

| <b>Work Package 3: Analysis of Local Situations + SWOT analyses+ Possible Trends</b> |   |
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| <b>Deliverable 3.2</b>   | One joint report for the 5 SWOT analyses (one from each involved area) of the olive-residues/energy market. |
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## SWOT analysis\_ The use of solid olive oil residues in Liguria, ITALY

### Strengths

- Availability of a mature technology for biomass exploitation
- Great interest by local operators (millers, olive growers, etc.)
- Presence of some small pilot cases in the region, which means that there is a positive attitude as well as a widespread knowledge on the topic
- High calorific value of pit
- Support by regional trade associations
- Involvement of the regional association of olive millers (COREFLI) and producers (Consorzio DOP)
- Media interest and support
- Limited costs of pomace as raw material

## SWOT analysis\_ The use of solid olive oil residues in Liguria, ITALY

### Weaknesses

- Limited quantity of pomace available each year
- Presence of different types of pomace due to different olive pressing technologies
- Absence of dry or depleted pomace (the pomace we have in Liguria is the one coming out of the mills – humid and oily – therefore less high in calorific value)
- High fragmentation/individualism amongst millers (therefore we might have difficulties in the creation of a supply chain)
- Pomace scattered throughout the region (these are many small mills)
- Regional territory morphology which makes transport very expensive
- Olive oil production process is a low energy consumer (we therefore need to find a demand for energy deriving from pomace combustion)
- Seasonality of pomace and different quantities each year due to different bearings of our trees
- Limited availability of updated figures on quantity and location of pomace (record files arrive till 2005)
- Italian normative framework on waste, by-products and smokes very complex and unclear.

## SWOT analysis\_ The use of solid olive oil residues in Liguria, ITALY

### Opportunities

- Raising costs for fossil fuels
- Renewable energy generation
- Economic revenue/savings for olive millers
- Presence of an interesting thermal energy demand (greenhouses) exactly where residues are located
- Possibility to use olive trees pruning or other vegetal residues (eg. from flowers cultivation)
- Availability of public funds coming from the Rural Development Plan
- Presence of some utility companies interested in investing for a plant
- Green certificates for electricity generation available in Italy
- Lack of consolidated replicable best practices in Italy ie. Chance to become the best practice
- Potential CO2 reductions
- Potential pilot pomace pellet production to overcome the problem of absence of dry and depleted olive pomace
- Agriculture sector suffering of higher costs and prices (they might represent an interesting energy demand)

## SWOT analysis\_ The use of solid olive oil residues in Liguria, ITALY

### Threats

- Opposition from the pomace refineries based in regions which will not receive Ligurian pomace anymore
- Delivery of pomace to other buyers for a higher price
- Possibility of a pomace quantity reduction year by year due to different bearings
- Normative changes
- Lack of government support: regional government not interested in our activities
- Air pollution deriving from pomace pellet combustion (since it would be a pilot production)
- Competition among the regional trade associations (they are in the RSC but on the market they compete strongly, therefore this can generate difficulties in the cooperation within MORE)

## SWOT analysis\_ The use of solid olive oil residues in Jaen, SPAIN

### Strengths

- Jaen is the main region of olive oil in the world
- Economic support on a local, regional and national level.
- High calorific value of pit.
- High concentration/cooperation among millers so high quantity of raw material.
- Presence of good practices in the region.
- Involvement of the regional companies which support biomass energy.

**SWOT analysis\_ The use of solid olive oil residues in Jaen, SPAIN**

**Weaknesses**

- Difficulty of managing large quantity of biomass (transport, awareness, etc).
- Large investment cost.
- Use only one type of biomass on a local and regional level.

## SWOT analysis\_ The use of solid olive oil residues in Jaen, SPAIN

### Opportunities

- Increase of the price of fossil fuels.
- Big companies invest in this type energy.
- This type of energy helps environment and it helps to reduce levels of carbon dioxide so renewable energy generation.
- Introduction of Centre for Technology Innovation in the biomass sector (GEOLIT).

## SWOT analysis\_ The use of solid olive oil residues in Jaen, SPAIN

### Threats

- Normative change at present the economic incentive benefits small companies (Power  $\leq$  2 Mega Watt).
- Professional insufficiency in the sector.
- Lack of connection in the biomass sector.
- The population's ignorance of renewable energy and of energy efficiency and their opportunities.
- Utilization of other energy resources.

## SWOT analysis\_ The use of solid olive oil residues in Chania, GREECE

### Strengths

- Olive Pits are a Renewable Energy Source (RES) so they can be subsumed in the framework for the exploitation of RES.
- Dry pomace or Pit has high enough heating value.
- It's a relatively inexpensive energy source.
- It's not fully exploited as an energy source.
- A stable olive residue to energy supply chain.
- The technology to use is known.
- Almost zero CO2 emissions during life cycle.
- Pomace can be safely transported.
- Pomace can be used as a natural fertilizer.

★★★★★★★★★★

According to the regional situation described in D 3.1 dry pomace price ranges between 0.03-0.05 €/kgr and provides approximately 4500 kcal/kg of heat. Compared to wood price that range between 0.10-0.13 €/kgr and the heating value 3900 kcal/kg it can be concluded that dry pomace is less expensive than wood and has a higher energy density. Additionally, compared to diesel oil prices that range between 0.60-0.65 €/lit, or 0.70-0.75 €/kgr (assuming an average density of 0.85 kgr/lit) and has approximately 10.000 kcal/kg of heat dry pomace is still cheaper.

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**SWOT analysis\_ The use of solid olive oil residues in Chania, GREECE**

**Weaknesses**

- Lack of policy for the energy exploitation of olive residues
- Small unconsolidated olive mills units
- Unpredictable olive pomace/pits production
- Absence of olive refineries in some olive mills areas
- Many olive groves as well as owners are old, and therefore their productivity is declining
- Mills have low energy demand
- Technology may not be available to all regions
- Transportation difficulties of olive pomace & pits from the small olive mills units unconsolidated
- Cost of technology for pit combustion



Each time an innovative method is suggested, doubts and scepticism always exist.

In the case of Crete, millers are not easily convinced to change their usual ways of doing things especially when it comes to forming new associations to exploit the energy benefits of pomace.



**SWOT analysis\_ The use of solid olive oil residues in Chania, GREECE**

**Opportunities**

- Current EU legislations favours & subsidizes RES use
- New additional revenues for olive millers
- Upward trend of petrol prices
- Known best practices in this field (energy exploitation of olive residues)
- Decrease environmental pollution by olive waste



Being a readily available RES source, pomace is favored by current EU national legislation as well as by high fossil fuel (i.e. petroleum) prices.

In addition uses in other countries are easier to adapt to local conditions, since the technology involved is relatively simple and well known.



**SWOT analysis\_ The use of solid olive oil residues in Chania, GREECE**

**Threats**

- Limited knowledge/information of energy potential
- Lack of government support
- Air pollution deriving from pomace pellet combustion
- Change of consumer behavior towards less expensive substitutes and products
- Unfavourable weather conditions.



As it's the case of most new investments, some kind of financial and technical support must be provided to give a positive impulse. In some cases, technical support may be more different due to unfamiliarity with the subject or the remote locations of the interested people. Other times financial support may be hard to obtain because of bureaucratic obstacles or lack of specific legislation.



## SWOT analysis\_ The use of solid olive oil residues in Koper, SLOVENIA

### Strengths

- Olive pit is RES
- Olive pit has high calorific value
- Olive residues in Slovene Istra have high calorific value (virgin pomace)
- Cheap energy source
- Accessible energy source
- Known and already developed technology to use

## SWOT analysis\_ The use of solid olive oil residues in Koper, SLOVENIA

### Weaknesses

- Small energy needs of olive mills in Slovene Istra
- No refineries in Slovene Istra
- Difficulties by transport of olive residues
- Lack of knowledge/information on olive residues energy potential
- No suitable repositories for olive residues
- Mostly wet olive residues
- No olive residues drying facilities/plants
- No policies in RS in field of managing with olive residues
- Non-existence of olive-to-energy chain in Slovene Istra
- Up to know – small amounts of olive residues appropriate for immediate energy use

## SWOT analysis\_ The use of solid olive oil residues in Koper, SLOVENIA

### Opportunities

- Global growth of crude oil prices
- EU legislation supports and co-finances use of RES
- Additional earnings for olive millers
- Bigger amounts of olive residues in near future (many olive trees were planted in last 5 years)
- Olive residues are not exploited as RES
- Decrease environmental pollution by olive waste

**SWOT analysis\_ The use of solid olive oil residues in Koper, SLOVENIA**

**Threats**

- Unpredictable pomace production
- Utilisation of other energy sources
- More pollution with olive waste (in future in no action is taken)

## SWOT analysis\_ The use of solid olive oil residues in Istria, CROATIA

### Strengths

- Olive-milling residues are not fully exploited renewable energy sources
- Increased exploitation of renewable energy sources is one of the main goals of Croatian energy development sector
- Increasing trend of olive growing in the Istria and Croatia
- Positive attitude of key market actors towards adequate olive residues management
- Local authorities are ready to support positive initiatives in the sector



Olive oil production in Croatia is very important and wide spread throughout the Istria, costal area of Kvarner and Dalmatia region.

Role of olive cultivation is important mainly for rural economy, local heritage and becomes important as specific landscapes interesting for tourism activity (olive oil road).

Because of that, olive oil production is more and more important as a source of employment and economic activity in Istria as well as in Kvarner Region and Dalmatia.

Most of olive oil producers are SMEs and can be distinguished as traditional groves and more managed traditional plantations. There are only few intensive and more mechanised plantations.



**SWOT analysis\_ The use of solid olive oil residues in Istria, CROATIA**

**Weaknesses**

- Lack of organization of olive milling residues management
- In Istria (and Croatia) there is no olive cake collecting centers or facilities for their drying and energy producing
- Olive milling residues are not used for energy purpose at the moment
- High percentage of olive oil in pomace in Croatia (no pomace oil extraction) requires a special approach in energy production
- Undefined legislation concerning olive residues management
- Limited access to information on regular and appropriate waste management



Olive producers use services of olive mills that are responsible for olive mill waste management. Regulations and state authorities are currently indefinite concerning olive residues management. Olive millers should alone make a choice, organize themselves and solve technological problems. In practice, residues after olive oil production are not used in some new useful product. Most commonly usage is as a fertilizer or as a waste. There is existing knowledge of other possibilities of pomace usage (animal feed etc.) – but up to now no concrete actions. At the moment, olive millers have unsolved problems with residues. Most of problems are lays in the fact that producers do not have information needed for regular waste management and soon will be faced with increasingly restrictive environmental legislations in Croatia and the EU.



**SWOT analysis\_ The use of solid olive oil residues in Istria, CROATIA**

**Opportunities**

- Creation of supply olive-residues-to-energy chains could be the optimal solution for olive residues management in the region
- Istria as a tourist region could implement known technology and solutions in tourist facilities (hotels, swimming-pools, etc.)
- Existing trend of waste repositories reconstruction in Istria could create additional possibilities for treatment and energy use of olive milling waste



At the moment in Croatia there is a lack of successful energy exploitation of olive residues.

Quantities of residues are relatively low in Croatia but in the following period significant increasing could be foreseen. It should be pointed out that the principal objectives of the Republic of Croatia energy policy are stated in the Energy Sector Development Strategy which was adopted by the Croatian Parliament in March 2002 for 10 years. One of the strategic objectives is striving to increase utilisation of renewable energy.



**SWOT analysis\_ The use of solid olive oil residues in Istria, CROATIA**

**Threats**

- Production seasonality and variability of residues quantities for energy production
- Existing producer's attitude of non profitability on pomace use in energy purposes



Creation of supply olive-residues-to-energy chains could be the optimal solution for olive residues management in the region but some problems for the energy exploitation could arise. A few main could be caused by the lack of olive cake collecting centres or drying facilities, dispersion and seasonality of olive residues production and presence of different milling systems with different residues content.



### **Main conclusions summarising SWOT analyses.**

- A major common strength is that pomace is a reliable, renewable, relatively inexpensive and readily available energy source of high calorific value.
- Technology for pomace exploitation is mature and is already being implemented in some scale (in Spain primarily, in Italy and Greece are rising) while in Slovenia and Croatia residues are still not fully exploited.
- Problems due to transportation, unawareness and seasonality exist.
- Because of different olive treatment procedures pomace is not a homogeneous sub-product in all regions, therefore a standardized exploitation methodology can not be implemented.
- Incentives and legislations are needed in order to overcome barriers.
- The development of olive residues to-energy chains can provide solutions to the cultivating regions and olive solid waste management.
- Green certificates for electricity generation can be made available.
- Pomace is a suitable replacement of fossil fuels and a promising source for the creation of new job opportunities.
- Unpredictable weather conditions affecting annual production of pomace.
- Lack of administrative support and dissemination efforts.

## Transforming SWOT analysis into actions

A framework by which SWOT issues can be developed into actions.

1. Product (what do we want to exploit?)
2. Process (how we plan to do that?)
3. Customer (who will be interested?)
4. Distribution chain (how does it reach them?)
5. Finance (what are the prices, costs, investments, profits ?)
6. Administration (and how do we manage all this?)

**SWOT Analysis is the Key Component of Strategic Development.**  
It can prompt actions and responses

| Internal   | External   |
|--|--|
| Build on <b>strengths</b><br>Surpass <b>weaknesses</b> | Exploit <b>opportunities</b><br>Avoid <b>threats</b> |

### Action 1

#### Product (what do we want to exploit?)

The product in question is dry pomace (with or without pit and humidity of no more than 8% ) derived from olive pressing. Dry Pomace can be used for combustion into a boiler to generate heat and/or electricity. Dry pomace has high enough heating value and it's relatively inexpensive and through unstable trend of petrol prices and the fact that pomace is not fully exploited it could be used as an inexpensive energy source. Current EU and national legislation supports and provides incentives for the use of biomass as fuel. Dry pomace can also be used as heat source especially if transformed into pellets. Applications include indoor space heating, swimming pool heating and electricity production. Moreover, olive tree prunings are also suitable as heating source in the form of pellets.

### Action 2

#### Process (how we plan to do that?)

The process of heating using dry pomace or pellets is rather simple and the technology is readily available. For dry pomace production, a pomace oil refinery is needed and in some cases these refineries are quite far from the mills. Accumulation (stocking) of pomace is usually an unstable process due to weather conditions, geographical diversities and unwillingness/unawareness of olive growers to use it as an energy source. In cases where

collection of dry pomace/pits is accomplished, good examples of applications have been performed (for home/commercial space heating, electric power generation etc). Transportation issues need to be resolved in some cases due to remote distances between raw material and location of its use. The legal framework is also often a key issue as can simplify the use of solid residues for energy.

### Action 3

#### **Customer (who will be interested?)**

Potential users/customers could be home owners, commercial establishments (hotels, spas, etc.) industrial installations, public facilities (hospitals, schools, public swimming pools etc.) as well as power plants.

### Action 4

#### **Distribution chain (how does it reach them?)**

In order to assure a smooth and continuous flow between olive millers and final customers' collection, transportation and technology issues (biomass boilers, pelletizers, etc.) must be resolved. Contracts agreements between chain actors will be needed. Technology providers are also necessary. Extensive dissemination efforts must be directed to the potential users in order to stir the market and attract customers

### Action 5

#### **Finance (what are the prices, costs, investments, profits?)**

Calculations are necessary to compare the costs of using pits or pomace pellets (together with the acquisition of proper boilers) with the costs of other conventional fuels (diesel, natural gas etc). The heating values of the energy sources used must also be taken into account. For some applications (power plant uses for electrical energy generation or distance heating) a business plan should be developed.

### Action 6

#### **Administration (and how do we manage all this?)**

To obtain results, all key actors involved in the distribution chain must be clearly defined and well connected. The use of pits and pellets from olive residues may supplement similar biomass raw materials resulting from agricultural residues or even urban waste. This will be useful particularly in regions with other biomass sources and unstable olive solid residues. Companies involved in the pelletization business could undertake administrative role between the partners involved (olive mills-refineries-customers).