Assessment of the annual cross-border infrastructure compensation sum

Study commissioned by ACER

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Christoph Maurer | Christian Zimmer

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Overview

- Background and approach
- Review of policy context and requirements
- Methodology options
- Numerical assessment
- Preliminary conclusions

Background and scope of the study

ITC = Inter-TSO Compensation

Legal framework for ITC mechanism: Annex A of Regulation 838/2010

> 2 components: Losses and costs of making infrastructure available to host cross-border flows
> Latter based on annual cross-border infrastructure compensation sum which shall be apportioned among TSOs (called “ITC infrastructure fund” hereafter)
> Article 5.4 sets fund size to 100 m€/a for time being
> Article 5.3 requests ACER to carry out review and make proposal to European Commission on future ITC infrastructure fund

Scope of the study: Assist ACER with the above review

» Develop and evaluate methodical options for determining ITC infrastr. fund
» Provide opinion on suitability of LRAIC

Out of scope

> Methods for determining contributions to and compensations from ITC infr. fund
> Losses
> General discussion of ITC beyond current legal framework

Approach

Qualitative and quantitative analysis

- > Review of policy context
- > Input from TSOs and NRAs
  - » Data for quantitative analysis
  - » Opinions regarding the appropriate size of the ITC infrastructure fund
- > Meetings with European Commission and ENTSO-E
- > Development of methodical options
  - » Policy context provides guidance and restrictions
  - » But no single options clearly preferrable by principle
- > Assessment of options

We would like to thank all who have provided input to the study

Current status and next steps

- > This presentation summarises the draft final report
  - » http://www.acer.europa.eu/Official_documents/Public_consultations/PC_2012_E_15/Consentec_ACER_ITC-Fund_FinalReport_Draft.pdf
- > Final report on the basis of input from public consultation: By end of 2012
- > ACER to decide on further steps

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Review of policy context and requirements

Dimensions and criteria

Principal dimensions to consider

- Scope
  - the question which share of the TSOs' infrastructure is to be considered relevant for the infrastructure fund under ITC
- Costing methodology
  - the question how the relevant share of the TSOs' infrastructure is valued when determining the size of the ITC infrastructure fund

Criteria

- Compliance with legal provisions defining the ITC mechanism
- Coherence with other instruments relating to financing of infrastructure for cross-border power flows
  - Congestion management
  - Proposed Energy Infrastructure Package

Review of policy context and requirements

Compliance with legal provisions

Relevant articles of Regulations 714/2009 and 838/2010

- Article 13 of Regulation 714 lays down high level requirements for ITC
- Reg. 838 implements current ITC mechanism (specifics in Annex A)
  - Methods for contributions and compensations firmly defined in 6.1 and 6.2
  - Infrastructure fund size is 100 m€/a for time being (Art. 5.4)
  - Cornerstones of assessment which this study provides input to (Art. 5.1/5.3):
    - Costing principles adopted from Art 13.6 of Regulation 714/2009
    - Adjustment where infrastr. is financed by sources other than network access charges
    - Specification of geographical scope

Overarching aspects

- Regulation 838 is the more specialised provision, specifying the current ITC mechanism within the requirements set by Regulation 714
  - Currently valid annual fund size of 100 m€ *de facto* constitutes an interpretation of the goals and principles of Regulation 714
- Fund size is only degree of freedom, while relative payments are fixed
  - Clear restriction if appropriateness of ITC is assessed by net financial positions → Justification of (if not demand for) methodical simplicity

Review of policy context and requirements

Coherence with other instruments: Congestion Management (1/2)

Coherence of ITC and congestion revenues discussed for long time

> Reason: Origins of congestion revenues and ITC payments are similar

Here: Confinement to restrictions imposed by current legal framework

> Analysis of the way in which the legislator has interpreted the requirements as to the coherence of ITC and congestion management
  » Different interpretation would require amending Reg. 838 → out of scope
> Regulation 838 requires the infrastructure fund to be appropriately adjusted to reflect infrastructure financed from other sources than network access charges
  » Congestion revenues (cf. Art. 16.6 of Regulation 714/2009)
  » Private investment with exemption according to Art. 17 of Reg. 714/2009

> Legislator has established a connection between congestion revenues and the scope of the ITC infrastructure fund
  » Some infrastructure to be deducted from total infrastructure before determining which share of the remainder falls under ITC
> Allows for different interpretations with regard to the options for using congestion revenues → next slide

Review of policy context and requirements

Coherence with other instruments: Congestion Management (2/2)

Narrow interpretation: Art. 16.6 1st para point b

> Investments explicitly financed by congestion revenues
> Inclusion in scope of ITC infrastr. fund would constitute double compensation

Wide interpretation: Art. 16.6 1st para point b + 2nd para

> Congestion revenues used for lowering tariffs: Also financing infrastructure?
> Consequent application would require ITC to be based on national tariff bases → incompatible with LRAIC; dependence on various national specifics
> Tariffs finance more than infrastrcture → how to determine share (per country)?
> Implicit definition of congestion income sharing key by Reg. 838 (through fixed method for compensations and contributions) → appropriate?

Direct set off of congestion revenues against ITC infrastructure fund

> Not an option provided for by Regulation 838/2010
> Would be inconsistent with current fund size being static

> We consider narrow interpr. applicable, but also quantify wide interpr.

Review of policy context and requirements

Coherence with other instruments: Energy Infrastructure Package

Background on proposed Energy Infrastructure Package (EIP)

> aims at promoting the timely development of trans-European energy networks in order to achieve relevant EU policy objectives

> defines so-called Projects of Common Interest (PCI) that shall mainly be financed via the network access charges of those countries that benefit from the respective investment

» Distinct mechanism for financing PCI → exclusion of PCI from ITC?

» Regulation 838/2010 only allows for excluding infrastructure not financed by network access charges

Implications for this study

> Valid reasons for considering amendment to Reg. 838/2010 when EIP comes into force

> However, future role and design of ITC in parallel to EIP is out of scope of study

> Purpose of this study is assessment on basis of currently valid legal framework

> EIP not considered in the study

Review of policy context and requirements

Scope and costing methodology

Scope of ITC infrastructure fund

> Geographical scope: 34 countries for the time being (based on Art. 5.3 of Annex A of Regulation 838/2010)

> New and existing infrastructure (Art. 13.6 of Reg. 714/2009)

> "costs incurred as a result of hosting cross-border flows" (Art. 13.6 of Reg. 714)

→ filter (i.e. only the respective share of new and existing infrastructure to be included in ITC infrastructure fund)

Costing methodology

> Legal provisions clearly demand forward-looking long-run average incremental cost (LRAIC) as the basis of assessment of ITC infrastructure fund

» Prescribed in Reg. 714, picked up in Reg. 838

> In addition, Reg. 838 asks ACER for an opinion on suitability of LRAIC

In this study,

> methods and numerical results are based on LRAIC

> separate considerations are provided on the suitability of LRAIC

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Methodology options

Principles

Structure of analysis

> Decoupling of
  - » scope - definition how the cost of some given infrastructure shall be determined for ITC purposes
  - » and costing methodology - determination of some “key” that defines which share of total infrastructure shall be considered in the ITC infrastructure fund
> Established approach: Determine scope in terms of asset amounts for a set of asset classes and weight these with unit cost according to costing methodology

High-level principles implied by legal framework

> Proportionate, i.e. reasonably simple, method is appropriate
  - » Reg. 838 leaves fund size as single degree of freedom
  - » Complex methods based on assessment of compensations and/or contributions per ITC party would lead to inconsistency:
    - > Would yield fund size as by-product
    - > But individual contributions would have to be ignored (fixed by Regulation 838/2010)
  - » Key for defining scope should be global, not composed country-by-country
> Combination of current fund size (100 m€/a) and methods for contributions/compensations are a consistent interpretation of Reg. 714/2009

e.g. WWT, AP, MP

Methodology options

LRAIC

Taking account of previous studies

Interpretation of LRAIC

> Long run:	no exclusion of short-run invariable cost, such as investment cost
> Average:	1. annuities 2. pro-rata share of cost between cross-border and other functions
> Incremental:	current, efficient technology (but actual structure and topology)
> Forward-looking:	replacement cost

Joint and common cost: “Thin” definition recommendable

National access charges to reflect ITC anyway

> Consistency and objectivity here more relevant than precise cost recovery
> Direct cost of investment (annuity) plus incremental annual operating cost

Options: Country-specific vs. standardised figures

> Relevance in given context lower than in the past (affects only global fund size)
> Standardisation could be done such that total cost are unchanged
> Standardisation of depreciation period towards asset life times c‘ld be beneficial

Methodology options

Incremental approach

Principle of incremental approach

Entry-into-force of Regulation 838/2010

> 100 m€/a = appropriate proportion of existing infrastructure in 2011
> Development after 2011 requires incremental adjustments

Proposed implementation (including simplifications for practicability)

D = standardised depreciation period

> Existing infrastructure: Decreasing over time
  » Decomissioning: Starting value (100 m€/a) reduced by 1/D each year
  » Scale with ratio of current and 2011 unit cost to reflect LRAIC development
> New infrastructure: Increasing over time
  » Every investment after 2011 may lead to increase of fund, with following restrictions
    > Deduct investment (shares) financed by other sources than network access charges
    > Only the share of the investment related to hosting cross-border flows may be counted →Multiplication with "Global Transit Share", see next slide

Methodology options

Global Transit Share GTS (element of incremental and absolute approaches)

Purpose and principle

- > Determine the share of new investment related to hosting cross-border flows
- > Key should be global and simple to determine
- > Desirable: Similarity to methods for determining contributions and compensations
  - » Formulae for determining the compensations reflect cross-border flows by means of “transit” (defined in Art.1.6 of Annex A of Regulation 838)
  - » Distinction between cross-border and “other” purposes: other = domestic load (defined in Art. 1.8 of Annex A of Regulation 838)

Proposed implementation

- > Ratio of
  - » Total transit of all participants and
  - » Total transit plus load of all participants
- > Remarks/properties:
  - » Based on data required anyway for implementing ITC
  - » Definition contributes to requirement to account for benefits (transits based on netted flows)

Methodology options

Absolute and restricted absolute approaches

Principle of absolute approach

> No disctinction between existing and new infrastructure
> Both the relevant share of new infrastructure and the “appropriate proportion” of existing infrastructure should be consistently determined by applying the GTS

Proposed implementation (including simplifications for practicability)

> Start with entirety of transmission assets
> Deduct (shares of) assets financed by other sources than network charges
> Multiply with GTS

Variant: Restricted absolute approach

> Expectation: Absolute approach yields fund size >>100 m€/a
> Restricted absolute approach may help avoiding abrupt large changes
  » Consider only share of infrastructure commissioned after “reference year”
  » Pragmatic implementation: Proportional shares based on standard depreciation period, assuming homogeneous age structure

e.g. 1996 (1st electricity market directive), but no unambiguously correct year

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Numerical assessment

Data base (1/2)

Introductory remark: Assessment limited by data availability

> Allows for comparison of options, but not to determine “definite” figures

Considered years

> 2011 is base year (latest completed year)
> Original request: Assessment for 2011, 2012, 2013
  » 2012 and 2013 not feasible for data availability reasons
> Instead, the following temporal effects are considered:
  » Short-term volatility of flow patterns – comparison of flow data 2010 vs. 2011
  » Impact of prospective network expansion – forecasted asset amounts of 2022

Asset volumes

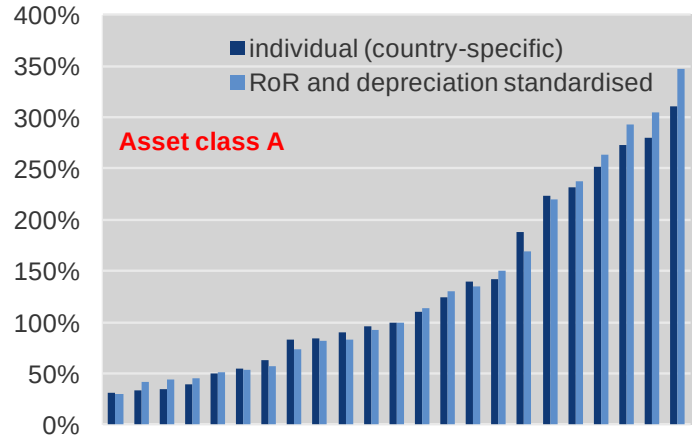
> 6 asset classes (AC lines, DC lines, transformers), 4 actually used here
> Data source: ENTSO-E
  » Data gaps replaced by data from older years, back to 2007
> Estimation of development until 2022 based on TYNDP (projects of pan-European significance)

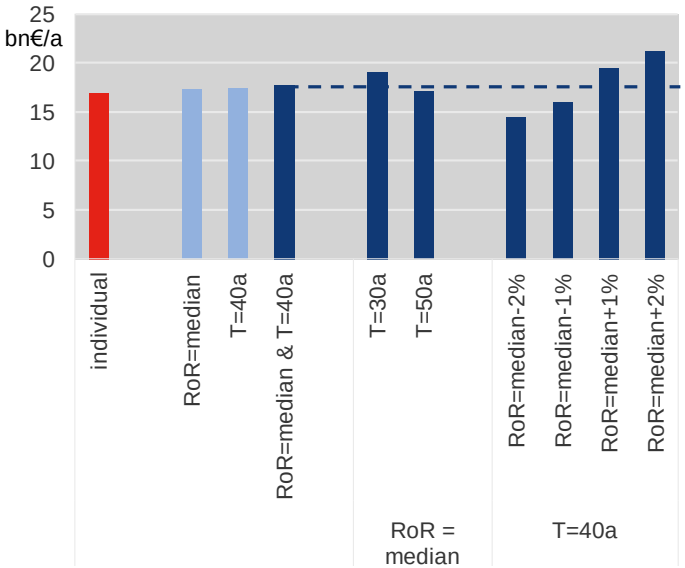
Numerical assessment

Data base (2/2)

23 usable responses, gaps replaced by volume weighted averages

LRAIC: Based on questionnaires sent to NRAs





> Large relative variation of LRAIC unit cost across countries

> Variation unaffected by standardisation of rate of return (RoR) and depreciation periods

> Variation mostly caused by differences between the capital outlay figures

> Total LRAIC based annual cost of transmission grid: ca. 17 bn€/a

Numerical assessment

Preparatory calculations

Global Transit Share (GTS)

> Based on historic data from actual ITC implementation provided by ENTSO-E

Year	GTS
2010	6.65 %
2011	7.53 %

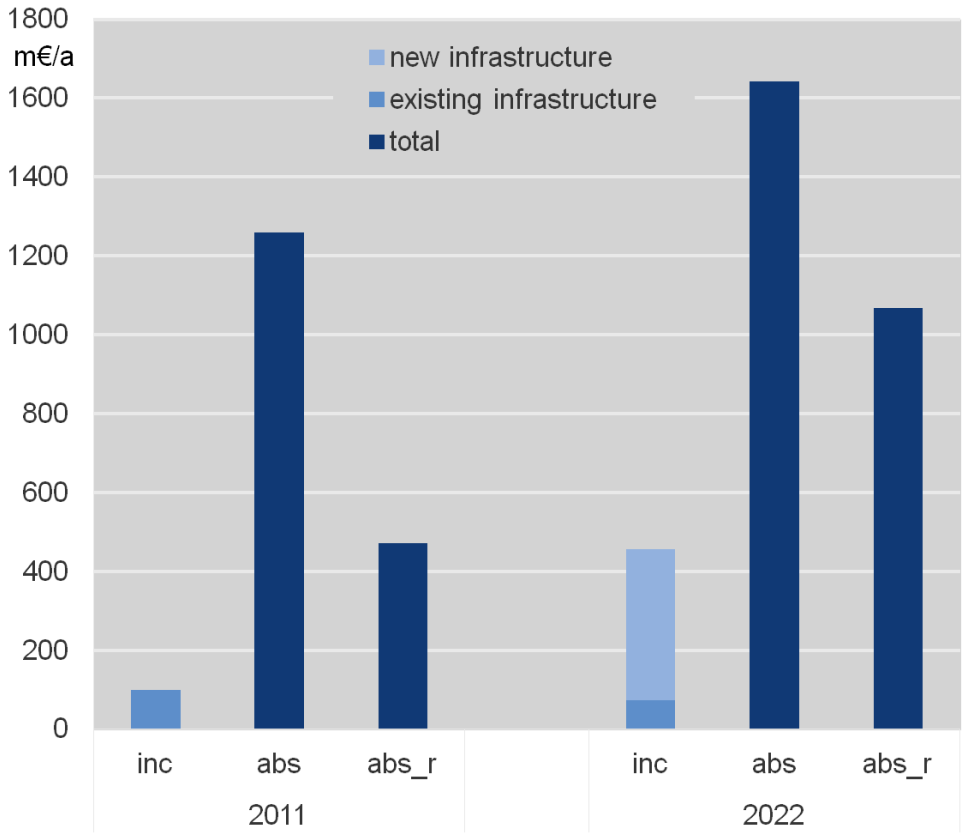
Infrastructure financed by sources other than network charges

> Based on congestion revenue data (divided by usage destinations) provided by ENTSO-E
> Results for 2011 and country-specific LRAIC:
  » “Narrow” interpretation: 1.2% of total LRAIC based network cost
  » “Wide” interpretation: 5% of total LRAIC based network cost
> Shares assumed to also apply to 2022

Numerical assessment

ITC infrastructure fund size: Base case

Comparison of fund sizes between methodology options



> Base case=
  - » Country-specific LRAIC
  - » GTS = 7,53% (2011)
  - » Reference year for restricted absolute (abs_r): 1996

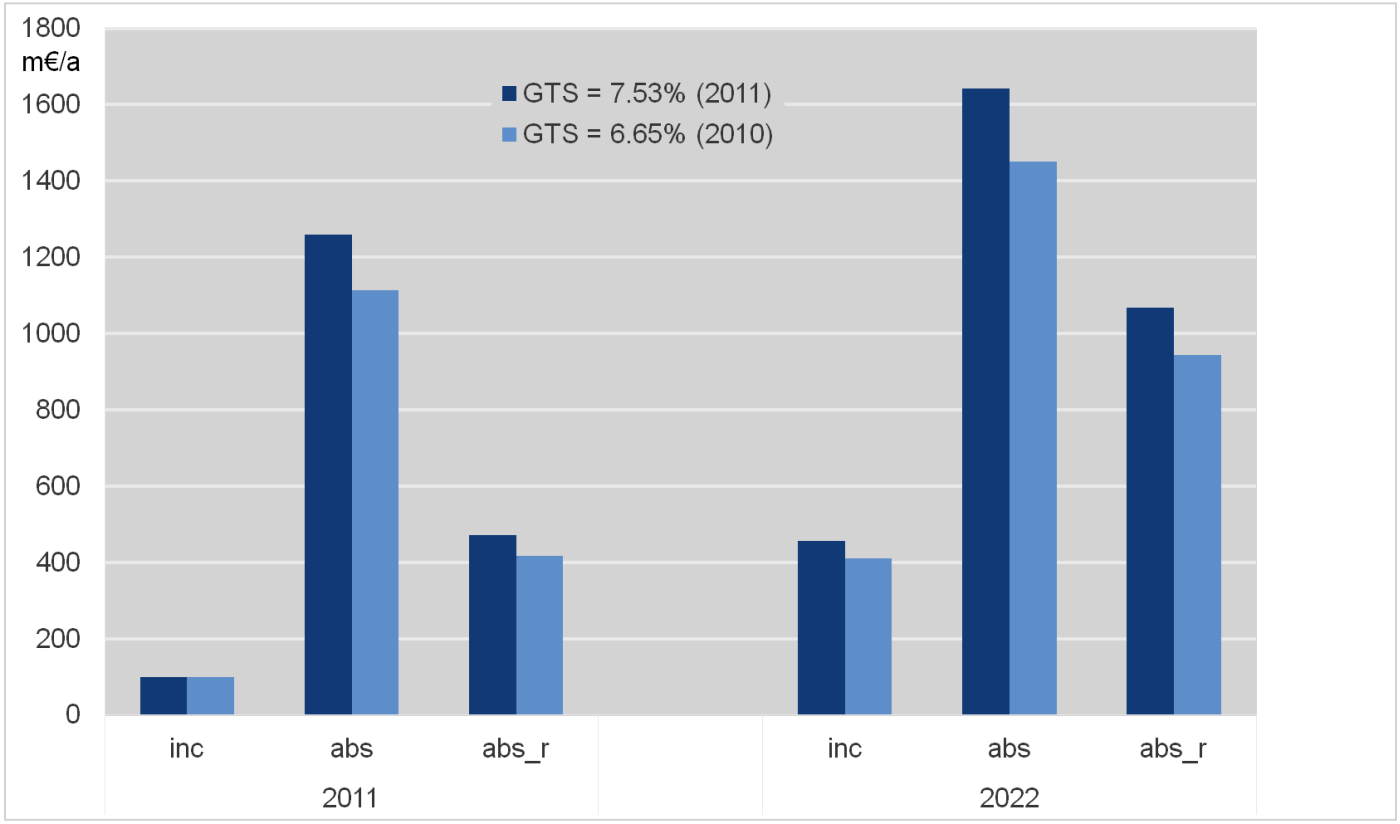
> Large differences between the 3 options

> Absolute sizes increasing, relative difference decreasing over time

Numerical assessment

ITC infrastructure fund size: Sensitivity analysis

Sensitivity with respect to Global Transit Share (GTS)



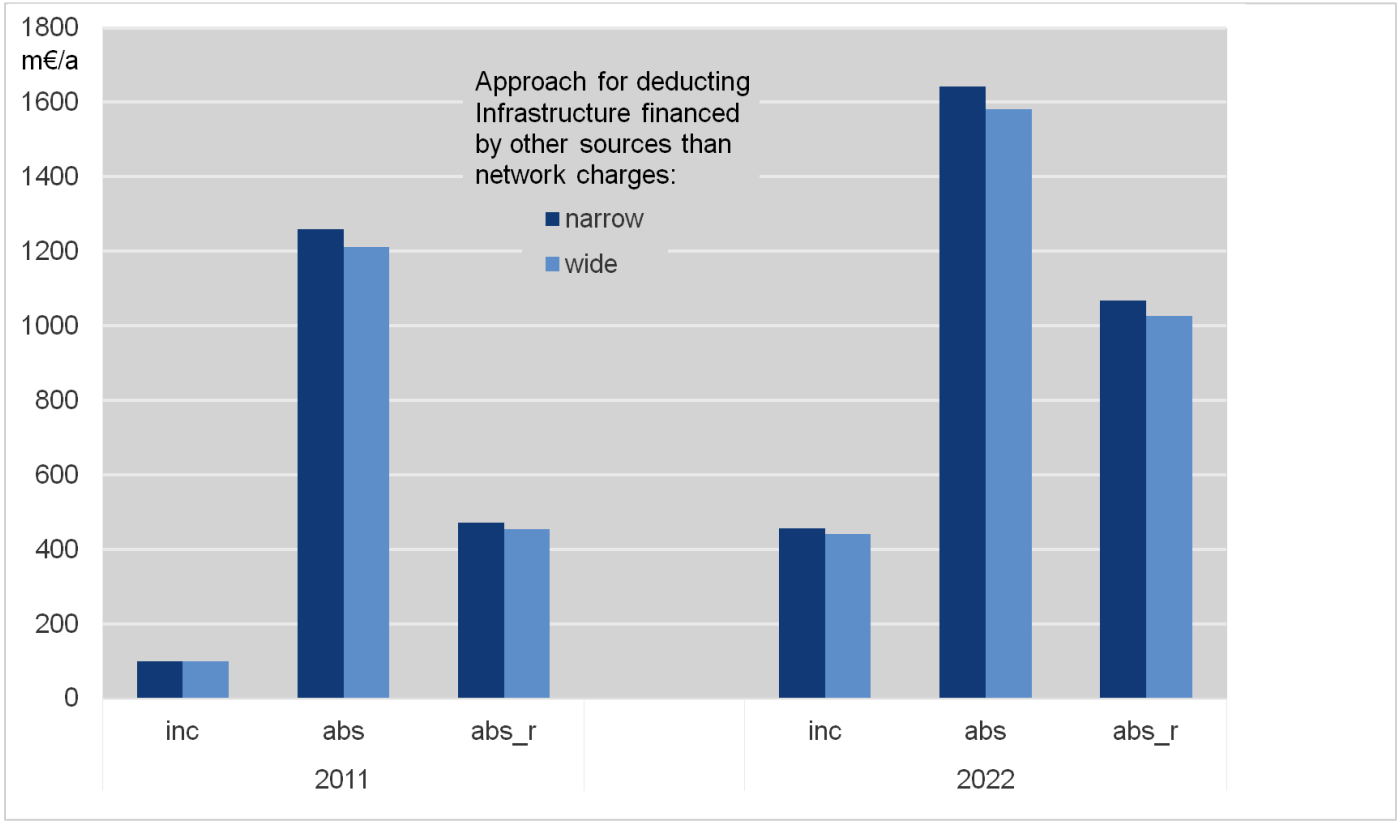
> Effect of GTS variation is much smaller than base case differences

> Effect on inc smaller than on abs and abs_r

Numerical assessment

ITC infrastructure fund size: Sensitivity analysis

Sensitivity with respect to treatment of congestion revenues

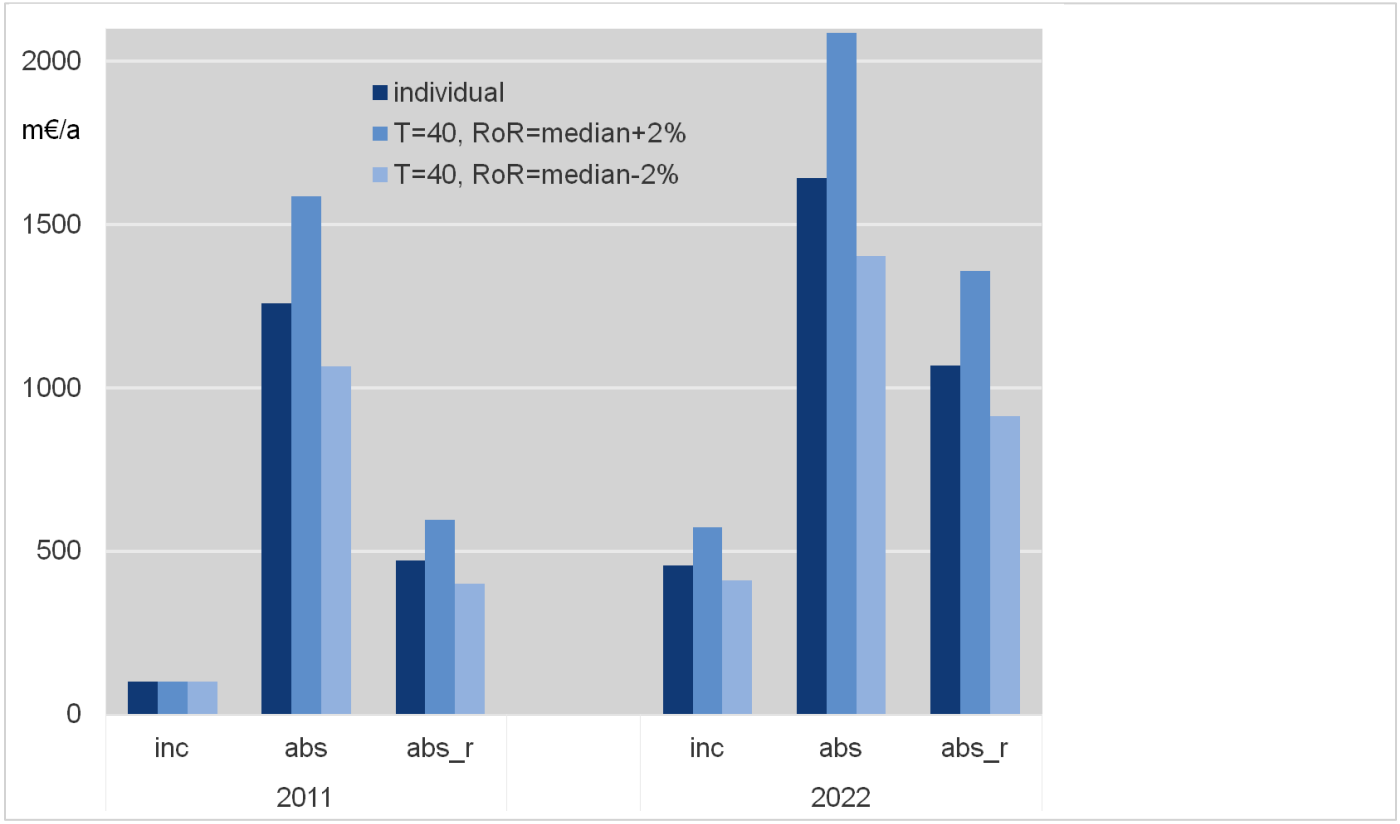


> Small impact with given data, because congestion revenues are small compared to LRAIC based total annual network cost

Numerical assessment

ITC infrastructure fund size: Sensitivity analysis

Sensitivity with respect to LRAIC parameters



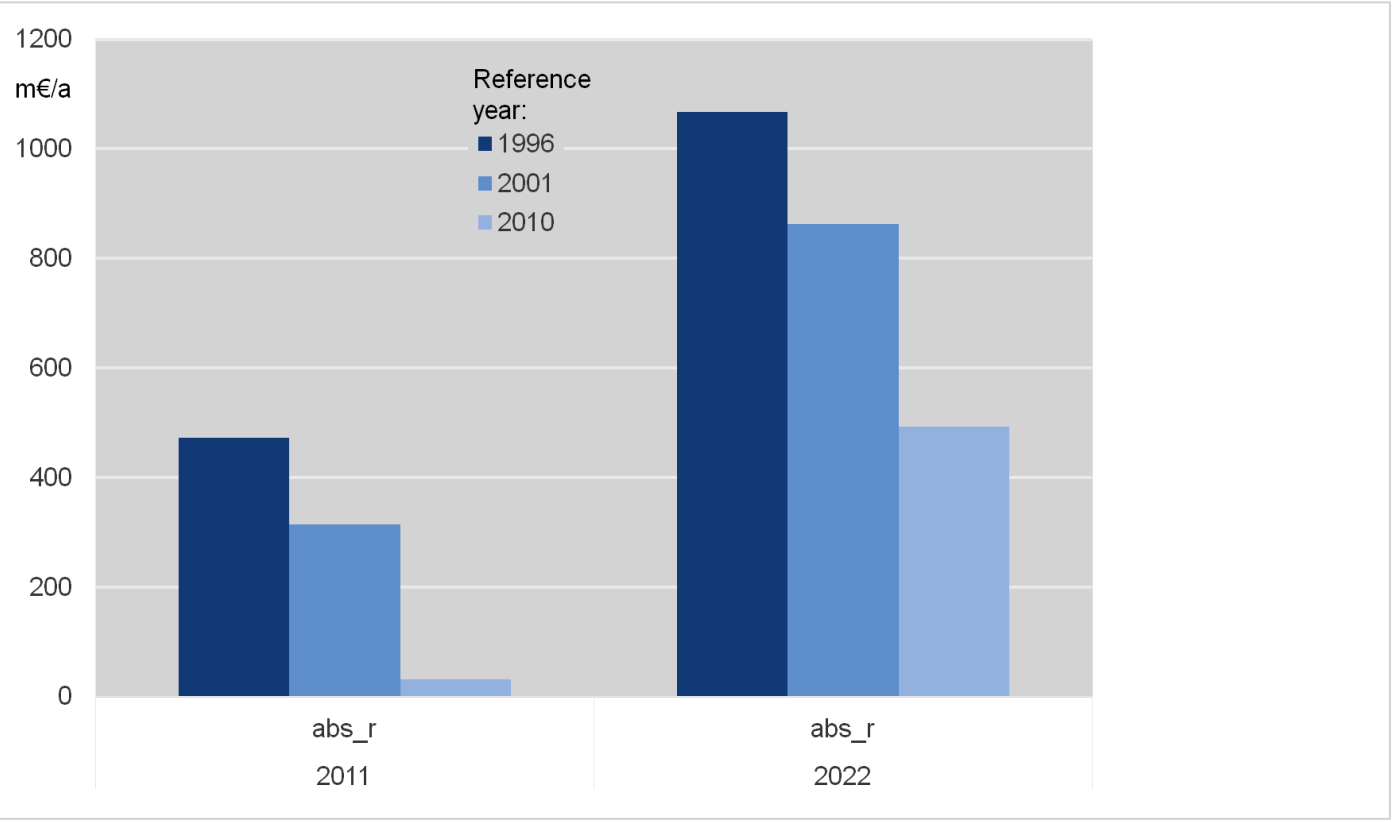
> Fund size varies by +25% / - 15% when altering RoR by 2%

> Damped effect on incremental approach

Numerical assessment

ITC infrastructure fund size: Sensitivity analysis

Sensitivity for restricted abs. approach w/ respect to the reference year



> Strong impact (intended flexibility – difficult to reach agreement?)
> Relative impact decreases over time

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Preliminary conclusions

Appraisal of methodology options for determining ITC infrastructure fund size

General observations

> Fund sizes differ considerably between the methods, but converge over time
> Relative order not changed by considered parameter variations
> Reservations concerning LRAIC bandwidth

Exception: Reference year for restricted absolute approach

Method-specific findings

Subject to reservations concerning LRAIC

> Absolute approach yields highest fund sizes
  » Outside usually discussed bandwidth
  » Abrupt change consistent with current fund size being in line with Reg. 714?
> Restricted absolute approach and incremental approach yield lower results
  » Advantage of incremental approach:
    Ensures consistency with current fund size
  » Advantage of restricted absolute approach:
    Avoids explicit tie to fixed setting of current fund size

Preliminary conclusions

Suitability of LRAIC

General considerations

> Alternative would require altering Reg. 714 → only if clearly better than LRAIC
> Motivation for LRAIC: High consistency across countries
> However, appears difficult to achieve in practice
  » Could be due to lack of practical relevance of LRAIC for national tariffing
> Improvement appears possible
  » External validation/auditing easier than for regulated cost (standardisation)
  » Difficulties faced in this study do not speak against LRAIC as such

Most suitable costing method could depend on approach for fund size

> Forward looking perspective of LRAIC consistent with incremental approach
> Regulated (historic) cost more appropriate for absolute approach
  » Considers entire asset base
  » In line with ITC purpose to compensate for costs actually incurred
> Restricted absolute approach: Practicability of obtaining reasonably sound cost figures could be the decisive criterion to decide between costing methods

consentec

Consentec GmbH

Grüner Weg 1
52070 Aachen
Germany

Tel. +49. 241. 93836-0
Fax +49. 241. 93836-15
info@consentec.de

www.consentec.de

Annex

Mathematical specification of methodology options

Incremental approach

$$F_{inc,t} = 100Mio\left(1 - \frac{t-2011}{D}\right)\frac{UC_{global,t}}{UC_{global,2011}}$$

$$+GTS_t \cdot \sum_{i=1}^{k}\left(Q_i\left(1 - q_{other,i}\right) \cdot UC_{i,t}\right)$$

with

t	year under assessment
D	standard depreciation period
k	number of new investment projects (2011 or later)
Q_i	quantity (in km or MVA) of new investment i
$q_{other,i}$	relative share of investment i financed by sources other than national network access charges
GTS_t	Global Transit Share of year t
$UC_{global,t}$	global unit cost in year t
$UC_{i,t}$	unit cost of asset class of investment i in year t

Mathematical specification of methodology options

Global Transit Share

$$GTS = \frac{\sum_{i=1}^{N} T_i}{\sum_{i=1}^{N} (T_i + L_i)}$$

with

N	number of ITC participants
T_i	transit of participant i
L_i	load of participant i

Mathematical specification of methodology options

Absolute approach and restricted absolute approach

$$F_{abs,t} = GTS_t \cdot \sum_{i=1}^{k} \left(A_i \cdot UC_{i,t} \right)$$

with	t	year under assessment
	GTS_t	Global Transit Share of year t
	A_i	Quantity (in km or MVA) of asset class i, after "appropriate adjustment" for financing by other sources than network access charges
	k	number of asset classes
	$UC_{i,t}$	unit cost of asset class i in year t

$$F_{abs,restricted,t} = F_{abs,t} \cdot \frac{t - t_{ref}}{D}$$

with	D	standard depreciation period
	t	year under assessment
	t_{ref}	reference year