



# UCO to biodiesel - 2030. Turn waste to resource

Brussels, 3<sup>th</sup> March 2015



Co-funded by the Intelligent Energy Europe  
Programme of the European Union

## **SUPPORT**

RECOIL project is supported by the European Commission through the Intelligent Energy Europe program



Co-funded by the Intelligent Energy Europe  
Programme of the European Union

## Coordinator


ENA – Energy and Environment Agency of Arrábida 

**Duration of the project:** 36 months

**Budget:** 1.519.793 € (75% contribution from IEE Programme)

**Partners:** Factor Social 

ReSEL TUC - Technical University of Crete 


ALESSCO - Local Energy Agency of the Province of Cosenza 

Senergia - Regional Energy Agency for the municipalities of Barreiro, Moita, Montijo and Alcochete 

ElinBiofuels SA. 

ETA-Florence Renewable Energies 

Ayuntamiento de Castrolibero 

EUBIA - European Biomass Industry Association 

ABP - Agro Business Park 

APEC - Energy Management Agency Province of Cádiz 



**KICK-OFF  
MEETING**

24 · 25<sup>TH</sup> MAY '12  
SETÚBAL (PT)

## PROPOSAL

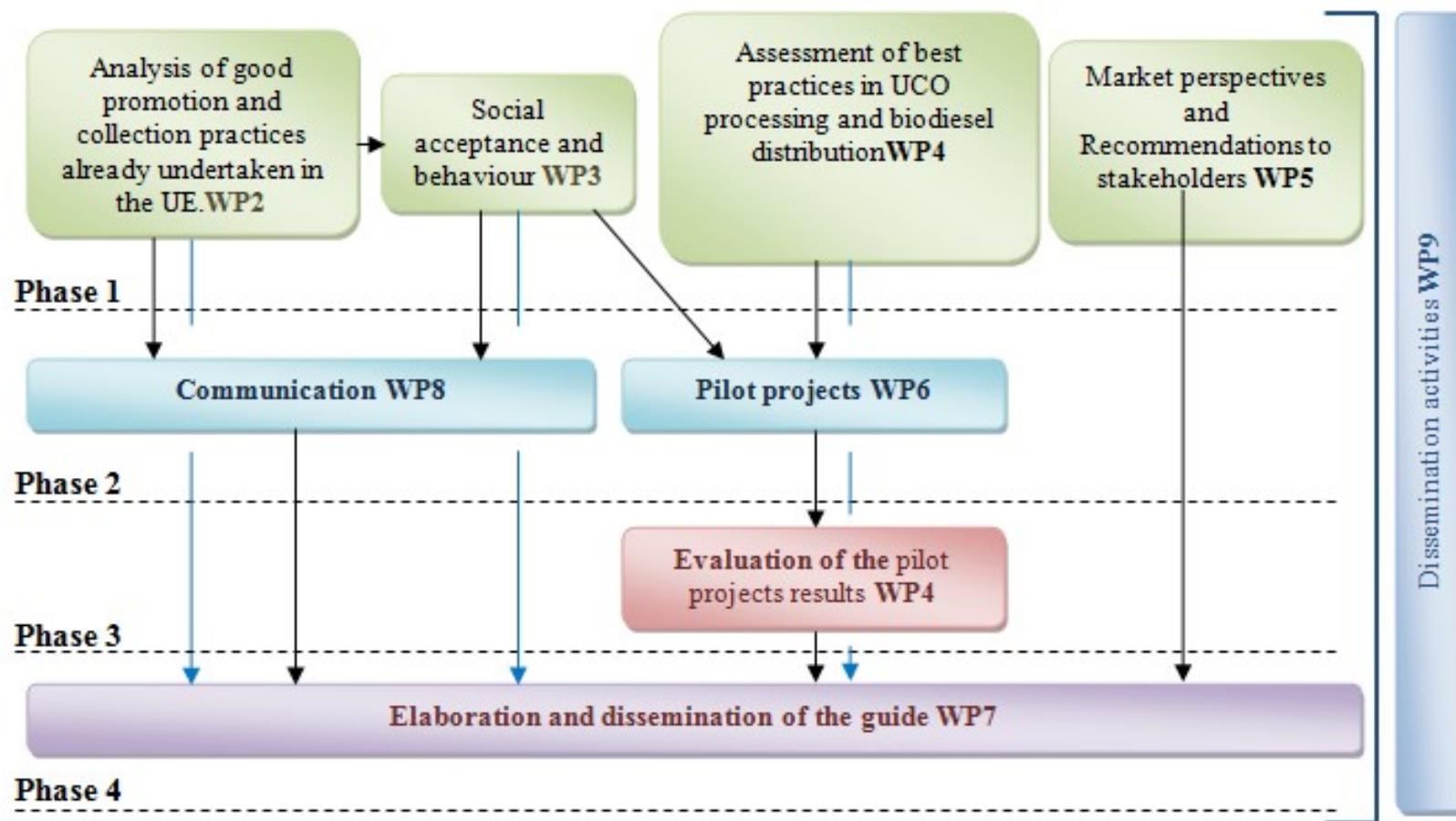
The project RecOil - Promotion of used cooking oil recycling for sustainable biodiesel production presents an integrated assessment of the “UCO to biodiesel” chain best practices, and aims to encourage new efficient collection, transformation, commercialisation UCO chains at local or regional level.



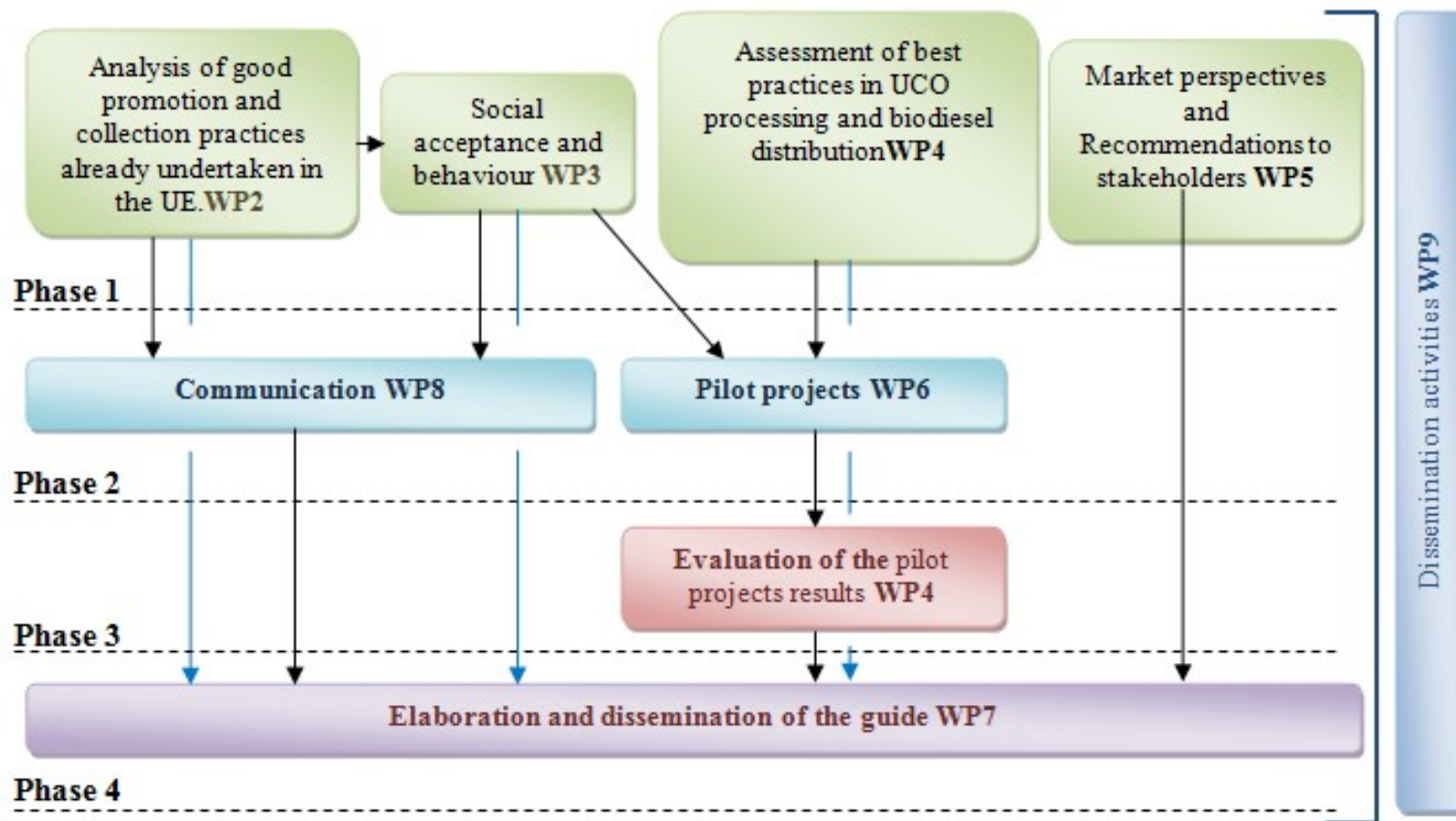
## **SPECIFIC OBJECTIVES**

- ✓ Encourage, increase and optimize UCO collection and its conversion to biodiesel
- ✓ Promote biodiesel markets through public awareness raising and involvement of stakeholders
- ✓ Best practices evaluation and the benefits of UCO recover by implementation of pilot projects
- ✓ Reduce competition between food production and energy crops used for biodiesel production
- ✓ Contribute to energy policies at national and European level

## RECOIL WORKING PROGRAM



## RECOIL WORKING PROGRAM



WP 2

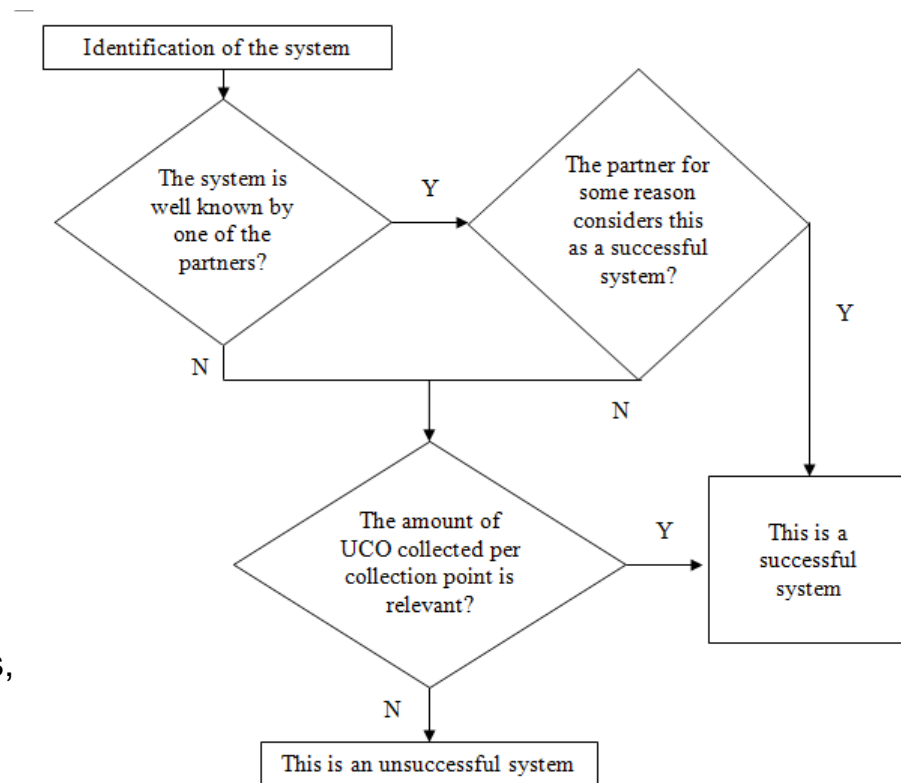


**Good promotion and collection practices**

- 43 collection systems were analysed, 21 of them were considered successful systems

### Typical collection methods identified

Collection points in gathering places such as schools, supermarkets, parking lots and municipal buildings





WP 2



**Good promotion and  
collection practices**

## Hygiene and safety issues

In 67% of the cases no hygiene problems were reported

Main hygiene problems reported:

- Dirty generated by discharge and pouring of bulk oil into the containers
- Dirty container stained clothes of people delivering their UCO (very few cases)

Main safety problems:

- UCO theft (80% of organizations declares that UCO theft risk is medium or high)
- Vandalism

WP 2



Good promotion and  
collection practices

## Frequent and common denominators of success cases

Support by local administrations

Involvement of local municipal waste management companies

Large engagement of local stakeholders

Engagement of student's families and teachers

Strategic positioning of UCO collection points in public places

Massive promotion via multiple communication activities

Citizens engagement through rewards and ease of delivery

WP 2



Good promotion and  
collection practices

### **Critical factors for development of UCO collection systems:**

Cleanliness and maintenance (spills, leakage to the street)

Lack of awareness/promotion

Distance of UCO collection point

Contamination of UCO with mineral oils

Contamination of UCO containers with urban wastes (plastic, glass, organic, etc.)

Amount of UCO collected might not be sufficient to satisfy the supply needs of biodiesel producers

WP 3



**Social acceptance  
and behaviour**

- Sample 877 valid surveys:
  - 83.60% women
  - 48.20% having children
  - Average age was 46 years old
  - School level referred mostly to the secondary school degree (38.60%)
  - The majority reported an average annual income of less than 15 000,00 € (47.30%)

WP 3



**Social acceptance  
and behaviour**



The average domestic consumption of oil is about 2,5 litres



More than 58% of the answers says that use the same oil for fry 2 or more times



Most of the people storages' UCO in bottles



Usually the UCO is disposed once per month

WP 3



**Social acceptance  
and behaviour**

## The collection system preferred

Disposal facilities	86,9%
Door-to-door collection system	79%
Disposal in supermarkets	66,2%
Gas stations	57,8%
Schools	54,9%
Municipalities	53,5%
Restaurants	51,5%

The majority reported to be willing to participate but only if it would be easy and practical (38.40%)

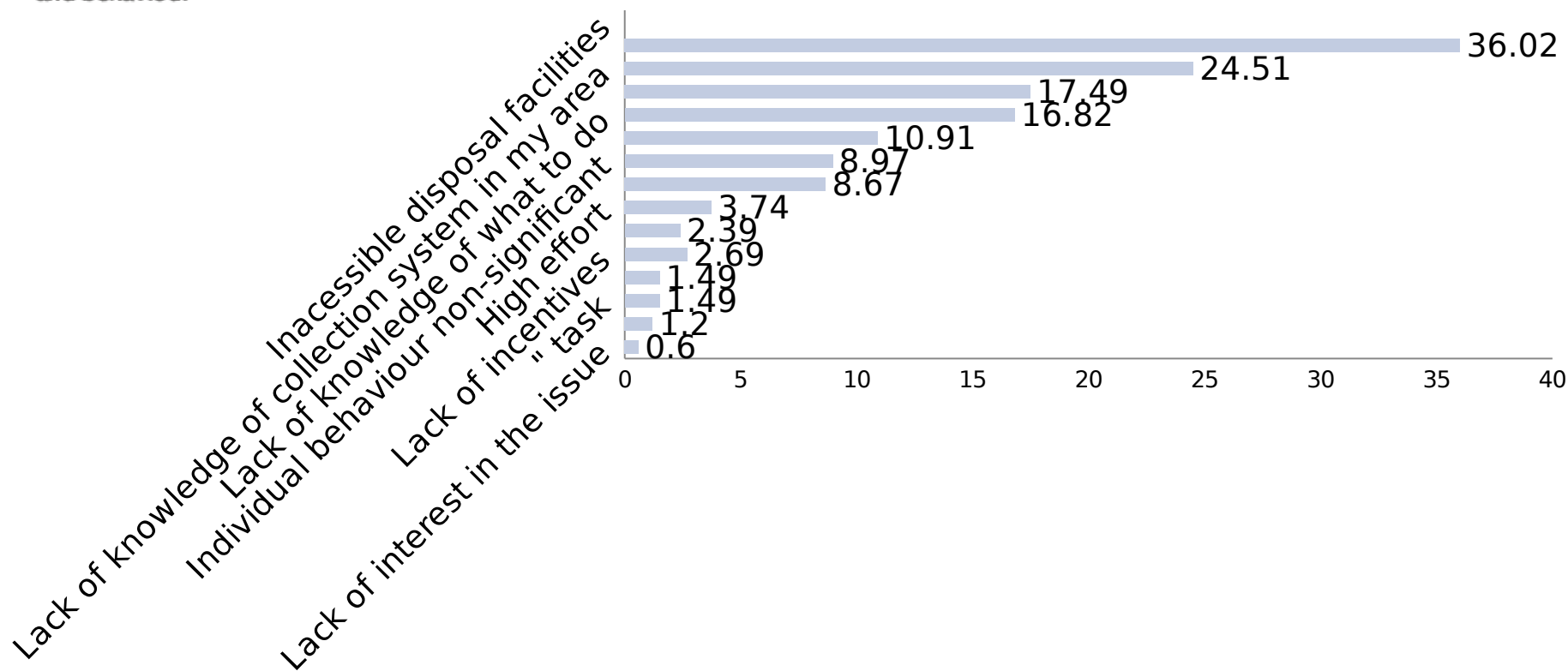
Others would be willing to participate even though the system would be complex (33.10%)

WP 3

## Barriers to UCO recycling



Social acceptance  
and behaviour



WP 4



**Best practices in UCO  
processing and biodiesel  
distribution**

### **Some quality control of UCO-best practice**

- Verification that UCO meets specifications when it is dispatched from the spot terminal to prevent contamination on biosiesel plant
- Procedures review when the quality of the product changes especially due to seasonal or feedstock transitions
- Proper training of the personnel
- Maintenance of the plant's equipment



WP 4

## Comparison between UCO to biodiesel transformation processes



**Best practices in UCO processing and biodiesel distribution**

Process	Environmental	Technical	Health & Safety	Market Opportunities & Barriers	Harmonization with EU Directive & Sustainability	Climate / Geographical Parameters
Homogeneous - catalyzed transesterification	Waste Water and Saponified Products Poor quality of glycerin.	Established Technology	Normal	Increasing Market Share. Low Quality	Covering the EU Directive on Sustainability	High dependent
Heterogeneous – catalyzed transesterification	No waste water. Low to normal glycerin purity.	Longer Time Reaction	Normal	High Costs Increased production of Methylsters	Covering the EU Directive on Sustainability	High dependent
Enzyme - catalyzed transesterification.	No waste water. Normal or triacetyl glycerol as byproduct		Normal	High Costs. Increased Production of Methylsters. High reaction time	Covering the EU Directive on Sustainability	Moderate
Supercritical Methanol	No waste water. Higher impact on the environment, because of its requirement for large amounts of methanol during the reaction and consequently the energy expenditure in methanol recirculation in the recycle loop. Large amounts of energy.	High glycerin purity	High	High Costs Increased Production of Methylsters. Large amounts of energy. Not proved industrial production.	Covering the EU Directive on Sustainability	Moderate

**From the comparative legal framework analysis and barriers/opportunities we identify:**

WP 5



Market perspectives  
and recommendation  
to stakeholders

	Denma rk	Italy	Greec e	Portug al	Spain
Maximum value for share of biodisel - 2013	7%	7%	7%	5,5%	7%
Targets for biofuels - 2020	10%	10 %	10%	10%	13,6 %
Annual quota system for biodiesel producers	No	No	Yes	Yes	Yes
Doble counting of CO <sub>2eq</sub> reduction	Animal fats	Yes	Yes	Yes	-

Need of clear and long term targets for biofuels	VS	Current uncertainties in EU environmental policy
Need of homogenous and well determined certification pathways	VS	Need of slim procedures
Need of stronger incentives for second generation biofuels	VS	Current lack of governmental financial resources
Ambitious production targets	VS	Lack of efficient strategies
Need of enhancing the biofuels higher blends market	VS	Lack of synergies with the transport sector

## PHASE 2 and 3

WP 6



Pilot Projects

- ✓ **7 pilot projects** (2 - Italy, 1 - Spain, 2 - Greece, 2 - Portugal)
- ✓ **12 protocols established with local authorities**
- ✓ **About 425 collecting points available**
- ✓ **6000 l UCO collected per month (average)**
- ✓ **Problems:** UCO theft, cultural and administrative issues

## PHASE 2 and 3

WP 8



Promotional campaigns  
and communication



## PHASE 4

WP 8



Guide elaboration and dissemination



EN

### WELCOME TO THE RECOIL ONLINE GUIDE

This guide is based on good practices identified by the European initiative RecOil and will give you guidance how to implement and optimize your Used Cooking Oil (UCO) to biodiesel chain. In this guide you can find information about UCO collection systems, transformation methods, legal framework and several useful tips related to communication, maintenance, safety, promotional campaigns and operators. The RecOil project, with the support of the European Commission in the frame of the Intelligent Energy Europe (IEE) Programme, aims to increase sustainable production of biodiesel and its inclusion in the local market by increasing the collection and conversion of Used Cooking Oil (UCO). More information about RecOil can be found at [www.recoilproject.eu](http://www.recoilproject.eu).

For project monitoring purposes, please indicate the stakeholder group you belong to:



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Developed by: 



etaflorence @ renewableenergies



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Photo: Tim Sackton

## UCO PROCESSING AND BIODIESEL DISTRIBUTION METHODS

[MORE INFORMATION HERE](#)

You are here: Inicio



### Partners

- ▣ Home
- ▣ About UCOs
- ▣ Good promotion and collection practices
- ▣ Social acceptance and behavior
- ▣ UCO processing and biodiesel distribution methods
- ▣ Market perspectives and legal framework
- ▣ Pilot Projects
- ▣ Newsletters

● Location of the partners



[www.recoilproject.eu](http://www.recoilproject.eu)

**Thank you for your attention**

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Find out more in the RecOil Project website:

**WWW.RECOILPROJECT.EU**

