New trends in regulatory market structures?

A national regulator rethinks broadband markets

New regulatory approach in Denmark

A new trend or unique circumstances?

- **Recent review of market 1 (broadband) by the Danish Business Authority (DBA) found**
  - Separate markets for high– and low-capacity broadband connections
    - *Markets for WCA and WLA joined*
    - *Effectively linked to technology with fibre and coax being separate from all other technologies, based on differences in speed and quality*
    - *Fixed Wireless Access connections in low capacity market*
  - Single national market for incumbent in low-capacity connections
    - *SMP for TDC*
    - *TDC has introduced voluntary functional separation*
  - Multiple geographic markets in high-capacity connections
    - *SMP by different providers where they have deployed fibre infrastructure*
- **Danish market review outcomes differ from common practice and European Commission positions**
  - Recent review of EU relevant markets concluded that WLA and WCA should remain separate markets
    - *Yet the Commission has not objected to the DBA's conclusion*
  - Other countries combine low- and high-capacity in one relevant market (based on the chain of substitution principle)
    - *Yet the Commission has not objected to the creation of two separate markets*
  - Separation of low- and high-capacity markets results in significant geographic differences due to local fibre deployment by local energy companies – resulting in multiple local SMP findings
    - *Although the Commission objected to some of these SMP findings, it embraces the principle of multiple geographic markets with separate SMP findings*

Retail product markets

DBA found separate low-capacity & high-capacity retail markets

Copper-based and fixed wireless broadband subscriptions

Customer segmentation based on

- Demand derived from traditional web browsing and email usage
- Installation/set up cost of fibre connectivity may act as a barrier to migration to fibre
- Lack of sensitivity to price-quality tradeoff between low and high-capacity services may be due to a lack of transparency in broadband pricing more generally

Fibre-based and coax-based broadband subscriptions

Customer segmentation based on

- Demand derived from increase in demand for bandwidth intensive OTT content services, gaming etc.
- Price increases of in the order of 5% to 10% do not result in customers switching to copper

Key driver of copper to fibre migration outside the broadband market definition

- DBA observes a downward trend in the number of copper based broadband subscriptions and an upward trend in the number of fibre based subscriptions
- DBA also notes that this migration from copper to fibre is derived from an increase demand for bandwidth intensive OTT content service etc, and that these services are not integrated or bundled with the broadband service
- Therefore, these drivers of demand are outside the scope of the broadband market definition in Denmark

Fixed wireless access

Is FWA a substitute for high-capacity wireline connections?

FWA vs Mobile Broadband

FWA	Mobile broadband
Variety of technologies, including point-point, point-multipoint, satellite and cellular	Cellular only, allowing mobility
Guaranteed minimum speed is possible	No speed guarantee - speed varies by customer location
Requires fixed CPE (possibly external to premises)	CPE = mobile handset

* GSA survey, 2021

Variants of Fixed Wireless Access

Technology	Marketed download speeds
WiMax	25 Mbps (superseded by LTE)
Microwave line of sight	1 Gbps+ - but very costly on a per-customer basis
Satellite	100-200 Mbps (Starlink)
LTE FWA	98.4 Mbps (mean peak speed offered across 295 operators)*
5G FWA	588 Mbps (mean peak speed offered across 33 operators)*

DBA determines that FWA is part of low-capacity retail market, but not the high capacity retail market

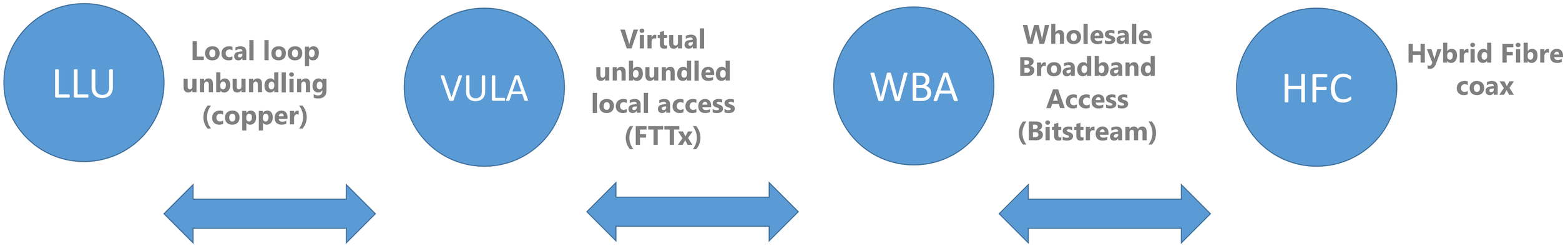
- Recent developments in FWA give the potential for much higher download speeds:
  - eg, Telenor are currently offering 1Gbps downstream service in Finland via 5G FWA
  - eg, Starlink are offering 100-200Mbps service via LEO satellite
- Such speeds are unlikely to be attainable with high levels of penetration, so FWA technology is likely to fulfil only a small proportion of high-capacity service demand
- DBA acknowledges that 5G FWA has the potential to offer high-speed connections in Denmark but does not include in the high-capacity market as the technology is currently in test phase only. DBA does not anticipate 5G FWA having a significant future impact in Denmark (reasons not clear)
- If 5G FWA were combined with network densification, then high speeds could be delivered with high penetration; capital investment per premises passed would be high, but not as high as FTTH.

Wholesale product markets

Are Local Access and Central Access separate markets?

WHOLESALE LOCAL ACCESS

WHOLESALE CENTRAL ACCESS



Considered one market by EC and most NRAs, yet significant technical and topological differences

Danish and Dutch NRAs consider no market break here, as functionality and exchange locations are similar

Wholesale functionality is similar, but not simple to migrate existing end users between these

In practice the wholesale product market split may make little practical difference as:

- **NRAs generally consider there to be a single retail product market, even if wholesale is split**
  - Cable retail market share will still be relevant in assessing if remedies are needed
- **Downstream indirect constraints must be considered when setting remedies**
  - Cable prices may constrain WLA prices indirectly, even if not in same wholesale market
- **In setting remedies where SMP is found, NRAs have wide discretion as to which to choose**
  - Ultimate aim is to ensure retail competition without excessive regulatory intervention

Are conditions in Denmark unique?

Or are the DBA's conclusions an early sign of a significant shift?

- **Is the "Chain of Substitution" broken?**
  - For many years a staple in the NRA toolkit, the chain of substitution has enabled regulators to find single markets across wide ranges of speeds and quality parameters
    - *Have consumer preferences changed so much that this principle can no longer be presumed?*
  - Many have expected that leased lines and broadband markets could merge as quality and speeds of fibre services approach those of conventional leased lines
    - *Does the Danish analysis make this more or less probable?*
- **Is 5G FWA really not a substitute for fibre in the high-capacity broadband market?**
  - Is this part of the Danish analysis durable?
- **What is the effect of merging the WLA and WCA markets?**
  - Is the Commission's recent review of relevant markets already out of date?
  - What could be the consequences for the shape of competition and level of future investment?
    - *Or does the fact that 'LLU' is a copper remedy mean that WLA is irrelevant in a fibre world?*

The team who have contributed to this analysis

Gita Sorensen, Managing Director GOS consulting.

Gita has more than 30 years of experience in telecommunications regulation and has held industry positions of Director of regulation, interconnection, and wholesale, before moving into consultancy. As a consultant, Gita has advised operators, regulators and investors across the world on a wide range of regulatory policy and strategy issues.

Tom James

Tom James was Head of Competition/Regulatory Finance at BT Group from 2011 to 2019 and previously held finance and regulatory roles at a number of UK and multinational telcos. He has particular experience in the theory and practice of cost measurement, modelling and reporting. He is a fellow of the Institute of Chartered Accountants in England and Wales (FCA).

Dr. Antony Srzich

Antony is a regulatory economist with over 25 years' experience in the telecommunications sector. He has worked in management and regulatory roles for an incumbent operator and a wholesale-only operator, as a senior advisor for a regulator, and as a consultant. Through these diverse roles, Antony has gained a unique combination of management, technical and regulatory economics experience.

Jonathan Kingan

Jonathan Kingan is a highly experienced senior consultant in regulation, strategy and technology in the ICT sectors. He works internationally with clients in 30+ countries who have valued his combination of business and technology expertise. Jonathan runs JJK Associates Ltd (a network of independent consultants) and is an associate of GOS Consulting.