

# Project Achievements



## Techno-economics of integrated communication systems and services

The overall objective of ECOSYS was to develop a strategic techno-economic framework for future telecommunications business, apply it to case studies and draw conclusions and recommendations for the stakeholders. We studied the market dynamics and worked out models and forecasts for the mobile, fixed and converged technologies, services and business scenarios.

### Main focus

The ECOSYS project focused on analyzing and modeling the technology and business evolution in developed and emerging telecom markets. Building on top of methodologies, developed in earlier European projects, ECOSYS created a new techno-economic framework that is suitable for modeling emerging business scenarios.

ECOSYS studied, for example, fixed broadband evolution towards higher bit rates using VDSL2 technology, and the role of WiMAX as fixed broadband solution for suburban and urban areas in Western European countries.

In the context of emerging mobile technologies, services and business players, ECOSYS analyzed the profitability of several business models and upgrade scenarios for a set of technology options.

ECOSYS also analyzed two Fixed Mobile Convergence (FMC) cases. The first case was from an integrated (mobile and fixed) operator point of view, and the other case was a 2G operator in an emerging market without a 3G license.

### Approach

To improve the analysis in the new, more complicated business and technology selection situations, ECOSYS pursued to evaluate and apply new methodologies like real option analysis and portfolio optimization. The project also focused on developing a systematic OPEX and tariff modeling as a basis for the case studies.

**Analysis of fixed broadband technologies:** The profitability was evaluated for areas that have a strong cable-TV operator, and in areas, where the competitor uses unbundled copper lines and the incumbent operator is not forced to provide unbundled lines from their new VDSL2 nodes.

**Emerging mobile business:** we identified the five most interesting scenarios in the developed framework of business alternatives:

1. Incumbent 2G operator choosing between UMTS or mobile WiMAX.
2. New entrant without spectrum license choosing between the pure service provider role or becoming a mobile virtual network operator (MVNO).
3. New entrant possessing an UMTS license.



## ECOSYS

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### Partners:

Deutsche Telekom, Germany

JVH International, Belgium

Helsinki University of Technology, Finland

Nokia, Finland

France Télécom R&D, France

National and Kapodistrian University of Athens, Greece

Norwegian Ministry of Government Administration and Reform, Norway

Telenor, Norway

Telefónica I+D, Spain

University of Athens, Greece

### Co-ordinator:

Ilari Welling

Nokia, Finland

E-mail: [ilari.welling@nokia.com](mailto:ilari.welling@nokia.com)

### Project Website

[www.celtic-initiative.org/projects/ecosys](http://www.celtic-initiative.org/projects/ecosys)

4. New entrant with a CDMA 450 license focusing on rural market in a Nordic country.

5. Mobile broadcast provisioning using DVB-H technology.

**Fixed Mobil Convergence:** The analysis focused on the differences between the "continue as now", i.e. separate fixed and mobile approach, and the approach to unify the business lines both on the organizational and technical levels.

## Achieved results

ECOSYS improved the techno-economic methodology and framework for telecom business analysis by evaluating and providing applications of real option analysis and portfolio optimization, and by developing the state of the art in OPEX and tariff modeling.

**Analysis of fixed broadband technologies:** The study showed that in areas with a strong cable-TV operator, the DSL operator's upgrade to VDSL2 is hardly profitable outside the areas, where no new fiber rollout is necessary. In cases where the competitor uses unbundled copper lines and the incumbent operator is not forced to provide unbundled lines from the new VDSL2 nodes, the upgrade case showed good profitability. WiMAX proved to be a viable fixed broadband solution for suburban and urban areas only where no or very low ADSL coverage is available.

**Emerging mobile business:** Out of the analyzed emerging mobile technologies, services and business players, the scenarios number 1, 2 and 5 proved to open up

viable cases, while scenario 3 is challenging. The business model used in case 4 did not show promising results at all. It is demanding to find the right business model for a newcomer as network provider in the saturated Western European mobile market, especially for sparsely populated areas. In scenario 1, UMTS showed a clearly stronger and less risky case than mobile WiMAX, but only for those who have acquired the license. A full virtual operator (scenario 2), with their own network termination has a benefit over a plain service provider, as having more competitive power and e.g. possibility to collect network termination fees. Scenario 5 demonstrates that DVB-H provides economically feasible prospects for mobile broadcast business.

**Fixed Mobile Convergence:** Both convergence studies indicate that the main advantage of introducing FMC services and network functionalities is to maintain market shares and, in the long run, to save OPEX costs. The delta cash flow calculations between the FMC case versus continuing current separate fixed and mobile businesses indicated clearly better profitability for the FMC operator, increasing towards the end of the study period (2007 - 2014). The investments in FMC were low compared to the OPEX savings gained. The second scenario of a 2G operator that has no 3G license in an emerging market demonstrates that broadband through the FMC approach can be a crucial factor for the 2G operator in reducing churn and related losses, when the other operators start to offer 3G services.

## Impact

The methodologies developed in ECOSYS will benefit the participating companies in their strategic calculations, as well as the industry at large through the public project deliverables, publications and conference presentations where information is shared as well as further research.

The fixed broadband evolution results of ECOSYS provide guidance for different business players, as well as the regulators, in assessing the incentives to invest into high-capacity technology deployments.

The emerging mobile business scenarios covered selected cases, but they give also more generic information about the dynamics between the different kind of business players considering the technology choices and market development. The existing and potential new players in the mobile market can find useful information for their strategic business decisions.

The analyzed FMC cases give quantitative justification for the decisions to migrate to the converging organization, infrastructure and integrated services, to gain better position in the future competition.

In addition to the utilization by the partners, we have efficiently disseminated the findings of the project through several conferences and publications, amounting to more than 50 publications in all.

In the year 2004, the project participated in ITU expert forums related to forecasting and managing risk in the telecommunication sector. In 2005, ECOSYS organized a special techno-economics session in NAEC (Networking and Electronic Commerce Research Conference). In the years 2006 and 2007, the project organized the CTTE (Conference in Telecommunications Techno-Economics), which is the prominent international conference focusing on techno-economics. The consortium intends to continue the yearly organization of the CTTE conference (<http://www.ctte-conference.org/>).

## About Celtic

Celtic is a European research and development programme, designed to strengthen Europe's competitiveness in telecommunications through short and medium term collaborative R&D projects. Celtic is currently the only European R&D programme fully dedicated to end-to-end telecommunication solutions.

**Timeframe:** 8 years, from 2004 to 2011

**Clusterbudget:** in the range of 1 billion euro, shared between governments and private participants

**Participants:** small, medium and large companies from telecommunications industry, universities, research institutes, and local authorities from all 35 Eureka countries.

## Celtic Office

c/o Eurescom, Wieblingen Weg 19/4,  
69123 Heidelberg, Germany

Phone: +49 6221 989 405, e-mail:  
[office@celtic-initiative.org](mailto:office@celtic-initiative.org)

[www.celtic-initiative.org](http://www.celtic-initiative.org)

