Energy from Short Rotation Coppice

Small scale plantatioms, non-competitive to food production

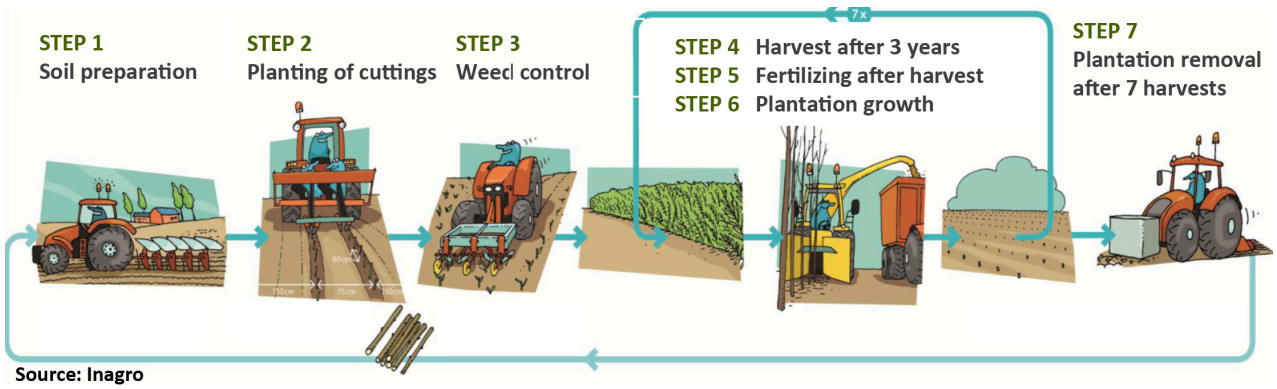
About pilot sites

- Fast growing willows for energy production
- Short rotation coppice system
- 7 x 3-year rotation cycle (in total 21 years)
- Small parcels < 2ha
- Operational planting and weed management
- No irrigation
- Natural fertilizer application after each harvest

Goal of the pilot installations

- Production of wood for the heating purposes in possibly short time
- Multifunctional use of agricultural and industrial soils (buffer zones, integration with chickens breeding, enhancing natural biodiversity) but no competition with food and feed production
- Creating additional profit from unused land

3-year rotation cycle



Source: Inagro

Economic facts

- All the installation costs included, heat from SRC wood chips is by 30-43% cheaper than from natural gas and by 45-63% cheaper than from heating oil. SRC wood creates a competitive product to the forest wood chips (cheaper by 25%) if no additional costs of the storage need to be included. It contributes to the energetic independency in the times of continuously increasing fuel prices.
- Creating small scaled SRC plantations contributes to the regional development through creation of green jobs and the local capital binding through the use of locally sourced fuels.

Environmental gains

- Nearly 4 tonnes of Carbon per ha permanently sequestered in the belowground biomass and soil pools after 21 life span of the plantation
- By 46% reduced overall environmental impacts if using SRC chips instead of forest wood chips for heat*
- 27 kg CO_2 emissions avoided per 1MWh heat produced* as compared to forest wood chips use
- Better landscape integration of the industrial premises
- If special measures introduced, increase in local biodiversity

* in 50kW installation, for SRC wood chips mix based on willows, poplars and to lower extent indigenous species

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Technical & financial challenges

- Starting capital of 2400€ per ha necessary, followed by the heating installation cost in the 3rd year of plantation
- The costs of heating installation for wood chips higher than for natural gas and heating oil
- In case of necessary investment in wood storage building, the production costs increase by nearly 40% (but still comparable to the costs of wood from the market)
- Planting, management, harvest and removal actions require agricultural know-how and equipment (for some actions very specialized)
- Depending on the region, possible difficulties with the availability of affordable harvest machines – too high harvesting costs can cause non-profitability of the whole endeavour
- High financial risk for the owner of the plantation linked to possible plantation damage by fortuitous events e.g. (severe pest or drought)

How to support SRC?

Information for public stakeholders

- Use of local synergy potentials e.g. by sharing local wood storage spaces with the forest authorities
- Creating access to the low interest rate loans for the involved parties, also those with low personal credit rating
- Reduction of the detaining risks by creating insurance fund compensating loses due to fortuitous events
- Establishing cooperation with local farmers and experts from the regions, where SRC plantation development is much more advanced to develop local SRC know-how

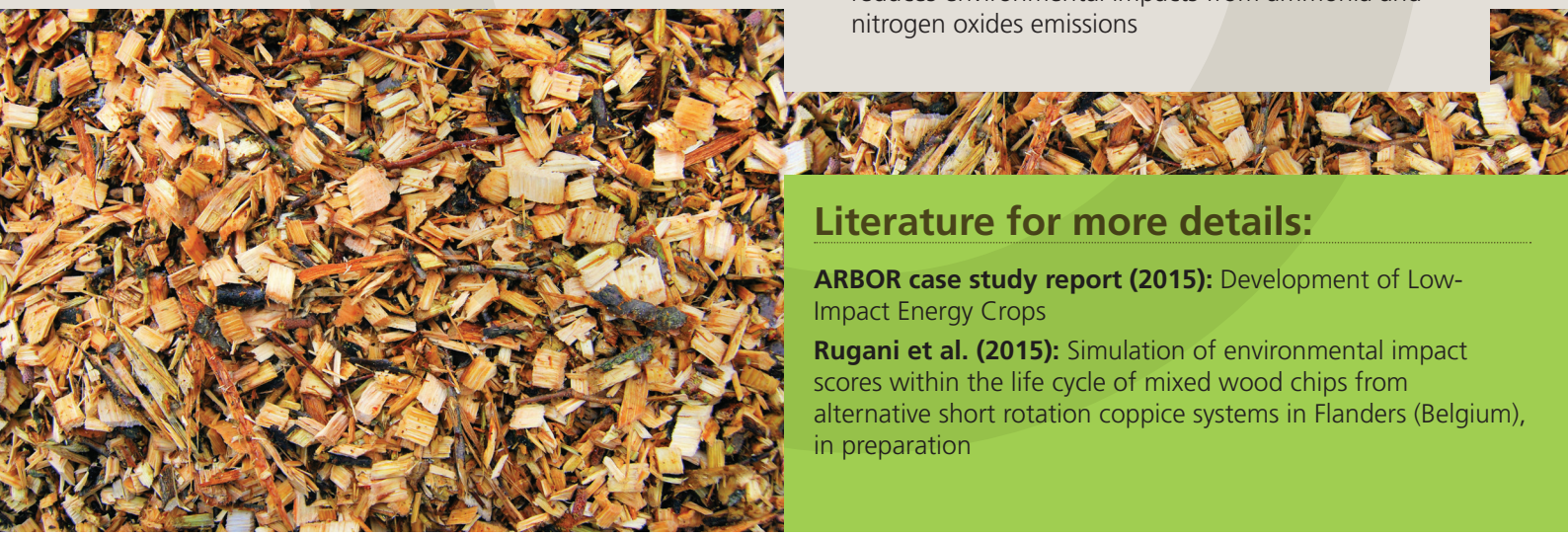
Multifunctional land use: free range poultry and SRC | Source: Inagro

The highest impacts:

- Cooling of the cuttings during the storage prior to planting highly influences freshwater eutrophication, as well as freshwater and terrestrial ecotoxicity
- Weed removal with glyphosate contributes to strong impacts on freshwater eutrophication, as well as freshwater and terrestrial ecotoxicity
- Frequent fertilizing during cuttings production generates high impacts on terrestrial acidification
- Field operations and plantations removal contribute to strong metal and ozone depletion

Optimizing measures:

- Use of locally produced cuttings reduces environmental impacts linked to the transport
- Minimizing the cuttings storage time contributes to reduced energy use for cooling
- Conservative approach towards application of herbicides and pesticides allows reducing impacts linked to their production and use
- Taking precautious decisions on the species to be planted, to reach the highest yields and therefore reduce the overall impact
- Conservative approach towards application of fertilizers (incl. the stage of cuttings production) reduces environmental impacts from ammonia and nitrogen oxides emissions



Literature for more details:

ARBOR case study report (2015): Development of Low-Impact Energy Crops

Rugani et al. (2015): Simulation of environmental impact scores within the life cycle of mixed wood chips from alternative short rotation coppice systems in Flanders (Belgium), in preparation

Arbor Biomass for Energy

Investing in Opportunities

This project has received European Regional Development Funding through INTERREG IV B.

NWE INTERREG IVB

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This study has been developed with financial support of the Regional Development Funding of the EU through INTERREG IV B NWE