Presentation for the Agency for Electronic Communications

Economic replicability test model and associated WACC calculation

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AEC is implementing an economic replicability test of NGA-based fixed wholesale services, supported by Analysis Mason and Grant Thornton

Context

- As a result of recent market analyses, the ERT is to be applied to Next Generation Access (NGA)-based broadband wholesale services supplied by the two dominant operators, namely Makedonski Telekom ('MakTel' or 'MT') and ONE.VIP on

  – copper and fibre (or fibre-only) networks, i.e. central IP-level and Ethernet-level local access point bitstream

  – hybrid fibre-coaxial (HFC) networks, i.e. national IP-level and local CMTS access point bitstream

- The developed ERT model will test the economic replicability of the retail products of the operators that are dominant in the upstream market by an (efficient) operator based on the wholesale inputs from the dominant operators

- The ERT model will be developed in accordance with the guidance from the European Commission (EC) on regulation of NGA wholesale access products

  – the EC's 2013 Recommendation stated, in summary, that an ERT under certain conditions should replace cost orientation in the *ex ante* price control of NGA wholesale products

- However, the EC's guidance on some of the key parameters of such ERTs is limited to date. There is a lack of international regulatory best practice

  – consequently, defining the ERT model methodology and parameters of the test is an important aspect of this project to ensure consistency with regulatory objectives and regulatory certainty

- Analysys Mason and Grant Thornton LLP have been commissioned by the Agency for Electronic Communications (AEC) to develop a model for economic replicability tests (ERT) of NGA fixed wholesale services and to calculate the associated WACC
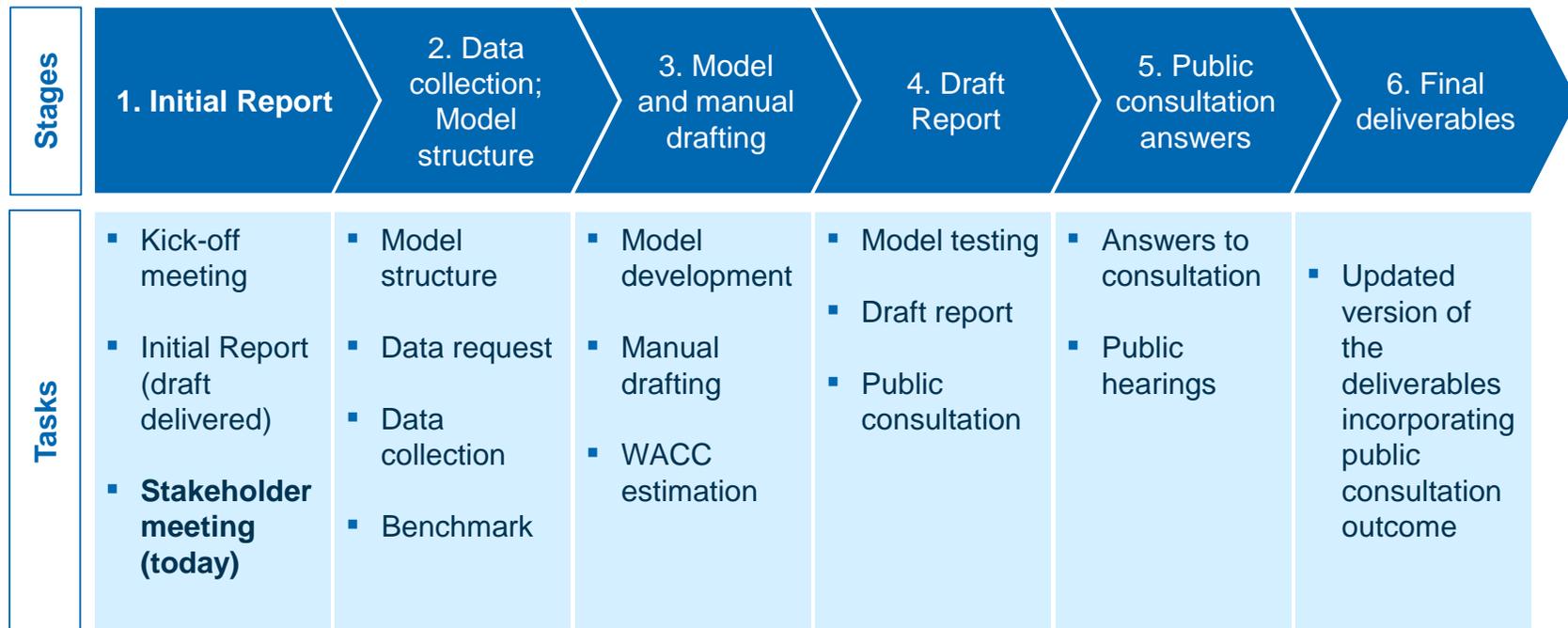
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The objective of the meeting is to present to the industry the approaches and methodologies that will be used by AEC

Today's meeting objectives

- Go through the methodology (at a high level) and gather information and comments in order to develop the appropriate ERT model methodology

- Discuss the modalities of data request and the format in which data should be provided by the industry

- Inform the industry about the purpose and the structure of the model

- The meeting will give the opportunity to the industry to provide their opinion on the ERT methodology as well as on model and the data request
  - a first example of the data request will be provided during the meeting
  - the finalized version of the data request, including the changes provided by the industry, will be available by the end of the week

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The project timeline foresees a number of points of interaction between AEC and the industry

Project stages and tasks

Stages	1. Initial Report	2. Data collection; Model structure	3. Model and manual drafting	4. Draft Report	5. Public consultation answers	6. Final deliverables
Tasks	▪ Kick-off meeting ▪ Initial Report (draft delivered) ▪ **Stakeholder meeting (today)**	▪ Model structure ▪ Data request ▪ Data collection ▪ Benchmark	▪ Model development ▪ Manual drafting ▪ WACC estimation	▪ Model testing ▪ Draft report ▪ Public consultation	▪ Answers to consultation ▪ Public hearings	▪ Updated version of the deliverables incorporating public consultation outcome

The proposed approach is expected to achieve all specified project objectives while interacting continuously with the industry
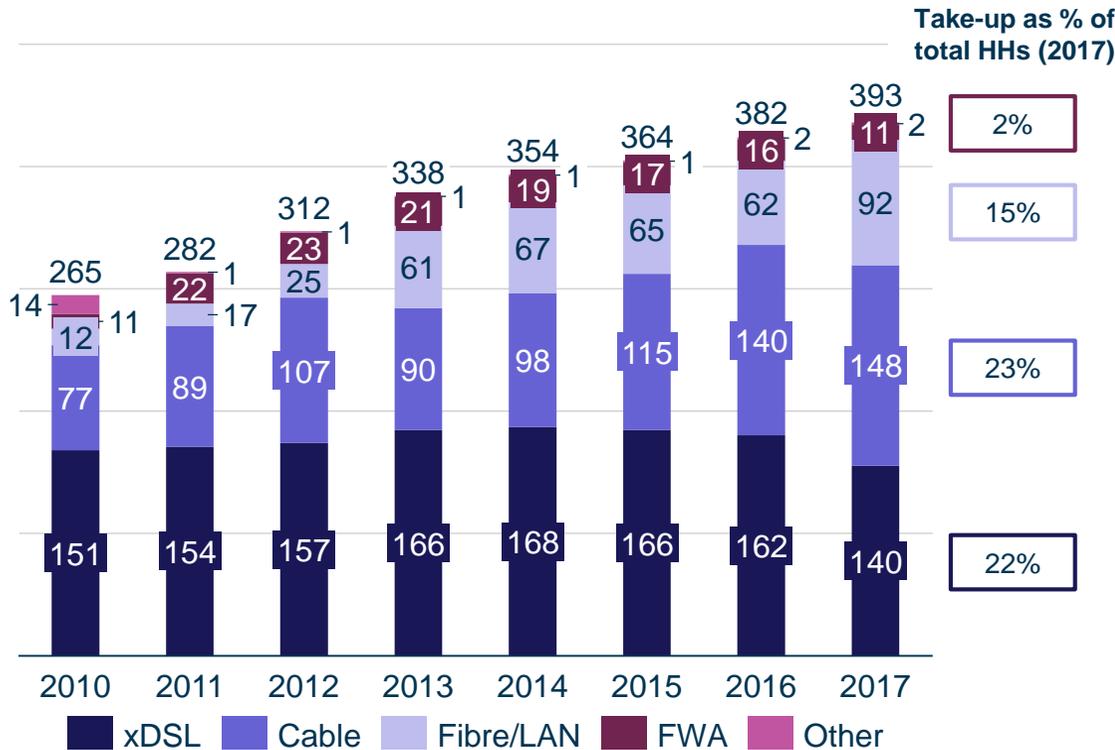
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Introduction

Project set-up

Market context

ERT and WACC methodology

Data request and model structure

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NGA networks (DOCSIS 3.0 and FTTx technologies) have been improving their coverage while still lagging in terms of take-up

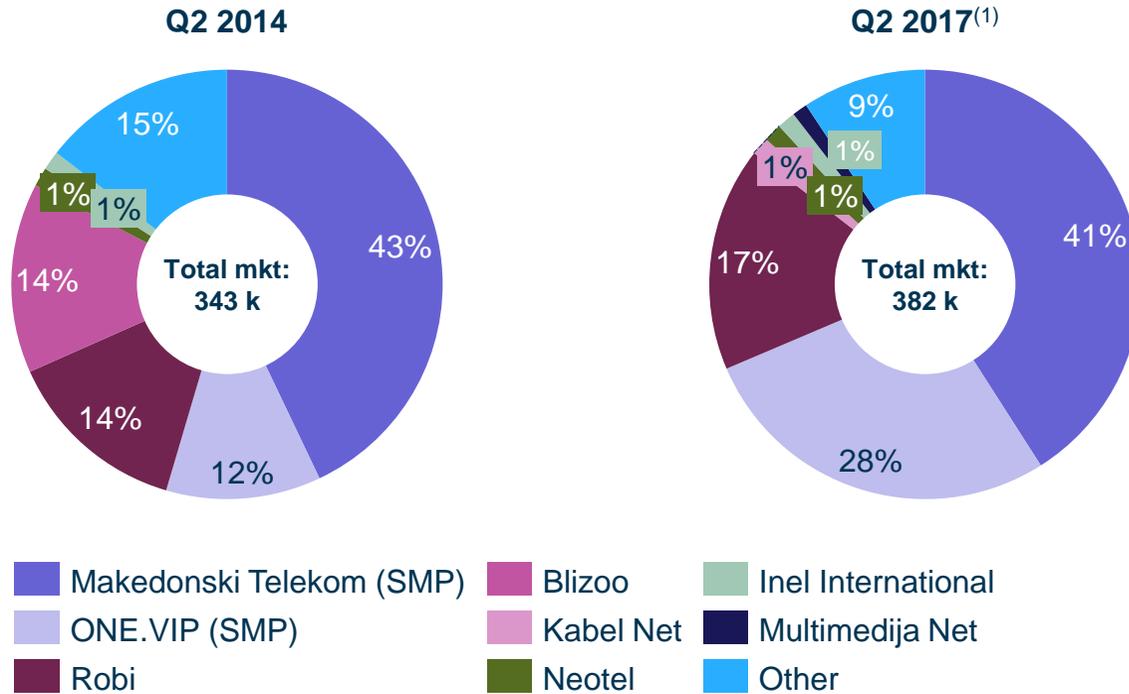**Fixed broadband subscribers by technology (thousand)**

Take-up as % of total HHs (2017):
- 2%
- 15%
- 23%
- 22%

	Coverage (Q2 2017)
xDSL	
Makedonski Telekom	>99%
FTTx	
Makedonski Telekom	27%
ONE.VIP	Skopje
Neotel	Major cities
Robi	Main cities
Cable (DOCSIS 3.0)	
ONE.VIP	>85%
Robi	Skopje and other major cities

Legend: xDSL, Cable, Fibre/LAN, FWA, Other

- NGA coverage has been steadily increasing in the past years
- UBB take-up is still lagging, especially in rural areas

Source: Telegeography

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In the past years the Macedonian market has seen important consolidations, which reduced MakTel's market share

Broadband market share for Macedonian operators

Q2 2014

43%
12%
14%
14%
1%
1%
15%

Total mkt: 343 k

Q2 2017[1]

41%
28%
17%
1%
1%
1%
9%

Total mkt: 382 k

Legend:
- Makedonski Telekom (SMP)
- ONE.VIP (SMP)
- Robi
- Blizoo
- Kabel Net
- Neotel
- Inel International
- Multimedija Net
- Other

2015-2016 M&A

- **July 2015**: MakTel absorbed its wireless subsidiary T-Mobile

- **H1 2015**: Telekom Austria acquired 8 Macedonian cablecos via Blizoo

- **October 2015**: Telekom Austria Group agreed with Telekom Slovenije to merge its parent company VIP with ONE

- **May 2016**: Blizoo combined its operations with the sister company ONE.VIP

- In 2015-2016 the market experienced a period of intense consolidation with several providers embarking on acquisitions and mergers

Note: (1) in 2017 the market share of Blizoo is included in ONE.VIP's (M&A)

Source: AEC, Telegeography

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MT and ONE.VIP have been designated with SMP in the wholesale access markets; economic replicability is to be tested for NGA upstream inputs

- AEC has recently conducted analyses of the markets for both wholesale local and central access provided at a fixed location

- AEC has determined that there is no effective competition in these wholesale/upstream access markets

- The delineated markets are national in scope. Cable TV (CATV) networks need to be included in these markets

- MakTel and ONE.VIP were designated as operators with significant market power (SMP) in each upstream market; their upstream access input is essential for downstream players to provide services to retail customers

- Both the vertically integrated SMP operators are subject to obligations for accounting separation, cost accounting and provision of data and information to AEC

- Further, the Agency imposed obligations for non-discrimination, including equivalence of input (EOI), technical and economic replicability, on the SMP operators with regards to the upstream services provided in these markets

- With an aim to provide SMP operators with greater incentives to invest in NGA networks, the 2013 EC Recommendation[1] allows NRAs to apply ERTs and to refrain from imposing cost orientation obligations for NGA wholesale access prices when:

  – the above safeguards of non-discrimination are in place

  – a "demonstrable retail price constraint" exists. This implies effective competitors in the retail market either resulting from alternative infrastructure competition or competition on legacy networks based on a price anchor stemming from cost-oriented wholesale legacy network access prices

It is in this context that AEC considers the application of *ex ante* ERTs to assess the compliance of the SMP operators' prices via copper/fibre optic and HFC NGA networks

Note: (1) 2013 EC Recommendation, September 2013 No. C(2013) 5761 final

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Introduction

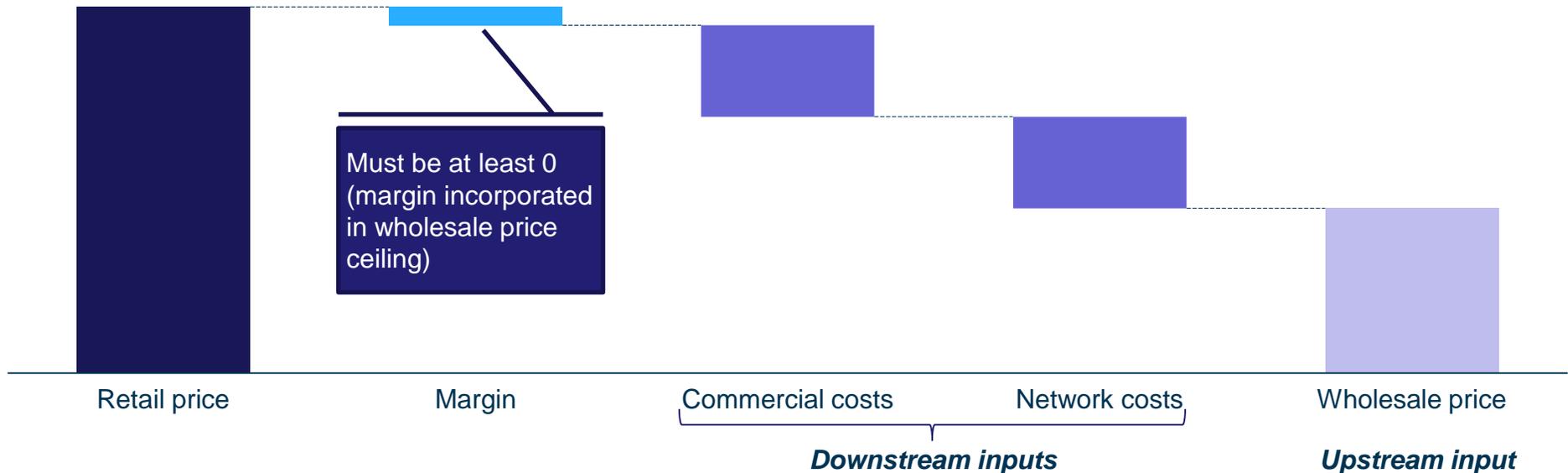**ERT and WACC methodology**

    ERT methodology

    WACC methodology

Data request and model structure

Margin squeeze traditionally checks whether there is enough economic space between the retail and the corresponding upstream input price

Illustration of typical margin squeeze test

Must be at least 0 (margin incorporated in wholesale price ceiling)

| Retail price | Margin | Commercial costs | Network costs | Wholesale price |

Downstream inputs   *Upstream input*

- Margin squeeze is aimed at checking whether the retail product of the dominant operator can be economically replicated by an efficient competitor in the downstream market

- A margin squeeze occurs when the difference between the retail and the corresponding wholesale price does not replicate the offer profitably

- The test checks whether the difference between the wholesale and the retail price is sufficient to cover the downstream costs

- In telecoms, downstream inputs consists of both network and commercial costs

Note: there may be several upstream inputs for the same retail service

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The ERT is run when specific hypothesis are verified, in agreement with the 2013 EC Recommendation

When to run the ERT

Case	Rationale
The SMP operator introduces/changes one of its flagship retail offers	Running the test when a flagship offer is launched/changed ensures that it is replicable
The price of a relevant wholesale input are changes	The ERT will be run when any relevant wholesale price changes, because this might cause margin squeeze on existing offers

The AEC has to set out what will happen if the ERT is not passed for regulatory certainty purposes

The test will be initially run on the existing flagship offers (on a forward-looking basis) to check if the are replicable

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Methodological decisions (discussed in following slides) will impact on the model development and the data request

Key decisions for ERT model development

| Retail inputs | ▪ Relevant retail products to be tested | ① |

| Wholesale inputs | ▪ Relevant wholesale inputs to be tested | ② |

| Operator efficiency | ▪ The level of operator efficiency that will be considered to run the test | ③ |

| Costs standards | ▪ The cost standards that will be used to evaluate downstream costs | ④ |

| Modelling approach | ▪ The modelling approach and time period for running the test and evaluate profitability | ⑤ |

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Since the test is going to be run when a new offer is launched or an existing offer is changed, then appropriate definitions must be provided

- It is proposed to run the ERT when:
  - a retail flagship offer is launched or changed
  - wholesale prices or relevant wholesale inputs are changed

- As a consequence of this it is important to determine a unique definition of retail offer, flagship offer and offer change

Retail offer

- A retail offer is a service that includes the following elements:
  - A product (family) name
  - A pricing scheme
  - A voice traffic allowance included in the subscription agreement (monthly fee)
  - A broadband access nominal throughput
  - An IPTV channel offering included in the subscription agreement (monthly fee)
  - Pre-defined add-on packages (e.g. additional voice traffic / IPTV channels)
  - Out-of-bundle / add-on packages service tariff conditions (voice traffic, additional IPTV content, etc.).

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The approach to the definition of a flagship offer is similar to the one used by the Luxembourgish regulator

Retail flagship offer

- The flagship offers[1] are defined the Luxembourgish regulator as the ones that:
  - in descending order, represent in sum a revenue share of 70% of all retail products of the SMP operator in the broadband market
  - represent at least 10% of revenues on an individual basis
- A similar definition will be used by the regulator to determine what products are flagship, however the precise percentages used in the actual definition will be decided once the data from the SMP operators are available

Retail offer change

- An offer changes if any of the below characteristics varies:
  - offer type: customer (e.g. residential to business) or product (e.g. new services are included)
  - offer features: broadband (nominal download/upload speed[2]) or IPTV (e.g. inclusion of other contents)
  - pricing conditions (recurring charges and promotions)

Note: (1) Approach used by ILR (Luxembourg regulator); (2) in a way that would imply a change in the corresponding wholesale fixed access product

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Running the test on new users for single offers would follow the 2013 EC Recommendation and is aligned with AEC's objectives

Offer and time dimension chosen options

	Chosen option	Rationale

Offer dimension	*Single package*	▪ The 2013 EC Recommendation states that the test should be run on the flagship products only
		
		▪ The single package option:
		  – allows pricing freedom
		  – is easy to use in a forward-looking manner

Time dimension	*New users*	▪ In alignment with the AEC regulatory objectives it has been decided to run the test on new users only ▪ This approach provides a more accurate representation of the competitive context (competition is related to new users)

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All the relevant wholesale inputs are going to be tested, since in Macedonia there is a peculiar market condition (joint dominance)

Offer access technology

- In its market analysis AEC has outlined that the offers that must be subject to ERT are based on the following NGA-based wholesale fixed broadband services:
  - Fibre and potentially a mix of fibre and copper:
    - IP-level bitstream at central level
    - Ethernet-level local access point (VULA)
  - HFC networks based on DOCSIS 3.0 technology:
    - IP-level bitstream at national level
    - local CMTS level

Wholesale input

- AEC decided to test all the relevant wholesale inputs
- Given the peculiar Macedonian market conditions (e.g. joint dominance), slight differences between AEC stipulations and the 2013 EC Recommendation ones may hold

Given the market conditions, AEC will test all the relevant wholesale products

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The EEO approach is consistent with the 2013 EC Recommendation and provides incentives to SMP operators to keep in investing in NGA networks

Chosen option

Equally Efficient Operator (EEO)

- The EEO test aims to assess whether a player that has the same cost structure as the downstream division of the SMP operator would be able to be profitable in the downstream market with wholesale and retail prices set by the SMP operator

Rationale

- The EEO approach will be applied since it:
  - allows to measure costs in an objective way
  - is widely accepted in legal proceedings
  - provides better incentives for the SMP operator to continue investing in NGA networks and NGA-based services
- The choice made is consistent with 2013 EC Recommendation which suggests that downstream costs should be estimated based on the dominant operator's own downstream business (EEO)

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Using LRIC+ as downstream cost measure is consistent with the 2013 EC Recommendation; AEC deems appropriate to be aligned with it

Chosen option

LRIC(+)

- The Long Run Incremental Cost method (LRIC) is the approach chosen for downstream cost calculation
  - it is calculated as difference between the total cost when producing all services, and the total cost when the output volume of the examined service is zero (while keeping all other output volumes fixed)
  - takes into account only the incremental costs directly attributable to a service, i.e. not shared or common costs
  - a reasonable share of common costs are allocated using a mark-up (then getting to the so-called 'LRIC+' measure)

Rationale

- Main advantages by using LRIC(+) approach are that:
  - it overcomes the problem of attributing common costs to different services
  - it produces more reasonable results when the market presents strong growth
- This choice is in line with the 2013 EC Recommendation, where it is suggested to use the LRIC+ model to calculate the incremental cost

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The LRIC approach requires to distinguish between incremental costs and common costs; a reasonable share of the latter is included in the model

- The key downstream cost elements (non-essential input network costs and commercial costs) that may be relevant for the ERT include:

  - multi-service access nodes (MSANs)/switches in local exchanges

  - backhaul, aggregation and core network

  - service platforms appropriate to the retail product

  - content costs (TV content)

  - promotions

  - customer-premises equipment (CPE)

  - subscriber acquisition and retention costs

  - personnel costs

  - marketing costs

  - sales network costs

  - billing and collection costs

  - general and administration costs

  - customer care costs

  - bad debt

- In the LRIC approach it is necessary to identify and separate the incremental costs from the common costs. According to the 2013 EC Recommendation a 'reasonable' percentage of common costs should be included in the downstream costs (LRIC+)

- There is no formula to establish the 'reasonable share', however it should ensure that:

  - the SMP operators have sufficient pricing flexibility and can choose from which products to recover common costs

  - the ERT does not allow the SMP operators to abuse their market position

- The 'reasonable share' is also related to the level of retail product aggregation: the more granular the test is the more costs can be considered common (as the increment becomes smaller)

> The level of aggregation used to run the ERT will be consistent with that of the retail offer dimension

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The Discounted Cash Flow (DCF) method is a widely accepted investment valuation technique and is in line with the 2013 EC Recommendation

Chosen option

Discounted Cash Flow (DCF)

- To evaluate the time period over which to assess the profitability the discounted cashflow (DCF) method will be used:
  - the approach examines profitability over a reasonable time horizon
  - profitability of the activity is assessed based on the NPV[1] of all future expected cashflows over the whole investment period. If the NPV is positive, then the activity creates value (i.e. it is profitable)

Rationale

- The DCF method has been chosen since it:
  - provides a good framework for investment decisions
  - is sensitive to the time period considered
  - considers the three main 'objects'/variables of an investment decision, i.e.:
    - cashflows generated by the investment
    - the time horizon in which these cashflows are generated
    - the associated risk.
- The EC recommends that the ERT should evaluate the retail products based on a 'dynamic multi-period analysis'
  - the DCF method is in line with the 2013 EC Recommendation

Note: (1) the net present value (NPV) is a measurement of profit calculated by subtracting the present values (PV) of cash outflows (including initial cost) from the present values of cash inflows over a period of time.

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The ERT is run when the flagship retail offer is launched or the wholesale prices change, on new users and based on the relevant wholesale inputs

#	Item	Chosen option	Details
0.a	When running the test	▪ Change of SMP operator flagship retail offers ▪ Change of wholesale prices	▪ If one or more of the key offer features are changed, then the test result may change
0.b	Retail flagship offer	▪ The test should be run on the current flagship offers on a forward-looking basis	▪ Balance / trade-off between accuracy and burden, focussing on innovative and relevant products/services
1	Retail inputs	▪ Offer dimension: single package ▪ Time dimension: new users	▪ Aligned with the 2013 EC Recommendation and AEC regulatory objectives ▪ Provides a more accurate representation of the competitive context for flagship offer only
2	Wholesale inputs	▪ All relevant wholesale inputs	▪ The 2013 EC Recommendation suggests to check only most relevant wholesale inputs ▪ The particular market conditions (joint dominance) require the analysis of all the wholesale inputs

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It will be an EEO test, using a LRIC+ measure for downstream costs; profitability will be assessed using a DCF approach

#	Item	Chosen option	Details
3	Operator efficiency	▪ EEO (one per SMP operator, since there is joint dominance)	▪ Provides several advantages − requires few assumptions − is accepted in legal proceedings ▪ Is aligned with the EC Recommendation
4	Downstream cost standard	▪ LRIC(+)	▪ Coherent with the 2013 EC Recommendation ▪ Overcomes the problem of attributing common costs to different services ▪ Could produce more reasonable results when the market presents strong growth
5	Profitability evaluation	▪ DCF	▪ The DCF approach examines profitability over a reasonable time horizon (estimate of customer lifetime) ▪ Follows the 2013 EC Recommendation

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Introduction

ERT and WACC methodology

ERT methodology

WACC methodology

Data request and model structure

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The cost of capital will be calculated based on the weighted average of the cost of debt and the cost of equity ('WACC')

- The ERT model requires definition of a reasonable return on capital employed by the relevant operator

- This is generally measured by the Weighted Average Cost of Capital ('WACC')

WACC formula

$$WACC_{post\ tax} = C_d \times \frac{D}{D+E} + C_e \times \frac{E}{D+E}$$

where

$$C_e = R_f + \beta \times R_e$$

$$C_d = (1-t) \times (R_f + R_d)$$

Appropriate benchmarks may be needed to complement received inputs following data request

Elements of the WACC

Formula input	Approach/possible sources
Risk-free rate (R_f)	- Yield of long-term maturity - Government bonds issued in MKD
Equity risk premium (R_e)	- Risk premium of the Macedonian stock market (or international benchmarks if required)
Beta (β)	- Operator financial information, otherwise using benchmarks
Debt premium (R_d)	- Operator financial information, otherwise using benchmarks
Gearing ($\frac{D}{D+E}$)	- Operator financial information, otherwise using benchmarks
Tax rate (t)	- Current Macedonian corporate tax rate (10%)

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The WACC used in the model has to be pre-tax and it can be calculated by estimating the parameters or benchmarked from similar operators

Pre- and post-tax WACC

- The ERT model works in pre-tax terms, therefore it is necessary to transform the calculated post-tax WACC in the corresponding pre-tax one

$$WACC_{pre\ tax} = \frac{WACC_{post\ tax}}{(1 - t)}$$

- $WACC_{post\ tax}$ includes the effects of the so-called 'tax shield', while $WACC_{pre\ tax}$ does not include them

- To cross check the value of the calculated WACC it is possible to use benchmarks of comparable operators

  – the typical benchmarks are expressed post-tax, so it is important to appropriately convert the WACC before making comparisons

Already available SMP operator WACC

- An already available SMP operator WACC can be used if it is calculated as an average WACC for the SMP operator's (fixed) business. The same WACC can be used for:

  – the annualization of shared downstream investments – applies to DCF

  – the discounting of future cash flows in a DCF test

- If the WACC used for the wholesale/upstream inputs is a (lower) wholesale only WACC then a (higher) de-averaged WACC needs to be used to also include the downstream business or, alternatively, a benchmark can be compiled

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Introduction

ERT and WACC methodology

Data request and model structure

Data request

Model structure

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Data will be required from both SMP and alternative operators

- While the precise data set requested will depend on the actual model structure, the ERT model will generally require data from the SMP operators covering the following areas
  - Retail tariffs and revenue
  - Take-up of specific retail packages
  - Usage of specific retail services
  - Gross-adds / churn
  - Tariffs and usage of wholesale inputs
  - Downstream costs
- While downstream cost data from the alternative operators would, strictly speaking, only be required in case of a REO/SEO test, our preference would be to request cost data in any case in order to cross-check the SMP operators' data
- As the ERT will be forward-looking, we will require forecasts and estimates on e.g. product take-up, churn and usage
  - We will be happy to review any forecast inputs which will be shared by the industry

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Areas where data needs to be requested from SMP and from alternative operators [1 of 2]

Area	Data to be requested	Applies to	Purpose/comments
Retail tariffs / revenue	▪ Retail prices, current pricing level and structures ▪ ARPU and revenues per package and how they relate to nominal fees ▪ Split of ARPU between recurring subscription fees, add-on packages, out-of-bundle usage per package, initial/one-off fees ▪ How discounts are considered and their impact ▪ Forecast of subs and gross adds for each package	▪ SMP operators	▪ Priority: high
Take-up of specific packages	▪ The relative importance of different mix of products (number of single-play, dual-play, triple-play)	▪ SMP operators ▪ Alternative operators	▪ Identify the flagship products ▪ Priority: high
Churn	▪ The share of users that churn from a specific package and/or from the operator in a given year	▪ SMP operators ▪ Alternative operators	▪ Estimate average lifetime for the test ▪ Priority: high
Wholesale tariffs and usage of wholesale inputs	▪ Wholesale tariffs by service ▪ Take-up and usage of different wholesale inputs (ideally per access seeker)	▪ SMP operators	▪ Priority: low

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Areas where data needs to be requested from SMP and from alternative operators [2 of 2]

Area	Data to be requested	Applies to	Purpose/comments
Downstream costs	▪ Total downstream costs and unit costs (per sub, MB or min) covering network and commercial costs as well as overheads ▪ Downstream cost allocation to the different products and services ▪ Average costs per user ▪ Split of costs into recurring (OPEX) and non-recurring (CAPEX) ▪ One-off costs ▪ Methodology used for the allocation of costs to products and services ▪ Whether and how the operator takes into account cost of capital and depreciation of fixed (non-recurring) investments	▪ SMP operators ▪ Alternative operators	▪ Cost inputs ▪ Audited fully allocated cost model available? ▪ Priority: medium
Usage for specific retail inputs	▪ Traffic and usage data for the specific products that are to be tested ▪ Covering e.g. voice traffic, add-on packages for Internet and IPTV and discounts, and to be split between in-bundle and out-of-bundle	▪ SMP operators ▪ Alternative operators	▪ Priority: medium

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Data request

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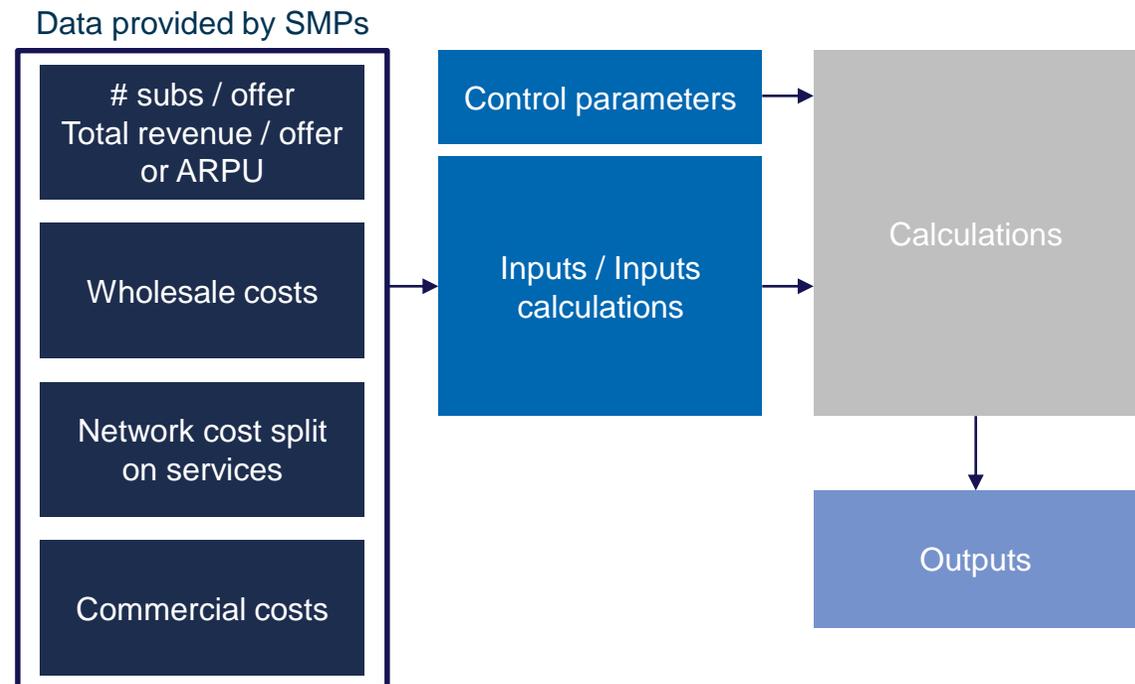
The model will take as input the data obtained from the operators and some parameters to define the specific scenario to test
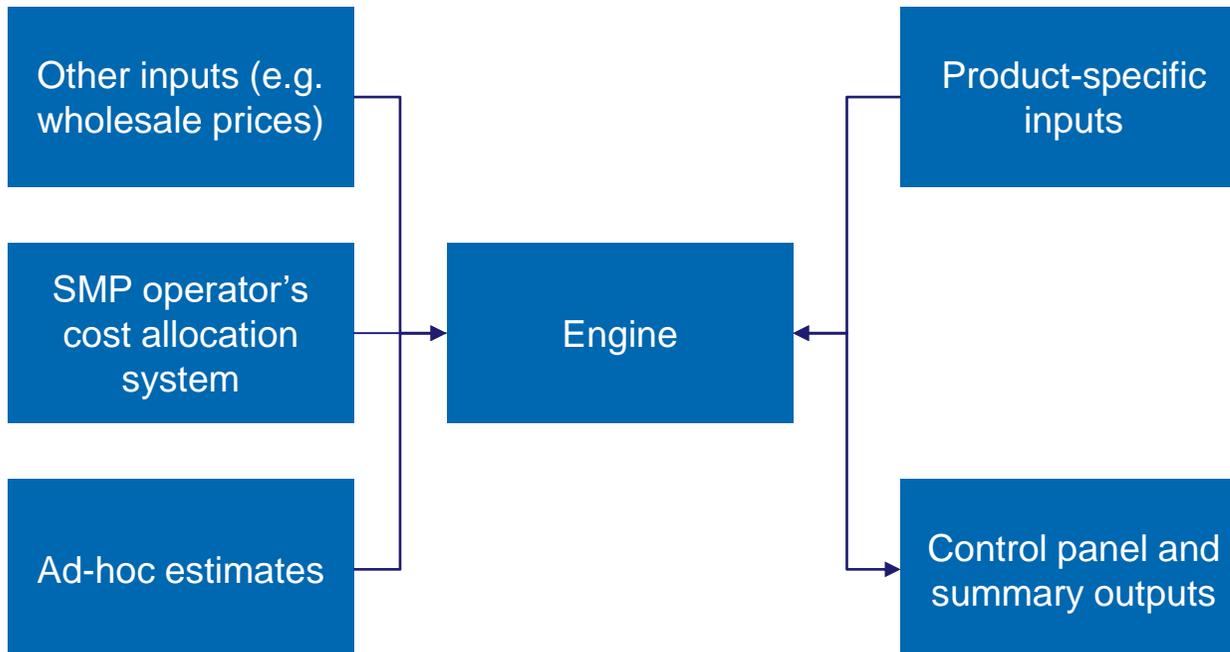
- From the data obtained in the data request phase the model will be able to calculate the different variables required by the ERT

- The model takes as an input also some control parameters that will change the calculation mechanics to take into account different scenarios

- One possible output of the model is an 'economic space' for which the test is passed

  – this could be thought of as the SMP operator's part of the profit that could be reduced for the accommodation of further promotions

  – this possible outcome will be implemented in the model through dedicated slots

  – distribution of the promotions over time has to be considered as it has a different impact on the NPV

Logical flow of the ERT model

Data provided by SMPs

subs / offer Total revenue / offer or ARPU
Wholesale costs
Network cost split on services
Commercial costs

Control parameters

Inputs / Inputs calculations

Calculations

Outputs

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The ERT model will be built using a modular structure in order to be easy to update and validate

ERT standard model flow

```
Other inputs (e.g.        Product-specific
wholesale prices)         inputs

SMP operator's
cost allocation  ──►  Engine  ◄──
system

Ad-hoc estimates          Control panel and
                          summary outputs
```

- The ERT model will be built in a modular manner to make it easy to update.

- Different modules will include:

  - a control sheet from which key scenarios and parameter values can be selected and outputs are shown

  - an ERT calculation engine, taking into account different revenue and cost inputs for the selected product

  - input sheet(s) on which inputs are inserted and that can be changed to test different products

  - input sheet(s) on which static data such as historical cost accounting data from the SMP operators is inserted

  - a number of intermediary calculation sheets

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We will use our house formatting style to allow the user understand the cell content type

- The model will be developed with standardised cell formatting styles to ensure that inputs, assumptions, calculations and outputs can be easily identified:

  – formulae will use named ranges for ease of understanding and clear auditing

  – the model will be suitably flexible for extension / modification where relevant

  – calculations will be clearly visible

  – model operation and modification will be as straightforward as possible

- The model style will be consistent with the styles used in previous models developed for AEC and reviewed by the Macedonian industry, including the two SMP operators

  – the industry is expected to be familiar with our model development methodology

Excel formatting styles guideline

Style guidelines

Input cell styles

Input Parameter	100	unlocked	An input to the model that it is expected the user will change
Input Data	100	unlocked	A piece of real data
Input Estimate	100	unlocked	An estimate used in the absence of real data
Input Calculation	100	locked	An input to the model that has been calculated from other inputs
Input Link	100	locked	An input to this part of the model, which is linked to a source

Other cell styles

Total	123		A total
Checksum	0,00	locked	A side calculation intended solely to cross check a result
Output	100		A key result from this part of the model
Name	Name	locked	An Excel Name applying to one or more adjacent cells
Note	Note		A note
Highlight	100		A cell that is special in some way

Number styles

	Number	Percentage	Currency	Percentage (2dp)
Positive	1.235	12%	1.235	12,34%
Negative	-1.235	-12%	(1.235)	-12,34%
Zero	-	-%	-	-%
Text	Text	Text	Text	Text

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