

#### **EFFLOCOM**

Energy efficiency and load curve impacts of commercial development in competitive markets

**EU/SAVE 132/2001** 

# **Interim Progress Report**

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## EFFLOCOM Partners:

Partner 1 / Coordinator	Norway
Partner 2	England)
Partner 3	Finland
Partner 4	Denmark
Partner 5	France
Partner 6	Norway
	Partner 2 Partner 3 Partner 4 Partner 5

<sup>\*)</sup> Until July 2003

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## 1 Executive summary

Halfway in the EFFLOCOM project all activities have been accomplished according to the work plan. There have been some delays, but the planned deliverables are produced:

- www.efflocom.com web page is established
- Reports from phase 1, 2, 3 and 4 are produced
- 6 national test projects are defined as EFFLOCOM pilots
- An additional workshop is arranged (Copenhagen 13 June 2003)

Unfortunately there have been a few changes in the partner structure:

- The Norwegian partner "E-CO Partner" closed down in April. A new company "E-CO Tech" has taken over the EFFLOCOM contract responsibilities, and is accepted by the other partners and the EC as new partner in the project.
- Electricity Association from England has withdrawn from the project due to reorganisation. SINTEF will take responsibility for, and finish the EA parts of the contract.

The formal steps requested by the Commission regarding change of partners have been followed. The cooperation among the partners and with the EC has run well so far and, in spite of changes in partnership, everything seems to be well prepared for the last year of the project. The main remaining parts of the project are:

- Completing phase 1 and 2 regarding load curve studies within primo September.
- Follow the 6 EFFLOCOM pilots and describe the technology and market impacts of the ongoing tests in technical reports (phase 3 and 4).
- Discuss and analyse policies and tools for energy efficiency (phase 5).
- Concluding workshop (June 2004).

## 2 Objectives

The project will seek to remove existing market barriers to energy efficiency through the determination of customer responses to different market based customer services of deregulated electricity markets. Load profile impacts from the introduction of competition will be studied for different customer groups, particularly with the focus on new communication solutions, variable pricing options and Smart-house technology. More specifically the objectives of the proposed action are to:

- Establish specifications for load profiles in deregulated markets while taking into account the interaction between electricity and other energy resources.
- Quantify the potential for peak power demand reductions in competitive electricity markets by the means of market solutions, dynamic pricing options, new technology solutions and information services.
- Quantify the energy efficiency potential in competitive electricity markets by the means of market solutions, dynamic pricing options, new technology solutions and information services
- Determine which policy actions are the most efficient in removing existing barriers to energy efficiency.

## 3 Progress made during the reporting period

## 3.1 Project management

#### 3.1.1 Contract and consortium

The start up of the project was delayed several times due to long contract preparation time compared to the initial plans from the EC and due to the change of partner just before final contract signature. The contract was signed 1 July 2002, which is the official start up date.

There have been two changes in the partnership (see 4.1):

- The Norwegian partner E-CO Partner has closed down and is substituted by E-CO Tech.
- The English partner Electricity Association has withdrawn from the project due to reorganisation.

#### 3.1.2 Financial coordination

The coordinator received 40% of the EU funding 1 month after contract signature. The payment is distributed among the partners.

## 3.1.3 Meetings

During the first year of the project four meetings in the coordination group and one workshop are arranged. Meetings and main topics of discussion are listed in Table 1.

Date Location	Meeting / Workshop	Main topics
2002.08. 23 London	Kick- off meeting Coordination group	<ul> <li>Project coordination</li> <li>EC requests</li> <li>Start of phase 1 and 2</li> <li>Planning phase 3 and 4</li> </ul>
2002.11.20 Helsinki	Coordination group	<ul> <li>Economy</li> <li>Web site update</li> <li>Progress phase 1 and 2</li> <li>Start of phase 3 and 4</li> <li>Presentation of VVT projects and relevant tools</li> </ul>
2003.03.20 Oslo	Coordination group	<ul> <li>Administration</li> <li>Draft report phase 1 and 2</li> <li>Draft report phase 3</li> <li>Progress phase 4</li> <li>Workshop preparation</li> </ul>
2003.06.12 Copenhagen	Coordination group	<ul> <li>Administration</li> <li>Deliverables phase 1 and 2</li> <li>Deliverable phase 3</li> <li>Description of Pilots</li> </ul>
2003.06.13 Copenhagen	Workshop 20 participants from EFFLOCOM Partners, sponsors and EC	<ul> <li>Demand Flexibility</li> <li>Customer products, Load profiles and segmentation</li> <li>Load Forecasting</li> </ul>

 Table 1
 Meetings EFFLOCOM

### 3.2 Deliverables

Activity	Responsible	Deliverables
Phase 1	Electricity Association/ SINTEF	EU/SAVE 132/01 EFFLOCOM report no.1, September 2003: Basis for load management
Phase 2	Electricity Association/ SINTEF	EU/SAVE 132/01 EFFLOCOM report no. 2, September 2003: Influence of Competition
Phase 3	SINTEF	EU/SAVE 132/01 EFFLOCOM report no. 3, September 2003: Survey of technology for Direct Communication
Phase 4	VTT	EU/SAVE 132/01 EFFLOCOM report no. 4, June 2003: <b>Description of the EFFLOCOM Pilots</b>
Project administration	SINTEF	EU/SAVE 132/01 EFFLOCOM report no. 5, September 2003: Interim Progress Report
Conference papers	E-CO Tech	Norvik, Lund: "How to achieve energy efficiency actions as an alternative to grid reinforcement!" ECEEE, Saint Raphäel, France, June 03.

Table 2 Deliverables

### 3.3 EFFLOCOM Pilots

6 national projects are defined as EFFLOCOM pilots. The pilots are described in EFFLOCOM report no. 4, and a summery of the main goals and activities are listed in table 3.

Pilot/objectives/technologies	Responsible Partner
Hourly metering with two-way communication and web-based interface for control and following consumption  The objectives of the Danish pilots are to increase the end-user flexibility in periods with scarcity of electrical energy and power by:  • Establishing a decision basis and suggest external conditions for a prioritised building of an infrastructure based on IT-solutions for direct communication and demand response.  • Develop, test and evaluate incentives, which stimulates flexibility in consumption, with basis in an economical bonus (to be a part of a power price tariff) and implementation of IT in order to facilitate the customers acting and knowledge on their consumption.	Energy Piano
Technology is based on	
Two-way communication (GPRS, internet)	
<ul> <li>Remote meter reading and smart house</li> <li>Web</li> </ul>	
Effect of web-based feedback on the electricity consumption and load curves  The main objective of the pilot is to study what effect the improved extranet-based information on energy consumption has in the real-estate and household energy and water consumption in terraced houses and in the block of flats.  Technology is based on  • Remote meter reading of hourly data of total electricity consumption	VTT
<ul> <li>and real estate electricity consumption (household consumption can be calculated) as well as of water and heat (district heat) consumption.</li> <li>Extranet-based feedback on consumption is given to building energy managers and partly also to final consumers</li> </ul>	

Pilot/objectives/technologies	Responsible Partner
Tempo tariff feedback at EDF Main objective is to study the effect of dynamic tariff tempo on the electricity consumption. The tempo option divides the year into three types of random days: 300 blue days (the least expensive), 43 white days (medium price), and 22 red days (the most expensive). Each day is divided into two fixed periods: peak hours (day) and off-peak hours (night). The colour of the day is chosen by the national operating system at the end of each day for the next day.	EDF
Technology of the pilots include  electronic meters  a notification equipment fit to inform the customer about the tariff of the present day and of the day after  energy management systems  ripple control (one-way communication technique for sending tariff signal using the electric power lines).	
Implementation of Demand Side management in Oslo	E-CO Tech
Main objectives are  to avoid/expose planned grid reinforcement with use of DSM (energy efficiency actions) and  to increase knowledge about electricity end-users behaviour and compose a motivation model that can be used by the grid-owner and his coadjutant partner for energy economising.  Technology includes  the smart house solution based on Internet and wireless radio communication and  the Ebox "plug and play" units implemented among residential end-	
users containing a switch, a radio receiver, a thermostat and a	
clock.	
New technology for Controlling of Power load in Oslo Main_objective of the project is to initiate remote controlling of minimum 2 MW uninterruptible power load among various categories of commercial customers. The grid owner (project) shall initiate implementation of necessary actions among the commercial end users through offering new tariffs related to controllable or interruptible load. Necessary actions will be implementation of new technology for smart house and building automation or other solutions for remote control of single power loads. The project shall also gain knowledge concerning "what makes the end user carry out the necessary actions?"	E-CO Tech
Consumer flexibility by efficient use of ICT	SINTEF
The objective of the project is to increase the end-user flexibility in periods with scarcity of electrical energy and power by  • Establishing a decision basis and suggest external conditions for a prioritised building of an infrastructure based on ICT-solutions for direct communication and load management.  • Develop, test and evaluate different incentives, which stimulates to flexibility in consumption, with basis in network tariff, power prices and other market solutions.  The technology of the project involves establishment of Direct Communication (two-way communication), including hourly metering and separate channel for remote control, to altogether 10 000 customers in 2 different network areas.	

 Table 3
 Pilots

# 3.4 Web page

A web page is established www.efflocom.com.

The site contains both public information and internal documents accessible by password only. The coordinator (SINTEF) is responsible for update of the site according to progress plan.

## 4 Changes or modifications to the original project

### 4.1 Project partners

The consortium is reduced from 6 to 5 partners from July 2003:

- E-CO Partner, Norway (Partner no. 6) closed down 11 April 2003. A new company E-CO
  Tech is established and the persons involved in the EFFLOCOM project are reemployed. The
  new company will continue the business of E-CO Partner and belonged contracts/agreements.
  SINTEF has received a declaration from E-CO Tech, signed by the Managing Director Mr. Per
  Morten Torvildsen, saying that E-CO Tech takes over and pursues the EFFLOCOM contract.
- 2. Electricity Association (EA), England (Partner no. 2), is considered to be closed down by end of September 2003. David Cooper, representing EA, informed the partners in the meeting no. 4 of coordination group in Copenhagen, 12 June 2003, that EA on this background has decided to withdraw from the EFFLOCOM project activity. Following decisions were made in the meeting:
  - SINTEF will take responsibility for, and finish the EA parts of the project contract which mainly is concerning phase 1 and 2.
  - EA will invoice 30% of the original contracted amount, according to the work performed.
  - EA will transfer all data information material received/used from all partners *including* UK to SINTEF, so that SINTEF can continue the project activity in a smooth way.

## 4.2 Progress Plan

Project	Dι	Duration of the project (in months)																								
phase			20	02								20	03						2004							
	1	2	3	4	5	6	7	8	9	1	1	1 2	1	1	1 5	1 6	1 7	1 8	1 9	2	2	2 2	2	2		
Phase 1:														P R												
Phase 2:			_	_	_	_	_	_	_	-		_	-	P R												
Phase 3:														PR						P R						
Phase 4:												PR										P R				
Phase 5:																			_	_	_		_	되고		
Project Meetings		Х			Х				Х			Х					Х				X			x		
Project deliver- ables			W P U			W P U						W S	W P U I R							W P U		W P U		W P U	F R	W S

**Table 4** Project progress plan (updated August 2003)

PR: Project report, IR: Interim report, WP: Web page, WPU: Web page update, FR: Final report, WS: Workshop

Table 4 includes the original plan and actual progress the first 13 months. Following changes have been necessitated so far:

#### Changes:

- The progress of phase 1 and 2 has been delayed. Final reports from these two phases will be completed by September 2003.
- The number of meetings in the coordination group has been increased from 3 to 4.
- An additional workshop has been arranged as a part of the dissemination process.

# 4.3 Plan for the dissemination of the results

Deliverable	Description	Туре
1	A project web site will be updated throughout the project	Web site
2	"Library" containing specifications of different types of load profiles, overview of load drivers of different countries and the availability of load profiles in the European countries.	Report Update of web site
3	Influence of competition on load profiles	Report Update of web site
4	Impacts of communication infrastructure	Report Update of web site
5	Quantification of energy efficiency potential from Smarthouse (Pilot case study)	Conference paper
6	Quantification of energy efficiency potential from dynamic pricing options (Pilot case studies)	Conference paper
7	Institutional settings to release the energy efficiency potential related to new market solutions	Guidelines
8	Potentials for load management and energy efficiency by different means	Brochure
9	Policies and tools for energy efficiency	Guidelines
10	Final dissemination of results	Workshop Update of web site

 Table 5 Original plan for dissemination.

### Changes:

- Additional deliverable from phase 4: Report describing EFFLOCOM Pilots (June 2003)
- Additional workshop in Copenhagen, 13 June 2003

# 5 Co-ordination with other projects/programmes

The project group have several contacts with other projects, but there is no formal cooperation. Following projects are linked to EFFLOCOM through the involved partners.

Projects	ID	Relevance	Link
ScadaOnWeb	EU (IST-00-30067)	Metering, Web Design Load curve data	SINTEF
OBELIX	EU (IST-01-33144)	End user Market	SINTEF
Demand Side Bidding	IEA	Market based Load reduction	SINTEF, VTT

Table 6 Linked projects.

## 6 Forecast of the next period activities and work

### 6.1 Impacts of communication infrastructure – pilot tests (phase 3)

The work will continue as described in the phase 3 project plan:

- Price signals: Description of network tariffs and electricity pricing used in the pilots
- Economical incentives of the different actors (end users, network owners, suppliers, authorities)
- Cost Benefit analyses, principles and examples from the pilots

The final report from phase 3 will be completed in February 2004.

### 6.2 Removing barriers – pilot tests (phase 4)

Most of the 6 pilots described in the table 3 continue during the winter 2003/2004. In each pilot the electricity consumption at customers are measured and analysed to estimate the effects of different type of technologies and pricing/information on electricity consumption and load profiles.

On the basis of the results the efficiency of different methodologies/technologies in removing barriers in energy efficiency and load reduction will be assessed.

The final report of phase 4 will be completed in April 2004.

### 6.3 Policies and tools for energy efficiency (phase 5)

Phase 5 will be started at the end of 2003. The phase 5 project plan will be prepared to the next meeting in the coordination group (Paris, 3 November 03).

#### 6.4 Dissemination

Information of the activities in the project will regularly be updated on www.efflocom.com.