

**EU projekt 7.OP (FP7-SME-2007-2):**

**SMILES**

**New technologies for water and energy savings in EU industrial laundries**

**1. UVOD**

**SMILES** je akronim za '**S**USTAINABLE **M**EASURES for **I**NDUSTRIAL **L**AUNDRY **E**XPANSION **S**TRATEGIES: **S**MART **L**AUNDRY-2015'. EU projekt SMILES št. 217809-2 bo trajal 3 leta, in sicer od septembra 2008 do septembra 2011.

Cilj projekta SMILES je raziskati, nadalje razviti in implementirati 16 novih trajnostnih tehnologij za varčevanje vode in energije in zmanjšanje količine CO<sub>2</sub> v industrijskih pralnicah Evropske unije.

Koordinator projekta je '**Federatie van de Belgische Textielverzorging vzw (FBT)**'. Konzorcij projekta sestavlja **14 projektnih partnerjev iz 7 članic EU** (Belgija, Nizozemska, Francija, Nemčija, Poljska, Slovenija in Hrvaška). V projekt je vključenih 2 MSP (SME), 5 združenj MSP (SME-AG) in 8 raziskovalnih institucij (RTD) (Tabela 1).

**Tabela 1. Partnerji EU projekta SMILES**

Partner	Ime partnerja	Država
1.SME-AG 1 (Koordinator)	Federatie Belgische Textielverzorging, FBT	Belgija
2. SME-AG 2	URBH	Francija
3. SME-AG 3	SPP	Poljska
4. SME-AG 4	Obrtno-podjetniška zbornica Slovenija, CCS-MT	Slovenija
5. SME-AG 5	Gospodarska zbornica Hrvaška , CCE-ITD	Hrvaška
6. RTD 1	Hogeschool Gent	Belgija
7. RTD 2	Schieke BVBA	Belgija
8. RTD 3	CTTN-IREN	Francija
9. RTD 4	wfk-CTRI	Nemčija
10. RTD 5	Univerza v Mariboru, UM-FZV	Slovenija
11. RTD 6	Univerza v Zagrebu, TTF-UZ	Hrvaška
12. RTD 7	PROMIKRON 3	Nizozemska
13. SME 1	Stomerij Zeekant	Nizozemska
14. SME 2	Kreussler & Co	Nemčija
15. RTD 8	ACT	Nizozemska

**UM-FZV:** prof. dr. Sonja ŠOSTAR TURK, doc. dr. Sabina FIJAN,

mag. Urška RABUZA.

## 2. NAMEN

V okviru projekta se bo z raziskavami, ki vsebujejo 16 ključnih tehnologij oblikovala SMART LAUNDRY 2015. Te vključujejo zmanjšanje porabe vode, prihranek energije, zeleno gorivo kot ustrezno nadomestilo za zmanjšanje CO<sub>2</sub>, nov energetski sistem in izboljšanje postopkov.

V Evropski uniji je registriranih 11.000 pralnic (več kot 90% je MSP), ki operejo 2,7 bilijona kg umazanega perila (mokra teža) na leto, zaposlujejo 168.000 delavcev, porabijo 42 milijonov m<sup>3</sup> pralne vode in 60 PJ energije na leto. Primerljiva količina vode se mora obdelati in sprošča se velika količina CO<sub>2</sub> (3,8 milijonov ton CO<sub>2</sub>/leto). Letna bilanca tega sektorja znaša 5,1 bilijon evrov in bi se lahko podvojila, če bi se vse razpoložljive tekstilije zamenjale z okolju prijaznimi produkti. Osredotočena in koordinirana raziskava za razvoj in izboljšanje inovativnih tehnologij lahko bistveno poveča učinek industrijskega EU sektorja pralnic. Za konvencionalne postopke pranja so namreč značilne izgube visokih entalpij in nezadostnost sredstev.

Popolna implementacija 16 ključnih tehnologij SMART LAUNDRY 2015 bo zmanjšala porabo vode do 10,4 milijone evrov (30% prihranek), porabo energije za 27,5 PJ (45% prihranek) in emisijo CO<sub>2</sub> za 2,3 milijonov ton na leto (60% prihranka) pri 100% predoru na trg v letu 2015 (Tabela 2).

**Tabela 2. Prihranek energije in zmanjšanje emisij CO<sub>2</sub> industrijskih pralnic EU pri 100% predoru na trg v letu 2015**

WP*	PRIHRANEK ENERGIJE (in PJ)		ZMANJŠANJE EMISIJ CO <sub>2</sub>	
	Posamezen WP	Kombinacija WP	(OLJE)**	(NARAVNI PLIN)****
LTW	5 PJ	4 PJ	0,29 MT CO <sub>2</sub>	0,22 MT CO <sub>2</sub>
GHL	10 PJ	5 PJ	0,36 MT CO <sub>2</sub>	0,27 MT CO <sub>2</sub>
AD	14 PJ	6 PJ	0,44 MT CO <sub>2</sub>	0,33 MT CO <sub>2</sub>
CHP	5 PJ	5 PJ	0,36 MT CO <sub>2</sub>	0,27 MT CO <sub>2</sub>
CO <sub>2</sub>			0,50 MT CO <sub>2</sub>	0,50 MT CO <sub>2</sub>
ER	10 PJ	7,5 PJ	0,55 MT CO <sub>2</sub>	0,41 MT CO <sub>2</sub>
<b>Skupen</b>		<b>27,5 PJ</b>	<b>2,50 MT CO<sub>2</sub></b>	<b>1,92 MT CO<sub>2</sub></b>
<b>Skupen kombiniran*</b>		<b>Δ 45%</b>	<b>2,3 MT CO<sub>2</sub> (Δ 60%)</b>	

WP = Work Package projekta (oz. delovni paket)

\*\*Izračunan prihodnjega izkoristka goriva za 60% olja in 40% naravnega plina v EU-27

\*\*\*Konverzijski faktor za olje: 0,073 MT CO<sub>2</sub>/PJ

\*\*\*\*konverzijski faktor za naravni plin: 0,055 MT CO<sub>2</sub>/PJ

Izboljšano poslovanje pralnic s 16 ključnimi tehnologijami in praksami bo povečalo uporabo tekstilij za ponovno uporabo in zmanjšalo odvržen in odstranljiv material za 20%. 16 ključnih tehnologij bodo raziskane na pilotnem nivoju in nadalje integrirani v

enotvit dizajn v industriji. Vzporeden »benchmarking« in inovacijski monitoring bo validiral dejansko potrebo po energiji in potencialne energijske prihranke bodočih inovacij. Načrtovan bodoči ekonomski zaslužek iz projekta SMILES je 1020 milijonov EUR v naslednjih 10 letih.

### 3. KLJUČNE TEHNOLOGIJE

Ključne tehnologije, ki bodo raziskane, nadalje razvite in implementirane v okviru projekta so:

1. Zmanjšanje porabe vode
2. Ponovna uporaba vode/membrane
3. Dezinfekcija vode
4. Superkrično uplinjanje
5. Nizko-temperaturno pranje z ustrezno higieno
6. Direktno plinsko ogrevane pralnice
7. Tehnike sušenja tekstilij
8. Kombinirana toplotna energija
9. Znižanje emisij CO<sub>2</sub>
10. Zmanjšanje energije
11. Redukcija kemikalij
12. Okolju prijazni tenzidi in aditivi
13. Elektrokemijsko beljenje
14. Čiščenje z ultrazvokom
15. Higiena tekstilij
16. Sestava SMART LAUNDRY-2015

Raziskovanje in razvoj v okviru projekta SMILES se bo izvajalo v **6 delovnih paketih (Work Packages (WPs))**:

- WP1 Zmanjšanje vode
- WP2 Varčevanje z energijo in zmanjšanje emisij CO<sub>2</sub>
- WP3 Redukcija kemikalij
- WP4 Izboljšanje kvalitete
- WP5 Integracija/ in posredovanje rezultatov projekta
- WP6 Management projekta

### 4. Izobraževanje

Pomembni sestavni del projekta SMILES je izobraževanje in šolanje ključnega osebja in aktivno sodelujočih delavcev za pomoč pri vpeljavi SMART LAUNDRY 2015. Projekt prav tako obsega dokumentiranje, produkcijo in objavljanje ključnih gradiv na posebni spletni strani za nacionalna združenja in za vse SME v EU sektorju. Končno zmanjšanje sredstev v procesih pralnic so zagotovljeni z avtomatskim sistemom za energijsko upravljanje z nadziranjem in monitoringom prihrankov za produkcijo in storitev (input in output prihranki).

## 5. KONTAKT

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Slika 1. Kick-off sestanek Konzorcija SMILES na sedežu projektnega koordinatorja FBT v Bruslju (BE)

# SMILES

## New technologies for water and energy savings in EU industrial laundries

### 1. INTRODUCTION

**SMILES** is the acronym for '**Sustainable Measures For Industrial Laundry Expansion Strategies: Smart Laundry-2015**'.

EU project SMILES no. 217809-2 will be started in September 2008; it has duration of 3 years and will be completed in September 2011.

Project SMILES will **investigate, further develop and implement 16 new sustainable technologies for water and energy savings and CO<sub>2</sub> reduction of EU industrial laundries.**

The evaluators of the European Commission (EC) for this project stated that project SMILES (amongst other things):

- a) has a very high relevance for the objectives of the European Community;
- b) is excellent by its good and clear focus on scientific and technological issues;
- c) is well balanced in expertise.

Project coordinator '**Federatie van de Belgische Textielverzorging vzw (FBT)**' has submitted the project proposal. It is targeted for SME Associations in the Theme FP7-SME-2007-2. The Consortium of the project consists of **14 project participants** from **7 EU Members States** (Belgium, the Netherlands, France, Germany, Poland, Slovenia and Croatia): **5 European AGs** (Industrial Associations) including their members, **2 individual SMEs** (small and medium enterprises) and **7 RTDs** (research performers); see Table 1.

The project has a **well-planned management structure** for the cooperation of 5 European Industrial Associations, 2 individual SMEs and 7 RTD performers from 7 EU Members States.

Table 1. Participants EU project SMILES

Participant type	Participant name	Country
1. SME-AG 1(Coordinator)	FBT	Belgium
2. SME-AG 2	URBH	France
3. SME-AG 3	SPP	Poland
4. SME-AG 4	CCS-MT	Slovenia
5. SME-AG 5	CCE-ITD	Croatia
6. RTD 1	Hogeschool Gent	Belgium
7. RTD 2	Schieke BVBA	Belgium
8. RTD 3	CTTN-IREN	France
9. RTD 4	wfk-CTRI	Germany
10. RTD 5	UM-FZV	Slovenia
11. RTD 6	TTF-UZ	Croatia
12. RTD 7	PROMIKRON 3	Netherlands
13. SME 1	Stomerij Zeekant	Netherlands
14. SME 2	Kreussler & Co	Germany
15. RTD 8	ACT	Netherlands

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## 2. PURPOSE

It is the purpose of project SMILES to design the **SMART LAUNDRY-2015** through research, further development and adaptation of 16 sustainable key technologies with its practical utilisations (combined for green sites or individual for existing plant augmentation). These include water reduction, energy savings, green fuel substitutions for CO<sub>2</sub> reductions, new energy systems and improved sequencing of the processes, greater textile hygiene.

The EU-27 industrial laundry sector, with 11.000 establishments (more than 90% SMEs), washes 2,7 billion kg of soiled textiles per year (wet weight) employing 168.000 workers and utilizing **42 million m<sup>3</sup>** of wash water and **60 PJ** of energy per year. It generates similar quantities of waste water, to be treated, and substantial CO<sub>2</sub> emissions (**3,8 million tons CO<sub>2</sub>/year**).

The annual turnover of the sector is 5,1 billion euro, which can be doubled if all disposable textile articles were replaced by environmentally friendly reusable items.

Focused and coordinated research to develop and improve innovative technologies can greatly enhance the performance of the industrial EU laundry sector. Conventional laundry processes are characterized by large enthalpy destructions and resource inefficiencies.

It is expected that full implementation of the 16 key technologies of Smart Laundry-2015 will reduce the annual water consumptions by at least **10,4 million m<sup>3</sup> (30% water savings)**, the energy consumptions by **27,5 PJ (45% energy savings)** and the overall CO<sub>2</sub> emissions by **2,3 million tons CO<sub>2</sub> per year (60% CO<sub>2</sub> reduction)** at 100% market penetration in all EU Member States in the year 2015 (see Table 2).

**Table 2. Future annual energy savings and CO<sub>2</sub> emissions reduction of EU industrial laundries at 100% market penetration in the year 2015**

WP*	ENERGY SAVINGS (in PJ)		CO <sub>2</sub> EMISSIONS REDUCTION	
			(OIL) ***	(NATURAL GAS) ****
	Single WP	Combined WPs		
LTW	5 PJ	4 PJ	0,29 MT CO <sub>2</sub>	0,22 MT CO <sub>2</sub>
GHL	10 PJ	5 PJ	0,36 MT CO <sub>2</sub>	0,27 MT CO <sub>2</sub>
AD	14 PJ	6 PJ	0,44 MT CO <sub>2</sub>	0,33 MT CO <sub>2</sub>
CHP	5 PJ	5 PJ	0,36 MT CO <sub>2</sub>	0,27 MT CO <sub>2</sub>
CO <sub>2</sub>			0,50 MT CO <sub>2</sub>	0,50 MT CO <sub>2</sub>
ER	10 PJ	7,5 PJ	0,55 MT CO <sub>2</sub>	0,41MT CO <sub>2</sub>
<b>Total</b>		<b>27,5 PJ</b>	<b>2,50 MT CO<sub>2</sub></b>	<b>1,92 MT CO<sub>2</sub></b>
<b>Total combined**</b>		<b>Δ 45%</b>	<b>2,3 MT CO<sub>2</sub> (Δ 60%)</b>	

WP = Work Packages in the project

\*\* Calculated future fuel utilisation of 60% oil and 40% natural gas in EU-27

\*\*\* Conversion factor for oil: 0,073 MT CO<sub>2</sub>/PJ

\*\*\*\* Conversion factor for natural gas: 0,055 MT CO<sub>2</sub>/PJ

### 3. KEY TECHNOLOGIES

The three general **objectives** in SMILES are:

- 1) to **develop and design** the Smart Laundry-2015 through **RTD** resulting in lower water and energy usage and CO<sub>2</sub> emissions.
- 2) to **communicate and disseminate** the research findings and the design of the Smart Laundry-2015 to the SME-AGs, key commercial equipment suppliers and early adopting SME end-users in the EU-27.
- 3) to **implement** the project results of the Smart Laundry-2015 in the EU-27 through **training and demonstration** projects.

The key technologies that will be investigated, further developed and implemented:

1. Water reduction
2. Water reuse / membranes
3. Water disinfection
4. Supercritical gasification
5. Low Temperature Washing with adequate hygiene
6. Direct gas heated laundries (steamless industrial laundry)
7. Textile drying techniques (AD-ID-UD-MD)
8. Combined Heat Power
9. Lowered CO<sub>2</sub> emissions
10. Energy buffers
11. Chemicals reduction
12. Cleavable detergents and additives
13. Electrochemical bleaching
14. Ultrasonic cleaning
15. Textile hygiene
16. Synthesis for SMART LAUNDRY-2015

SMILES RTD activities for the 16 key technologies will be executed in **6 Work Packages (WPs)**:

- WP1 Water reduction
- WP2 Energy savings and CO<sub>2</sub> emissions reduction
- WP3 Chemicals reduction
- WP4 Quality improvement
- WP5 Integration/ and dissemination of project results
- WP6 Project management

Improved laundry services with the 16 key technologies and practices will enhance reusable textiles and reduce the throwaways and disposables by 20%. The 16 key technologies will be investigated at pilot scale level and subsequently integrated in a unified design. A parallel benchmarking and innovation monitoring will validate both the actual energy demand and the potential of energy savings of future innovations. Future economic gains from SMILES are projected at 1020 million EUR in the next 10 years.

#### 4. EDUCATION AND TRAINING

An important component of project SMILES is the **educational effort and training** of key staff members and hands-on workers of industrial laundries to assist in the introduction of the Smart Laundry-2015. The project also encompasses the writing, production and dissemination of key materials by a **special website** to national associations and to all SMEs in the EU sector. Finally the resource reductions in the industrial laundry processes are assured by an **automated energy management system** controlling and monitoring **input and output savings**.



## 5. CONTACT

**Further details** can be received by contacting the **Project Management Team**:

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Figure 1. Kick-off Meeting of the SMILES Consortium at the head office of project coordinator FBT in Brussels (BE)