

## SRP CASE STUDIES IN EUROPE



Country: **Sweden**  
Location: Enköping  
76 ha of willow SRP are produced with treatment by a mixture of supernatant from sewage sludge dewatering and treated wastewater. Produced biomass is used in a heat and power plant owned by the municipality (55 MWth and 22 MWe). The wood-ash produced is mixed with sludge and applied back to the SRP as fertiliser.



Country: **Spain**  
Location: Granada  
Pre-treated sewage sludge and wastewater were applied in a test SRP with poplars. A drip irrigation system was used to control wastewater application. The produced biomass was used by the local Valoriza Energy Company for energy generation.



Country: **Northern Ireland**  
Location: Londonderry  
320 ha of willow SRP are fertilized with municipal sewage sludge allowing cost-efficient nutrient recycling. The woodchip produced is used for heat and power generation in school buildings, hotels and swimming pools. The willow SRP produces approximately 9 tons DM/ha per year and is harvested every two years.



Country: **Italy**  
Location: Ferrara  
5 ha of poplar SRP are fertilized with sludge from an industrial wastewater treatment plant (wine production). The biomass produced is harvested in 2-year coppicing cycles and is sold to a local energy company for combined heat and power production. The SRP is used to evaluate beneficial effects on soil structure and increased biomass production.



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SIXTH FRAMEWORK  
PROGRAMME



HORIZONTAL ACTIVITIES  
INVOLVING SMEs

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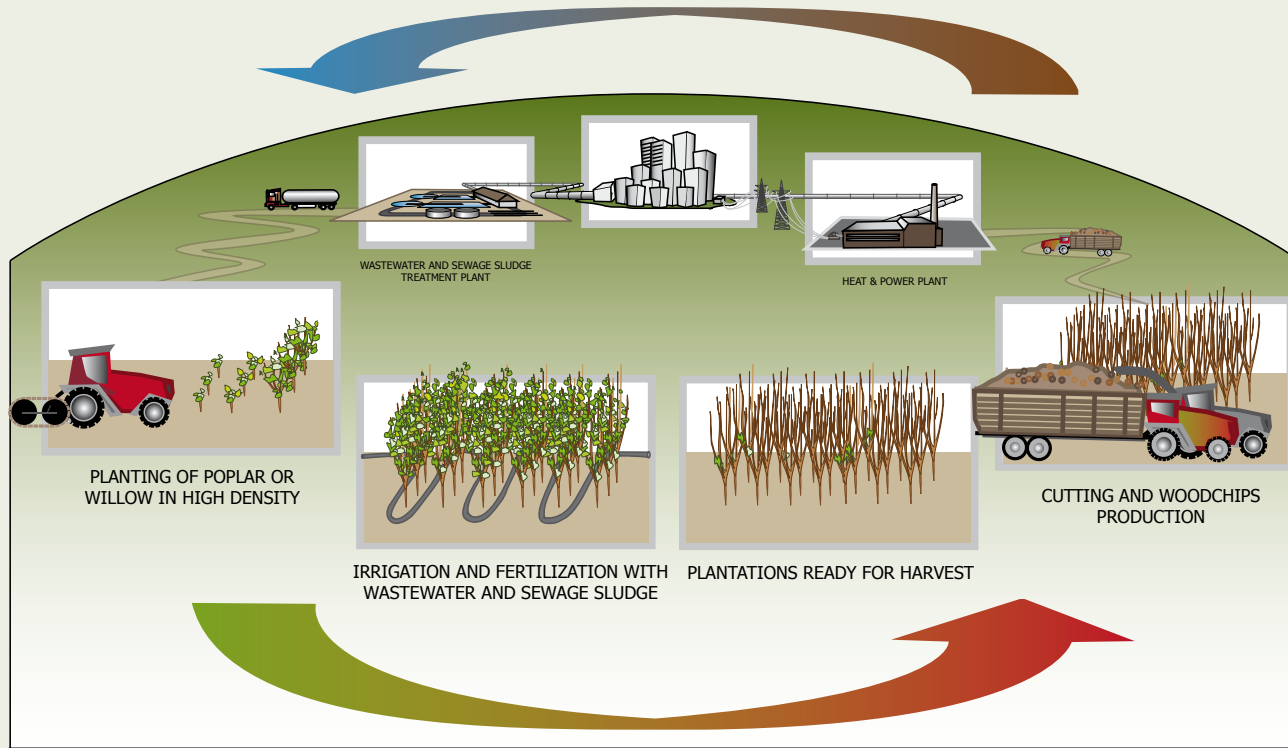
## Short Rotation Plantations

Opportunities for farmers  
from biomass production with  
the application of wastewater  
and sewage sludge

Developed with funding from the European  
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## AGRONOMIC MANAGEMENT OF SRP FOR COMBINED BIOMASS PRODUCTION AND TREATMENT OF WASTEWATER AND SEWAGE SLUDGE



- Specially designed equipment for efficient planting and harvesting of SRPs has been developed
- SRP is an agricultural crop, therefore conventional crop management techniques are required

### BENEFITS OF REUSING WASTEWATER AND SLUDGE

- Wastewater and sewage sludge contain high amounts of valuable plant nutrients (esp. N, P), therefore the need for mineral fertilizers is reduced
- Wastewater irrigation is particularly beneficial where irrigation demand is high and conventional water sources are scarce
- Environmental and hygienic risks from wastewater and sewage sludge application are low. After appropriate pre-treatment in most cases both sources contain only low levels of pathogens and chemical pollutants and therefore comply with existing legislation
- Hygienic risks from SRP biomass are low due to non-food/non-fodder crop production
- Farmers can benefit from recycling human residues via contractual payments for wastewater treatment and sewage sludge disposal
- Wastewater and sewage sludge application improves soil fertility and structure due to the high content of organic matter (sewage sludge) and nutrients present

### WHAT IS A "SHORT ROTATION PLANTATION"



Short Rotation Plantations (SRPs) are land-use systems combining agricultural and forestry practices (Agroforestry). Fast growing tree species such as willow and poplar are managed in short coppicing cycles (1-5 years). These non-food/non-fodder crops have a high demand for nutrients and water, which may alternatively be met by reusing pre-treated wastewater and sewage sludge enabling a sustainable nutrient recycling. The woody biomass produced can be used as a renewable and clean fuel for heat and power generation, or for further processing into liquid biofuels.

### BENEFITS OF CULTIVATING SRPs

- The market for woodchip from SRPs is growing in Europe due to increasing demand for heat and power generation from renewable versus fossil sources
- The cultivation of non-food/non-fodder SRP energy crops offers farmers an alternative source of income through the sale of woodchip to local customers (e.g. energy companies) or via the supply of energy services (heat entrepreneurship)
- The EU supports SRP cultivation with subsidies for energy crop production
- Extensive breeding efforts have resulted in resistant planting material
- After planting the land does not require any replanting for at least 15-20 years

### ENVIRONMENTAL AND HYGIENIC SAFETY

To ensure environmental and hygienic safety **wastewater and sewage sludge must be pre-treated** before being used in SRPs. Their agricultural application is regulated in the EU through:

- **Nitrates Directive (91/676/EEC)**,
- **Sewage Sludge Directive (86/278/EEC)**, and
- related **national specifications**

defining maximum application loads for nutrients and chemical pollutants. Pre-treatment further reduces pathogenic risks and allows compliance with local legislation for soil and water quality.