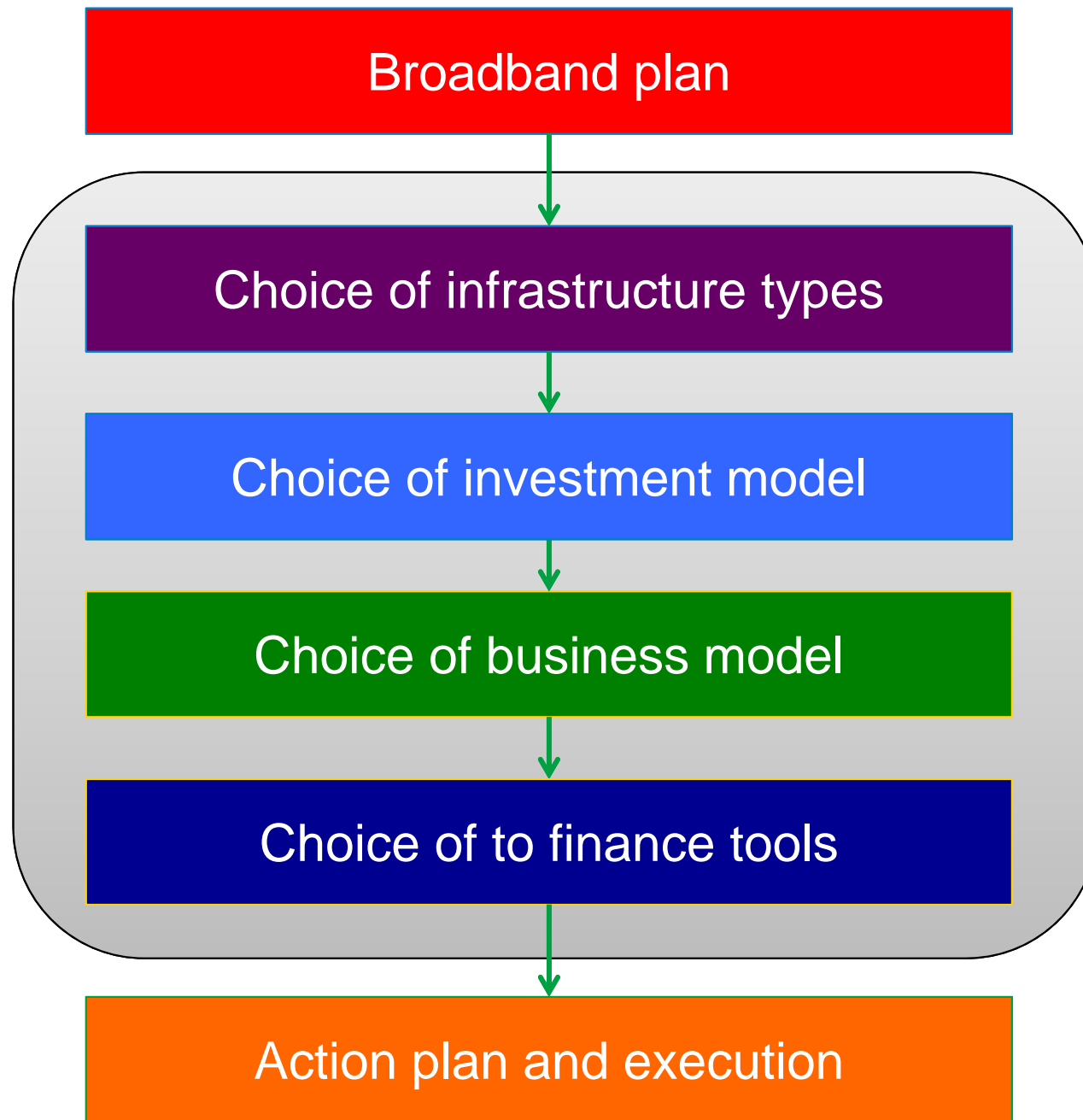


NEW EC GUIDE TO BROADBAND INVESTMENT

An overview

Marco Forzati

Crister Mattsson

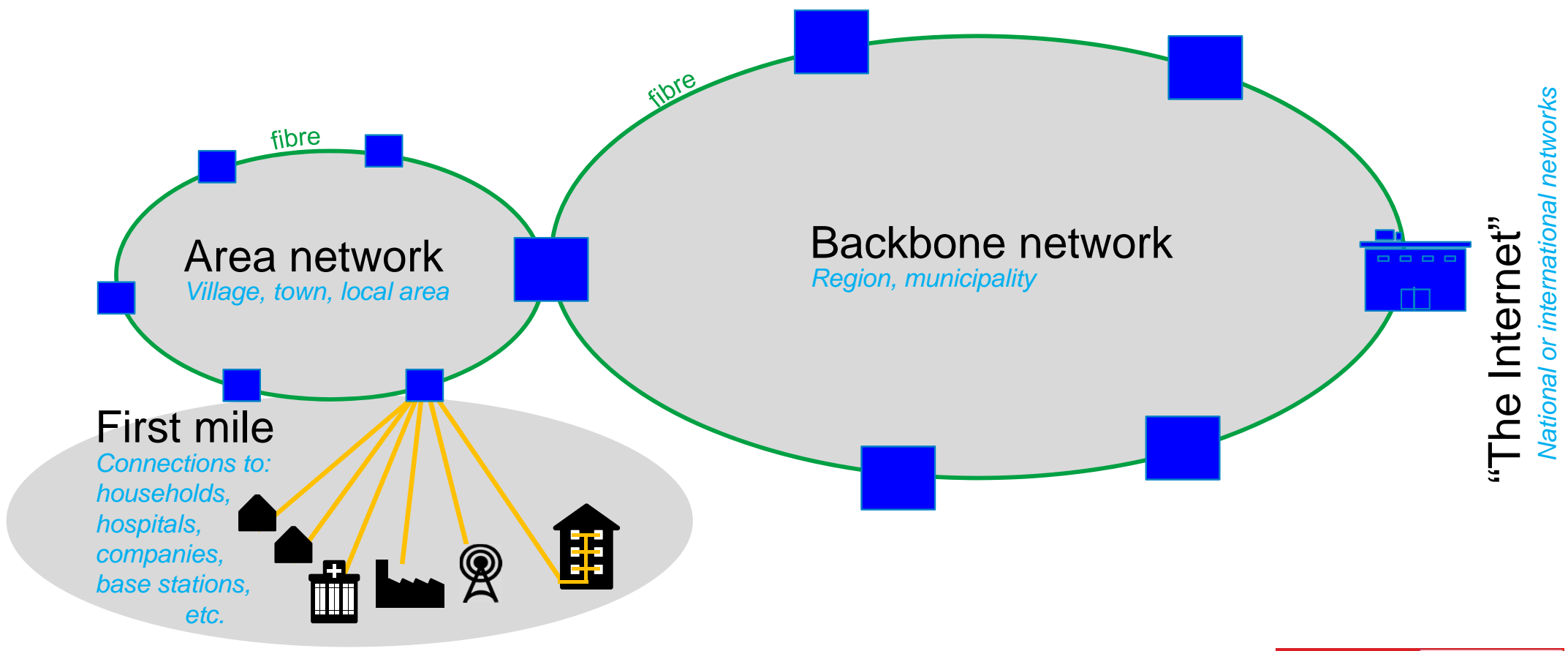


To define a broadband plan (strategy) is essential. Questions to target:

- Why broadband: policy context
- Mapping the current situation
- Why intervene?
- Defining the goals
- Identifying stakeholders and establishing collaboration
- Next steps: four strategy choices

- Choice of the **infrastructure type**.
Deploy a future-proof broadband infrastructure or upgrade the current infrastructure as an interim solution?
- Choice of the **investment model**.
How involved shall the PA be in each aspect of the infrastructure (implementation, operation, ownership and management?)
- Choice of the **business model**.
Vertically integrated or one of the open-network models? Which best maximises financial sustainability, coverage, competition?
- Choice of the **financing tools**.
How to provide the necessary financing and what can actors contribute in terms of capital, spend and assets?

INFRASTRUCTURE TYPES



INFRASTRUCTURE TYPES

Infrastructure types and technologies available

Infrastructure	Current technology (now)		Fundamental properties of physical medium (future)		
	Top technology	Data rate (down/up)	Shared medium in 1 st mile?	Available bandwidth	Basic transmission reach
<i>wired</i>	Fibre p2p	GbE 1/1 Gb/s	No	50 000.00 GHz	80 km
	Fibre p2mp (PON)	GPON up to 2.5/1.2 Gb/s	Yes	50 000.00 GHz	20 – 45 km (32 – 8 users)
	Coaxial cable	DOCSIS 3 up to 300/50 Mb/s	Yes	1.00 GHz	0.5 – 3.0 km (high – low speed)
	Twisted pair	VDSL up to 60/10 Mb/s	No	0.05 GHz	0.2 – 1.5 km (high – low speed)
<i>wireless</i>	Terrestrial wireless	LTE up to 60/10 Mb/s	Yes	0.10 GHz	several km
	Satellite	Ka-band systems up to 20/8 Mb/s	Yes	10.00 GHz	--

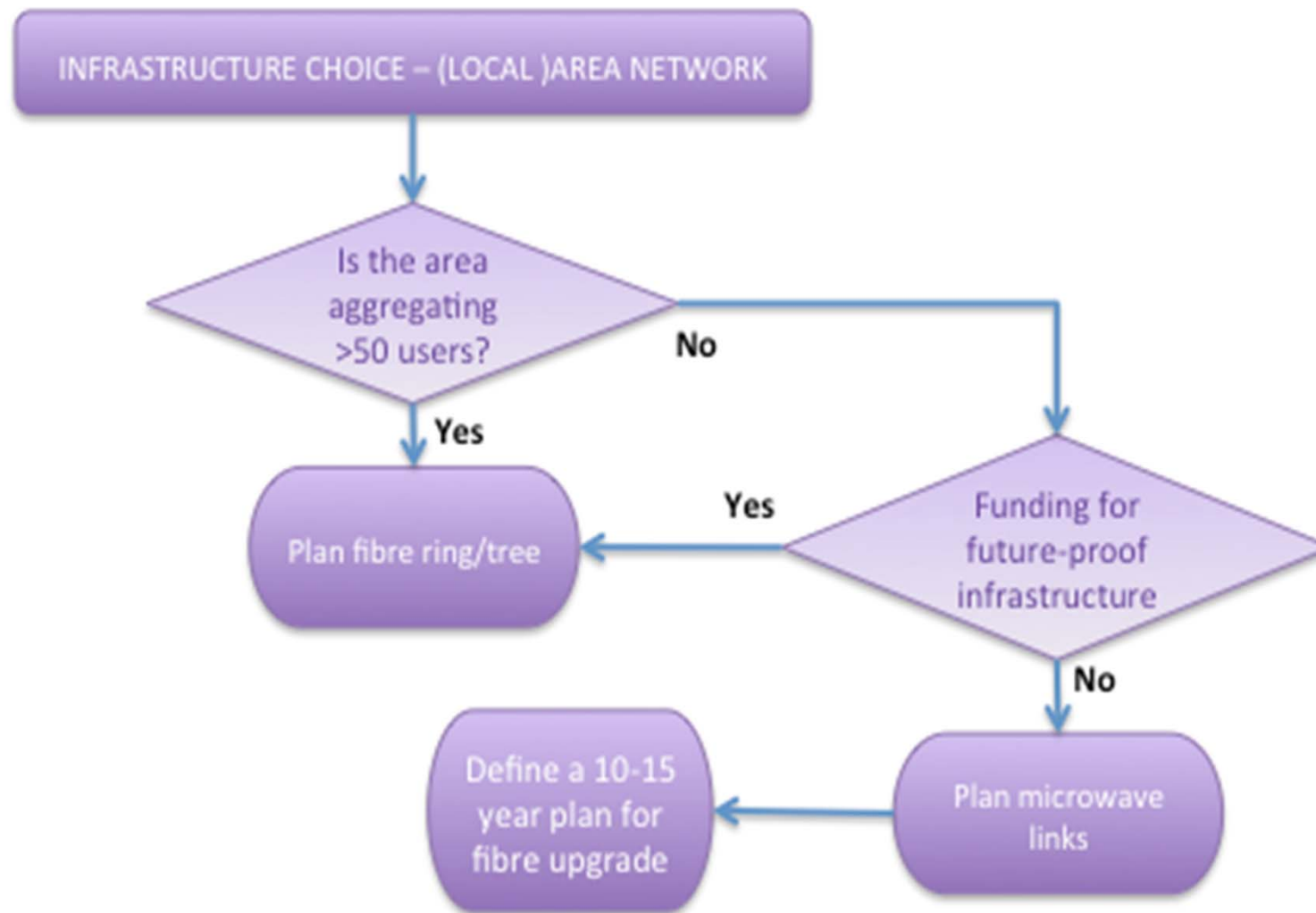
Layout: include some pictures of fibre, radio towers, satellites, copper lines?

INFRASTRUCTURE TYPES

Infrastructure types, pros and cons

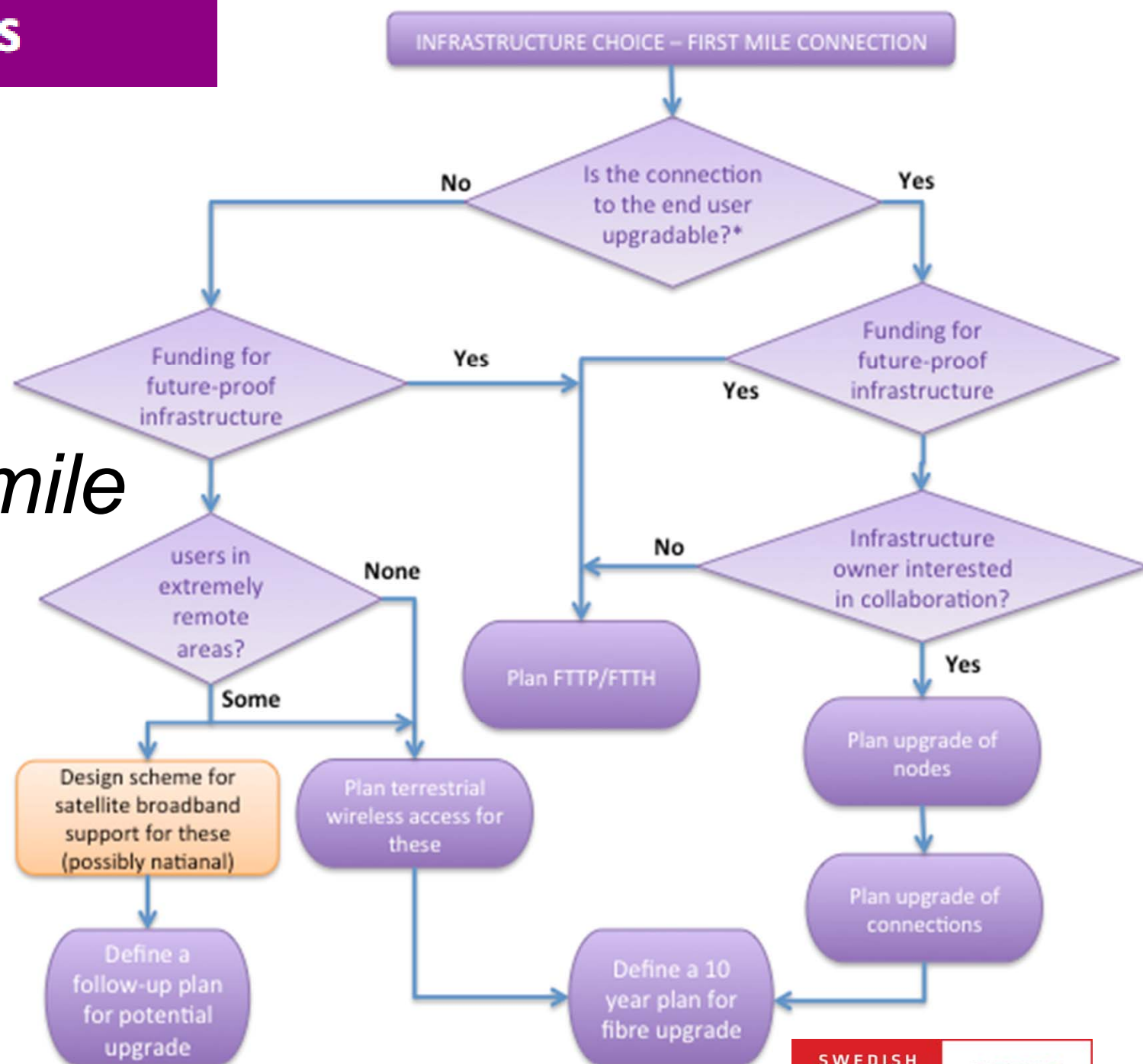
First-mile infrastructure	Pros	Cons
FTTH/FTTP (benchmark)	Future proof	High investment in passive infrastructure
Telephone copper line	<ul style="list-style-type: none">Relatively low investment needed for passive infrastructureLeast disruptive for the end users	<ul style="list-style-type: none">Not applicable everywhere (sparsely populated areas generally more challenging)Competition on fair conditions is more difficult to guarantee (the telephone lines already belong to an operator selling its own services over them); this is even more true when vectoring technology is used because this makes local-loop unbundling impossible.xDSL technology is heavily asymmetrical: upload speeds are generally much lower than download speeds: this hampers new services like cloud computing, teleworking, tele-presence, etc.Higher investment needed in active equipment (with a life-time of 5-10 years)Interim solution: investment in fibre infrastructure most likely only postponed by 10 years
Coaxial copper line	<ul style="list-style-type: none">Relatively low investment needed for passive infrastructureLeast disruptive for the end users	<ul style="list-style-type: none">Bandwidth shared among several users: peak traffic periods of the day will reduce the available bandwidth for each userCompetition basically absent in the cable marketSeldom present in the digital-divide areasInterim solution: investment in fibre infrastructure most likely only postponed by 10 years
Antenna sites for wireless	<ul style="list-style-type: none">First mile wire connections not needed.Infrastructure can be used for commercial mobile services as well	<ul style="list-style-type: none">Bandwidth shared among several users: peak traffic periods of the day will reduce the available bandwidth for each userSignal strength decreases fast with distance, and affected by weatherInterim solution: investment in fibre infrastructure may be needed within

Infrastructure choice in area networks



INFRASTRUCTURE TYPES

Infrastructure choice in first mile connections



INVESTMENT MODELS

- MA
- Open market actors

Public-run municipal network

Public design, build and operate

Joint venture

- MA (ownership)
- Neutral operator
- Open market actors

Private-run municipal network

Public outsourcing

- Neutral operator
- Citizen coop

Community broadband

Bottom-up

- Vertical telco

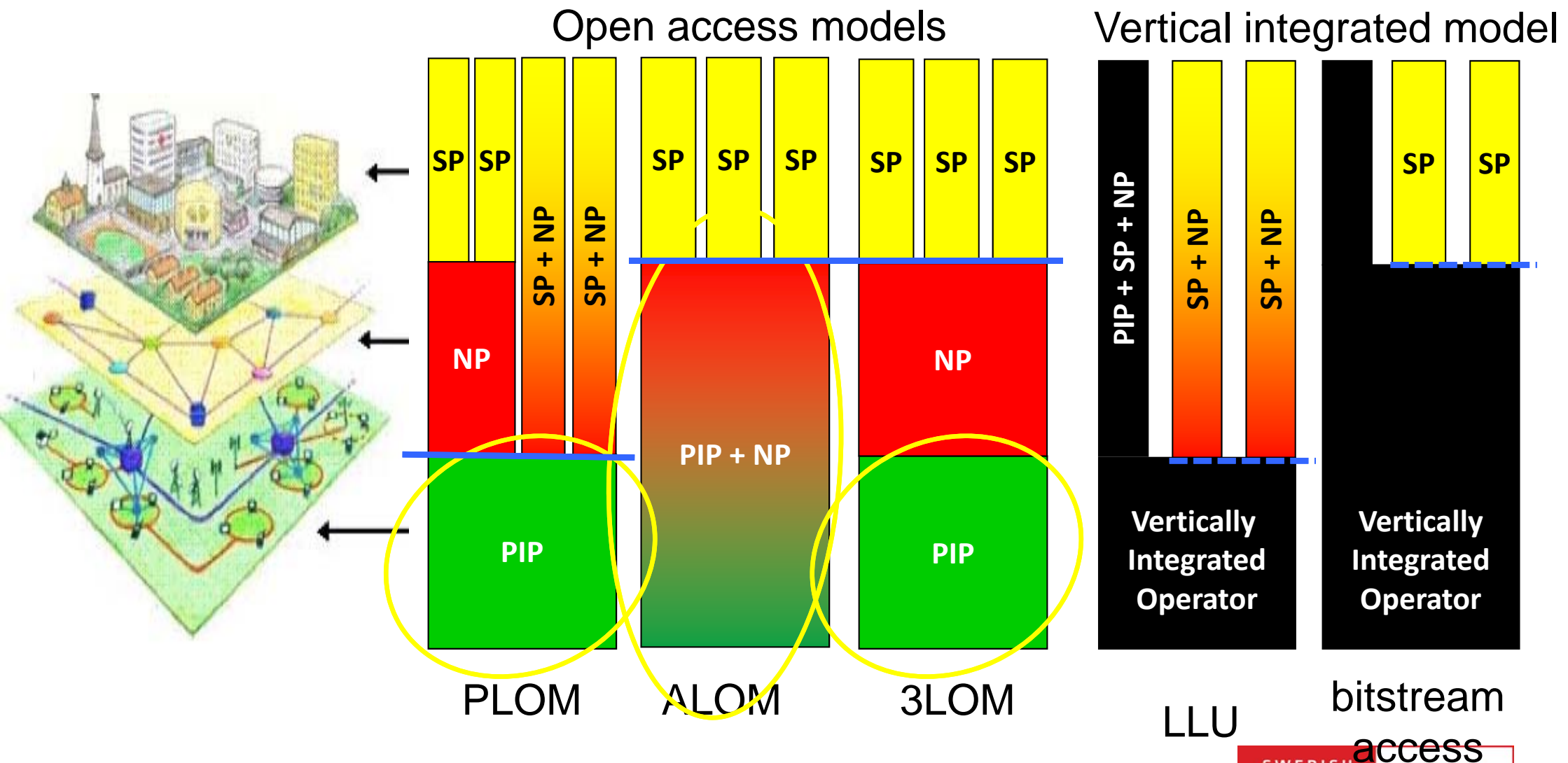
Gap financing

Private design, build and operate

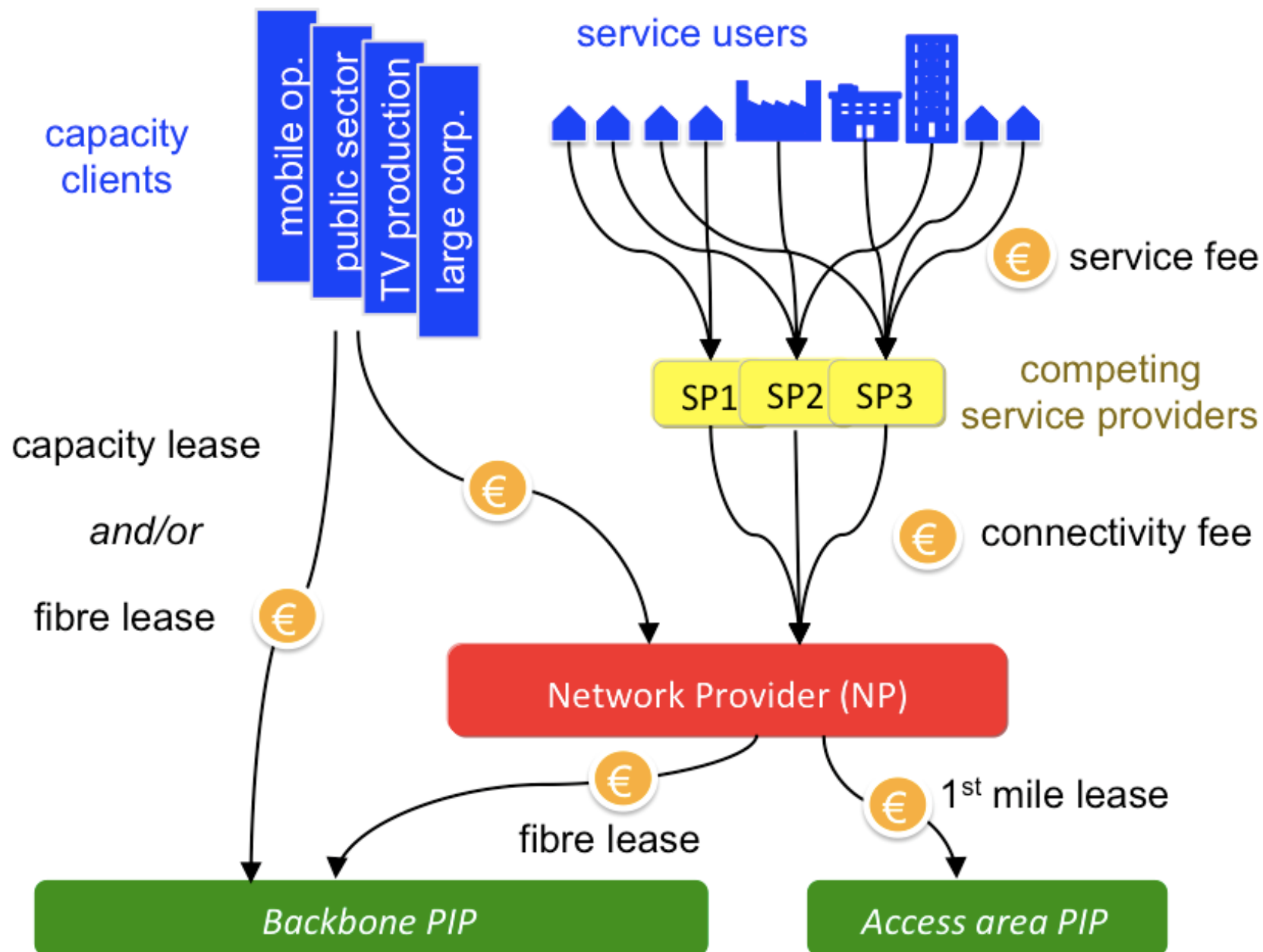
INVESTMENT MODELS

Involvement/investment Model	Promotion of competition	Commitment and financial risk for MA	Revenue generation for network expansion	Control over project	Availability of an infrastructure for society
Public-run Mun. Net	High😊	High😞	Potentially high😊	High😊	High😊
Private-run Mun. Net	Medium😊	Low😊	Medium😊	Medium😊	Medium😊
Coop-support	Medium😊	Low😊	Medium😊	Low😞	Medium😊
Gap Funding	Low😞	Low😊	Low😞	Low😞	Low😞

NETWORK LAYERS AND BUSINESS MODELS

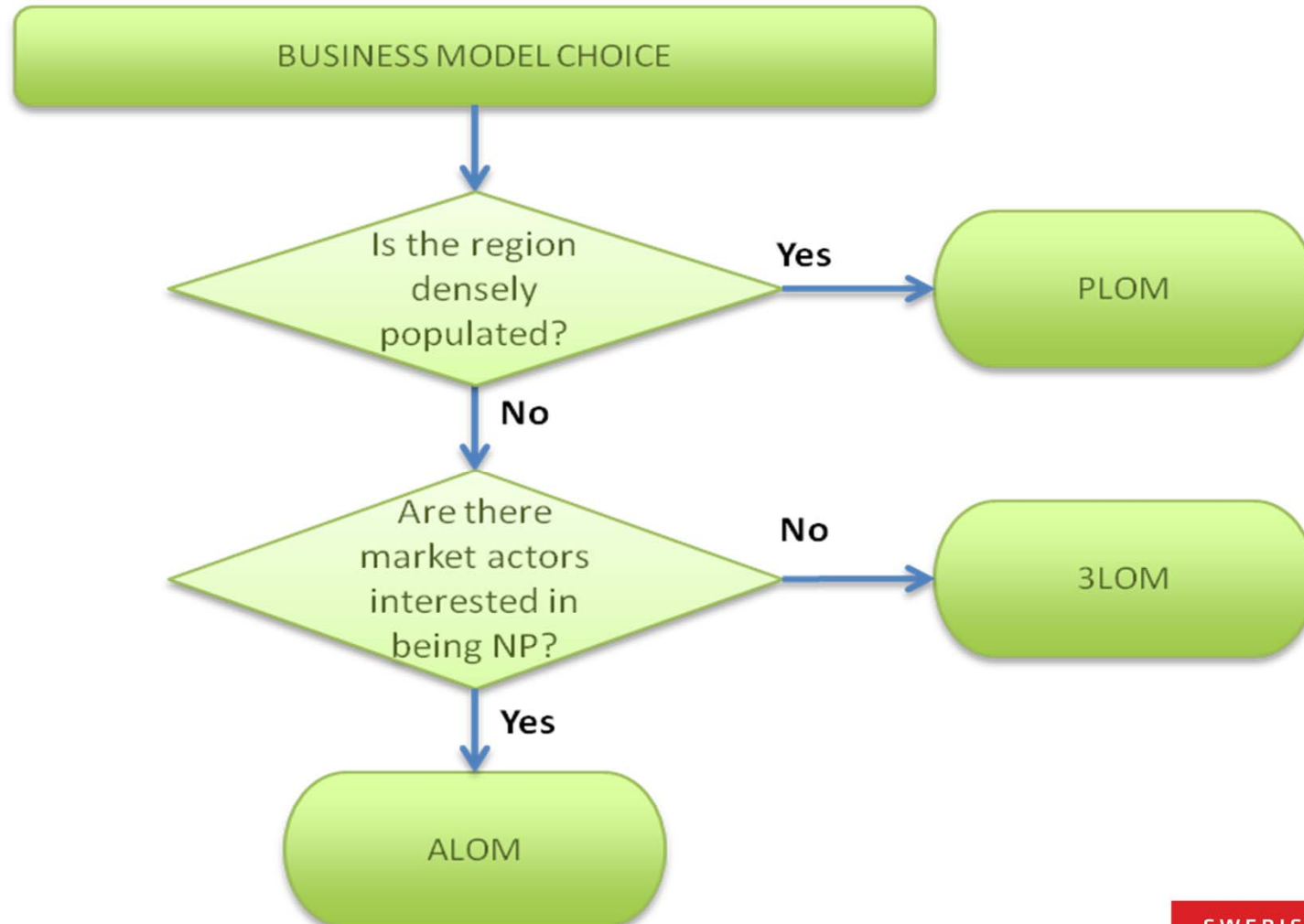


BUSINESS MODELS



GENERAL OPEN NETWORK VALUE CHAIN

Business model choice



Business model

MA role (investment model)

	PLOM	ALOM	3LOM	Vertically Integrated
Public-run Municipal	Ownership: MA PIP: MA NP: Open market SP: open market	Ownership: MA PIP: MA NP: MA SP: open market	Ownership: MA PIP: MA NP: market by proc. (3-5y) SP: open market	
Private-run Municipal		Ownership: MA PIP: market by proc. (IRU 20 y) NP: market by proc. (IRU 20 y) SP: open market		Ownership: MA PIP: market by proc. (IRU 20 y) NP: market by proc. (IRU 20 y) SP: market by proc. (IRU 20 y) and LLUB/bitstream access
Gap funding		Ownership: telco JV PIP: owners NP: owners SP: owners + open market		Ownership: telco PIP: owner NP: owner SP: owner + LLUB/bitstr. access
Coop support		Ownership: coop/investors PIP: owner or market by proc. NP: owner or market by proc. SP: open market	Ownership: coop/investors PIP: owner NP: market by proc. SP: open market	Ownership: coop/investors PIP: owner or market by proc. NP: owner or market by proc. SP: owner or market by proc.

HOW TO FINANCE THE PROJECT?

- Revenue-based financing
- Private capital and financial markets
- Public money (loan, grant, government investment, etc.)
- Government-backed bank loan and/or bonds
- Community-financed (bottom-up approaches)

ACTION PLAN AND EXECUTION

