

# Creating a brighter future

Webinar: National Fibre Strategies

Moderator: **Hartwig Tauber**

Director General

FTTH Council Europe

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# Creating a brighter future

## Webinar: National Fibre Strategies

Moderator: **Hartwig Tauber**  
Director General  
FTTH Council Europe

Presenter: **Andrea Faggiano**  
Principal, Head of SASCAR  
Arthur D. Little

**Arthur D Little**

# **National Fibre Strategies – A global analysis for consideration in local markets**

*12<sup>th</sup> November 2013*



## Content

- 0      Executive Summary**
- 1      Socioeconomic Benefits of High Speed Broadband
- 2      Global Analysis of National Fibre Models
- 3      Considerations for National Fibre Policy



**Recent flurry of FTTH investments have led to global fibre evolution but the current situation is not optimal and subtle changes can yield significant benefits**

### Key Messages

1	<b>Fibre is good for the entire economy</b>	<ul style="list-style-type: none"> <li>■ Doubling national broadband speed permanently can add 0.3%<sup>1)</sup> to GDP</li> <li>■ For every 1000 additional broadband users, ~80<sup>1)</sup> new jobs created</li> </ul>
2	<b>The investment case is partly national strategic</b>	<ul style="list-style-type: none"> <li>■ Left purely to private endeavours – the full advantages of fibre based economies will not be reached at all ... nor quickly</li> <li>■ Public (Government) and Private investment and cooperation required - Getting the model wrong has clear and unwelcome results</li> </ul>
3	<b>Five macro National Fibre models exist each with strengths &amp; weaknesses</b>	<ul style="list-style-type: none"> <li>■ There is no perfect model but some have proven to be better than others ... the key is matching the right model to the specific national circumstances</li> <li>■ Private endeavour combined with graded public involvement work best overall</li> </ul>
4	<b>Overall model 3 works well when applied diligently</b>	<ul style="list-style-type: none"> <li>■ Graded government support and private led model yields best results in most situations</li> <li>■ However, governments adopting this model should carefully institutionalize policy changes and adopt best practices from other markets</li> </ul>

Source: Arthur D. Little

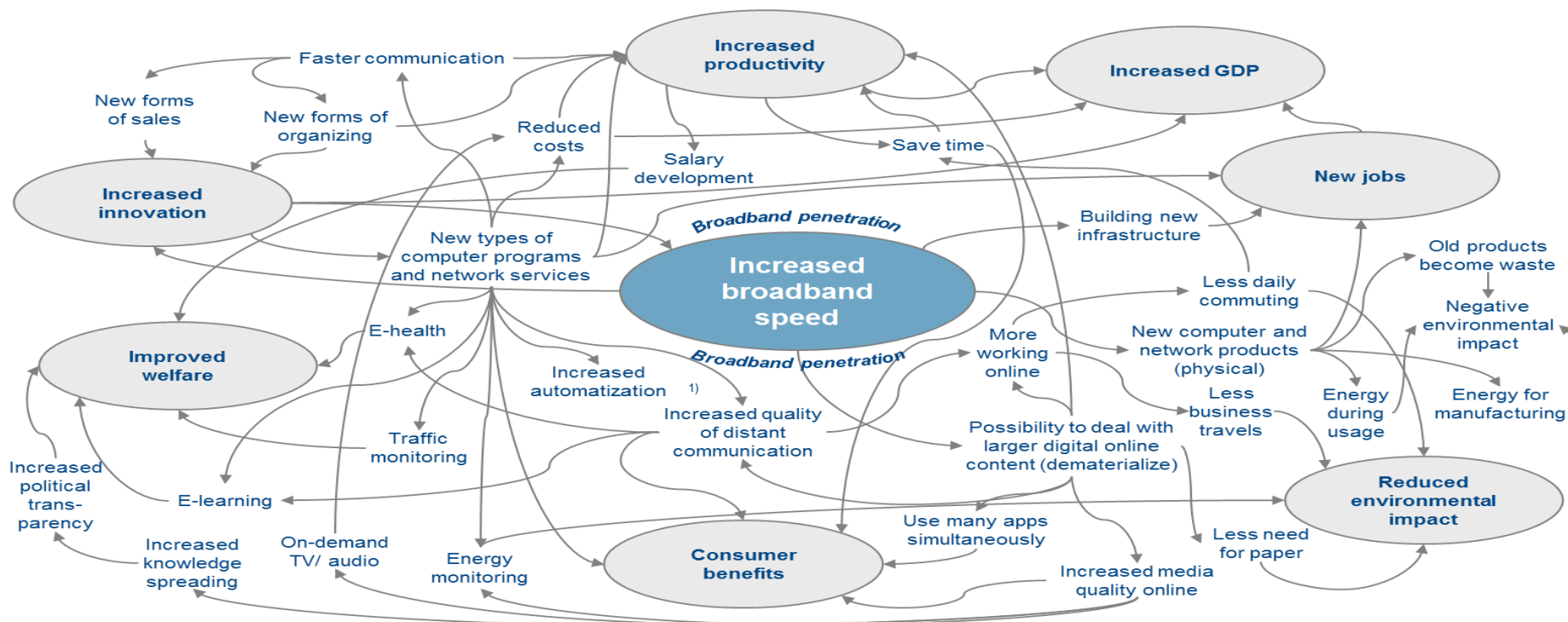
Note 1) Arthur D. Little study in cooperation with Chalmers University of Technology and Ericsson

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The benefits of high speed broadband expand into the wider economy via a web of enablement leading to tangible, time withstanding financial and socioeconomic results

### Socioeconomic Web of Benefits from High Speed Broadband



Note: This map is a simplification – in reality there are even more factors and linkages 1) Increased automation has a negative effect on number of jobs however the net effect of increased broadband speed on number of jobs is positive, according to several studies

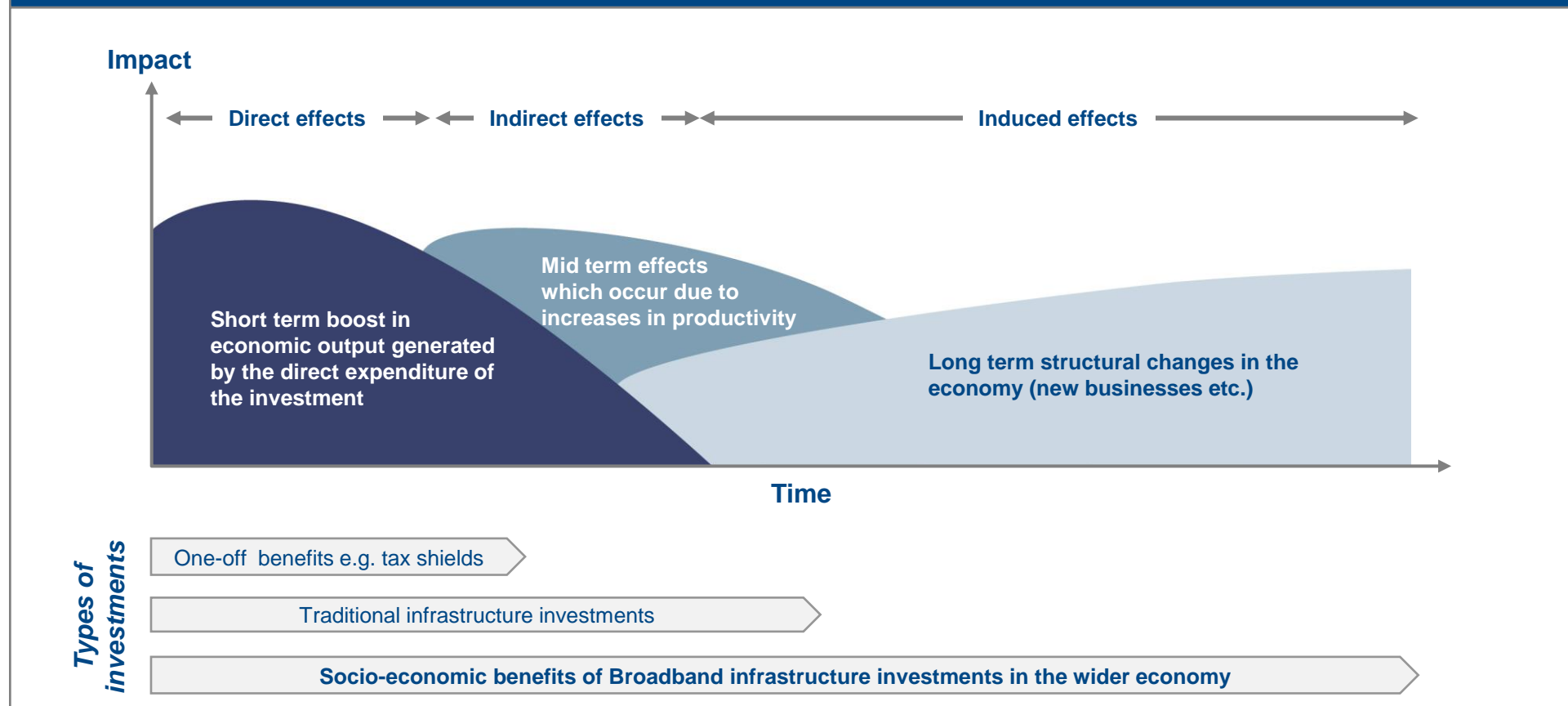
Note 2) Arthur D. Little in cooperation with Chalmers University of Technology and Ericsson . Based on advanced econometric analysis of 33 OECD countries with speed interval of 2 to 20 mbps; Note 3) Arthur D. Little analysis, based on advanced econometric analysis of 13,000 households in 15 OECD and BRIC countries

## 1 Socioeconomic Benefits of High Speed Broadband – Different Economic Impacts

These benefits will manifest themselves over time ranging from immediate one-off benefits to long lasting socio-economic benefits for society generally

*Illustrative*

### Economic Impacts of Broadband Infrastructure Investments



Source: Arthur D. Little research (covering more than 120 reports from leading research institutes)

The socioeconomic effects of high speed broadband have been explored extensively in renowned global studies by Arthur D. Little and Ericsson

### Arthur D. Little Socioeconomic Effect of Broadband (Speed Upgrades) Studies

#### Significant Attention by Regulators & Media

*“This is a completely unique material. I will immediately inform all my ministerial contacts”*

- National regulator in Europe

*“The European Union Commissioner must immediately see this”*

- Former minister of telecoms in Spain

arab news

#### Does High Speed Broadband Increase Economic Growth?

4 comments, 2 called-out + Comment Now + Follow Comments

It's a reasonable enough question: does the roll out of high speed broadband increase economic growth? If it does, if there's more than just the private gains that users themselves capture then this might make a decent case for there to be subsidy of the installation of such national infrastructure. This paper from Arthur D Little and Ericsson (who, err, make broadband

Forbes.com

#### Ericsson: Quadrupling KSA broadband speed can boost GDP by over \$ 3 billion

Quadrupling the speed of broadband in Saudi Arabia has the potential to contribute an additional 0.6 percent to the nation's Gross Domestic Product (GDP). The findings are based on research jointly conducted by Ericsson, Arthur D. Little and Chalmers University of Technology.

Significantly, while doubling the country's broadband speed would lead to a 0.3 percent increase in GDP worth almost \$ 1.730 billion, quadrupling Internet access speeds would add approximately \$

#### Study Description

*Socioeconomical and environmental effects of broadband (speed upgrades) (2010/11)*

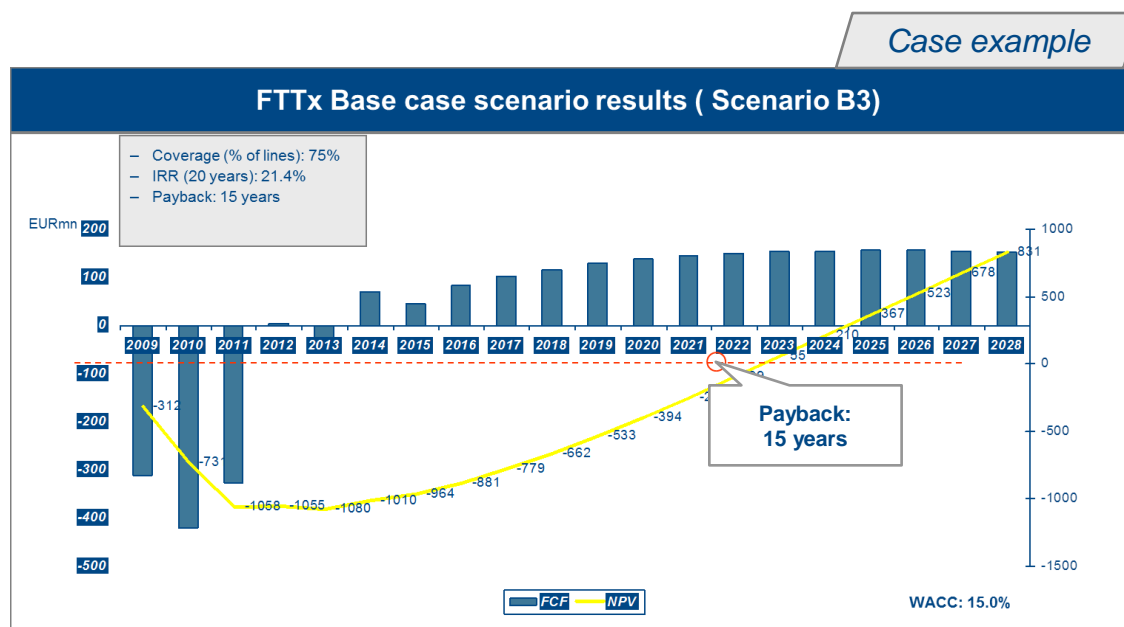
- Arthur D. Little conducted two worldwide recognized studies on the socioeconomic effects of broadband in general and speed upgrades in particular
- Development of an interactive model for calculating the economic impact of broadband investments on macro and meso level world wide
- Use of comprehensive report & study review as well as in-depth expert interviews
- Panel Data Regression analysis used with data collection on
  - 7 variables
  - 33 OECD countries
  - 3 years (12 quarters)



## 1 Socioeconomic Benefits of High Speed Broadband – Business Case

Despite the long lasting benefits of high speed broadband, the business case especially at a total national level is challenging – governments and industry players have to work together

### FTTH/B Deployment Business Case



*FTTH/B business cases in their base case scenario are characterized by high initial investments (CAPEX) and long payback periods*

### Challenges

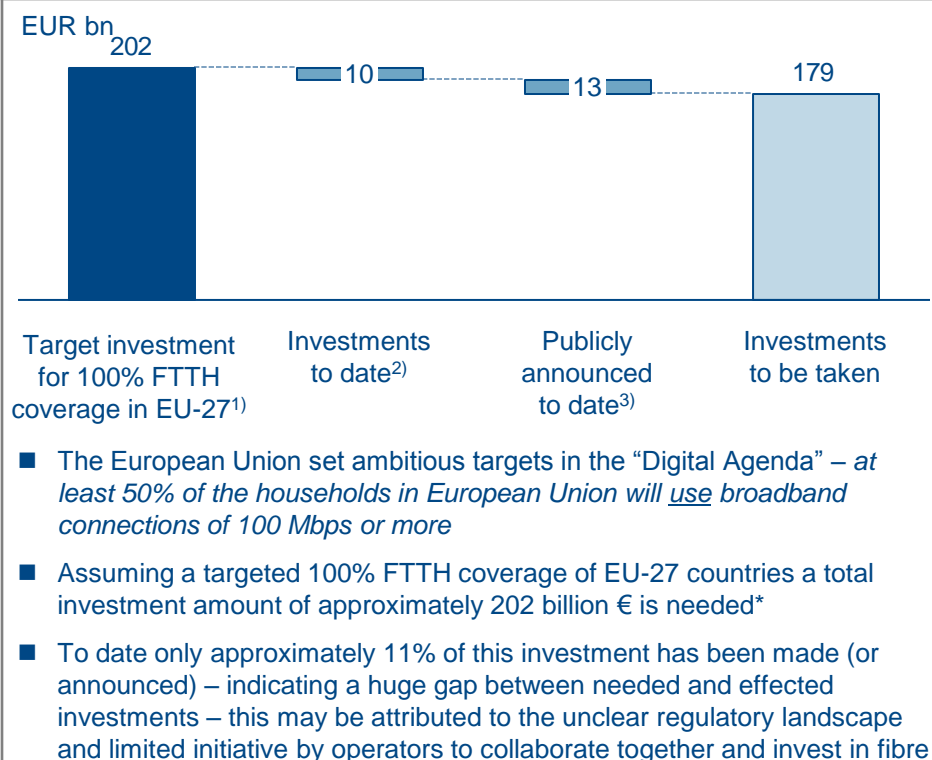
- **High initial investments (CAPEX)** as sunk costs - cannot be undone if demand turns out to be insufficient
- Basically **neutral NPV** of investment project
- **Investments in low density areas unprofitable** unless co-financed with other parties (e.g. government)
- **Variability of key variables** severely influencing the business case (regulatory choices, retail market share, triple-play penetration, wholesale revenues)
- Considerable **uncertainty about consumer interest** in and willingness to pay for ultra-fast broadband



**Example: To drive the European FTTH network deployment substantial investments are needed – however achieving co-investments among competing Telcos is very challenging**

### European FTTH/B Network Investments

#### Fibre Investment Requirements in EU 27



#### Recent Challenges for Fibre Network Co-investments

*Initiative by Vodafone for European FTTH/B network cooperation*

- In 2011/12 Vodafone asked rival European phone operators to share the investments needed for faster networks as regulators balk at consolidation
- Major European operators were not willing to team up with Vodafone in order to protect their dominance in their home markets – therefore Vodafone might turn to smaller local operators to form alliances
- Vodafone states that there is still a resistance to the concept of open networks, not in mobile but in fixed networks in specific EU countries

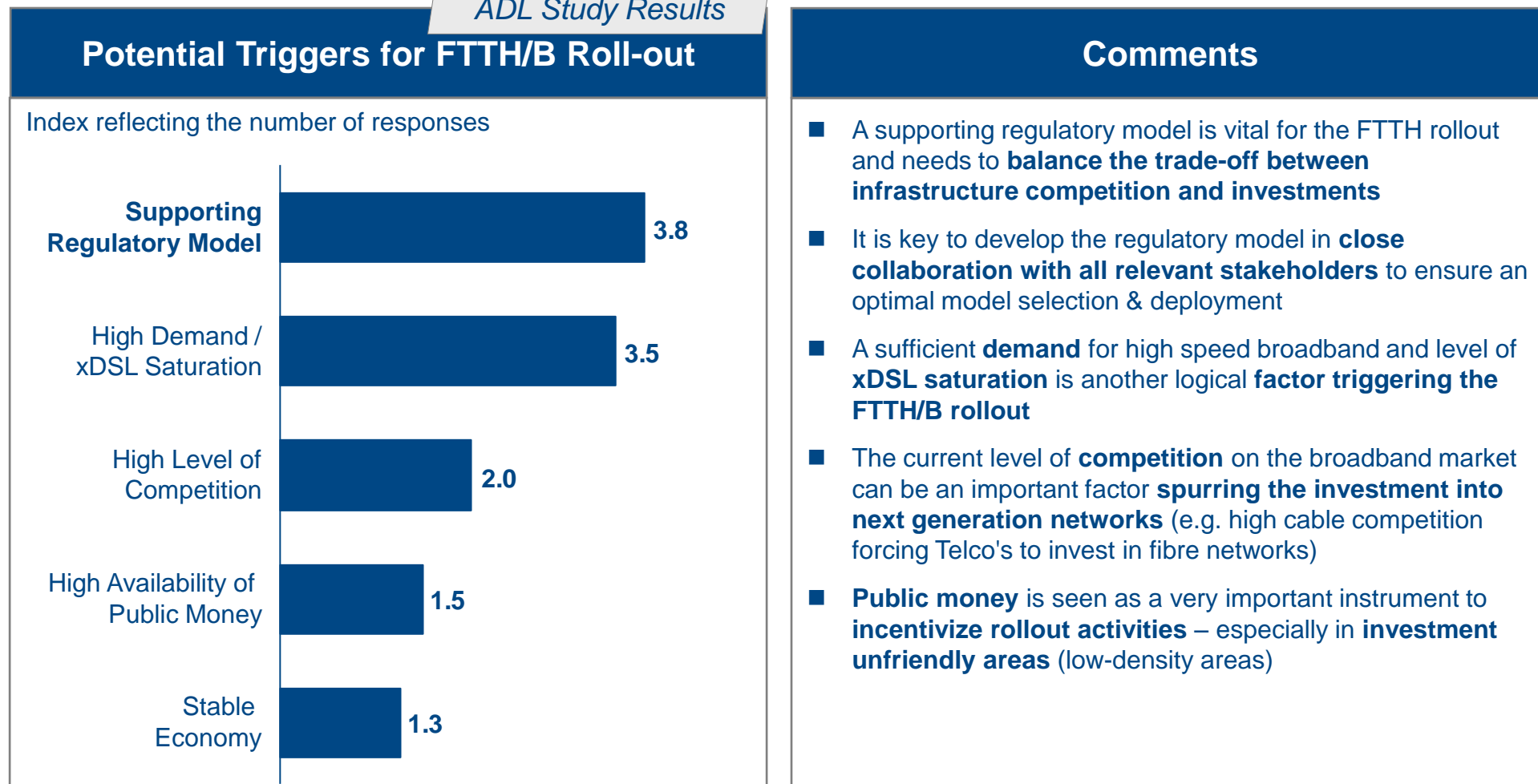
**“As Vodafone we have offered to co-invest in these networks, we have offered it to the most important European players” ... “So far, we have not succeeded in convincing them that this is a good idea but we are keen on doing it”**

**- Chief Executive Officer Vodafone (Vittorio Colao)**

## 1 Socioeconomic Benefits of High Speed Broadband – Potential Triggers for FTTH/B Roll-out

Given the socioeconomic benefits of high speed broadband and yet challenging business case, the regulatory position on fibre access is key to stimulating FTTH/B investments

ADL Study Results

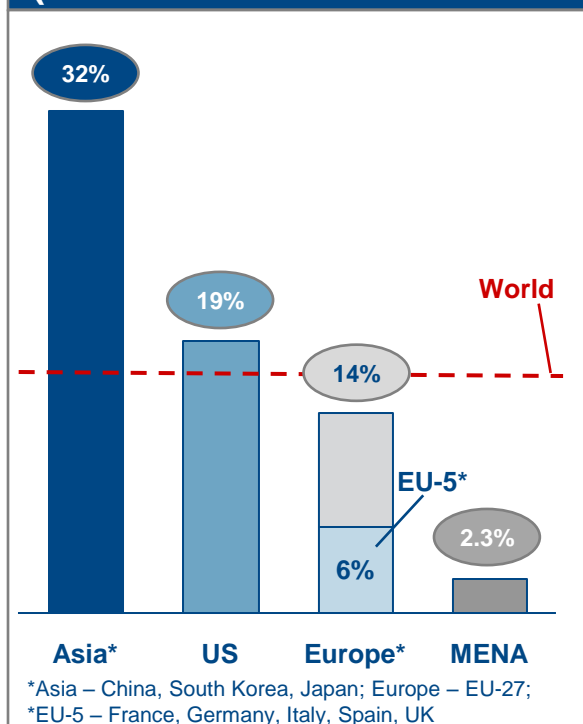


Source: Arthur D. Little, Exane BNP Paribas

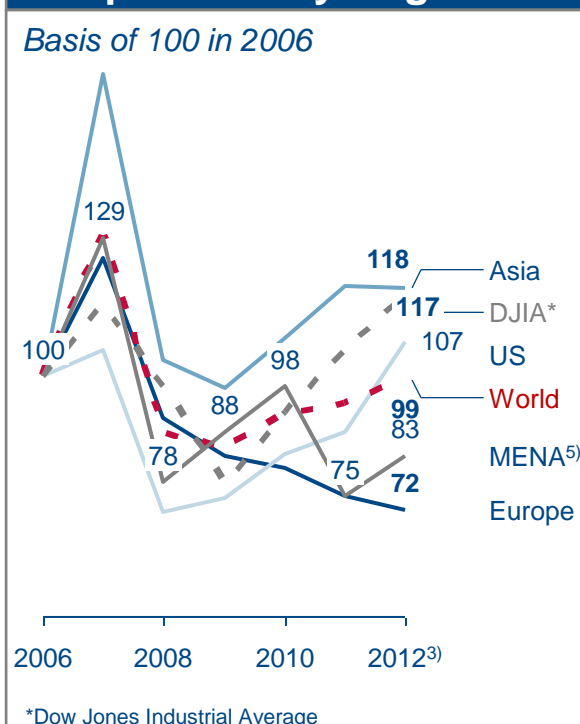
## 1 Socioeconomic Benefits of High Speed Broadband – Importance of a Good National Fibre Model

Getting the National Fibre Model working well is vital – getting it wrong leads to both under-performing investments and institutional economic issues – e.g. Europe generally lags behind

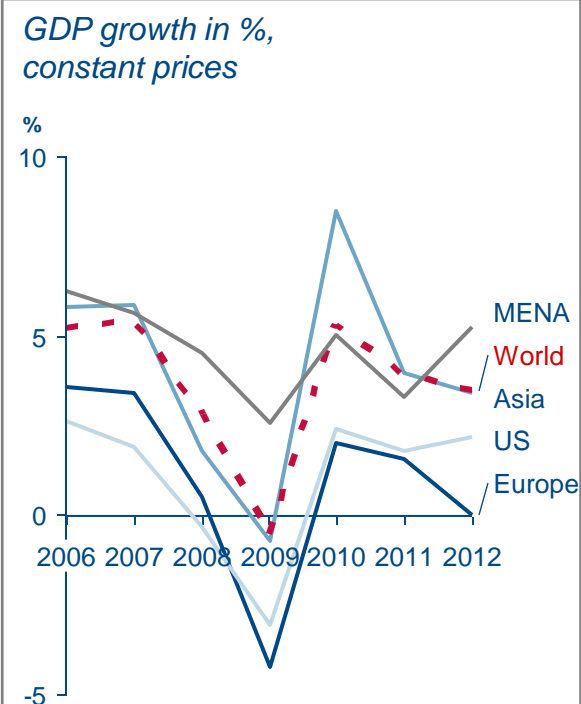
### FTTH/B Households Passed (in % of total households<sup>1)</sup>)



### Market Cap of Network Operators by Region<sup>2)</sup>



### GDP Growth per Region<sup>4)</sup>



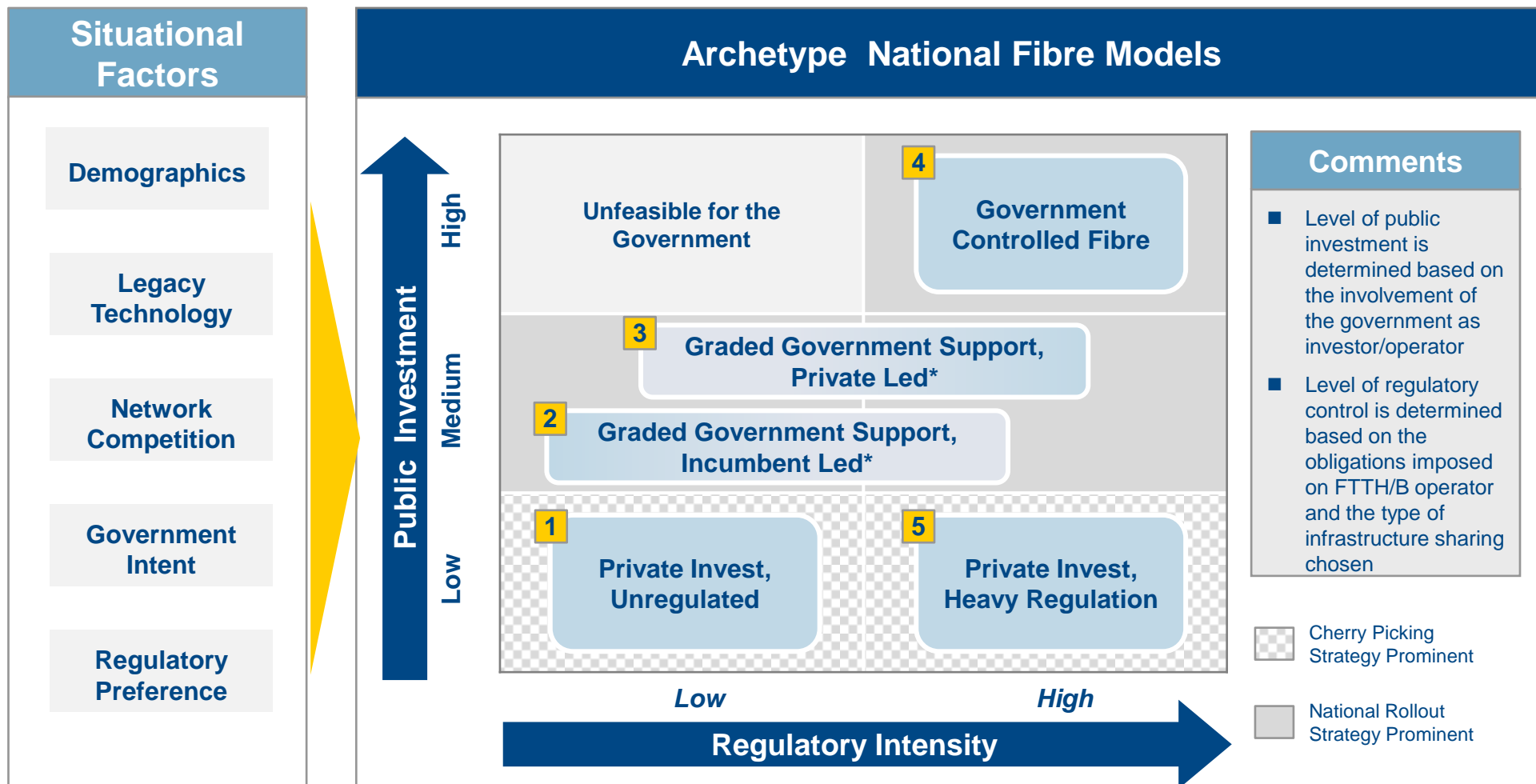
▶ **Implementing the right national FTTH/B deployment fosters fibre deployment, industry value generation and strengthens the economic development**

(1) FTTH Council Presentation; Asia assumption: China - 63 mill. HHP as of June 2012 + 25 mill. HHP added for Dec 2012 figure (assumption: yearly 50 mill HHP); MENA figure as on Sep 2012 (2) In top 30 global operators, nationality according to HQ location (3) As of Sept 28, 2012 (4) International Monetary Fund, (5) Until end of 2012; October 2012 (Europe – EU-27, Asia – Newly industrialized Asian economies)

## Content

- 0 Introduction & background
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- 2 Global Analysis of National Fibre Models**
- 3 Considerations for National Fibre Policy

Upon analysis of a vast array of case studies, Arthur D. Little has composed a generic framework where five macro models emerge (archetype models)



Source: Arthur D. Little analysis

\*Regulatory intensity in these models can vary from low to high depending upon situational factors

Each country represents a unique set of situational factors requiring specific national solutions to get the optimal balance of investment, operational and market model











	Situational Factors					Model Dimensions				
	Demo-graphics	Legacy Technology	Network Competition	Government Intent (intervention propensity)	Regulatory Preference	Public Investment		Regulatory Intensity		Roll Out Strategy
						FTTH/B Investor	FTTH/B Operator	Type of Infrastructure Sharing	Market Model	
<b>Description</b>	Description of geography in terms of land size, density, urban population% and demand for high speed broadband	Information on the local loop length (short/medium/long) as well as the market share of cable in fixed broadband market	Level of competition in broadband networks (all networks able to deliver broadband – including for example cable)	Propensity of the government for market interventions (high/ medium/ low)	Main orientation of regulations towards the broadband market (consumer vs. infrastructure orientation)	Main investor in the FTTH/B network (supplying majority of funds to build the network)	Main operator of the FTTH/B network	Business model that is employed in regards to network sharing	Obligation of the infrastructure owner in regards to network sharing	Scope of the fibre rollout by the network builder
<b>Rationale</b>	Geographical factors like population density, land area and consumer demand characteristics determine the degree of oversight/control and funding required	Loop length determines the presence of enhanced xDSL (more speed) and cable share acts as driver for FTTH/B investments	Level of broadband network competition is determining the tendency of market players to invest in fibre (e.g. high cable competition generally leads to fibre investments from telcos)	Mostly cultural/political factors determine the government's propensity towards interventions, which is an important market shaper	Regulatory bodies focus either on consumer factors (e.g. price) or infrastructure (investment) which in turn determines the players propensity to invest in FTTH/B	The FTTH/B investor differs depending on the factors that shape the business case (regulation, competition,...)	The FTTH/B operator is the main party that copes with the different network sharing issues and develops a sustainable and efficient network	The infrastructure owner can cover various layers of the network model and provide access to them for other parties	By regulation the infrastructure owner may be obligated to open up its network for other parties (open access)	Based on the business case different scopes of the fibre rollout might be taken (e.g. avoiding low density areas)

Source: Arthur D. Little analysis



## 2 Global Analysis of National Fibre Models – Archetype Model Factors & Dimensions

No model is necessarily right or wrong but rather each model will better fit based on country specific situational factors

Situational Factors						Model Dimensions				
	Demo-graphics	Legacy Tech.	Network Competition	Govt. Intent	Reg. Preference	Public Investment		Regulatory Intensity		Roll Out Strategy
						FTTH/B Investor	FTTH/B Operator	Type of Infrastructure Sharing	Market Model	
<b>1</b> Private Invest, Unregulated	Med/small land area, med/high density Med/high cons demand	Long copper length High% cable			Business/ Infrastructure oriented	Operators	Operators	Vertically Integrated	Closed Access	Cherry Picking
<b>2</b> Graded Govt. Support, Incumbent Led	Med land area, Low/ med density Low/ med cons. demand	Medium copper length Low% cable			Infrastructure oriented	Partial Government Funding	Incumbent	Vertically Integrated	Open or Closed Access	National
<b>3</b> Graded Govt. Support, Private Led	Med land area, Low/ med density Low/ med cons. demand	Medium copper length Med% cable			Balanced	Partial Government Funding	Private Players (Can Include Operators)	Fully Separated to Vertically Integrated	Open Access	National &/or Cherry Picking
<b>4</b> Government Controlled Fibre	Vast land area, low population density Low cons. demand	Medium copper length Low% cable			Balanced	Government	Government	Active or Passive Sharing	Open Access	National
<b>5</b> Private Invest, Heavy Regulation	Med/ small land area, med/high density Med/high cons. demand	Short copper length Low% Cable			Consumer oriented	Operators	Operators	Vertically Integrated	Open Access	Cherry picking

Source: Arthur D. Little analysis

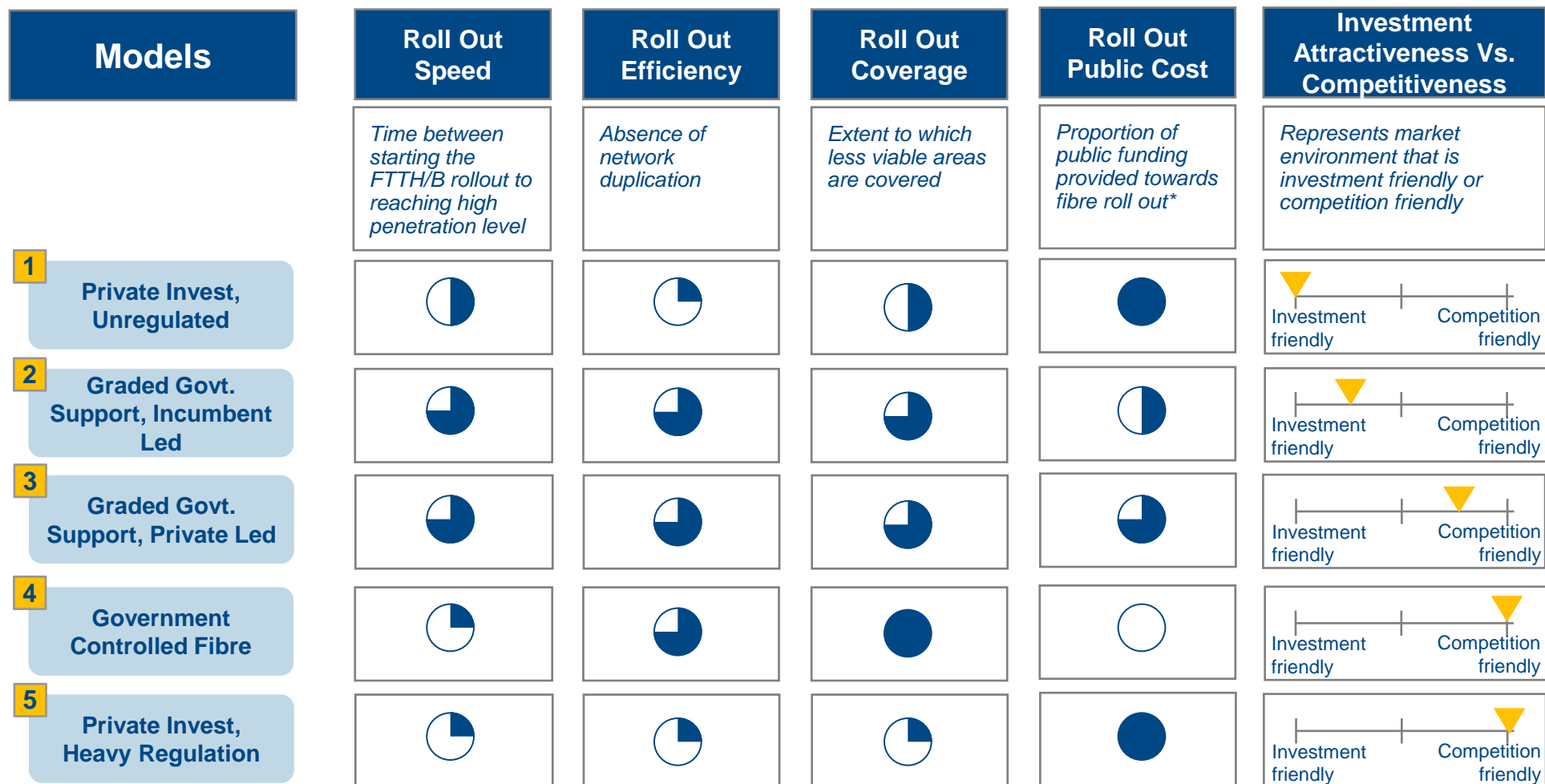
<sup>1</sup>Households Passed

<sup>2</sup>Households Connected

 Low  Medium  High

## 2 Global Analysis of National Fibre Models – Archetype Models' Strengths and Weakness

Understanding the strengths and weakness of each model helps national policy makers to choose attributes to address specific situational needs and wants



Source: Arthur D. Little analysis

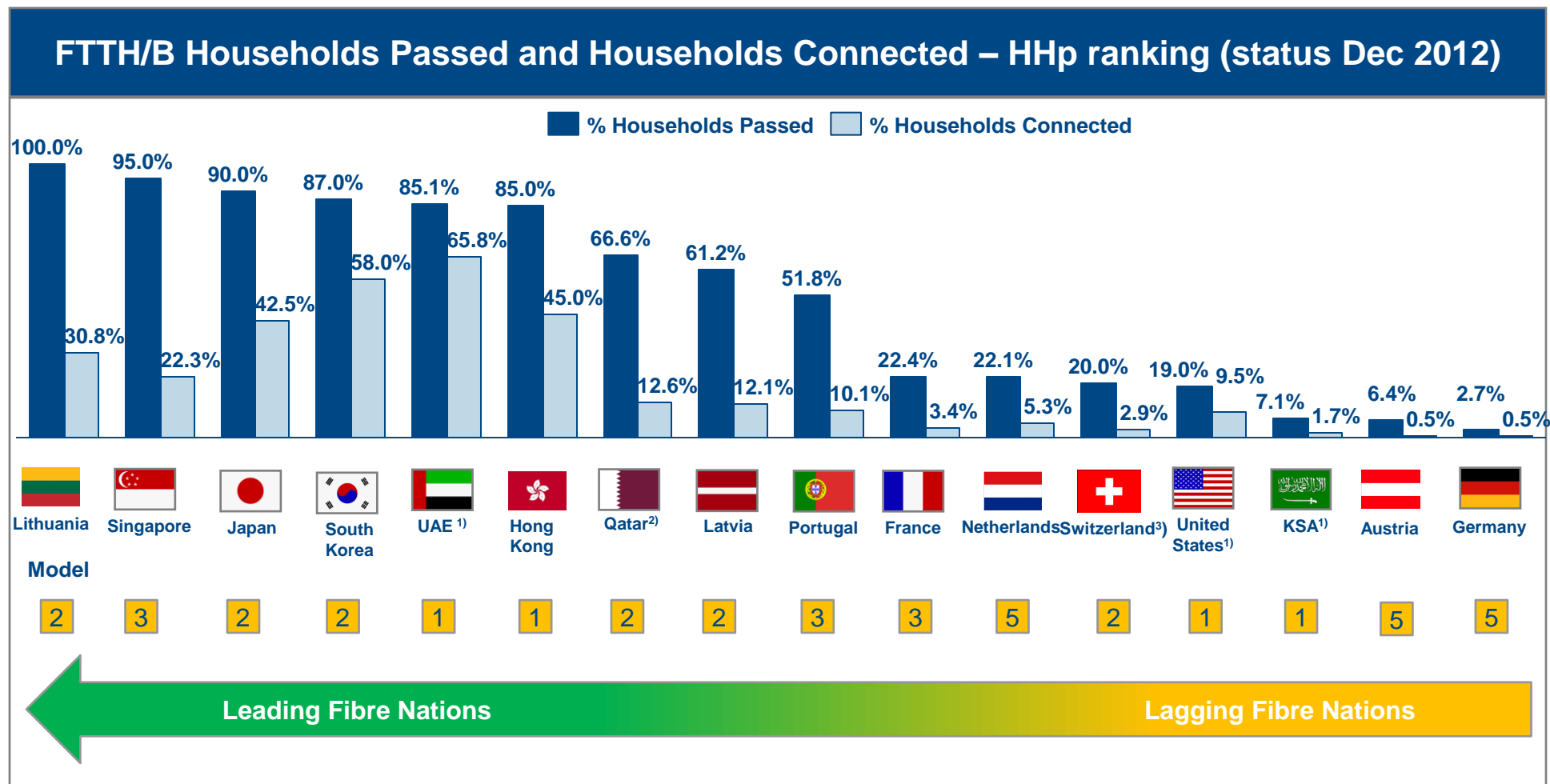
\* Best here means least / no public funding

Best

Worst

## 2 Global Analysis of National Fibre Models – Country Examples

Nations deploying fibre according to various National Fibre Models have achieved wide variation in fibre coverage (household passed HHp) and uptake (HHc)\*

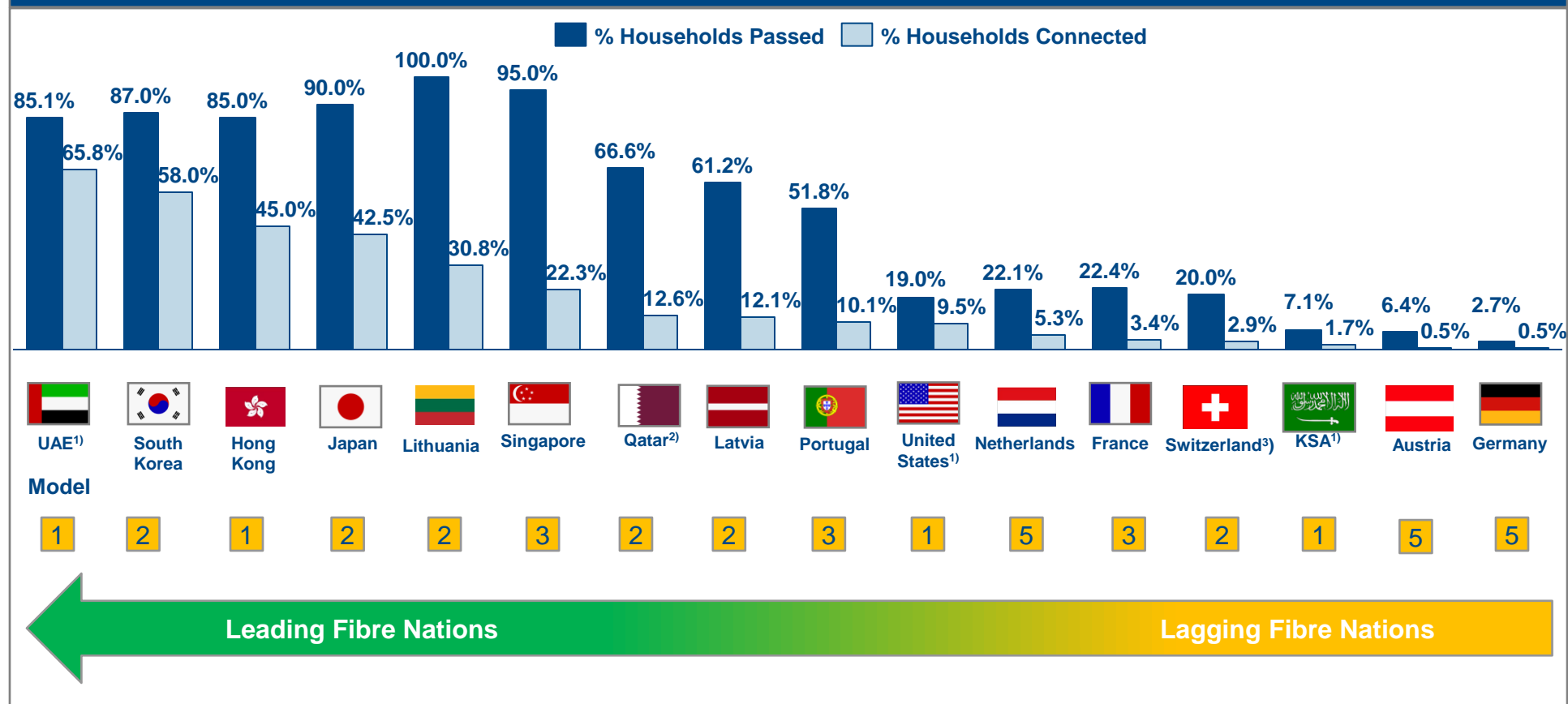


Source: FTTH Council Dec 2012, Singapore Statistics report, Arthur D. Little analysis. Note 1) As of Sep 2012; Note 2) Sourced from Ooredoo and publicly available resources; Note 3) ComCom Dec2012; \*Uptake or HHc is in large part determined by various service offerings, pricing and Go To Market strategies – where as HHp is a pure measure of infrastructure achievement

## 2 Global Analysis of National Fibre Models – Country Examples

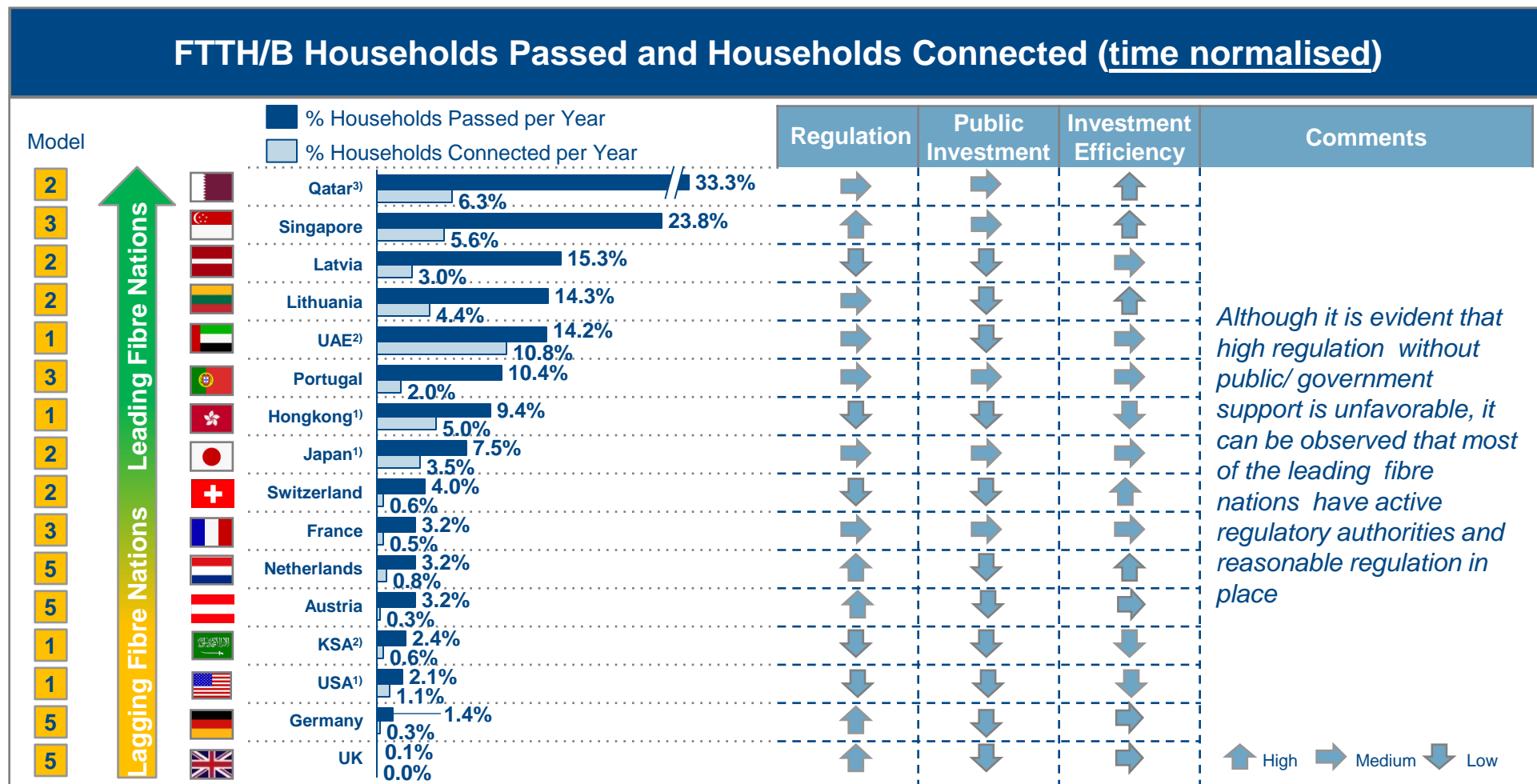
Households connected (HHc) will be significantly impacted by the strength of offers and GTM approaches\* or perhaps policy to retire copper – so we treat this as a secondary measure

### FTTH/B Households Passed and Households Connected – HHc ranking (status Dec 2012)



Source: FTTH Council Dec 2012, Singapore Statistics report, Arthur D. Little analysis. Note 1) As of Sep 2012; Note 2) Sourced from Ooredoo and publicly available resources; Note 3) ComCom Dec2012; \*Uptake or HHc is in large part determined by various service offerings, pricing and Go To Market strategies – where as HHp is a pure measure of infrastructure achievement

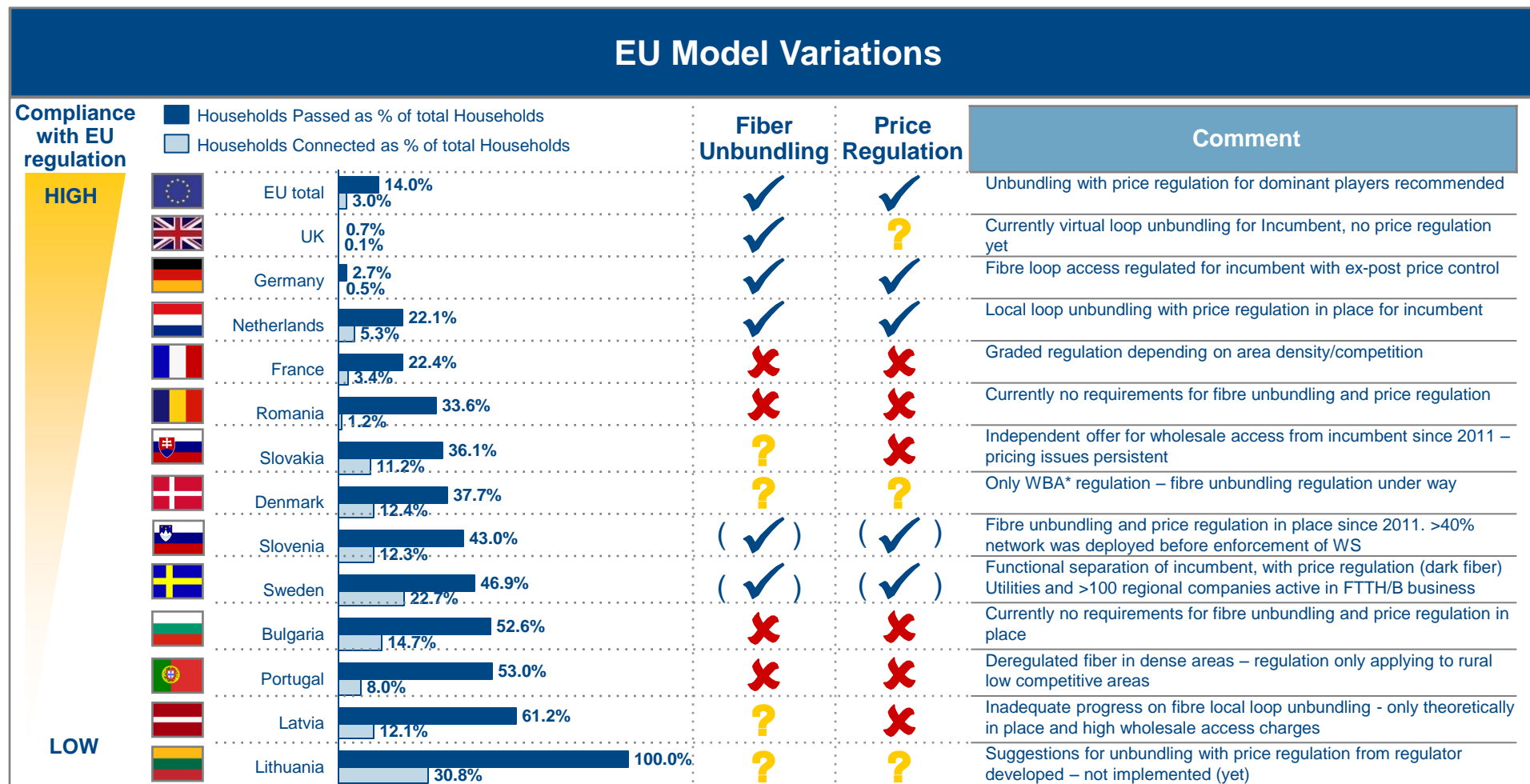
Normalising by time reveals that heavy regulation without considerable public investments inhibits fibre growth whilst lack of public involvement denies national coverage



Source: FTTH Council Dec 2012, Singapore Statistics reports ,Arthur D. Little analysis ; Note 1) As of June 2012; Note 2) As of Sep 2012; Note 3) Sourced from Ooredoo and publicly available resources ; % Households Passed/Connected per Year – normalized HHP/HHC actual data with respective roll out start years (Roll out start year is determined based on announcements from operators or govt./regulatory fibre initiatives start date)

## 2 Global Analysis of National Fibre Models – EU Country Examples

In Europe a regulatory stance focused on maximising competition is hampering fibre deployment – individual Euro countries have to tip-toe around directives to achieve results



Source: HHP and HHC data as of Dec 2012, from FTTH council and other publicly available resources  
(regulation heavy in case of Slovenia regulation put in after deployment and in Sweden utilities built and then sold out assets to incumbent)

\*WBA = Wholesale Broadband Access

✓ In place and enforced

? In development or not enforced

✗ Not in place and not in development



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## 3 Considerations for National Fibre Policy – High Level Recommendations

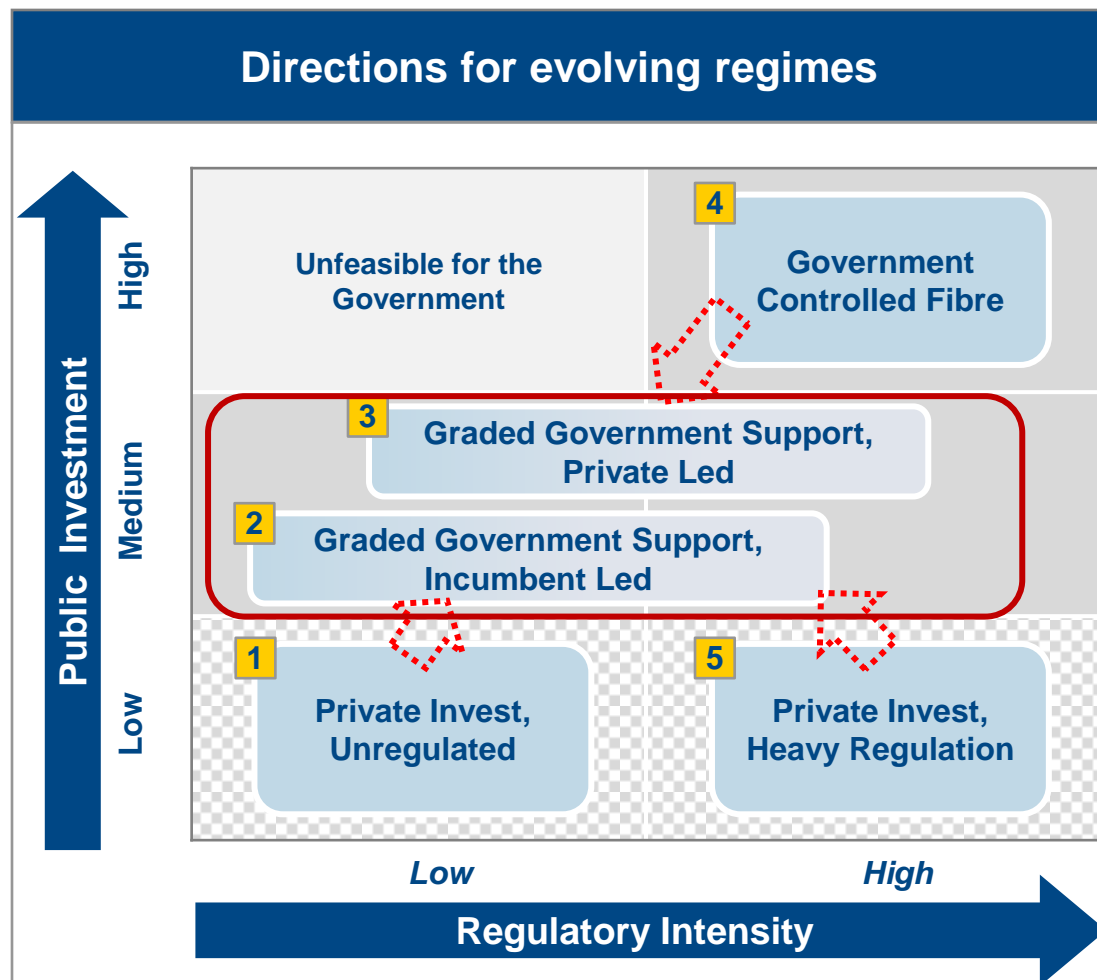
In a country where private players/ operators are willing to invest in fibre, model #3 appears to be the best

Models	Pros	Cons
1 Private Invest, Unregulated	<ul style="list-style-type: none"> <li>■ Easiest to implement/ execute</li> <li>■ No or minimal public money involved</li> </ul>	<ul style="list-style-type: none"> <li>■ No national coverage / no socio-eco benefits</li> <li>■ Duplicate investments</li> </ul>
2 Graded Govt. Support, Incumbent Led	<ul style="list-style-type: none"> <li>■ Pushes fibre to more places</li> </ul>	<ul style="list-style-type: none"> <li>■ Stifles competition at both services and infrastructure level</li> <li>■ Competitive investments wasted</li> </ul>
3 Graded Govt. Support, Private Led	<ul style="list-style-type: none"> <li>■ Socio-eco benefits maximised</li> <li>■ More efficient use of public funds</li> <li>■ Healthy competition &amp; co-op</li> </ul>	<ul style="list-style-type: none"> <li>■ Competition <u>and</u> co-operation required</li> </ul>
4 Government Controlled Fibre	<ul style="list-style-type: none"> <li>■ Pushes fibre to more places</li> </ul>	<ul style="list-style-type: none"> <li>■ Competitive investments to be bought back (negotiation wrangling)</li> <li>■ No infra competition</li> </ul>
5 Private Invest, Heavy Regulation	<ul style="list-style-type: none"> <li>■ No public money involved</li> </ul>	<ul style="list-style-type: none"> <li>■ Fibre does not happen / benefits do not happen</li> </ul>

Source: Arthur D. Little

## 3 Considerations for National Fibre Policy – High Level Recommendations

Globally, there is a shift towards a hybrid approach for fibre rollout – financially attractive areas left for private sector while financially less attractive areas receiving govt. support



**High Level Recommendations**

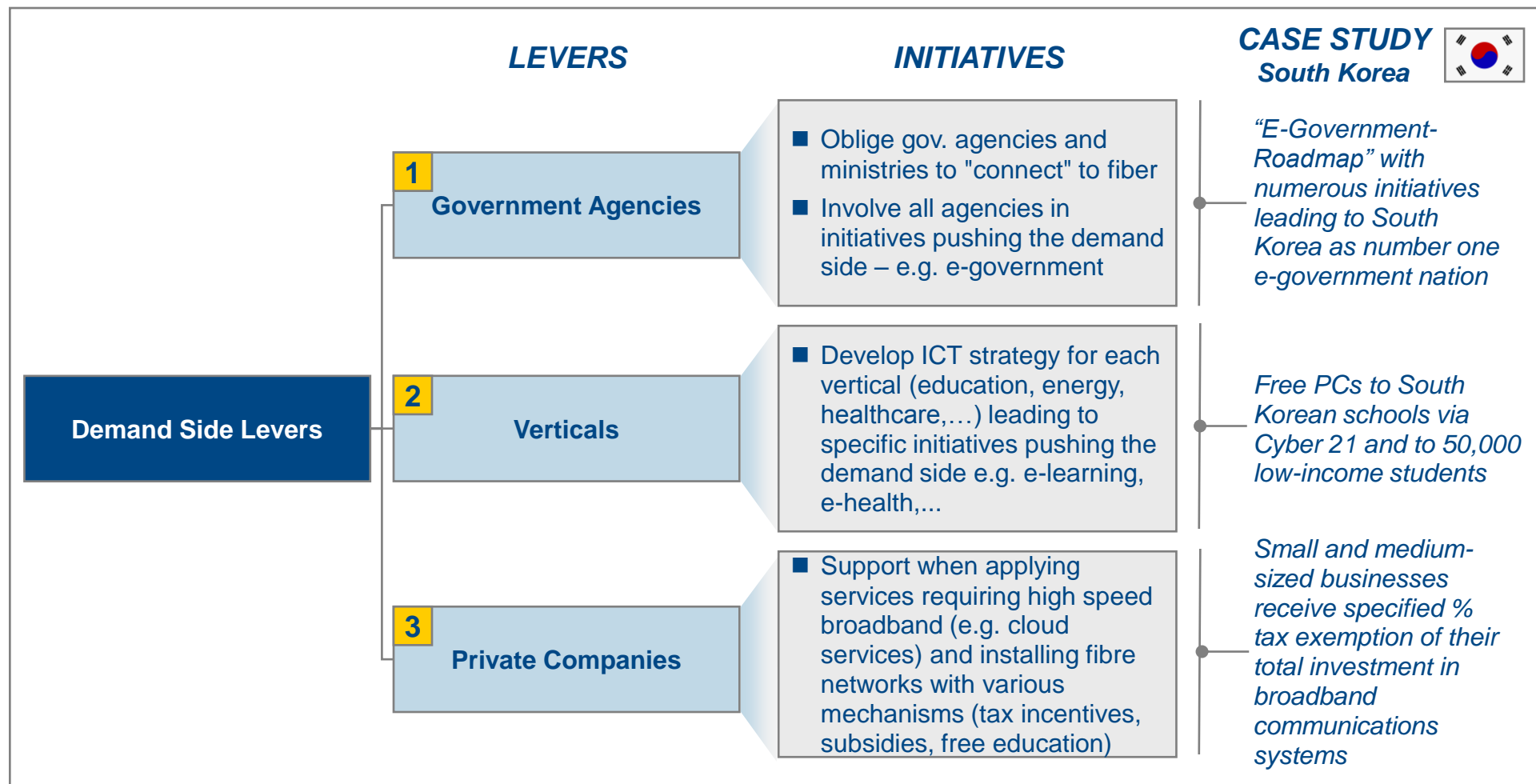
- Move policy to **graded government support**
- There is need to move to a hybrid approach
  - Lucrative areas to remain open to competition with continued private investments
  - Controlled support to areas that are less financially attractive. E.g. Reverse auction has been used effectively to provide transparent and cost effective fibre roll out in economically less attractive areas
  - Regulators facilitating utilities/municipalities to build and share infrastructure
- In supported areas, regulator should define rollout parameters including coverage targets, speed, QoS, etc. So that high national standards are achieved
- Focus competition pressure at services level and separate from infrastructure which benefits from moderate, graded regulation in selective areas only

## 3 Considerations for National Fibre Policy – General success Factors

From a government perspective, 5 basic key success factors for a successful national FTTH/B deployment have been identified – these need to be adapted to country specific requirements

Global FTTH/B Goals	FTTH/B Deployment Key Success Factors			
<ul style="list-style-type: none"> <li>■ Nationwide FTTH/B network deployment minimizing the “digital divide”</li> <li>■ Balanced FTTH/B competitive landscape with a level playing field for all participants</li> <li>■ Efficient use of public and private funds for FTTH/B deployment (e.g. minimization of network duplication)</li> <li>■ Broad and affordable service offerings based on FTTH/B technology</li> </ul>	<b>1 National Broadband Plan</b> <ul style="list-style-type: none"> <li>■ Goals should be devised as per situational factors &amp; be achievable and measurable</li> <li>■ Putting focus on FTTH/B service level (competition) to promote service innovation</li> <li>■ Establish national policy for broadband &amp; appropriate regulation</li> </ul>	<b>2 Differentiated Regulation</b> <ul style="list-style-type: none"> <li>■ Based on demographics (e.g. population density/level of competition) rather than operator differentiation</li> <li>■ Even in mode of regulation – difference between principle/price regulation</li> </ul>	<b>3 Graded Public Funding</b> <ul style="list-style-type: none"> <li>■ Based on demographics and private investment plans – e.g. funding for unattractive areas in order to improve business case</li> <li>■ Using all available funding sources (supra-national, national, regional)</li> <li>■ Supporting demand stimulating measures</li> </ul>	<b>4 Industry Cooperation's</b> <ul style="list-style-type: none"> <li>■ Promotion of cooperation's (e.g. co-investments) among Telco's and between Telco's and other players (utilities,...)</li> <li>■ Development of regionally differentiated models (e.g. PPP, co-investments,...)</li> </ul>
	<b>5 Other FTTH/B Network Stakeholders/ Participants Requirements</b> <ul style="list-style-type: none"> <li>■ Light regulation for selected areas in order to achieve “future-proof” network basis:               <ul style="list-style-type: none"> <li>– Requirement to lay fibre/ducts by utilities, construction comp., railways,....</li> <li>– Requirement to include necessary space in new buildings for future fibre infrastructure</li> <li>– Requirement to standardize ntw technologies in regional approaches/solutions (e.g. municipality rolling out ntw)</li> </ul> </li> </ul>			
	<b>Governments or regulators should carefully evaluate the nation’s current fibre model, extrapolate the direction and consider robust policy improvements to achieve success outcomes</b>			

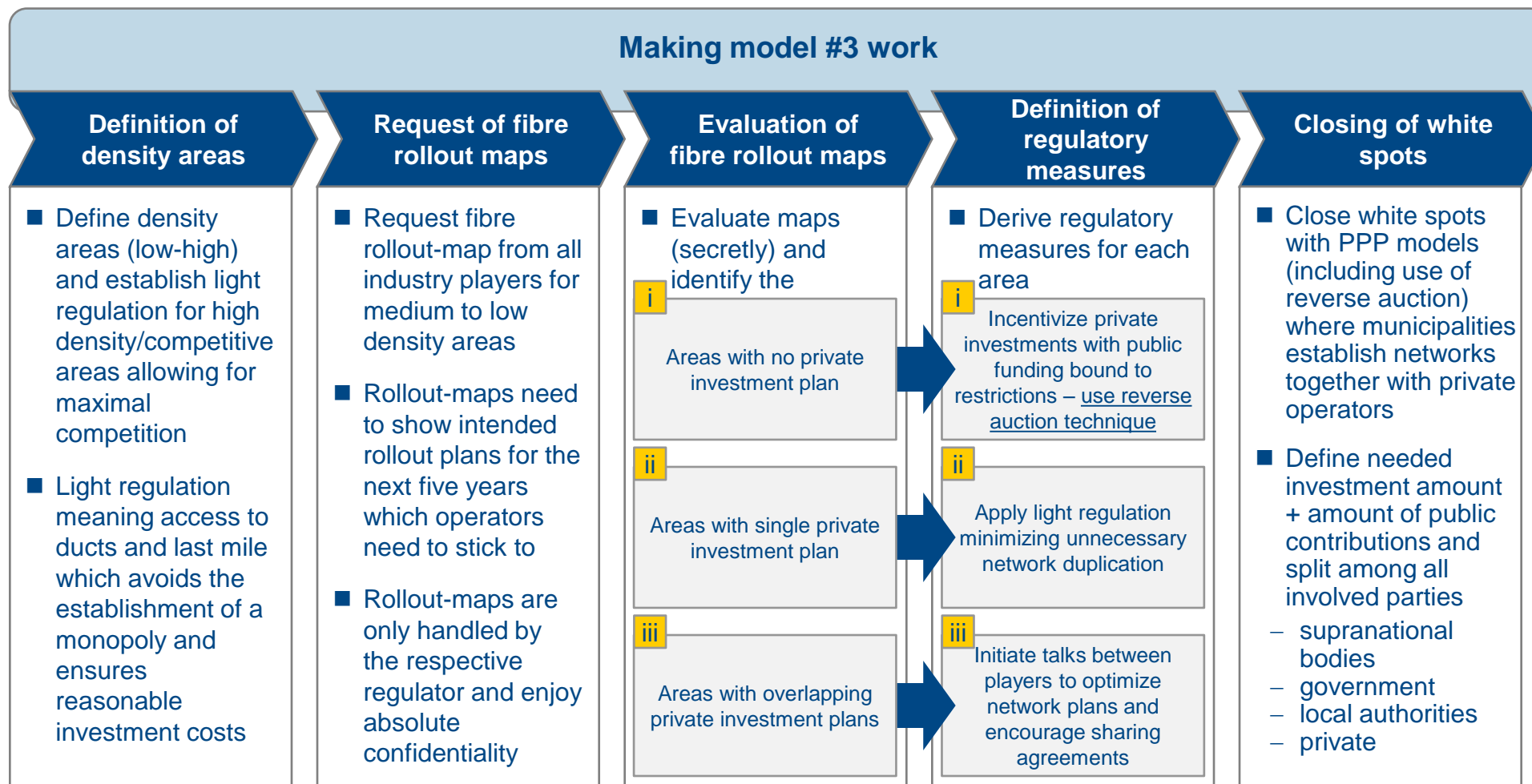
**Supply (network infrastructure) stimulation is only one half of the equation - demand stimulation is equally important to ensure a successful nationwide fibre deployment**



Source: Arthur D. Little analysis

## 3 Considerations for National Fibre Policy – “Graded Government Support, Private Led” implementation



In order to implement the “Graded Government Support, Private Led” model, several consecutive steps have to be taken – establishing a solid policy framework



Source: Arthur D. Little analysis; ARCEP publications

## 3 Considerations for National Fibre Policy – “Graded Government Support, Private Led” implementation

The graded government support model is characterized by a differentiated regulation and public funding combined with PPP models in investment unattractive areas

Making model #3 work				
	Regulation	Funding	Organization	Comments
<b>A</b>  <b>URBAN – highly competitive</b>	<i>Full competition on all network layers</i> <ul style="list-style-type: none"> <li>■ Sharing of ducts and last mile– enabling multi networks</li> <li>■ Asymmetric regulation where needed avoiding monopoly</li> </ul>	<i>Full private investments</i> <ul style="list-style-type: none"> <li>■ Mainly private investments with possibility for partial public funding in the form of tax cuts, etc. for all interested operators</li> </ul>	<i>Fully integrated private companies</i> <ul style="list-style-type: none"> <li>■ Fully integrated private companies competing on network and service</li> <li>■ Different commercial agreements between operators possible</li> </ul>	In urban areas the focus is on enabling a level playing field and ensuring end customer access (end local loop unbundling) with minimal public investments
<b>B</b>  <b>RURAL – non competitive</b>	<i>Economics enhancing regulation – open access</i> <ul style="list-style-type: none"> <li>■ Application of open access regulation for public funded networks</li> <li>■ Incentivizing of private network sharing</li> </ul>	<i>Graded government support</i> <ul style="list-style-type: none"> <li>■ Funding for FTTH projects coming from municipalities and gov.</li> <li>■ Encouraged to invest together to build optical fibre networks</li> </ul>	<i>PPP models</i> <ul style="list-style-type: none"> <li>■ In areas with no private investment plans – PPP models with partial public funding</li> <li>■ If no private interest at all – fully publicly owned networks</li> </ul>	In rural/non-competitive areas the focus is on incentivizing private investments by public funding, PPP models and operator coordination/cooperation

Source: Arthur D. Little analysis; ARCEP publications

## Contact details

As the world's first consultancy, Arthur D. Little has been at the forefront of innovation for more than 125 years. We are acknowledged as a thought leader in linking strategy, technology and innovation. Our consultants consistently develop enduring next generation solutions to master our clients' business complexity and to deliver sustainable results suited to the economic reality of each of our clients.

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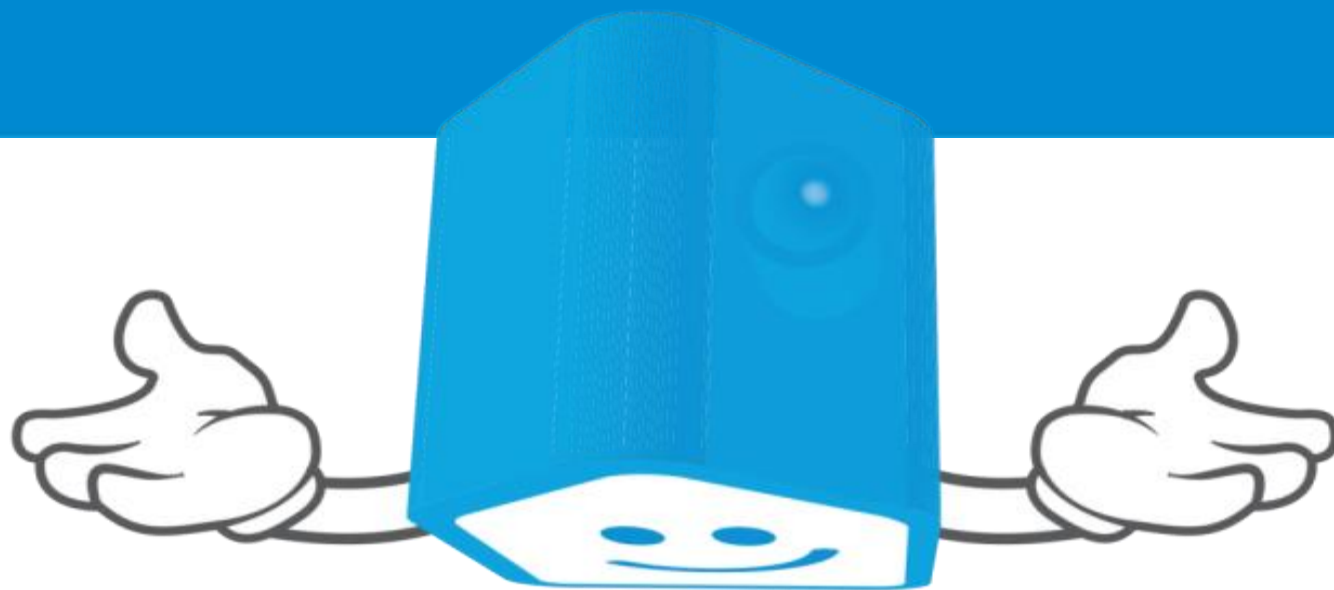


# Invitation: Upcoming Webinar

17 December 2013

11:00am CET

## **Dansk Energy: Transparency for Broadband Customers**



[www.ftthcouncil.eu](http://www.ftthcouncil.eu)

