



Renewable Fuels for Advanced Powertrains - RENEW  
EC Contract No. SES6-CT-2003-502705

***SP6 Final Report***

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## 1 Summary

The whole field of renewable energies is developing so quickly, but is still so little considered in actual education and training curricula, that the renewable energy sector is risking a shortage of specialised personnel in the medium term. In the area of biofuels, this does not only concern the sectors of the economy being directly involved in fuel production, but also administrations, the entire agricultural sector and the automobile industry.

The overriding aim of subproject 6 in RENEW was to provide a contribution to reduce this foreseeable shortage of specialised personnel. The concrete objectives were to establish a series of summer schools on renewable motor fuels, including the implementation of summer schools in 2005 and 2007, to organise a gender mainstreaming session, and to produce a web-based lecture course on this topic and a film on the RENEW project as a whole.

The first summer school, the 1<sup>st</sup> European Summer School on Renewable Motor Fuels was organised from 29-31 August 2005 on the Environmental Campus of the Umwelt-Campus (Environmental Campus), Birkenfeld, of the Polytechnic University of Trier, Germany. The second summer school, the 2<sup>nd</sup> European Summer School on Renewable Motor Fuels, was organised from 29-31 August 2007 at the Agricultural University of Warsaw, Poland. The proceedings of both summer schools have been made available on the RENEW website. In addition, videos of the first summer school have been recorded and be made available on DVD. Short versions of the videos together with the written proceedings on the website form the web-based lecture course. Further, a gender mainstreaming session was integrated in the 3<sup>rd</sup> project meeting in Engelberg, in March 2005, and a film on the RENEW project was produced.

**A specific contribution of SP6 to the RENEW project as a whole was the development of the logo and flyer design in the frame of the 1<sup>st</sup> summer school preparation by the marketing department of B.A.U.M. Consult GmbH. On demand of the overall project coordinator, B.A.U.M. allowed to use the design also for other purposes in the project, e.g. the flyers with the programme of the plenary meetings.**

## 2 Objectives, methodology and main results achieved within SP6

The whole field of renewable energies is developing so quickly, but is still so little considered in actual education and training curricula, that the renewable energy sector is risking a shortage of specialised personnel in the medium term. In the area of biofuels, this does not only concern the sectors of the economy being directly involved in fuel production, but also administrations, the entire agricultural sector and the automobile industry.

The overriding aim of subproject 6 in RENEW was to provide a contribution to reduce this foreseeable shortage of specialised personnel. The concrete objectives were to establish a series of summer schools on renewable motor fuels, including the implementation of summer schools in 2005 and 2007, to organise a gender mainstreaming session, and to produce a web-based lecture course on this topic and a film on the RENEW project as a whole.

### **3 Training session on gender mainstreaming (WP6.1)**

A one hour training session on gender mainstreaming was organised in connection with the third plenary project meeting in Engelberg, Switzerland (1. – 4. March 2005). The workshop addressed the project partners and trained them on gender mainstreaming strategies in projects, making use of existing strategies and experience of the project partner EEE. The corresponding documentation was made available in deliverable 6.1.2.

### **4 Development of a concept for a summer school and a web-based lecture course (WP6.2)**

The concepts for a summer school and a web-based lecture course have been established and documented in the deliverables D6.02.01 and D6.02.02.

Central elements of the summer school concept are:

- The programme covers the broadest possible range of bio-fuels, including, apart from the options researched on in RENEW, also 1<sup>st</sup> generation bio-fuels and new options whose impact is still difficult to estimate. Introducing lectures on motor technology, fossil fuels as well as lectures on horizontal issues such as potentials, costs, logistics, ecological impact etc. complete the programme.
- Various means are deployed in order to ensure an intensive exchange among participants and lecturers: panel discussions at the end of each session, evening events, remote location for summer school, etc.
- Care for children is offered in order to allow young parents to participate in the summer school.
- The announcement of the summer school is done exclusively by email and internet.

Central elements of the web-based lecture course concept are:

- The web-based lecture course concept comprises the full set of pedagogical means, lectures, exercises, seminars, library, etc., though not all these elements can be implemented with the RENEW project due to the limited budget.
- The lectures are presented in the form of videos which are essentially recorded during the RENEW summer schools.

The videos consist of the recorded lecture and integrated presentation slides.

### **5 Production of a web-based lecture course (WP6.3)**

Videos have been produced on the basis of the lectures given at the first summer school in 2005. As the video files are too large for down-load from the web, short sequences were produced and put on the web. Those who want to see the videos in full length have the possibility to order the DVD with the Summer School 2005 Proceedings from B.A.U.M. Consult against a handling fee.

The short versions of the videos together with the written proceedings of the summer school form the basis of the web-based lecture course which was made available on

a server of B.A.U.M. Consult. The respective web-site has the same design as the RENEW homepage. Direct access is possible from the RENEW website.

## **6 Pilot implementation of a summer school (WP6.4)**

The pilot implementation of a summer school has been done as 1st European Summer School on Renewable Motor Fuels from 29 to 31 August 2005 on the Environmental Campus in Birkenfeld, Germany (see programme on next page).

With 111 participants, 35% students, 65% persons in professional live from a broad range of industries, research institutes, administration, etc. coming from 16 countries, and with 23 high-quality lectures, the summer school has been a big success.

Questionnaires have been distributed to the participants for giving a feed-back on the event as a whole as well as the individual lecturers. Points could be given from 1 (very good) to 5 (very bad).

It is very encouraging that the programme and the topics chosen got a mark of 1.63 on the average, i.e. a good to very good rating. Individual comments given by the participants indicate, that the main point moving participant not to give a “very good” was that the programme focused too much on 2nd generation biofuels – a point hardly to avoid in the RENEW project.

Equally, the location was rated very positively and thus the concept of organising the summer school in a well accessible, but rather remote place without distraction, where participants and lecturers stay together in breaks and in the evening.

The comments on the individual lecturers were very telling and apparently well reflected too, allowing for a good basis for establishing the next summer schools lecturer list. The point which led primarily to different ratings of the referents was their capability to keep within the foreseen time limit. Apart from that, all referents got rather good ratings.

Activities in this workpackage included:

- (1) Pre-selection of presentations;
- (2) Invitation to pre-selected speakers to provide both a paper and a presentation;
- (3) Review of papers and presentations both from a scientific aspect (more related to quality and relevance of content) and from an educational aspect (more related to form of presentation, quality of setting of subject in a wider context, etc.) and final selection of speakers;
- (4) Final selection and briefing of speakers;
- (5) Two announcements including final programme;
- (6) Final definition of all local arrangements;
- (7) Collection of final version of papers for summer school proceedings;
- (8) Implementation of the summer school;
- (9) Production of the summer school proceedings.

The second summer school programme and relevant figures on the participants and their feed-back is shown on the next pages.

## 1<sup>st</sup> European Summer School on Renewable Motor Fuels

### 29-31 August 2005, Umwelt-Campus-Birkenfeld



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### Monday, 29 August 2005

08:30 **Guided tour on Umwelt-Campus**

**General introduction**  
*Session moderator: M. Stöhr, B.A.U.M. Consult GmbH*

10:30 Welcome

10:45 Why bio-fuels? - An introduction into the topic  
*M. Specht, Zentrum für Sonnenenergie- und Wasserstoffforschung Baden-Württemberg*

11:45 Automobile motor technology and requirements for automotive fuels  
*C. Kohnen, Volkswagen AG*

12:45 Panel discussion with referents of morning session

13:00 **Lunch break in Umwelt-Campus Mensa**

**Existing automotive fuels**  
*Session moderator: U. Zuberbühler, Zentrum für Sonnenenergie- und Wasserstoff-Forschung*

14:00 Properties of liquid transport fuels from mineral oil  
*D. Walther, BP*

14:40 Bio-ethanol - existing pathways  
*D. Schieder, Technical University of Munich*

15:20 **Coffee break**

15:40 Bio-gas up-grading for use as automotive fuel  
*W. Tentscher, Asian Institute of Technology (a.D.)*

16:20 Bio-diesel from trans-esterification of oils and fats  
*J. Krahl, University of Coburg*

17:00 Panel discussion with referents of afternoon session

18:30 **Walk/ shuttle transfer to Castle of Birkenfeld**

20:00 **Reception by the District Chief Executive, Landrat Redmer, and Dinner Buffet in the Castle of Birkenfeld**

22:30 **Shuttle transfer back to Umwelt-Campus**

### Tuesday, 30 August 2005

**Generation of synthetic gas from bio-mass and gas cleaning**  
*Session moderator: M. Claußen, CUTEC-Institut GmbH*

08:30 Gasification of bio-mass - an overview on available technologies  
*U. Zuberbühler, Zentrum für Sonnenenergie- und Wasserstoff-Forschung*

09:15 The case of the Choren Carbo V gasifier  
*M. Rudloff, Choren Industries GmbH*

09:40 **Coffee break**

10:00 The FZK concept of biomass gasification  
*R. Stahl, Forschungszentrum Karlsruhe GmbH*

10:25 Indirectly heated gasifiers - the case of the Güssing reactor  
*R. Rauch, Techn. Univ. Wien*

10:50 CFBR - the CUTEC concept of biomass gasification  
*M. Schindler, CUTEC-Institut GmbH*

11:15 The case of the Chemrec black liquor gasifier  
*I. Landálov, Chemrec AB*

11:40 Panel discussion with referents of morning session

12:30 **Lunch break in Umwelt-Campus Mensa**

**Transport fuel synthesis**  
*Session moderator: E. Heini, Volkswagen AG*

13:30 Synthesis of automotive fuels from bio-mass syngas - An overview of available technologies  
*G. Schaub, Engler-Bunte-Institut, Univ. Karlsruhe*

14:15 Fischer-Tropsch-Diesel synthesis  
*M. Rudloff, Choren Industries GmbH*

14:40 Fischer-Tropsch heavy products up-grading  
*A. Lappas, Center for Research and Technology Hellas*

15:05 **Coffee break**

15:25 Di-Methyl-Ether synthesis  
*I. Landálov, Chemrec AB*

15:50 Ethanol synthesis  
*J. Caraballo, Abengoa Bioenergia S.L.*

16:15 Methanol-to-synfuels synthesis  
*T. Dimmig, Institut für Energieverfahrenstechnik und Ingenieurwesen, Technical University of Freiberg*

16:40 Panel discussion with referents of afternoon session

18:30 **Wild pig rotisserie dinner in front of Umwelt-Campus Mensa**

### Wednesday, 31 August 2005

**Horizontal issues**  
*Session moderator: M. Stöhr, B.A.U.M. Consult GmbH*

08:30 Biomass potential and potential development  
*M. Pisarek, EC Baltic Renewable Energy Centre*

09:30 Biomass supply and logistics in future scenarios  
*D. Thrän, Institut für Energetik und Umwelt GmbH*

10:30 **Coffee break**

10:45 Life cycle assessment of BtL pathways  
*S. Jungbluth, ESU-Services*

11:45 Cost assessment of BtL pathways  
*A. Vogel, Institut für Energetik und Umwelt GmbH*

12:45 **Lunch break in Umwelt-Campus Mensa**

13:45 Technology assessment of BtL pathways  
*F. Seyfried, Volkswagen AG*

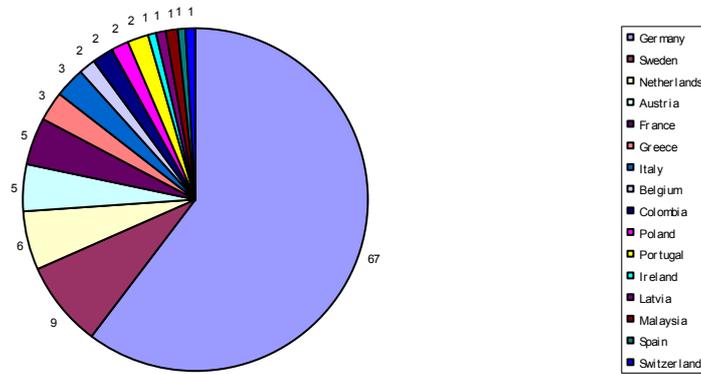
14:45 Material flow management in regions  
*P. Heck / K. Helling, Umwelt-Campus Birkenfeld*

15:45 Closing session

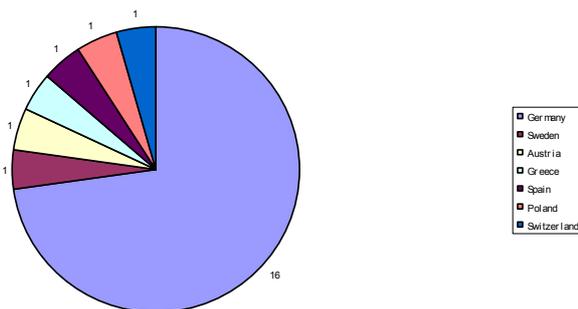
16:00 **End**



## Participants by country



## Lecturers by country





## Participants' feed-back on event

<b>student</b>	13	<b>partner</b>	4	<b>other prof.</b>	11
<b>male</b>	20	<b>female</b>	8		

### accomplishment of the event

	Very good	Good	Okay	Bad	Very bad	
Programme and topics chosen	12	13	2	0	0	1,63
Time-flow of programme	2	14	7	3	2	2,61
Announcement of the topics	6	17	5	0	0	1,96
Signage of location	12	11	4	1	0	1,79
Quality of location	11	12	5	0	0	1,79
General atmosphere	9	10	4	0	0	1,78
						<b>1,93</b>



## Feed-back on accommodation

<b>accommodation</b>						
	<b>all 3</b>					
	Very good	Good	Okay	Bad	Very bad	
Price-performance ratio	6	13	10	0	0	2,14
Distance to lecture room	13	7	9	0	0	1,86
						<b>2</b>





## Feed-back on catering

<b>catering</b>	Very good	Good	Okay	Bad	Very bad	
Menus offered	4	15	8	2	0	2,28
Taste	3	10	14	2	0	2,52
Price	8	12	9	0	0	2,03
						<b>2,28</b>



## Feed-back on accessibility

### access to the event

	Very good	Good	Okay	Bad	Very bad	
Description of the access	6	16	5	2	0	2,1
Accessibility	7	15	5	0	2	2,14
	0	0	0	0	0	2,12





## Feed-back on lecturers: overall average

SPEAKER AVERAGE	1	2	3	4	5	2,17
<b>Personal review</b>	Very good	Good	Okay	Bad	Very bad	
<b>The content o. t. speech</b>						<b>2,1</b>
was well-fitting to its subject						1,9
was logic, comprehensible and practical						2,2
<b>The Speaker</b>						<b>2,2</b>
used technical terms and explained them						2,3
responded to questions of the auditory						2,2
limited the length of his speech to a appropriate time						2,3
spoke loud, clear and understandable						2,2
used facilities for a better performance						2,3

## 7 Summer school 2007 (WP6.5)

The organisation of the second summer school in Poland was in pattern with the first summer school in Germany: Two announcements were published and a comprehensive information package for participants was made available on the RENEW website. The actions until the event itself comprised registration of participants, final fine-tuning of local arrangements, and up-date of the information package.

The Summer School took place from 29-31 August 2007 on the campus on the Agricultural University of Warsaw. 25 lectures were given and 3 flash-light presentations of summer school participants (students) who are not RENEW partners. 69 participants from 15 countries joint the event, out of which 36% were students and 38% women. The targets to increase both students and women participation compared to the first summer school were fully achieved. Further, the distribution of country or origin was more balanced than in 2005.

The feed-back of the participants which collected via a short questionnaire was overwhelmingly positive. The analysis of the feed-back was presented at the 8<sup>th</sup> RENEW plenary meeting in Dublin on 26<sup>th</sup> September 2007. The Summer School proceedings were published in September 2007 on the RENEW website shortly before the plenary meeting.

Activities included:

- (1) Development of a draft concept (2 options) and submission to the Coordination Committee;

- (2) Finalisation of the concept;
- (3) Selection of a venue in Poland;
- (4) Pre-selection of presentations;
- (5) Invitation to pre-selected speakers to provide both a paper and a presentation;
- (6) Review of papers and presentations both from a scientific aspect (more related to quality and relevance of content) and from an educational aspect (more related to form of presentation, quality of setting of subject in a wider context, etc.) and final selection of speakers;
- (7) Final selection and briefing of speakers;
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- (12) Production of the summer school proceedings.

The second summer school programme and relevant figures on the participants and their feed-back is shown on the next pages.

## 2<sup>nd</sup> European Summer School on Renewable Motor Fuels 29-31 August 2007, Agricultural University of Warsaw (SGGW)



### Wednesday, 29 August 2007

#### General introduction

Session moderator: *M. Stöhr, B.A.U.M. Consult GmbH*

- 08:30 Welcome notes
- 09:00 The RENEW project: aims and main results  
*E. Heini, Volkswagen AG*
- 09:30 Why bio-fuels? - An introduction into the topic and overview of different bio-fuel options  
*M. Specht, Zentrum für Sonnenenergie- und Wasserstoff-forschung Baden-Württemberg*

10:30 Coffee break

#### Generation of synthetic gas from bio-mass and gas cleaning

Session moderator: *M. Stöhr, B.A.U.M. Consult GmbH*

- 11:00 Gasification of biomass - an overview on available technologies  
*U. Zuberbühler, Zentrum für Sonnenenergie- und Wasserstoff-Forschung*
- 12:00 Lunch break

- 13:00 The status of the Choren Carbo V gasification  
*K. Biener, Choren Industries GmbH*
  - 13:45 The status of the FZK concept of biomass gasification  
*E. Henrich, Forschungszentrum Karlsruhe GmbH*
  - 14:30 Coffee break
  - 15:00 Indirectly heated gasifiers – results of biomass gasification with the Güssing reactor  
*R. Rauch, Techn. Univ. Wien*
  - 15:45 CFBR - the status of the CUTEC concept of biomass gasification  
*B. Benker, CUTEC-Institut GmbH*
  - 16:30 The status of the Chemrec black liquor gasification concept  
*I. Landálov, Chemrec AB*
- Flash-lights on work of summer school participants**
- 17:15 Short presentations given by summer school participants (see separate list of speakers)
  - 18:00 Departure to city centre
  - 19:00 Visit of the city centre
  - 20:00 All-you-can-eat-and-drink dinner buffet, BrowArmia

### Thursday, 30 August 2007

#### Transport fuel synthesis

Session moderator: *E. Heini, Volkswagen AG*

- 09:00 Fischer-Tropsch-Fuel synthesis  
*K. Biener, Choren Industries GmbH*
- 09:40 Fischer-Tropsch heavy products up-grading  
*A. Lappas, Center for Research and Technology Hellas*
- 10:20 Coffee break
- 10:50 Di-Methyl-Ether synthesis  
*I. Landálov, Chemrec AB*
- 11:30 Ethanol synthesis  
*J. Caraballo, Abengoa Bioenergia S.L.*
- 12:10 Lunch break

#### Bio-fuel use in motors

Session moderator: *U. Zuberbühler, Zentrum für Sonnenenergie- und Wasserstoff-Forschung*

- 13:40 Automobile motor technology and requirements for automotive fuels  
*W. Degen, Daimler-Chrysler AG*
- 14:40 The results of motor tests of BIL by VW  
*E. Heini, Volkswagen AG*
- 15:25 Coffee break
- 15:55 The results of motor tests of BIL by Daimler-Chrysler  
*W. Degen, Daimler-Chrysler AG*
- 16:40 The results of motor tests of DME by Volvo  
*H. Salsing, VOLVO Power Train Sweden*
- 17:25 The results of motor tests of synthetic fuels by Renault  
*P. Rouveiroles, REGIENOV*

### Friday, 31 August 2007

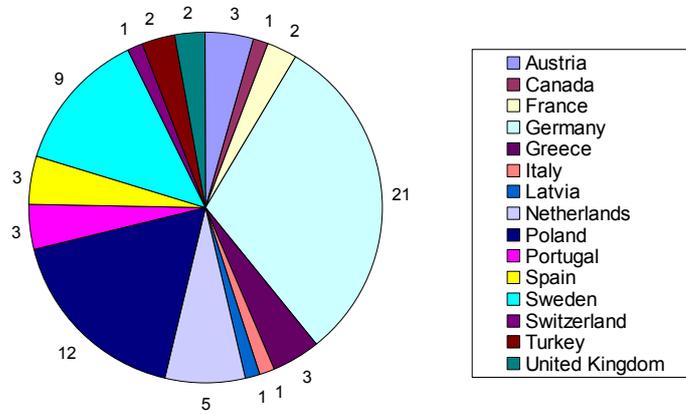
#### Assessment of BTL pathways

Session moderator: *M. Stöhr, B.A.U.M. Consult GmbH*

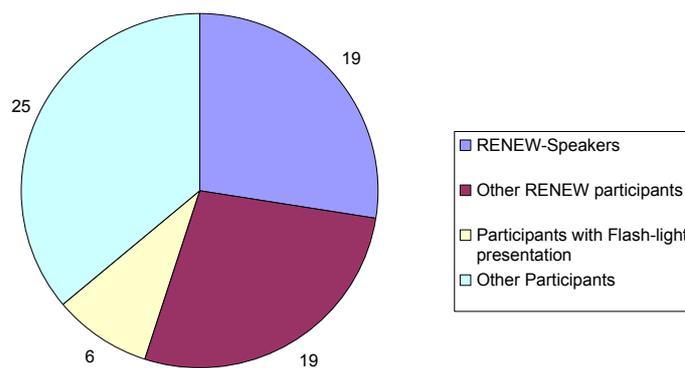
- 08:30 Environmental assessment methodologies for renewable energies  
*M. Tuchschnid, ESU-Services*
- 08:50 Biomass assessment: data, methodologies and tools  
*M. Rogulska, Institute for Fuels and Renewable Energies*
- 09:20 Potential assessment: land use change  
*E. Gaňko, Institute for Fuels and Renewable Energies*
- 09:50 Potential assessment: potential for biomass production for BTL in Europe  
*E. Gaňko, Institute for Fuels and Renewable Energies*
- 10:20 Coffee break
- 10:50 Biomass supply and logistics  
*F. Müller-Langer, Institute for Energy and Environment gGmbH*
- 11:50 Life cycle assessment of different biomass fuels  
*M. Tuchschnid, ESU-Services*
- 12:20 Lunch break
- 13:20 Cost assessment  
*F. Müller-Langer, Institute for Energy and Environment gGmbH*
- 14:05 Toxicological assessment  
*R. Nordlinger, VOLVO Technology Corporation AB*
- 14:35 Technology assessment  
*D. Beiermann, Volkswagen AG*
- 15:20 Closing session
- 15:40 End



## Participants by country



## RENEW vs other participants





## Feed-back: accomplishment of the event

	Very good	Good	Okay	Bad	Very bad
Programme and topics chosen	7	16	1		
Time-flow of programme	5	10	7	2	
Announcement of the topics	5	13	6		
Signage of location	5	5	12	2	
Quality of locations	3	11	10		
General atmosphere	5	15	4		
Description of the access to the event in the announcements	4	6	8	4	



## Feed-back: quality of lectures

The three best lectures concerning their content?	1. M. Specht: <i>Why bio-fuels? An introduction to the topic</i>
	2. M. Tuchschnid: <i>Life cycle assessment of different biomass fuels</i>
	3. U. Zuberbühler: <i>Gasification of biomass-an overview on available technologies</i>
The three best lectures concerning the rhetoric of the speaker?	1. M. Specht: <i>Why bio-fuels? An introduction to the topic</i>
	2. I. Landälvy: <i>The status of the Chemrec black liquor gasification concept</i>
	3. A. Lappas: <i>Fischer-Tropsch heavy products upgrading</i>



## Feed-back: accommodation

	Very good	Good	Okay	Bad	Very bad
Price-performance ratio	9	10	4	0	0
Distance to lecture room	7	6	5	3	2



## Feed-back: catering

	Very good	Good	Okay	Bad	Very bad
Menus offered	0	9	10	3	1
Taste	1	8	8	6	1
Price	1	11	6	5	1



## **8 Subproject management (WP6.6)**

The coordination activities at the beginning of the project focused on finding a proper time and place for implementing the gender mainstreaming session.

In the second year, they were dominated by the discussion of the subproject leader with the members of the Coordination Committee about the exact programme and lecturers of the summer school. In particular, some members of the Coordination Committee were very concerned about a potential lecture on pure vegetable oil which they wanted to discard. This happened finally in full agreement of all parties, because the chosen lecturer did not submit in time a paper which could be considered as fitting with the required quality standards.

The further decision processes around the finalisation of the programme for the summer school 2007 as well as on the details of the organisation went on much more smoothly.

A number of subproject meetings were organised, generally linked to the plenary progress meeting. In addition, one subproject meeting took place at the office of B.A.U.M. in Munich and one at CUTEC in Clausthal-Zellerfeld. The bulk of the subproject coordination however, was organised via email and phone. The production of the film was managed in very close co-operation with the Consortium Committee.

**A specific contribution of SP6 to the RENEW project as a whole was the development of the logo and flyer design in the frame of the 1<sup>st</sup> summer school preparation by the marketing department of B.A.U.M. Consult GmbH. On demand of the overall project coordinator, B.A.U.M. allowed to use the design also for other purposes in the project, e.g. the flyers with the programme of the plenary meetings.**

## **9 RENEW Film production (WP6.7)**

The main objective was to disseminate the results of the RENEW project in the most efficient and effective way including the audiovisual presentation in television in order to achieve a wide audience.

A small working group was setup by members of the coordination committee who defined the scope and content of the film. A tender for a film was performed and as the maker Fact+Film GmbH in Bremen selected. The main facts: A 20 minute film on the RENEW project presenting results of the subprojects and the assessment of pathways. The script and all details were setup in close cooperation with the film group and the Coordination Committee. The final version was commented and revised by all partners. The camera team travelled to a variety of locations including Warsaw (Poland), Piteo (Sweden), Dublin (Ireland), Clausthal Zellerfeld, Karlsruhe (Germany), Güssing (Austria), Seville (Spain) and used supplied materials from several contractors including VW, Daimler, Volvo, Renault and Choren.