

Short Rotation Woody Crops (SRC) plantations for local supply chains and heat use

Project No: IEE/13/574



***Minutes***  
***International Study Tour***  
***Successful SRC production and  
utilization concepts***

*21-23 January 2014*  
*Uppsala, Sweden*

**WP 1 – Task 7.4**

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SRCplus website: [www.srcplus.eu](http://www.srcplus.eu)

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## 1 Introduction

The SRCplus International Study Tour took place on 21-23 January in Uppsala, Sweden alongside the SRCplus 2<sup>nd</sup> Progress Meeting (20 January 2015). As foreseen, the study tour was organised for 2.5 days by SLU.

All project partners attended the study tour. The power point presentations of all speakers are available on the SRCplus website under the 'News' section and on the SRCplus Dropbox.

A detailed list of participants is attached to the minutes (Figure 1). In total 30 participants joined the international study tour from 7 European countries. A detailed programme of the study tour is attached to the minutes.

On 20 January 2015 SLU hosted a common dinner at Restaurant Lingon, Svartbäcksgatan 30, Uppsala, where organizational details for the study tour were announced. In addition to the SRCplus partners, different stakeholders joined the dinner.



Figure 1: Participants of the SRCplus 2<sup>nd</sup> Progress Meeting in Uppsala, Sweden

## 2 Study Tour – Day 1

The core programme of the study tour started on 21 January 2015 at the Swedish University of Agricultural Sciences, Department of Crop Production Ecology, Ecology Centre. The first day was planned to play the role of providing the necessary background information to all partners and stakeholders about SRC cultivation and management issues in Sweden.

After the introduction provided by Dr. Ioannis Dimitriou (Figure 2), the coordinators of the SRCplus project Dominik Rutz and Rita Mergner introduced the project idea and main activities (Figure 3).



Figure 2: Welcome of the participants to the international study tour, Dr. Ioannis Dimitriou, SLU



Figure 3: Overview on the SRCplus project idea and main activities, Dominik Rutz, WIP

Afterwards the general overview of issues concerning willow SRC in Sweden was given by Nils-Erik Nordh, the researcher at SLU. Dr. Nordh focused on all management issues of SRC (from planting to harvest and use), providing with research results, but also with information

on practical issues concerning the SRC biomass production system for energy, which was probably more on focus of this group (Figure 4).



**Figure 4: Overview on willow plantations in Sweden, Dr. Nils-Erik Nordth**

The next presentation was given by Dr. Almir Karacic, researcher at SLU, focusing on the cultivation of poplar plantations as energy feedstock in Sweden, both as coppice and single-stem cultivation. Dr. Karacic analysed the current situation in Sweden for poplar, and draw examples with similarities and differences in terms of management regime between cultivation in Sweden and other European countries (Figure 5).



**Figure 5: Overview on poplar plantations in Sweden, Dr. Almir Karacic, SLU**

The day continued with a visit to nearby willow SRC experimental plots located near the SLU campus. The participants had the opportunity to visit different willow SRC fields, some of which have been established for more than 20 years, with different clone material and under different soil conditions. The group also visited an agricultural field where cultivation of SRC has been terminated, and new crops have been established on former SRC land. This gave an idea about the possibilities for using SRC as a part of the crop rotation in agricultural land, which might play an important role in the future of SRC (Figure 6, and Figure 7).



**Figure 6:** Willow SRC fields near SLU campus



**Figure 7:** SRC fields near SLU campus

The last part of the day, after the visit to SRC plantations and lunch, was also devoted to presentations that brought up different issues of SRC cultivation and management. The first one was given by Assoc. Prof. Ioannis Dimitriou, SLU, and was related to sustainability issues of SRC. Dr. Dimitriou focused on the impact of SRC on the environment, namely on soil and water quality, and biodiversity, and he also gave examples of multifunctional uses of SRC that can be considered as a good way of promoting SRC cultivation producing besides biomass for energy other ecosystem services. Dr. Dimitriou presented scientific results on the impact of SRC cultivation on soil quality (soil carbon, heavy metals) and water quality (nitrates, phosphates), compared to conventional crops, revealing the importance of SRC cultivation on improving the environment, giving also practical examples of SRC uses. Moreover, Dr. Dimitriou presented in detail real examples of using willow SRC for biomass for energy and for simultaneous treatment of municipal wastewater, e.g. as a multifunctional crop for provision of several ecosystem services. This presentation was also connected to the coming visit in Enköping on Friday.

Assoc. Prof. Håkan Rosenqvist was not able to visit Uppsala and give the presentation concerning the economy issues of SRC (as it was planned from the beginning), but instead it was Dr. Dimitriou that presented these issues on behalf of Dr. Rosenqvist. Dr. Dimitriou gave an overview of all costs involved in SRC cultivation (all management steps, but also logistics), and furthermore presented comparisons of gross margins for a series of energy crops but also conventional crops in Sweden. These figures indicated under which circumstances cultivation of willow SRC should be preferred instead of other crops, and opened interesting discussion from partners and stakeholders who took into account the conditions for agriculture in their countries and draw parallels asking the opinion of the experts present in the room.

Dr. Dimitriou brought up also the issue of treating municipal residues in SRC plantations and the implications in the total economy of SRC. The next and last presentation of the day was related to practical issues of willow SRC cultivation and was given by Stig Larsson, who is working for a Swedish private company called European Willow Breeding (EWB), who is specialized in putting forward new willow material, but is also offering services in all steps of willow management steps. Dr. Larsson presented a series of examples concerning problems and opportunities of willow SRC cultivation, based on his ca 20 years' experience with willow SRC. Dr. Larsson focused on new willow clones reaching the market soon based on features that will tackle climate change issues, but also referred to issues such as Cd that can be a way to increase willow SRC cultivation by using willow to take up soil Cd.

The day was finalized by a round discussion, starting with information on the status of SRC on the other countries SRCplus countries (except Sweden). Each partner of each country analysed the current situation of SRC in their country and indicated the biggest challenges that they face at the moment for a broader SRC introduction (Figure 8). The participants also took up several issues that were presented during all presentations, related to the management, economy and sustainability, and there were several things clarified. Due to the big amount of new information provided during the day, and since the day was reaching to an end according to the schedule, it was decided to continue the discussions during the coming two days when different steps of cultivation and management of SRC would be presented in practice, presented also by farmers or entrepreneurs.



Figure 8: Participants of the international study tour, final discussion

### 3 Study Tour – Day 2

The second day of the study tour was dedicated to the following visits:

- Commercial willow SRC fields, Glanshammar (discussion with farmers about practical issues)
- Willow farmer cooperative (discussion about activities, opportunities and constraints)
- Production of pellets from willows, Läfte EnergiTeknik
- Willow SRC harvester at Vingåker

The first stop was at two willow SRC fields at Glanshammar, where the group was shown willow fields that were harvested this year, the one in the form of chips (the prevailing end product of willow SRC in Sweden sold to combined heat and power plants as fuel), and the other in the form of long sticks to sign the roads for snow-marking (Figure 9).



Figure 9: Harvested willow field in Glanshammar

The farmer that described the practices in these fields was Anders Jansson, who is also a representative of a local cooperative of willow farmers called “Salixodlarna”. Andreas explained the background of these fields, production figures, harvest costs, distance to end users and was open to provide answers to all questions from the partners and stakeholders that showed a great interest to this first stop (besides the harsh weather conditions with frozen conditions and heavy snow fall) (Figure 10). After lunch, the group gathered in the premises of Salixodlarna cooperative in Örebro, where Anders gave a presentation about the cooperative and their ways to organize their activities concerning SRC (Figure 11). Anders gave a detailed presentation about all the steps that Salixodlarna are involved in willow cultivation, and also discussed the drawbacks and the things-to-consider when others might try to start a cooperative for SRC. His presentation, as well as of all the others, is available on the SRCplus website, together with contact details.



**Figure 10: Discussion with the farmer Andreas Jansson**



**Figure 11: Presentation on the farmers' cooperative "Salixodlarna"**

The next stop was at a willow field next to the wastewater treatment plant at Vingåker, where harvest of willow SRC plantation occurred that day (Figure 12). The harvest was conducted by a New Holland machine, specially designed for willow SRC (Figure 13). The study tour participants had the opportunity to study in detail the machine, which was actually not in operation at the very moment the group visited the SRC field, since the operators were engaged in other activities, namely, cleaning the snow from the local roads in the area, which is a seasonal occupation that is prioritized before all other agricultural activities when needed.



**Figure 12: Harvested willow field**



**Figure 13: Harvesting machine New Holland designed for willow plantations**

The last stop of the day was at the premises of “Läppe EnergiTeknik”, located at the small town of Läppe, where production of pellets from willow SRC, but also other wood and biomass material takes place. The owner of the company, Fredrik Malmberg, together with his daughter who is an employee in this company, presented in detail the different steps of pellet production, the equipment with their capacity, figures of electricity and energy

consumption that showed that pellet production in small-scale enterprises can be a good and profitable business (Figure 14, Figure 15).



Figure 14: Visit to “Läppe EnergiTeknik”



Figure 15: Visit to “Läppe EnergiTeknik”

Of special interest was the information given for pellet production from willow SRC material; Fredrik Malmberg said that in his experiments he has managed to have willow pellets with ash content lower than 1%, which makes a huge difference in terms of quality of the pellets. The day was finalized after exhibition of many kinds of pellets from different material, and a discussion with the owner of Läfte EnergiTeknik about pelletising prospects. After that, the group took the 2.30 hours long way back to Uppsala, which actually became a 3-hours' drive due to the heavy snowfall that evening.

## 4 Study Tour – Day 3

The last day of the study tour was dedicated to the following visits:

- Willow field for bioenergy, wastewater/sludge treatment and utilization plant, Nynäs Gård, Enköping
- Ena Energi: discussion with the director of the power plant, tour in the power plant and discussion with farmers

Enköping is a town ca. 60 km west of Uppsala, where the SRCplus partners and stakeholders discussed willow biomass and bioenergy issues during three moments of the last day of that study tour (Figure 16, Figure 17).



Figure 16: Willow field in Enköping next to the waste water treatment plant



**Figure 17: Waste water treatment plant in Enköping**

The first stop was at Nynäs Gård, a farm of ca 180 ha, where the farmer, Herman Arosenius, is cultivating willow SRC in ca 80 ha. The special feature of these willow SRC fields is that they are being irrigated with nutrient-rich municipal wastewater in a fertigation system where willow SRC is used as a treatment and utilisation system for the wastewater. The wastewater treatment plant is located close to Nynäs Gård, and the wastewater applied to SRC comes from dewatering of sewage sludge to ensure the highest amounts of nitrogen in the lower possible water volume. This water is then collected and stored in big (total 20,000 m<sup>3</sup>) storage ponds before applied to the willow SRC after storage for at least 2 months during May-September. Herman gave an overview of this system and explained that he receives the wastewater for free from the municipality, and that he receives some compensation for taking the wastewater and for maintenance of the irrigation system. The irrigation system at Nynäs Gård is drip irrigation system and Herman assured that there were only small problems after 14 years (three harvests) of willow established at Nynäs Gård. The biomass production of willow SRC at Nynäs Gård is rather high (ca. 13 t/ha DM as an average), and the field is planted with different clones and harvested not all in once each year (but some parts are harvested each year to ensure income each year). There were several issues brought up concerning the management of this willow field that were related to both biomass production and wastewater treatment issues, and Herman explained that it was the combination of the two that is producing income for his willow SRC operation.

The discussions were continued into the premises of ENA Energi, which is the combined power plant of Enköping owned by the municipality, located not very far from Nynäs Gård (ca 1.5 km) (Figure 18). The general director of Ena Energi, Tomas Ulväng, gave a detailed presentation about the company, its operations, and its attitude towards biomass fuels. Ena Energi is a company that uses almost 99% of its fuel in the form of wood biomass, and willow SRC chips are ca. 8% of that fuel (on average, depending on the period of time and the year). After a short discussion about Ena Energi, Tomas Ulväng had arranged to continue discussing while taking a tour through the different operations at Ena Energi, from the receiving of biomass, weighing, separating, mixing, and delivering to the boilers, where the SRCplus study tour participants had the opportunity to ask questions to Ena Energi personnel. After the ca 1 hour tour, the group was gathered again in the presentation room at Ena Energi, where the last presentation of the day and the study tour was given by Bodil Lind and Johan Lind, willow farmers for many years. Bodil Lind and Johan Lind shared their experience in a very inspiring way from willow SRC cultivation, from their farm in the small village of Lundby, outside Enköping. They cultivate willow SRC in several fields, and in some

of them they irrigate their fields with wastewater that is coming from local septic tanks that are being stored in collection points in rural areas around Enköping. The water is stored for six months before applied to the willow SRC fields. The idea is to decentralize the wastewater treatment system and avoid large amounts of wastewater and therefore N and P entering the central wastewater treatment plant in Enköping. Irrigation of willow is a way to use the nutrients in the wastewater in the rural areas, and according to Bodil and Johan the system so far works perfectly since frequent analyses in the soil show no signs of metal accumulation or nutrients in excess. Several partners were interested to have Bodil and Johan's opinion about the future of willow SRC in the areas, which both believed is connected to the will of ENA Energi (the buyer) to receive willow chips from the farmers at a relative good price. Bodil, Johan and Herman thought that this would probably be the case in the future as well, despite the fluctuations in the prices of oil and of other biomass feedstock material.

The day and the study tour finished with a common lunch where the partners had the opportunity for last questions to the farmers and the SLU organizers.



Figure 18: Combined power plant “ENA Energi” next to willow fields



Figure 19: Delivery of willow to the ENA Energy

## ANNEX I Participants List

No.	First Name	Last Name	Organisation	Country
1	Rita	Mergner	WIP Renewable Energies	Germany
2	Dominik	Rutz	WIP Renewable Energies	Germany
3	Jan	Vidomus	EAZK	Czech Republic
4	Tomas	Perutka	EAZK	Czech Republic
5	Dagnija	Lazdina	LSFRI Silava	Latvia
6	Stefan	Hinterreiter	BAT	Germany
7	Ioannis	Eleferiadis	CRES	Greece
8	Željka	Fištrek	EIHP	Croatia
9	Ilze	Dzene	Ekodoma	Latvia
10	Linda	Drukmane	Ekodoma	Latvia
11	Laurie	Scrimgeour	CDCT	France
12	Gordana	Toskovska	SSA-Resen	FYROM
13	Naumche	Toskovski	SSA-Resen	FYROM
14	Ioannis	Dimitriou	SLU	Sweden
15	Michal	Jurenka	Hostejov Municipality	Czech Republic
16	Ludka	Cizkova	Consultant	Czech Republic
17	Patrice	Pelissard	Seml Bois Energie du Trieves	France
18	Ines	Pohajda	Advisory Service	Croatia
19	Blaž	Štefanek	Hrvatske šume Ltd	Croatia
20	Martins	Trons	Farmers Parliament	Latvia
21	Peter	Stöger	BAT region, farmer	Germany
22	Stavroula	Braimi-Botsi	Municipality of Souli	Greece
23	Laila	Gercāne	Vidzeme Planning Region	Latvia
24	Srekjko	Gjorgjievski	St. Cyril and Methodius University	FYROM
25	Ioannis	Stathopoulos	Energy Cooperative of Karditsa (ESEK)	Greece
26	Magesh	Ganesapillai	Aristotle University of Thessaloniki	Greece
27	Panayotis	Gorezis	Hasselt University	Belgium
28	Nils-Erik	Nordh	SLU	Sweden
29	Almir	Karacic	SLU	Sweden
30	Stig	Larsson	EWB	Sweden

## ANNEX II Agenda



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



### ***International Study Tour Successful SRC production and utilization concepts***

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***20-23 January 2014  
Uppsala, Sweden***

## Program

### Tuesday 20 January 2015

Arrival	
19:30	Joint dinner for SRCplus project consortium and invited stakeholders <a href="#">Restaurant Lingon</a> , Svartbäcksgatan 30, Uppsala.

### Wednesday 21 January 2015

Workshop on SRC: management issues and their implications in Sweden Visit of SLU experimental fields		
9:00-9:10	Introduction and general information for the day	Ioannis Dimitriou
9:10-9:30	SRCplus project	Rita Mergner, Dominik Rutz
9:30-10:15	Willow in Sweden	Nils Erik Nordh
10:15-10:45	<i>Coffee break</i>	
10:45-11:15	Poplar in Sweden	Almir Karacic
11:00-11:45	Walk through SLU campus and willow fields	Ioannis Dimitriou
11:45-12:45	<i>Lunch</i>	
13:00-13:45	SRC and sustainability	Ioannis Dimitriou
13:45-14:15	SRC and economy	Håkan Rosenqvist
14:15-14:45	<i>Coffee break</i>	
14:45-15:15	EWB – Experience from practice	Stig Larsson
15:15-16:30	Discussion & introduction to next day tours	Ioannis Dimitriou

### Thursday 22 January 2015

Visit to Örebro area and meeting with SRC practitioners		
<b>8:00</b>	Beginning of the study tour	
<b>10:00</b>	Glanshammar – Commercial willow SRC fields (discussion with farmers about practical issues)	Andreas Hedlund Anders Jansson
<b>12:00</b>	<i>Lunch in Örebro</i>	
<b>13:00</b>	Willow farmer cooperative (discussion about activities, opportunities and constraints)	Anders Jansson
<b>16:00</b>	Läppe EnergiTeknik: Pellets from willows	Fredrik Malmberg
<b>17:00</b>	Driving back to Uppsala	

### Friday 23 January 2015

Visit to Enköping area and meeting with SRC practitioners		
<b>8:00</b>	Beginning of the study tour	
<b>9:00</b>	Nynäs Gård, Enköping. Willow field for bioenergy, wastewater/sludge treatment and utilization	Herman Arosenius
<b>10:00</b>	Ena Energi: discussion with the director of the power plant, tour in the power plant and discussion with farmers	Tomas Ulväng and others
<b>12:00</b>	<i>Lunch &amp; continuation of discussions with farmers</i>	
<b>13:00</b>	End of the study tour Possibility to return to Uppsala or driving to the airport	

## Registration

Click [here](#) to register for the Study Tour

*The participation in the study tour is free of charge. Swedish University of Agricultural Sciences covers all expenses for the plant visits and the bus transfers in the framework of the SRCplus project, which is supported by the EU IEE programme. All other expenses (travel to Sweden, accommodation, meals) are to be carried by the participants. Participants from the SRCplus target regions may contact the responsible partner in their region regarding support for the travel.*

## Contact

Information about the SRCplus project	Information about the study tour
 <p><b>WIP Renewable Energies</b> Sylvensteinstr. 2 81369 Munich, Germany <b>Rita Mergner</b> and <b>Dominik Rutz</b> Tel.: +49 89 720 127 31 Tel.: +49 89 720 127 39 E-mail: <a href="mailto:Rita.Mergner@wip-munich.de">Rita.Mergner@wip-munich.de</a> E-mail: <a href="mailto:Dominik.Rutz@wip-munich.de">Dominik.Rutz@wip-munich.de</a></p>	 <p><b>Swedish University of Agricultural Sciences</b> Arrheniusplan 4 Uppsala, Sweden <b>Ioannis Dimitriou</b> Tel.: +46 18 672553 E-mail: <a href="mailto:Ioannis.Dimitriou@slu.se">Ioannis.Dimitriou@slu.se</a></p>

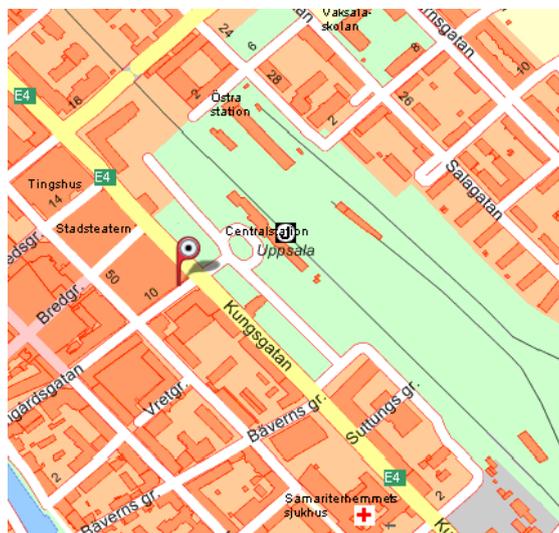
### SRCplus consortium



## ANNEX III Logistics

### Hotel & Venue

SLU has reserved the Best Western Hotel Svava ([www.hotelsvava.com](http://www.hotelsvava.com)) which is located right across the central station (and therefore rather convenient for you arriving by bus or train to Uppsala). Therefore, the project partners should not contact the Hotel for room reservation.



The special rate for SLU is 950 SEK per night for single room including breakfast and evening snacks (ca. 105 Euros).

**The project meeting will take place at SLU campus in Ultuna**, ca. 6 km from Uppsala center (address: **Ullsväg 16, Ultuna, Uppsala**). There are regular buses from the hotel to our Campus. SLU will meet us at the hotel lobby at 07:50 and all partners together will take a bus to the campus.



## **Transport**

### **Directions from the airports to Uppsala**

#### ***From Stockholm Arlanda airport***

Arlanda airport is the main international airport of Stockholm and is located 30 km south of Uppsala. Most of the air-companies fly to Stockholm Arlanda airport.

There are frequent train and bus connections from Arlanda to Uppsala central station which take ca. 50 minutes for the bus. Train is a better alternative; it takes 18 minutes from Arlanda to Uppsala. The train stops at the lower level of the airport (follow the signs or ask at the information desk). There is also a bus stop of bus no 801 to Uppsala outside the arrival hole (follow the signs); the bus takes ca. 45 min to reach Uppsala.

In case you want more information: [www.ul.se](http://www.ul.se)

#### ***From Stockholm Skavsta airport***

For you looking for a cheaper alternative with Ryanair, Skavsta airport is situated ca. 100 km south of Stockholm. There are buses connecting Skavsta with Stockholm Cityterminalen, and the trip takes ca. 1 hour. From Stockholm Cityterminalen to Uppsala there are frequent bus and train connections (another 55 min with the bus and 40 min with the train).

For more information:

<http://www.flygbussarna.se/en/default.asp> (bus from Skavsta to Stockholm)

[www.sj.se](http://www.sj.se) (train to Uppsala from Stockholm)