

**Towards a circular BIOeconomy scheme:
The role of wood from agrarian pruning and plantation removal as biomass**



Take-off for sustainable supply of woody biomass from
agrarian pruning and plantation removal

HEATING OF MUNICIPAL BUILDINGS WITH BALES OF FRUIT TREE PRUNING

Arkadiusz DYJAKON

Wroclaw University of Environmental and Life Sciences (WUELS), Poland



Call H2020-LCE-2015-3
Coordination and support action

30th April 2019 | Copa-Cogeca, 61 Rue Trèves, 1040 Bruxelles

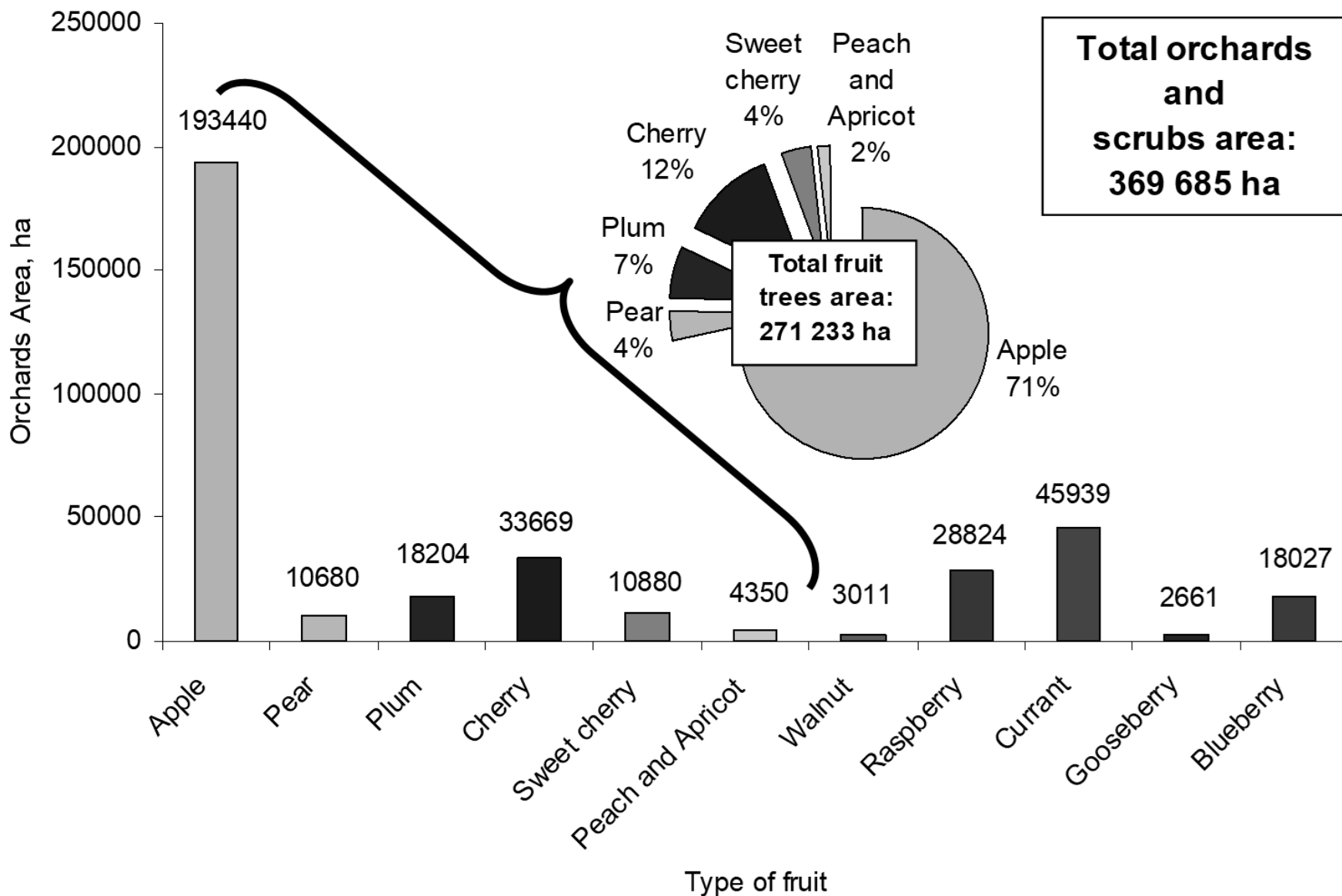


This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 691748

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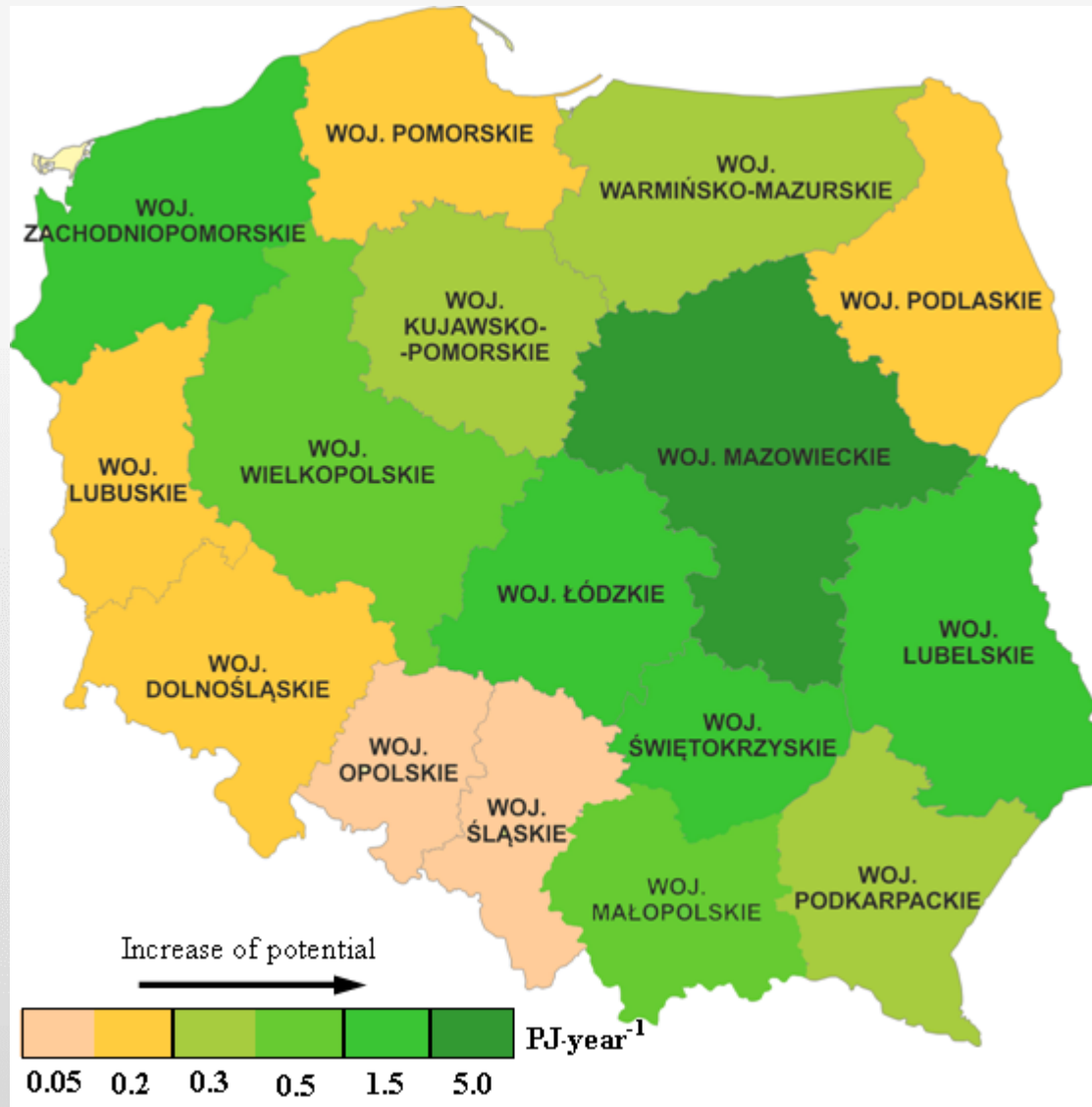
1. Pruning potential in Poland
2. Pruning to Energy – case 1
3. Pruning to Energy – case 2
4. Conclusions - Lessons learned







Significant but scattered biomass resource



Apple Orchards:

ca. 200 000 ha

3.5 t·ha⁻¹ (fresh matter)

Potential:

12.5 PJ·year⁻¹

=

500 000 t·year⁻¹
of coal



Typical view of pruning treatment/management in Poland
more than 99% of cases



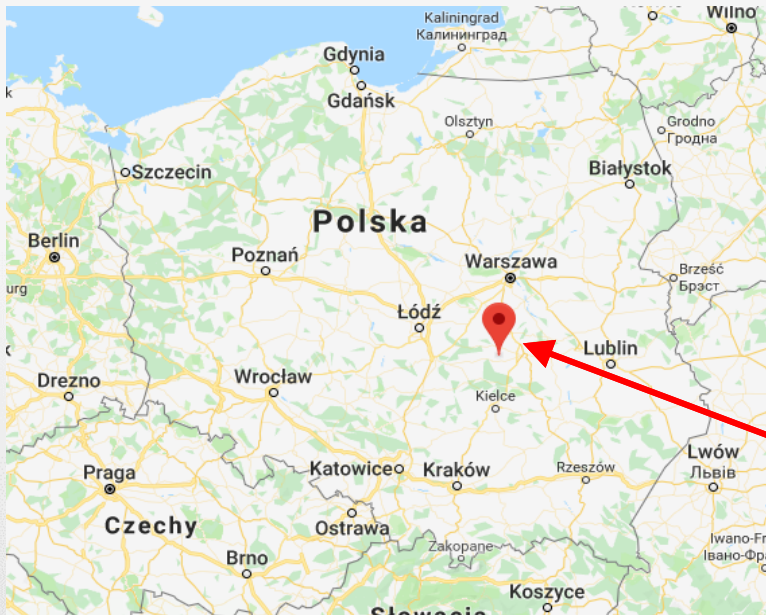
Burning

Mulching





The owner of the fruit farm (36 ha) and fresh juices production line. It is a family business. However, in the frame of co-operation, ca. 140-220 ha are under his management.



Mazovia Province – the region with a large biomass potential from pruning:

103,000 ha of orchards
(inc. 77,000 ha of apple orchards).

Komorów

- Eco-friendly farmer oriented on the limited organic waste production,
- He has seen the opportunity to decrease the management costs related to fruit production and increase the incomes of his company from pruning sell for energy purposes,
- The farmer is very conscious of the technology and solutions existing on the market,



Apple Orchard in Komorów



a) apple orchard



b) apple pruned biomass



c) biomass baler



d) pruned biomass bale



e) pruned biomass size



f) storage in the orchard



g) pruned bales trailer



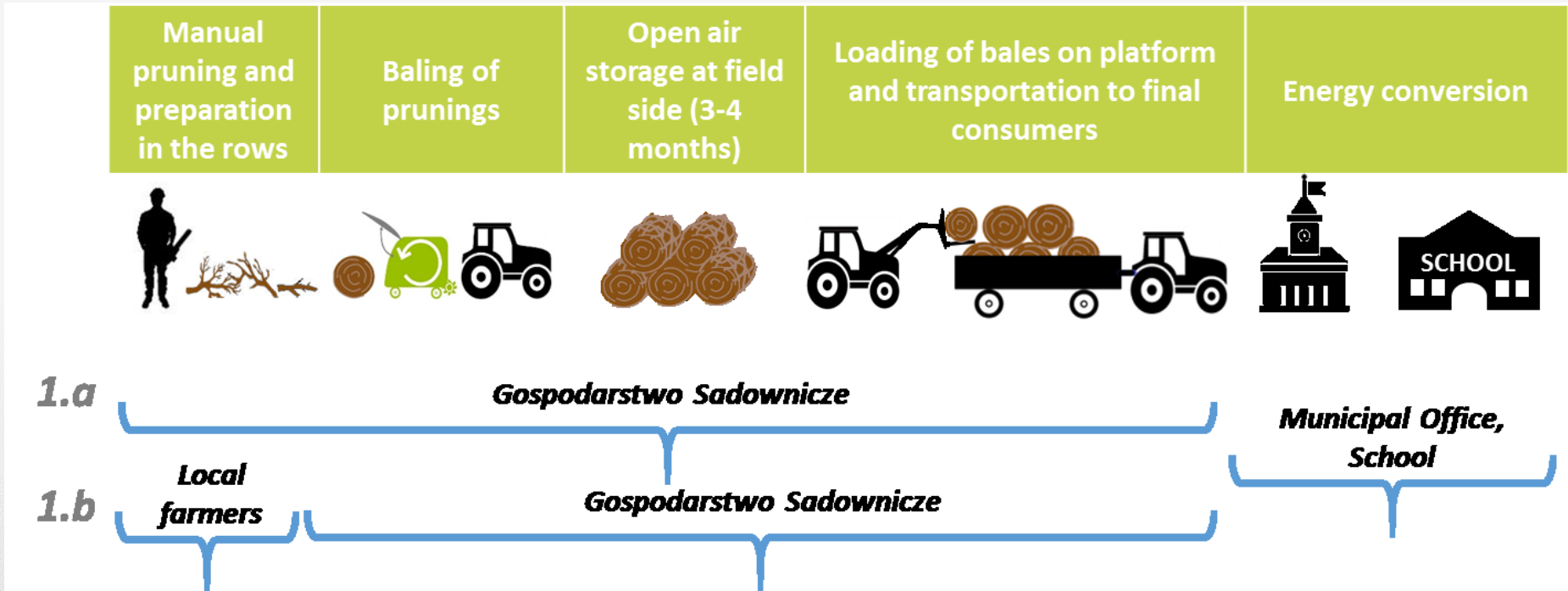
h) boilers house (2x300 kW_{th})



i) boiler for bales combustion



Apple Orchard in Komorów

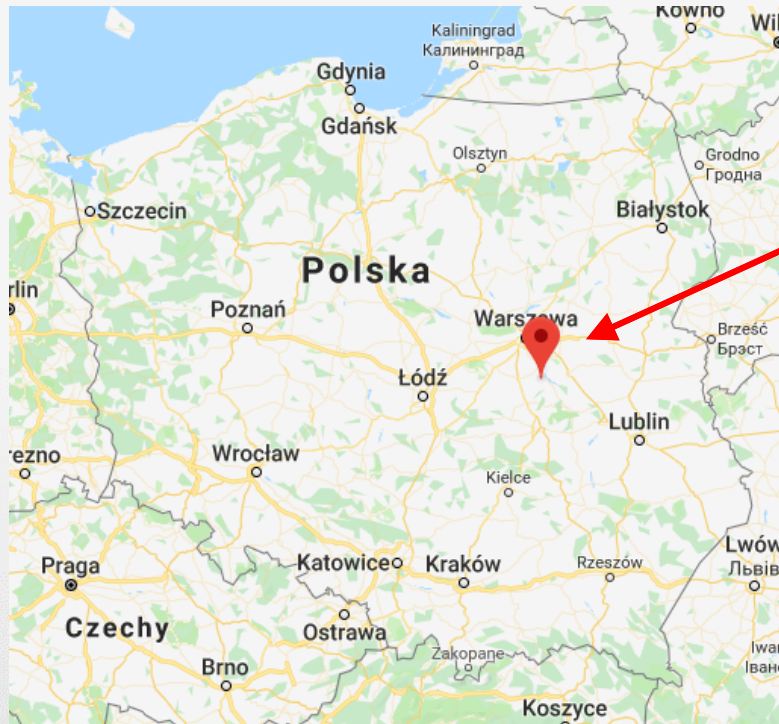


!!! IT WORKS !!!

The orchards owner has financial benefits (very short logistics chain), satisfaction from environment protection, less problems in apple production process.



The owner of the apple orchard (10 ha)



Piaseczno

- The farmer wanted to get rid of the infected branches,
- He has seen the energy potential in the pruned biomass,
- He planned to offer the services of orchards cleaning using his modified baler machine.



Apple Orchard in Piaseczno

Apple tree pruning in the orchard with the use of cutting strip





Apple Orchard in Piaseczno

Pruning preparation and harvesting in the form of bales





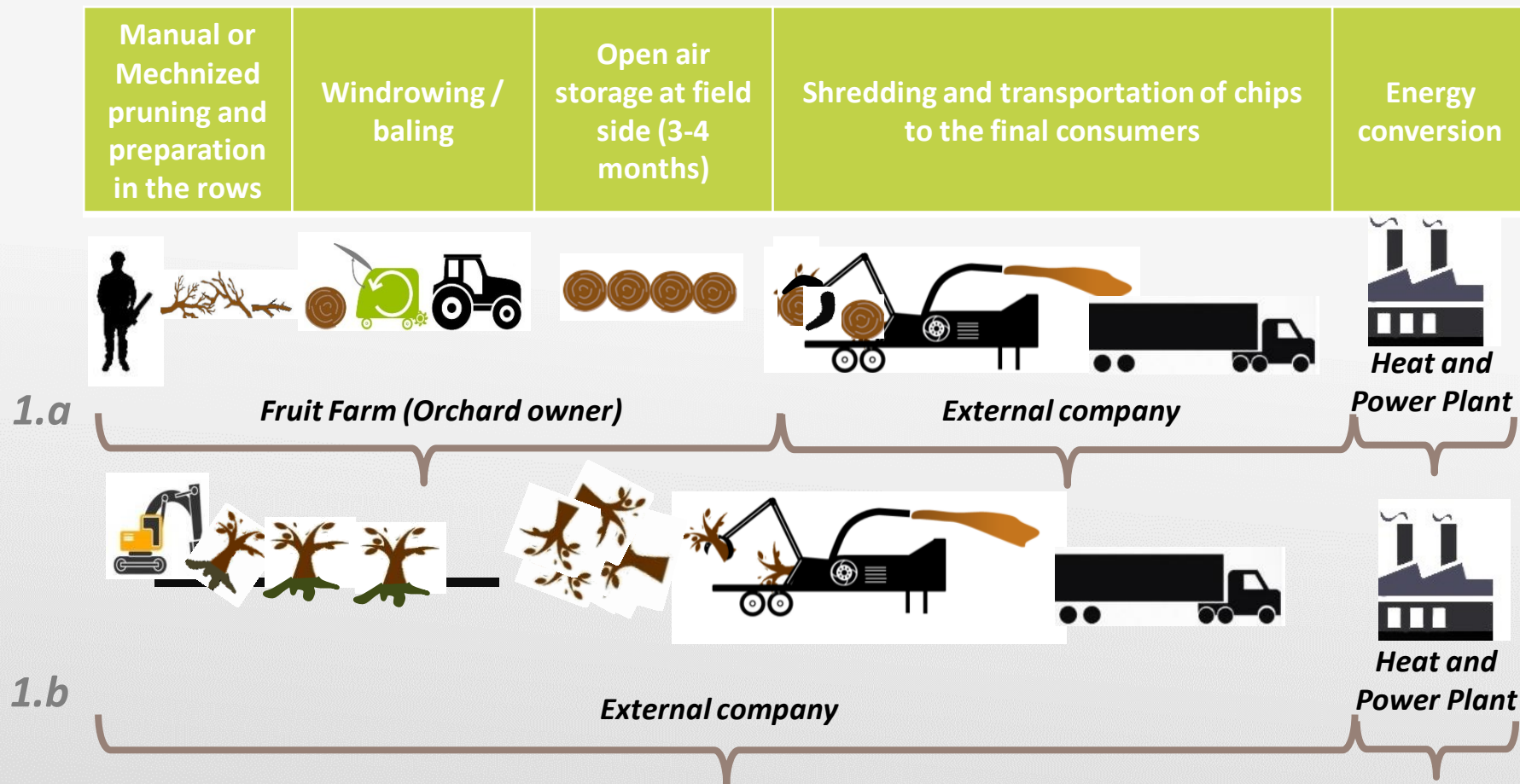
Apple Orchard in Piaseczno

Bales shredding/chipping and on truck loading





Fruit farm (apple orchard) in Piaseczno





Fruit farm (apple orchard) in Piaseczno

!!! IT DOES NOT WORK WELL !!!

MAIN MISTAKES MADE:

- ✓ No market recognition before technology implementation (pellets production instead of bales would be better),
- ✓ No middle size boilers burning bales in close neighbourhood,

DECISION MADE:

- Business for Business: the external company removes and cleans the selected orchards area and takes the bales and all harvested biomass for free (as a payment).
- The farmer considers the purchase of small pelleting line, but high costs is the main barrier.



Main barriers for the implementation of new value chains:

- Problems with apples selling causes the resistance to new investments,
- Tradition and old habits of orchards farmers,
- The farmers do not believe in benefits (too less successful examples that can be seen in person),
- Access to the sophisticated machinery,
- Still low awareness and responsibility for the environment,
- Biomass market is not stable in Poland, especially for large power plants,
- New anti-smog Directive/Regulation favours the burning of pellets, which increases the costs of fuel production, and as a result, reduces the demand (costs are a bottleneck).



Driving forces that may support the development of new value chains:

- Formal regulation and support in the case of local biomass utilization,
- Education and promotion in terms of biomass residues utilization for energy purposes,
- Social acceptance and engagement in environment protection,
- Biomass energy market stabilisation,
- Increase of competitiveness in relations to fossil fuels (especially to coal). The coal is still too cheap in Poland.



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Thank you very much for your attention!

PhD Arkadiusz Dyjakon

Wroclaw University of Environmental and Life Sciences (WUELS), Poland

Email: arkadiusz.dyjakon@upwr.edu.pl

Tel.: +48 713205945, mobile: +48 662 258 384

