise and project risk monitoring and management (use top firm like QCM or ABB for role; identifying &gt;monitoring &gt;evaluating &gt;handling &gt;controlling)</li><li>• Multiple-vendors for key technologies (incl. bogey, software integration)</li><li>• Phased development approach – first development is a pilot track connecting downtown Kigali with Nyabugogo Bus Station</li></ul>	World-class comprehensive risk Mngt.
•Market risk	<ul style="list-style-type: none"><li>•Displaced taxi operator risk</li><li>•Ridership risk</li><li>•Other market risks</li></ul>	➔	<ul style="list-style-type: none"><li>•Government guarantees (traffic demand management, fare pricing)</li><li>•Comprehensive marketing program that begins early to sell program</li><li>•Comprehensive due diligence research on rider switching behavior, likely volumes and thresholds</li><li>•Taxi (moto and auto) operator hiring program</li></ul>	
•Political risk	<ul style="list-style-type: none"><li>•Political instability</li><li>•Non-performance of guarantee obligation</li><li>•Other external risks</li></ul>	➔	<ul style="list-style-type: none"><li>•Guarantee insurance and political risk insurance</li><li>•Agreed risk management and scenario actions approach with government (upfront agreement)</li><li>•True relationship management (communication, regular governance forums, participation in decisions etc.)</li><li>•Hedging where feasible</li></ul>	



# Initial risk management approach framework 2 of 2

RISK CATEGORY	RISKS		RISK MANAGEMENT APPROACH / MITIGATION
Company risk	<ul style="list-style-type: none"><li>• Counterparty risk</li><li>• Company failure risk</li><li>• Organizational risks</li></ul>	➔	<ul style="list-style-type: none"><li>• World-class comprehensive enterprise and project risk monitoring and management</li><li>• Comprehensive insurance where possible</li><li>• Multiple-vendors for key technologies and components</li><li>• Company solvency &amp; liquidity requirements</li></ul>
• Financial risk	<ul style="list-style-type: none"><li>• Credit risk</li><li>• Currency risk</li><li>• Commodity risk</li><li>• Ridership revenue</li></ul>	➔	<ul style="list-style-type: none"><li>• Phased development approach – first development is a pilot track connecting downtown Kigali with Nyabugogo Bus Station</li><li>• Partial credit guarantee</li><li>• Engage several financiers for transactions</li><li>• Bespoke insurance products where feasible</li><li>• Ongoing stress testing and financial hedging using available derivatives (SWAPS, Options, futures) and indexes</li><li>• Phased development approach</li><li>• Rwanda/Kigali traffic demand management (congestion zones)</li><li>• Regulatory actions through RURA (fare pricing, volume targets)</li></ul>

World Class Comprehensive  
Risk Mngt.

## **THE 'DO NOTHING' RISKS ARE SIGNIFICANTLY HIGHER FOR KIGALI & RWANDA**

The risks of the PRT project need to be compared with the risks of continuing to rely on surface-based solutions. As proven in many cities worldwide, the 'do nothing' approach leads to the following results:

- A negligible increase in the use of public transit
- Significant growth in car traffic that matches and exceeds road development
- Increased congestion and longer trip times
- Large expenditures on road improvements that do little to improve the flow of traffic
- Continued public transit financial losses
- Continued climate change impacts



# Vuba

[adverb]

*quickly; to move with speed*

language: Kinyarwanda

 Hindura Mu Kinyarwanda