

- french context
- the advantages as urban transport mode
- some constraints
- main results and discussions points



Technology and developments of aerial cable systems well known because of major constructors in Europe

Doppelmayr – Garaventa :

- head office in Switzerland and Austria

Pomagalski – Leitner :

- head office in Italy and France



A law voted in 2009 (Grenelle Law) :

- Identifies cable ways as systems which have to be promoted
- Because they can provide an effective service in the field of urban transport
- And so be part of tools to reduce greenhouse gas emissions



French context

A lot of projects of cable cars, aerial or not, in France



A global analysis in 2010/2011 conducted by the french ministry of sustainable development and :

- CERTU – Centre for studies on urban planning, transportation and public facilities
- STRMTG, in charge of safety for ropeways and guided transport systems



Certu *Advantages as urban transport mode*

Cross over rivers, mountains, wide roads, railways..



Advantages as urban transport mode

Capacity depends on :

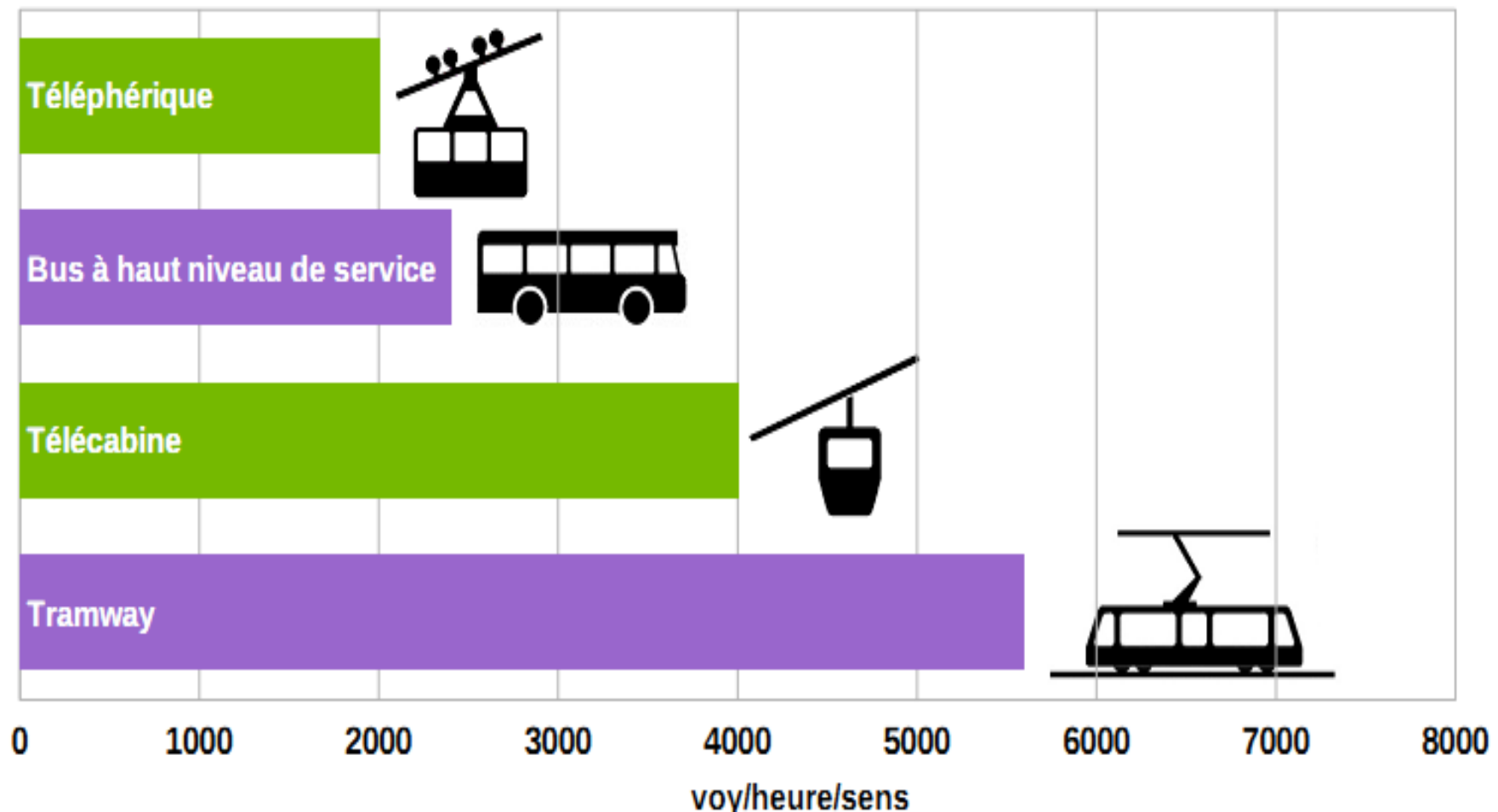
- Speed of the cable
- Number and capacity of the vehicles
- Way to get in and out vehicles

| Cableway system | monocable (TC) | bicable (2S) | tricable (3S) | aerial tram |
|-------------------------------|------------------|------------------|------------------|-------------------|
| Maximum capacity (p/h) | 3000 | 3500 | 4000 | 2000 |
| Maximum operating speed (m/s) | 6 (21.6 km/h) | 7.5 (27 km/h) | 7.5 (27 km/h) | 12.5 (45 km/h) |

Advantages as urban transport mode

Capacity is similar to tramway's

Hyp : 4 passengers/m² and frequency of 3min.



Advantages as urban transport mode

The level of service :

A frequency between a few seconds and several minutes

Excellent regularity because of the dedicated lanes

Availability similar to subway

Example of Medellin (Colombia) : a vehicle every 12 seconds



Advantages as urban transport mode

The level of service :

One of the safest transport mode in the world : example of french data

| | 2002/ 2003 | 2003/ 2004 | 2004/ 2005 | 2005/ 2006 | 2006/ 2007 | 2007/ 2008 | 2008/ 2009 | 2009/ 2010 |
|----------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Number of pass. (millions) | 84 | 88 | 83 | 77 | 66 | 71 | 82 | 73 |
| Serious accidents | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 |
| included serious injured | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Included people killed | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

Advantages as urban transport mode

Short delay of works – with few inconvenience on residents

Maintenance with no impact on residents

Automation possible for boarding and delighting



Some constraints

Because of technology, necessity of straight line between two stations/ pylons (intermediate stations)

To corner, need more pylons ---> increase costs



Example of Constantine
(Algeria) :
a station to corner

Some constraints

Urban integration of Stations :

- May be huge and high : how to integrate them ?

*A cable car station in
New York*



Some constraints

Dimensions of stations :

A cable car station in Medellin



Some constraints

Stations :

*A cable car station in
Grenoble (France)*



Some constraints

A system hardly adaptable to higher demand :

---> The increase of the demand has to be forecasted before the implementation

→ The number of passengers carried per vehicle can't be exceeded



Some constraints

Visual intrusion :

- Impact the value of the property : Myth or reality ?
- A useful argument for opponents

Example: an association against a project in France
named :

ACTEVI

Action Citoyenne pour les Transports et l'Environnement
de la Ville d'Issy-les-Moulineaux
surnommée "TOUCHE PAS A MON CIEL"

Don't touch my sky



Main results

Cable systems as urban transport mode are suitable to :

- Serve isolated inhabited areas
- Cross over rivers, mountains, wide roads, railways...
- Carry between 2 and 4 000 pass/h/direction and not any more
- Cable systems are not similar to light trams
but can feed them, complete them and be a
real part of the transport network

Need of further studies

A few items need further studies/discussions

- Urban integration of stations and pylons
- Accessibility for disabled persons
- Comfort
- Energy consumption
- Noise
- ...



Need of further studies

Investment costs : the weight of

- urban design ?
- And Safety policy

Example of London (UK) :
a pylon = 12 M€



Need of further studies

Operating costs : the weight of

- Staff in station (no drivers but 2 persons/stations) ?
- And Safety policy (impact on maintenance costs) ?

Example of Medellin



Forum THNS - 2011

A lack of data/ Costs

Estimated costs

| Transport system | monocable | bicable/ tricable | aerial tram |
|--|-----------|-------------------|-------------|
| Average estimated investment costs of a 1st one section-line – basic "mountain" design | €7-8 M/km | €15 M/km | €18 M/km |
| Additional cost for hardened and "urbanized" electro-mechanical equipment | + 20% | + 20% | + 20% |

Thank you for attention

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Annexe

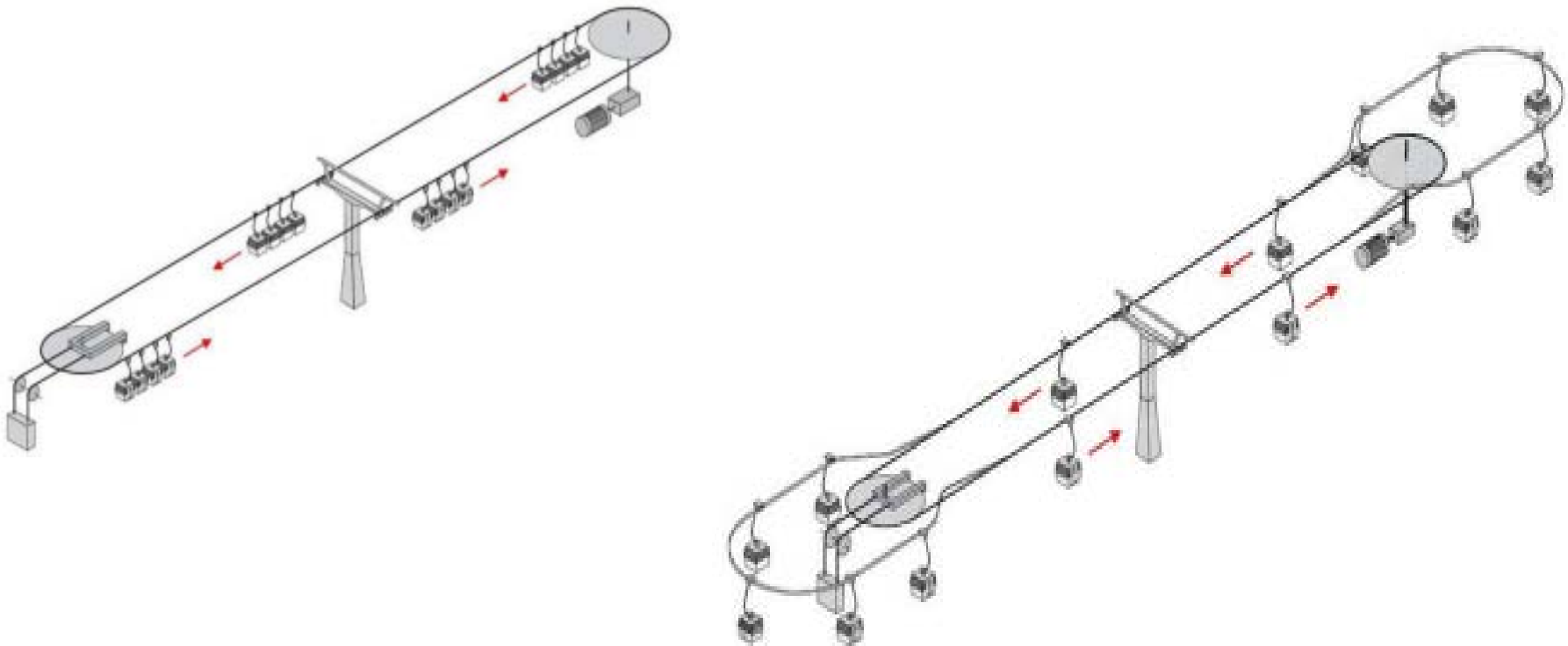


3 categories of aerial cable systems

Gondolas : small vehicles, moving around a loop in one direction

Several vehicles for one system,

Not obliged to stop at station



3 categories of aerial cable systems

1 monocable gondolas : supported and propelled by 1 cable

Vehicle capacity : 6-16 passengers

Example : Saragosse (Spain)



3 categories of aerial cable systems

2 bi or tri-cable gondolas : supported by 1 or 2 cables and propelled by 1 cable, allows larger vehicles (around 40 passengers)

Example : Bolzano (Italy)



3 categories of aerial cable systems

3 aerial tramways :

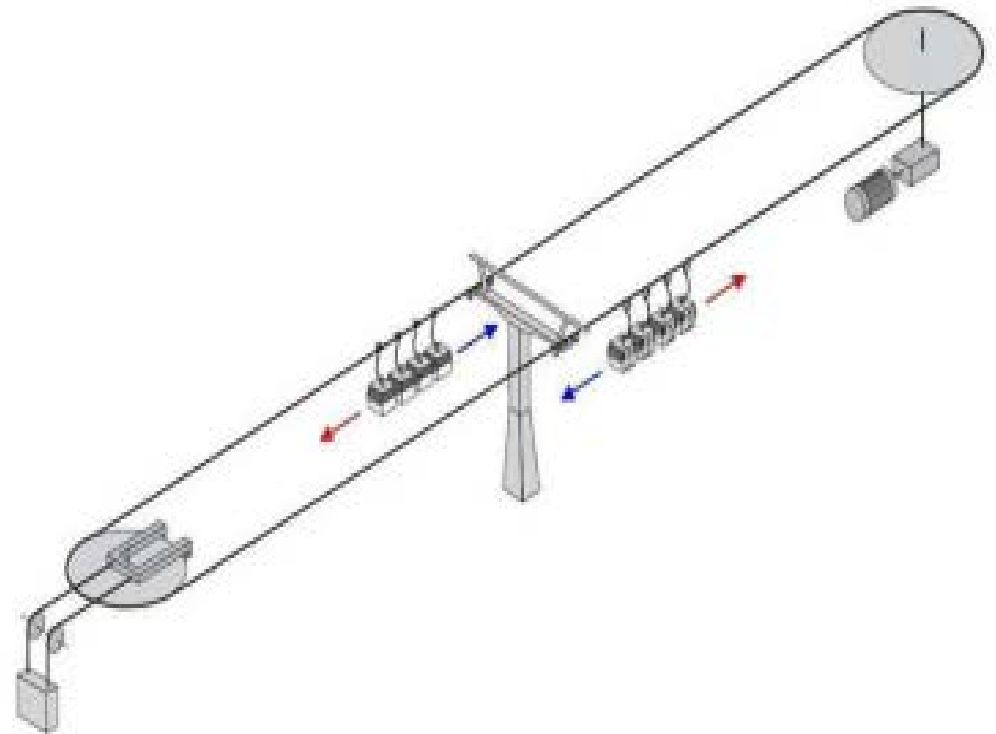
Vehicle shuttles back and forth between two stations

Vehicle capacity : between 50 and 200 passengers

1 ou 2 vehicles

Always stop at stations

Intermediate stations limited to single mid-points along the line



3 categories of aerial cable systems

3 aerial tramways

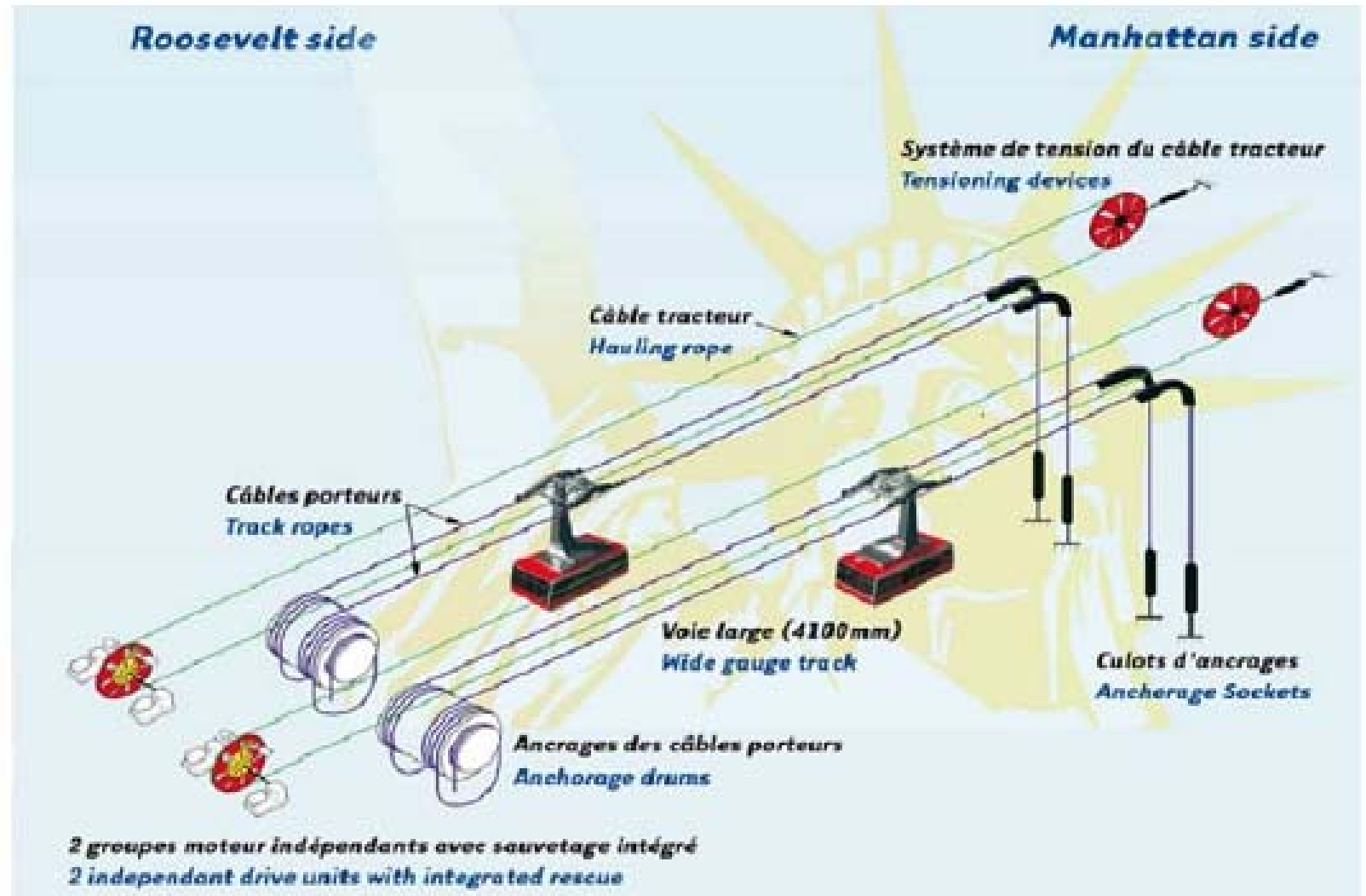
Example : New York (U.S.)



3 categories of aerial cable systems

3 aerial tramways

Example : New York (U.S.)



3 categories of aerial cable systems

3 aerial tramways

Exa

