



BIOEUPARKS –Exploiting the potentialities of solid biomasses in EU Parks
Contract N°: IEE/12/994

DINPD Localized Supply Chain Plan
(Task 3.2.1.)

by
DINPD – Danube-Ipoly National Park Directorate
based upon the Common Supply Chain Guideline Report by FNR, DUTH and SFI

December 3. 2013



Table of content

1.	Localized supply chain	2
1.1	Parts of the supply chain	2
1.1.1	Feedstock	3
1.1.2	Harvesting	4
1.1.3	Transport	4
1.1.4	Storage	5
1.1.5	Conversion	5
1.1.6	Energy production.....	5
1.1.7	End-consumer	6
1.2	Basic types of the local supply chains.....	7
2.1	Important aspects of supply Chain organization.....	10
2.1.1	Contracts and contracting	Fehler! Textmarke nicht definiert.
3.	Adapting the supply chain to the respective local context	Fehler! Textmarke nicht definiert.
5.1	Assessment of individual data from nature parks.....	Fehler! Textmarke nicht definiert.

1. Localized supply chain plan

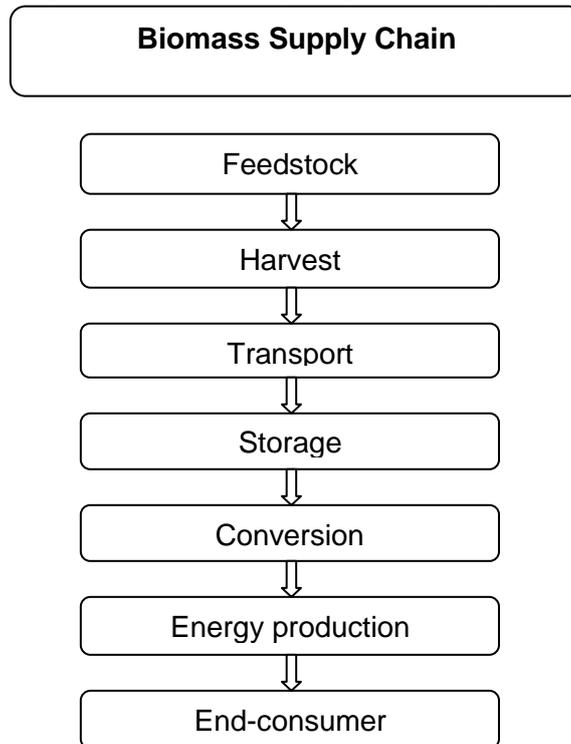
The localized supply chain plan was designed on the base of the common supply chain guidelines.

Basic characteristic of the biomass supply chains in and nearby the protected areas is that they must be small-scale, with no more than 50km between harvesting of the feedstock and consumption of the energy.

Sustainability criteria – all aspects: environmental, economical and social – were discussed with the project partners. DINPD's localized supply chain plan follows the commonly agreed sustainability criteria and even stricter sustainability criteria regarding nature conservation aspects, regarding that the main task of the DINPD is nature conservation as stated in the deed of foundation. This relates to all parts of the supply chain.

1.1 Parts of the supply chain

When designing a supply chain, the different steps from finding the right feedstock to identifying suitable end-consumers need to be taken into consideration.



Planning of the localized supply chain of the DINPD was originally started from the first element of the chain: the feedstock. Although forestry management is allowed in certain zones of the protected areas, DINPD decided to focus on the biomass, which is produced during the nature conservation management of the protected areas.

To select the areas, where a sustainable small-scale supply chain can be set up, the other end of the supply chain was examined to assess the existing heater capacity and to identify the overlap of the 50-km-diameter patches on the map. This is the starting point of the site selection and the supply chain plan.

Then the other elements of the supply chain and their sustainability need to be examined in the selected areas.

If this way the supply chains cannot be set up, other sources of biomass and other sites might be involved to the project.

For all steps of the supply chain the following questions were examined:

- Who is responsible for the outcome?
- Which legal frameworks are there?
- What sustainability criteria have to be taken into consideration?
- How will the compliance with sustainability criteria be monitored?
- How will the nature park be affected?
- What is the timeframe from start of harvesting to supply to end-consumer?

In the following, each step will be explained individually and in the context of sustainability.

1.1.1 Feedstock

The first step was identifying locally occurring biomass resources. The results are described in details in the bioenergy potential assessment form (data assessment). Regarding the big size of the overall area, the large number and diversity of the selected/potential project sites, additional data collection is necessary and planned for the year 2014. Here a short summary based upon the data available so far is given. A more detailed analysis will follow.

In and nearby the protected areas belonging to the DINPD the following biomass sources are available:

- 1) Branches, coppice, fire wood produced by invasive removal and maintenance in woody areas managed by the DINPD,
- 2) Woody biomass, coarse materials, forestry residues from forestry maintenance (pre-com thinning etc.) and invasive removal (eg. *Elaeagnus angustifoli*) from lowland forest areas (Natura2000 sites) managed by the HM forestry company (state owned),
- 3) Small branches, coppice from removal of invasive species and shrubs (eg. hawthorn, rosehip, blackthorn) from grassland areas managed by tenants of the DINPD,
- 4) Reed from protected areas managed by the DINPD,
- 5) Woody biomass from forestry activities done by the forestry companies,
- 6) Agricultural residues.

A more detailed description of the biomass types can be found in the data assessment form.

From the available options, the feedstock should be chosen which is available at the lowest risk to biodiversity and which can be harvested with the highest level of sustainability.

In case of biomass sources 1-4) compliance with one of the existing forestry or agricultural standards furthermore stricter environmental sustainability criteria are guaranteed by the nature conservation management plans and management conceptions of the DINPD available for all protected areas.

In case of biomass sources 5-6) the basic standards are required by the national legislation (EU legislation is adopted in it). Stricter requirements like those of FSC or PEFC regulations must be specified in the Supply Chain contracts because FSC Forest Management Certification hasn't been issued to any forestry company in the operational area of the DINPD and PEFC is not introduced in Hungary yet (national standards haven't been elaborated). However there are sites where the forestry management meets the requirements of the FSC principles but the managers have not applied for the certification.

Therefore the "lowest risk to biodiversity" condition can be fulfilled and checked easier if the feedstock is produced in the areas managed by the DINPD itself, so biomass type 1-4) has priority in the supply chain plan.

Further and more detailed data collection is necessary to calculate the exact amount of available feedstock from type 1-4). The sites (13.000 ha altogether) can be found in an area of 125 km diameter, which is why a detailed data assessment takes more time. Data collection (review of the data assessment) is to be finished by September 2014. Regarding the huge size of the potential territory, these areas shall provide the planned amount of feedstock.

The biomass exploitation rate from invasive removal has an uneven time characteristic for a certain site: a large amount of biomass exploited in the second and third year, then a small yearly amount and then a new cycle may start a few years later. Long term availability of biomass can be ensured by involving a nearby site when the biomass production by invasive removal reaches the peak at a spot. In the 13000 ha big area managed by the DINPD invasive removal as part of nature conservation management is being done continuously in many sites. Furthermore, the normal maintenance and management of the sites provides more or less equal amount of biomass yearly, which can also equalize the biomass supply. Would the data assessment result in an insufficient amount of available biomass from prioritized sites, biomass type 5) and 6) will be involved in the project. The area of these sites is so big (128.000 ha) that the long term availability of feedstock is guaranteed.

If the woody areas managed by the forestry companies will not be part of this pilot project, we still hope that similar sustainable supply chains will be formed in those areas as a consequence of the awareness raising actions of the project.

1.1.2 Harvesting

In the case of biomass sources 1-4) the harvesting is done by the employees of the DINPD and/or by subcontractors of the DINPD. Environmental sustainability is guaranteed this way as the rules of harvesting are defined and controlled by the DINPD. The method of harvesting has to be determined site by site based upon the management plans or management conception plans, considering the specifications for each site. (For example in some areas the invasive species are very densely situated and after getting killed by the chemical treatment the biomass could be moved from the area cost-effectively by trucks. At other sites the invasive species are rarely situated in valuable natural habitats, from where the removal of the biomass must be done very carefully, mainly by manpower.) The description of the generally used methods is given in the data assessment. Harvesting the biomass from several smaller spots of very diverse characteristics can be less favourable from an economic point of view but the fact that the biomass is actually a by-product of the nature conservation management activities, which are financed from other sources anyway, compensates for the additional costs of the divers methods and thus ensures economical sustainability. So far the elimination of the biomass produced this way was a problem and that means that using it for heating increases the environmental and economical sustainability.

As the matter of timing the own management is advantageous as well: at many sites the harvesting, transport and conversion is done by the employees of the DINPD, therefore the work phases can be organized in the most favourable way and harvesting can be controlled by the rangers of the DINPD.

In areas managed by the forestry companies the economical sustainability is ensured by the for profit characteristic of the companies. Environmental sustainability of the harvesting method is partly prescribed by the legislation and by the forestry plan supervised by the National Forestry Agency. Further requirements can be specified in the supply chain contracts.

1.1.3 Transport

The transport is only short distance, for BIOEUPARKS below 50km from source to use. The transport method cannot be chosen freely because there is not much availability of different special capacities like trucks powered by biofuels. Usually the transport is conducted by the biomass provider (DINPD or forestry company) or quite often by the consumer – these are the two main concepts the supply chain plan deals with. Transport can be an important cost driver, therefore in case of the two pilot supply chains the following methods are used to reduce the costs:

1) in case of the Sas-hill Supply Chain the biomass is used on site. Should additional fuel be necessary, the chips can be transported from other sites of the park by the vehicles of the DINPD rangers and other employees, which travel from time to time between the sites for other reasons and transporting the biomass can be scheduled for those travels.

2) in case of the Ócsa Supply Chain the consumer of the biomass is the end user, local inhabitant, who can transport the biomass right from the site with his own vehicle. Being the end user local inhabitant, the transporting distance is very short and timing can be easily arranged with the ranger of the site (also local inhabitant himself).

1.1.4 Storage

The biomass might need to be stored before and after conversion. Due to the limited amount of biomass needed, large storage capacities are not necessary.

The storage of biomass must be well designed and constructed for a number of functions. Most importantly it must keep the fuel in good condition, particularly protecting it from moisture. It must also be possible to deliver the fuel into an appropriate receptacle for transport, and convey it from there to its next destination conveniently and efficiently and requiring the minimum of additional energy input. A bigger store will allow larger, less frequent deliveries, a lower unit price for fuel, and more reserve in case of delays.

When setting up the supply chains, attention of the relevant actors will be drawn to these aspects. However other aspects might influence the storage. For example in case of the first pilot supply chain (Sas-hill) calculation was made on how much biomass is needed for the energy installation and how much needs to be in storage to secure the supply for a year (heating season). On the other hand, calculation was made in how much biomass is produced on the site and when can it be chopped. But finally the size of the chips storage was limited by the legislation as storage under a certain size may be built without building permission and thus it was easier to build a smaller storage and organize the inside transfer and conversion fitting these circumstances.

1.1.5 Conversion

The supply chains are mainly built or will be build upon chips and fire wood as these are the fuel types most frequently used in the existing installations. Pre-treatment is not necessary for these fuel types. In the usual routine and in case of the pilot supply chain in Ócsa the harvester provides fire wood, so the conversion is done by the harvester and the biomass is sold for the end user in the final ready-to-use form.

DINPD has a small and a big chopper machine. Further data collection is necessary about the existing conversion capacity in the area – this is going on and plan to be done for the whole area in 2014 as part of the revised data assessment.

For reed and agricultural residues pelletizing/briquetting will be considered and existing conversion capacities mapped as well.

1.1.6 Energy production

Existing heating or CHP installations, their capacity, energy carrier and location are a very important factor. Data available so far for all the 50 km radius areas around the possible feedstock producing sites is insufficient, therefore data collection is currently on-going. In a first round local governments and forestry companies were questioned regarding their existing capacities and their future plans about such developments. Mayors are very much interested in the BioEUParks project and they are ready to provide more detailed data.

DINPD wants to encourage new investments with providing as much data as possible to mayors.

The traditional use of biomass is household scale heating by fire wood in traditional ovens and more and more frequently by modern heaters working with fire wood, woodchips or pellets. The rangers have personal contacts and thus information about the possible end-users, however data collection is going on regarding household scale heaters as well. Dealers of such installations are involved in this data collection as well.

The existing and planned CHP installation capacity is going to be examined by a subcontracted expert.

In the pilot supply chain at the Sas-hill a fully automated, computer controlled wood chip heating boiler provides the energy for the visitor centre. The automatic fuel feeder provides the fuel without constant supervision, but human labor is necessary to carry the wood chip from the big storage to the inner storage (to the fuel feeder).

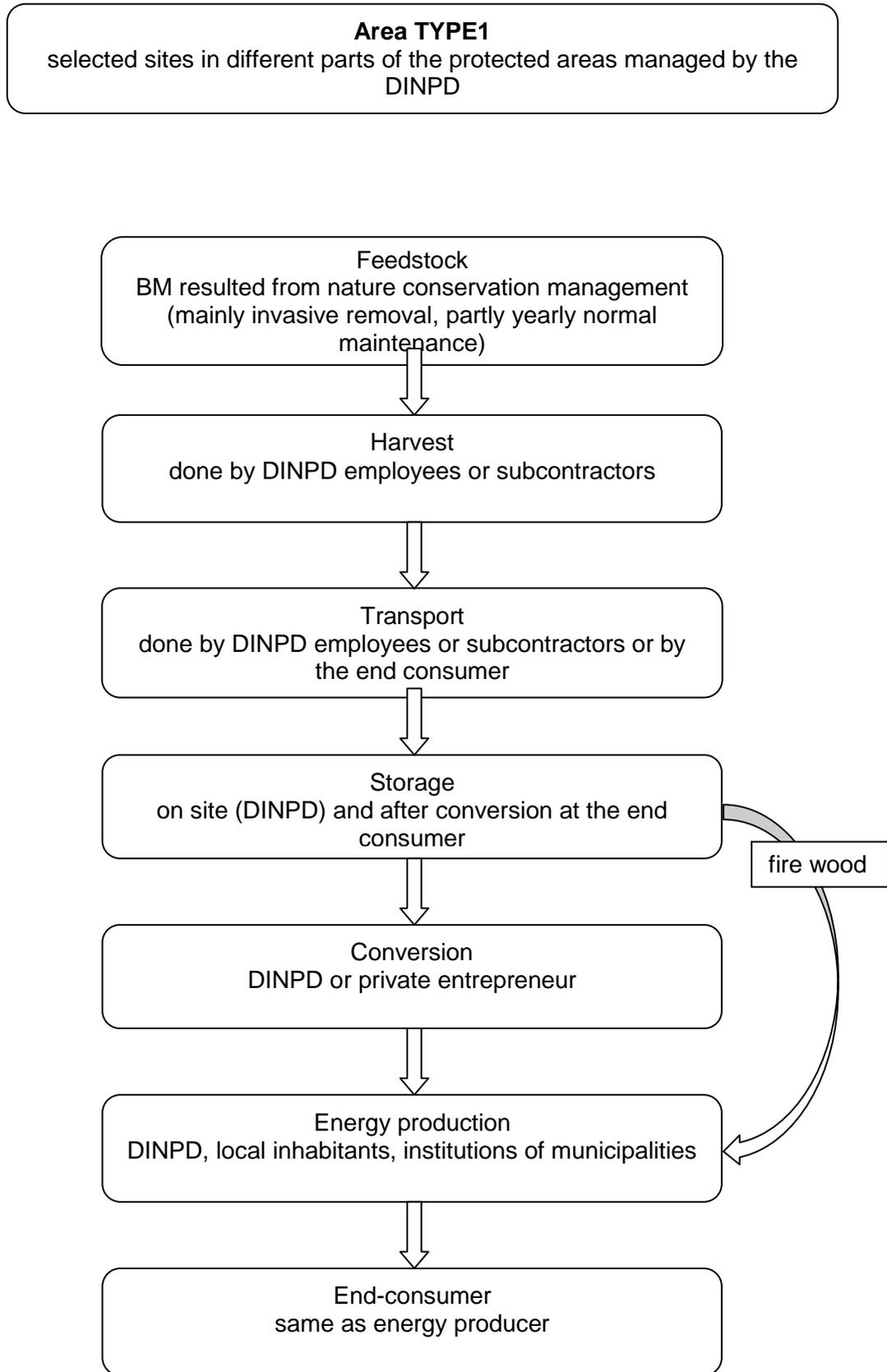
Introducing the modern, energy efficient installations to the public is part of the awareness raising activities as well. We hope that this will initiate new investments.

The decision on the form of energy production will largely depend on the type of feedstock, if it will be converted into chips or pellets and what kind of facilities are already in place on the side of the end-consumer. DINPD plans to set up a webpage where the potential actors of future supply chains can find each other: biomass providers, conversion and transport services, biomass consumers and dealers. They will be listed on this web page by location.

1.1.7 End-consumer

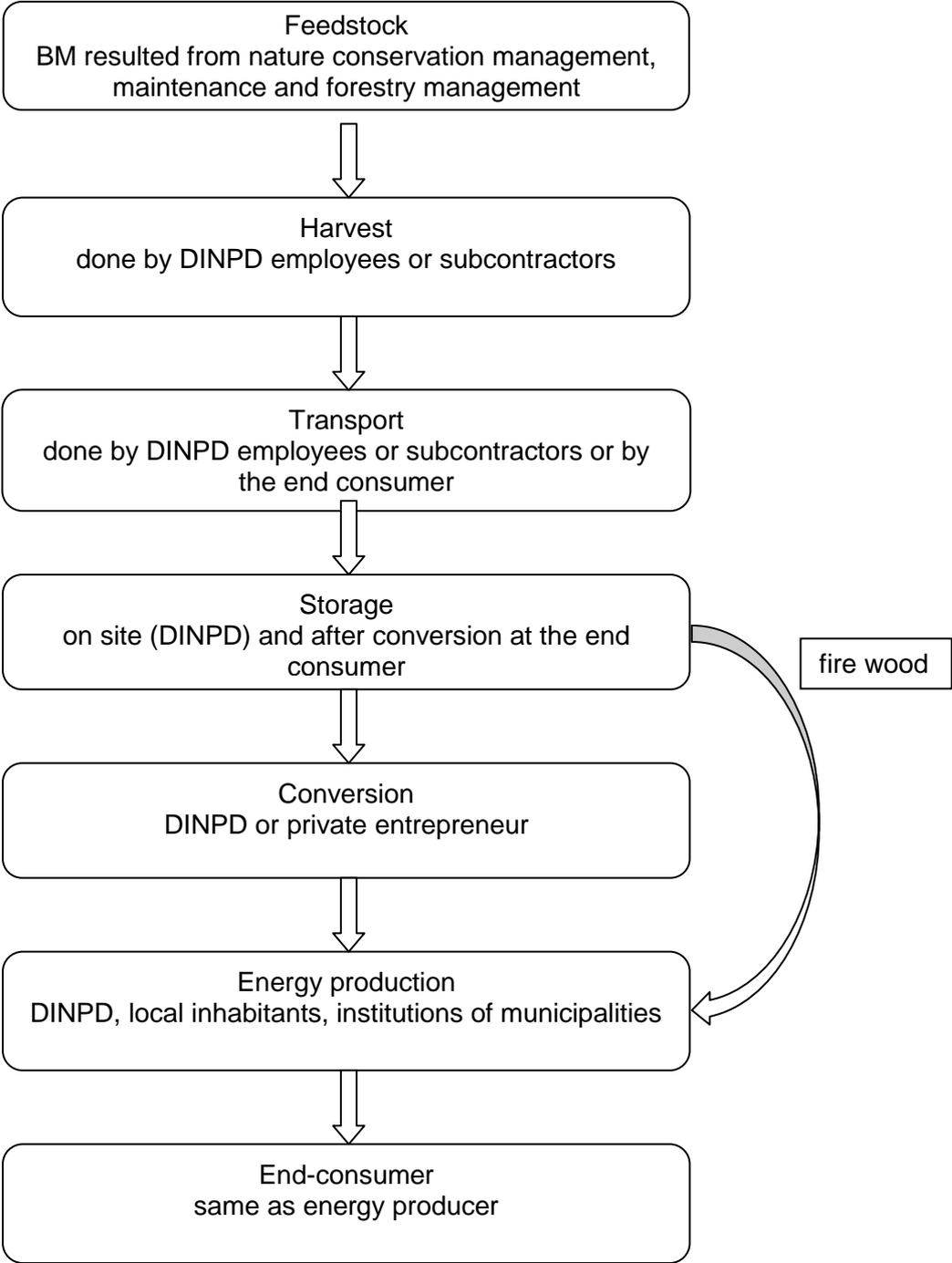
In most cases the producer is also the consumer of the energy. Institutions of the DINPD, municipalities and forestry companies are in the focus of the supply chain plan. The potential consumers of the energy are involved from beginning on based upon the existing cooperations between DINPD and these organizations. The main tool of involving individuals and local inhabitants is the organization of awareness raising events. DINPD organises many environmental education events so not only the project events but other events help as well, when trying to get the message to the stakeholders.

1.2 Basic types of the local supply chains



2.

Area TYPE2
other sites in different parts of the protected areas managed by the
DINPD



Area TYPE3
selected state owned sites in different parts of the protected areas
managed by the stated owned forestry companies or privately owned and
managed sites

Feedstock
BM resulted from forestry management (logging)



Harvest
done by the forestry companies



Transport
done by the forestry companies or by the end
consumer



Storage
on site (forestry companies) and after conversion at
the end consumer



Conversion
forestry companies or private entrepreneur



Energy production
forestry companies, local inhabitants, institutions of
municipalities



End-consumer
same as energy producer



2.1 Supply Chain organization, contracts and contracting

Identifying potential problems and how they can be avoided from the onset:

In case of the pilot supply chains the contracting procedure is easy. At Sas-hill the whole supply chain is owned by the DINPD itself. In Ócsa there are only two actors involved in the supply chain: DINPD itself and a private actor. Therefore the supply chain can be established by a simple contract on selling the biomass.

In case of other supply chains municipalities and forestry institutes might be important actors. In both cases the public ownership and the bureaucratic regulations of decision making can delay the setting up of the supply chains. Long term contracts and contracts without tendering are not allowed in the normal procedure so special legal ways must be elaborated for these special conditions. Therefore the regulations must be checked by a lawyer. Regarding the frequent changes in the legislation, the legal framework must be monitored continuously. In case of municipalities the elections in Hungary in spring 2014 might influence the contracting processes as well.

As the state forestry companies are the forestry managers of several state owned protected areas where DINPD is the nature conservation manager of the sites, the relationship between forestry companies and DINPD is kind of sensitive, partly friendly and cooperative and partly competitive. While sustainable forest management is a common goal, there are differences in priorities because the task of the DINPD is nature conservation while the main task of the forestry companies is profitable silviculture. Therefore negotiations must be carried out very carefully with leaders of the forestry companies to result in a compromise acceptable for both parties. This requires a long time as well. This is another reason, why areas managed by the DINPD itself got priority in the supply chain plan.

However the longstanding good relationship and cooperation with municipalities and forestry companies can forecast that the partnership will be successful in regards to the biomass supply chains as well.

Possible problems like insufficient cooperation, information and training within the agricultural and forestry sectors as well as the lack of public awareness are going to be anticipated by ongoing monitoring, communication with the partners and capacity building and awareness raising activities of the project.

Setting up supply chains with more than 2 actors, including private and public actors, are even more complicated, therefore DINPD does not plan to set up such supply chains itself but plans to inspire and help in the formation of such supply chains by offering information: organizing awareness raising events and capacity building trainings as well as offering a database on potential partners.

The outcome can be that the results from this project could again be used to help implement and bring together stakeholders in nature parks.

Annex: Initial data assessment for Area TYPE 1-2.

Nature park	Biomass	Potential/year	Heating installation
DINP	Invasive species: small branches	9.972t	Heating for local visitor center –Pilot Supply Chain Sas-hill
DINP	Invasive species: woody biomass	n/a	Used in private homes
DINP	Small branches, coppice from maintenance	n/a	Small institutional burner, local inhabitants
DINP	Woody biomass from maintenance and forestry management	n/a	Local home owners Pilot Supply Chain Ócsa
DINP	Coarse materials and forestry residues	n/a	Used by army heaters, as it comes from areas used and owned by the military
DINP	Shrubs/berries from grassland	n/a	Local homes, nearby institutions
DINP	Reed from protected areas	n/a	Briquette burning heaters