

# Some Lessons from International Experience

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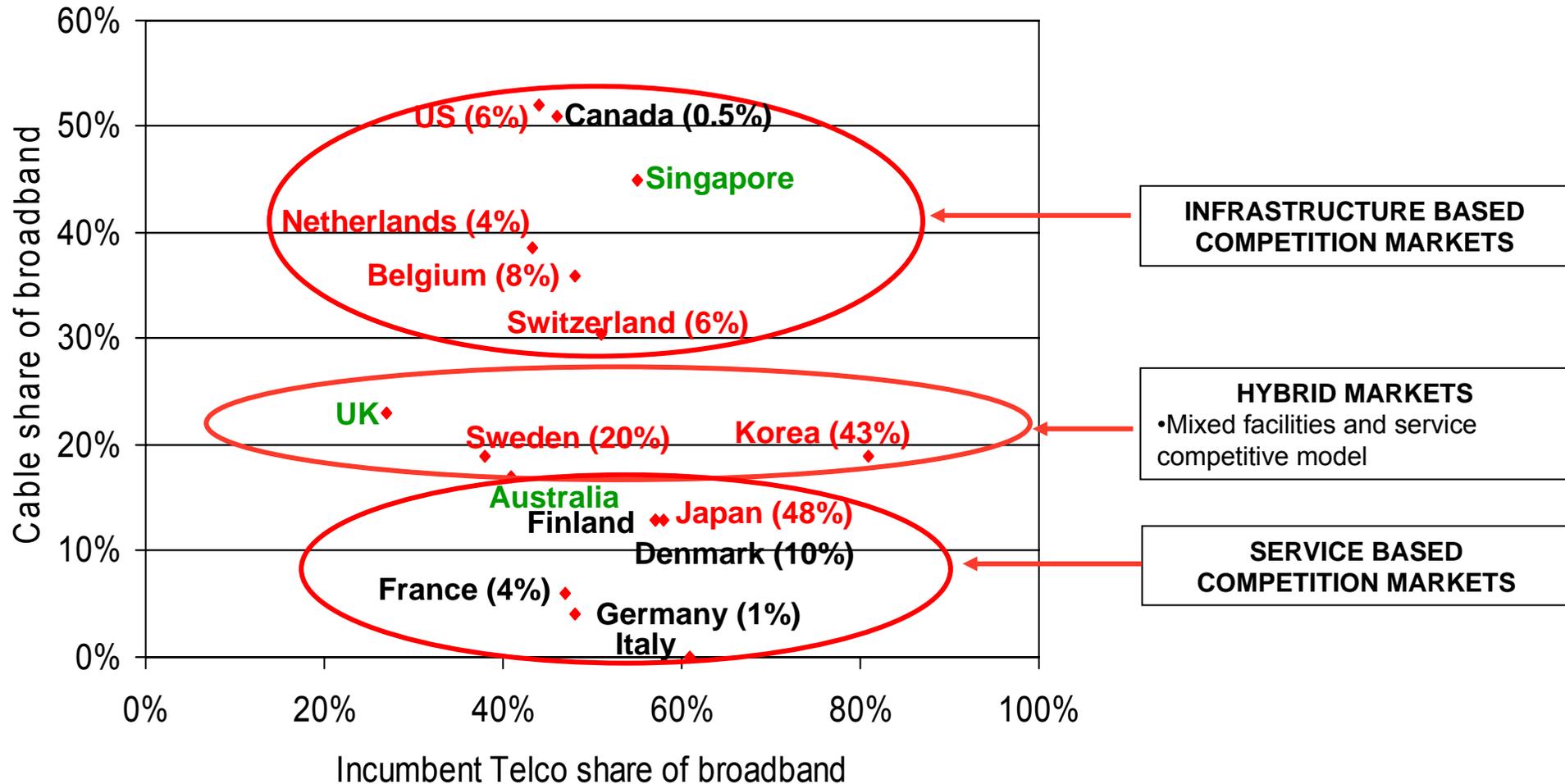
# Selected key broadband policy issues

- Key variables fostering investment and innovation
- Supply vs. demand programs? What is the demand problem?
- Focus on high penetrated broadband areas or unserved/underserved areas? What are the expected effects?
- What is the role of public sector? Federal government vs, sub-sovereign? Issues with municipal networks?
- Conclusions and the problem of national relevance

# Four factors drive the pace of broadband NGAN deployment

- Market structure: facilities-based competition conducted between one (or more) telco and/or cable player within a “2.5-3.0 players” industry structure
- Active government policy: subsidies to underserved areas, demand-side incentives, co-investment in NGAN
- Monopoly of NGAN access; assuming natural monopoly characteristic of the access market (or recognizing the need to provide additional investment incentives), the government enacts a monopoly of access rule
- Density: high urban concentration

# Infrastructure-based competition and hybrid markets are at the forefront of fiber deployment



Notes: Data labels in red indicate fiber deployed; data labels in black no fiber program; data labels in green indicate upcoming fiber program; numbers between brackets FTTx as % broadband accesses

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# Understanding the broadband demand gap

**PROPORTION OF NON ADOPTERS    REASONS FOR NOT ADOPTING    EXPLANATORY VARIABLES**

Country	Non-users that could use	Year	Source
United States	21%	2009	Pew Research
United Kingdom	26%	2009	Ofcom
Germany	41%	2008	German Gov.
Spain	40.2%	2007	Red.es

Reasons	Percentage
Low relevance	50 %
Pricing	19 %
Service availability	17 %
Ease of use	13 %

Variables	Percentage
1) Education	< high school
2) Age	> 65
3) Geography	Rural
4) Ethnic	African american

Reasons	Percentage
No interest	60 %
Pricing	28 %
No knowledge	16 %
Other (service avail., etc.)	7 %

Variables	Percentage
1) Income	Segments C, D and E
2) Age	> 65
3) Family structure	No children in household

Variables	Percentage
1) Education	< high school
2) Age	> 45
3) Occupation	Housewife, retired, etc
4) Income	<900 Euros

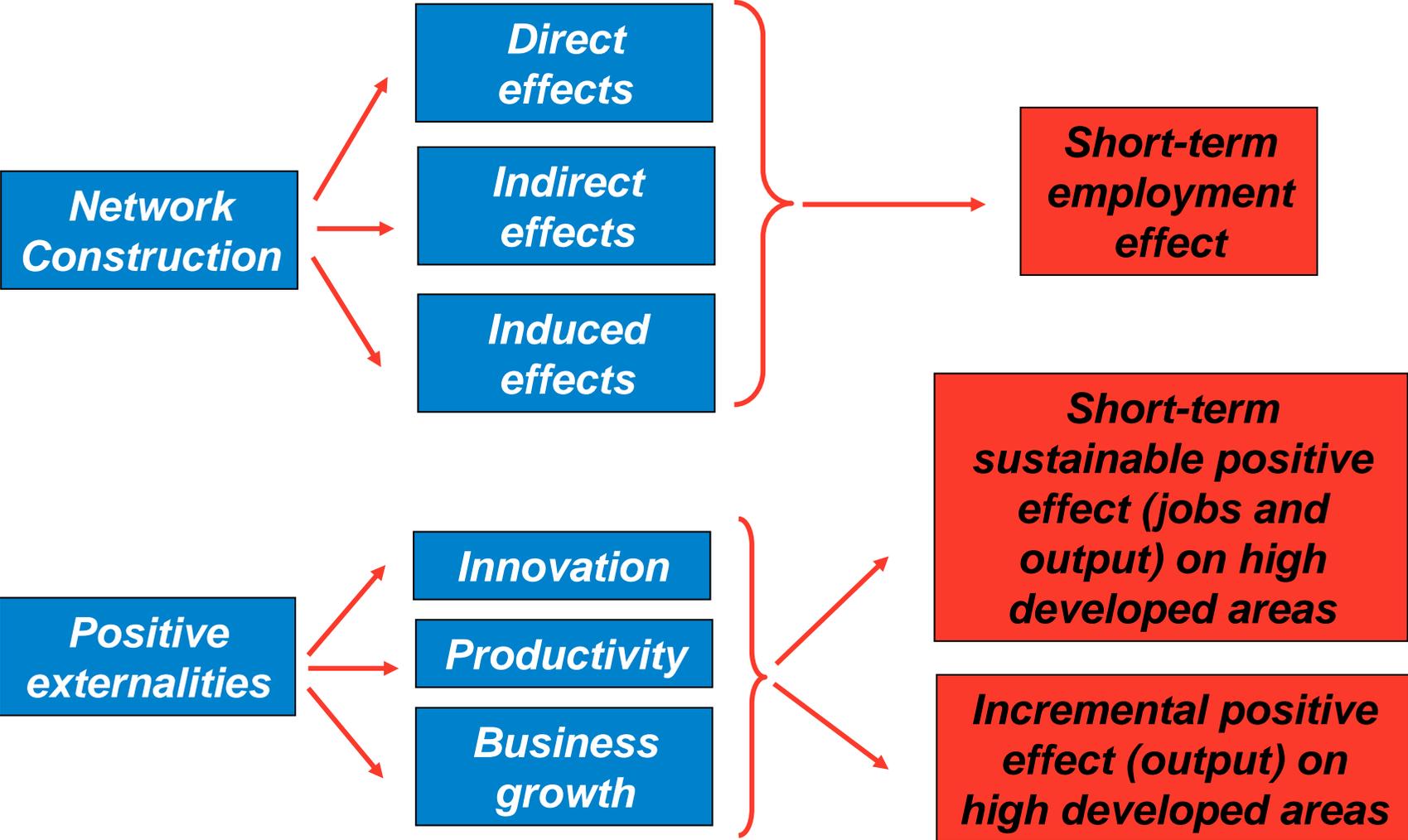
# Examples of broadband demand stimulation policies

- In Sweden, provide subsidies at the access level for development of neighborhood, and household fiber
  - Tax incentives given to businesses and residential tax- payers who sign up for broadband services (key stimulus in a country where the marginal tax rate for the average taxpayer is 20%)
  - 50% of the costs are deductible up to a maximum of 5'000 SEK
- Similarly, in the Netherlands, the government considers that the best way to stimulate the supply of broadband infrastructure without artificially favoring any technology is to “bundle demand” around schools, communities, etc in order to make a project attractive

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# Multiple economic effects need to be considered in formulating broadband policy



# Network construction effects and multipliers are significant

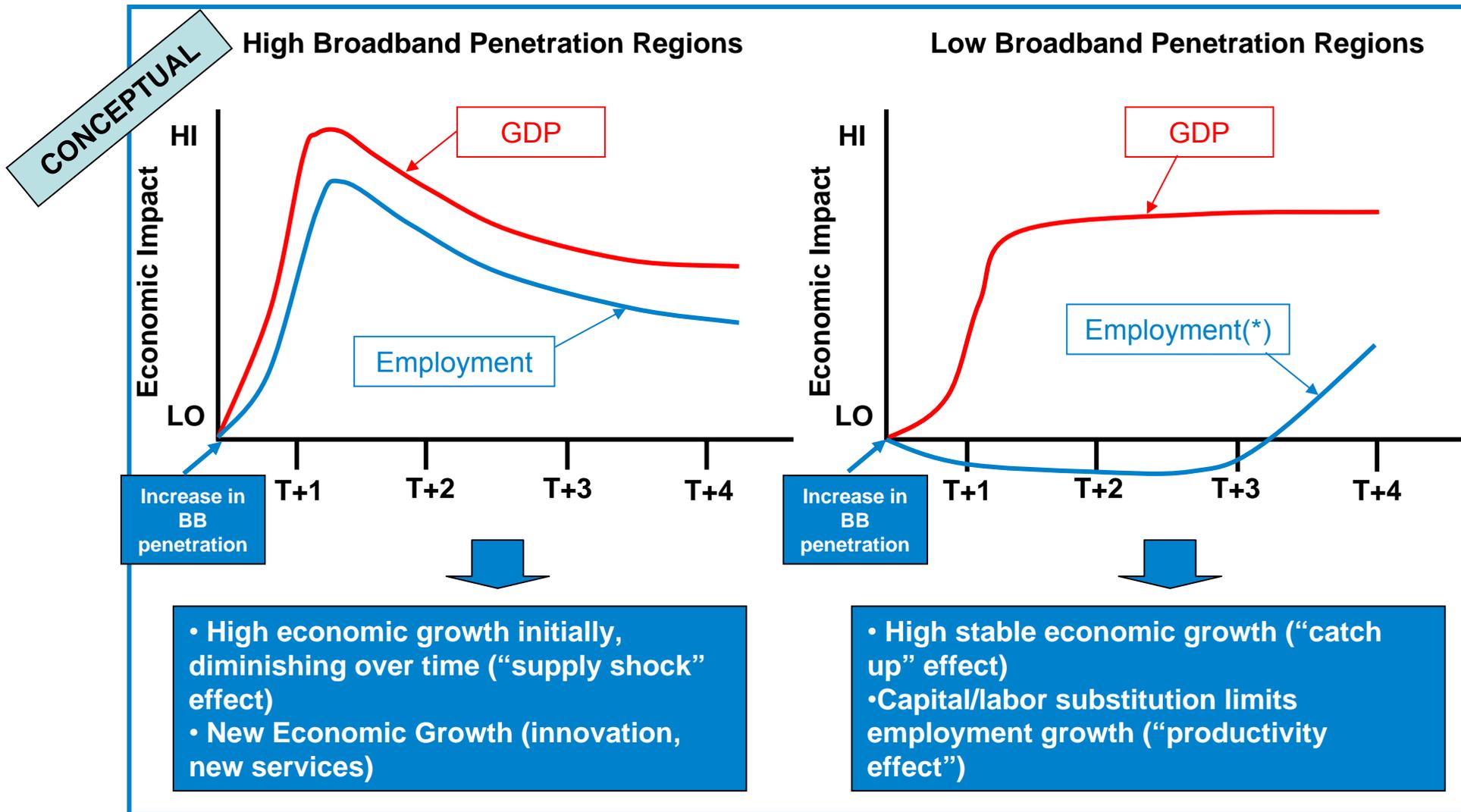
## NETWORK CONSTRUCTION EFFECTS OF BROADBAND

COUNTRY	STIMULUS INVESTMENT (USD billion)	NETWORK DEPLOYMENT JOBS ESTIMATE				MULTIPLIERS	
		DIRECT	INDIRECT	INDUCED	TOTAL	TYPE I (*)	TYPE II (**)
UNITED STATES	\$ 6,390	37,300	31,000	59,500	127,800	1.83	3.42
SWITZERLAND	~\$ 10,000	~80,000	~30,000	N.A.	~110,000	1.38	N.A.
GERMANY	\$ 47,660	281,000	126,000	135,000	542,000	1.45	1.94
UNITED KINGDOM	\$ 7,463	76,452		134,541	211,000		2.78
AUSTRALIA	\$ 31,340				200,000		

Sources: Katz, R. and Suter, S. (2009). *Estimating the economic impact of the US broadband stimulus plan*, Columbia Institute for Tele-Information working paper; Katz, R., P. Zenhäusern, S. Suter, P. Mahler and S. Vaterlaus (2008). *Economic Modeling of the Investment in FTTH in Switzerland*. unpublished report; Katz, R., S. Vaterlaus, P. Zenhäusern, S. Suter and P. Mahler (2009). *The Impact of Broadband on Jobs and the German Economy*. Liebenau, J. Atkinson, R. (2009) *The UK's digital road to recovery*. LSE and ITIF; Australian government

(\*) (Direct + indirect)/direct  
 (\*\*) (Direct + indirect + induced)/direct

# Different economic impact profiles at the regional level result from different levels of broadband penetration

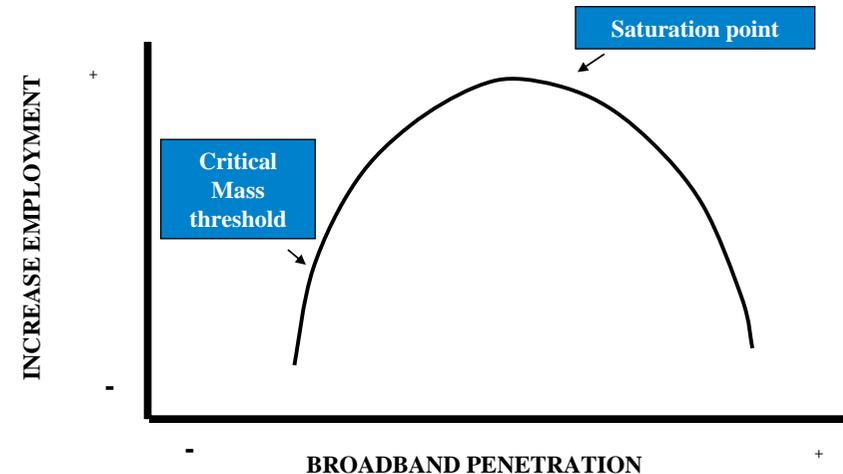


(\*) Results are at a low significance level

# Is there a saturation effect? We have yet not identified it

- Is there a linear relationship between broadband adoption and economic impact?
- Or are we in the presence of a more complex causality effect?
- Following the "critical mass" findings of research of the impact of telecommunications on the economy, the impact of broadband on employment only becomes significant once the adoption of the platform achieves high penetration levels.
- At the other end of the diffusion process, at least according to what was found by Lehr et al. (2006), the relation between penetration and employment should not be linear "because broadband will be adopted within a state first by those who get the greatest benefit (while) late adopters within a state will realize a lesser benefit"
- Atkinson et al. (2009) also point out that network externalities do decline with the build out of networks and maturing technology over time.
- Hypothesis: the strength of the relationship is highest once the technology has achieved a certain critical mass but before it reaches saturation.

## **BROADBAND PENETRATION IMPACT**



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# In response to the economic crisis, governments have launched infrastructure stimulus programs with an ICT focus

COUNTRY	ICT FOCUS
United States	<ul style="list-style-type: none"> <li>Launched a Broadband Stimulus program focused on providing service to unserved and underserved areas for \$7.2 billion</li> </ul>
Australia	<ul style="list-style-type: none"> <li>Government is planning to spend A\$ 11 billion of total A\$ 43 billion required for construction of the National Broadband Network</li> </ul>
Singapore	<ul style="list-style-type: none"> <li>Government will provide a grant of S\$ 750 million of S\$ 2.2 billion to support the roll-out of the fiber network</li> </ul>
Germany	<ul style="list-style-type: none"> <li>Government has announced a National Broadband Strategy with the objective to have nationwide capable broadband access (1 Mbps) no later than by the end of 2010 and provide to 75 percent of German households access to a broadband connection of at least 50Mbps by 2014 (estimated investment: Euros 36 billion)</li> </ul>
Sweden	<ul style="list-style-type: none"> <li>Broadband government promotion comprised financial incentives to municipalities to fund 2/3 of total NGN investment (Euros 864 million)</li> </ul>
Portugal	<ul style="list-style-type: none"> <li>Government announced an 800-million-euro credit line for the roll-out of NGAN. This is part of an the first step in a 2.18-billion-euro plan to boost the country's economy.</li> </ul>
Ireland	<ul style="list-style-type: none"> <li>The government will invest 322 million in a National Broadband Scheme aimed at completing country coverage</li> </ul>
Canada	<ul style="list-style-type: none"> <li>Has relied on four programs to promote broadband development resulting in an overall investment of C\$ 300 million</li> </ul>

# In addition to federal government investment, municipal networks are quite common, although some counter-intuitive effects emerge

- Four business models have been identified
  - Closed network, whereby Municipality provides retail services
  - Wholesale to a single retail service provider
  - Wholesaler of transport to multiple retail service providers (open access)
  - Provider of dark fiber
- Of all the municipal models in the US, the open access networks appear to have most difficulty (Operating inefficiencies prevents them to show a positive financial profile, Customer provisioning is very cumbersome in a multi-provider system, Difficulty in managing the network and resolving from service problems, PON systems are less capable of accommodating open network collocation)
- in several cases the municipalities are migrating from public to commercial service
  - In the US, some of the municipal fiber networks extend beyond city limits, offering broadband services in adjacent areas
  - In Sweden, similarly to the US case, while funding was provided to municipalities to deploy facilities in areas where infrastructure competition was not feasible, they are starting to behave as commercial entities (Deploying infrastructure in areas where competition is feasible, Refusing to provide dark fiber or access to their infrastructure, Becoming full service providers, Prices are not market driven)
  - From a financial standpoint, some German municipalities post the FTTB investment in the parent's balance sheet to benefit from lower borrowing costs

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## Based on the benchmark applicability, the following model recommendations should be considered

- Broadband model needs to maintain the facilities-based competition paradigm (key driver in fiber deployment in the US, Sweden, Korea Netherlands, and in the future programs for Australia, Canada and Singapore)
- Government intervention is critical to solve potential market failures by means of providing supply and demand incentives (key factor in Sweden and in the future programs of Singapore and Australia)
- Furthermore, governments should aim at clearly laying out the competition model regulatory framework and set of policy tools; failure to do so will lead to unending war of industry announcements of deployment (DOCSIS vs. fiber), and perpetual negotiations around *quid pro quo*, with little progress in the construction of NGAN

## Lessons that can be learned from the international experience regarding competitive dynamics

- Competition between two network operators (cable TV and telcos) is sufficient enough to guarantee a strong push toward investment and innovation based on two alternative technologies
- When the incumbent telco enters the FTTH/C arena, competitive dynamics push for a healthy rate of investment and product innovation on the part of the cable competitor
- If the incumbent telco does not enter the FTTH arena, the industry fragments itself in a multiplicity of local providers (utilities, local telcos, municipalities) with consequent diseconomies of scale
- Having said that, there appears to be a market “zone” requiring government intervention to prevent failures: rural and disadvantaged areas
- Governments address this, mixing indirect subsidies and municipal activity: there appears to be an opportunity for rationalizing government intervention in this area (coherent subsidy framework, definition of public/private partnerships)

# Lessons regarding focus of investment promotion and stimulus

- It is imperative to clearly determine objectives to be maximized in terms of economic impact: Digital divide or innovation? Short term job creation or long term positive externalities?
- Job fulfillment in underserved areas is driven by success in implementing job creation and retention programs that could be enabled by broadband
- Policy implications:
  - Coordinate broadband deployment with job creation and retention programs
  - Refine criteria for selecting areas to deploy broadband based on the stimulus
  - Centralize program evaluation and grant allocation
  - Develop systematic tests based on social and economic criteria to evaluate the return on the investment

