INTERNATIONAL PRUNE ASSOCIATION

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Context and Challenges

The French Prune Industry launched research aimed at :

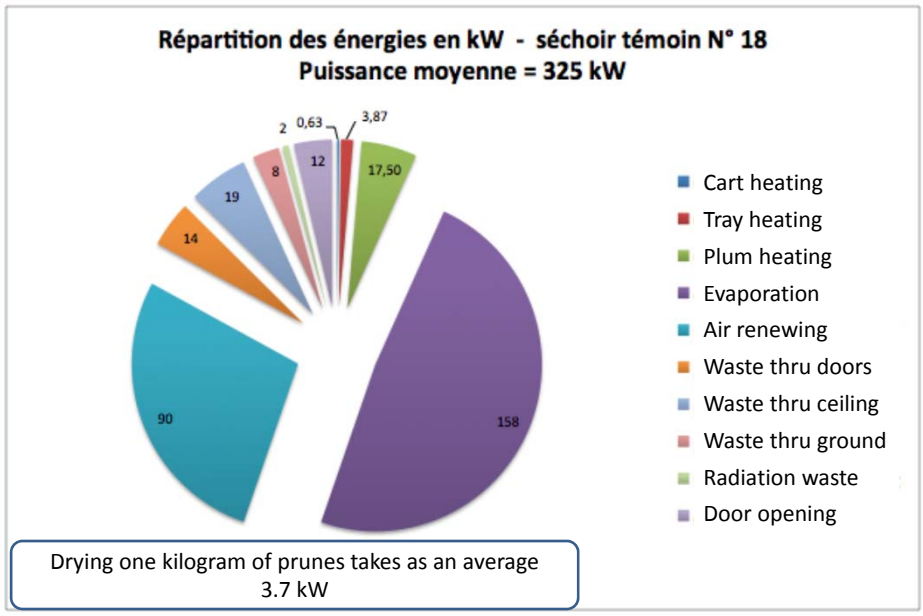
- Developing a new dehydration technology (ionic wind, osmotic dehydration, zeodration, microwave, use of overheated steam …)
- Improving existing dehydrators with:
  - Improvement of prune quality
  - Environmental protection (valuation of waste, valuation or management of effluent …)
  - Cost cutting (energy, workforce…)

Here-presented experiments

- Heat balance of a parallel-flow tunnel
- Tunnel Insulation
- Energy saving
- Alternate energies
- Improvement of aeraulics

Heat Balance

Heat balance of parallel-flow tunnel

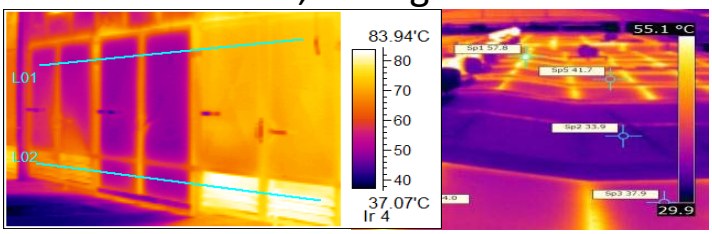


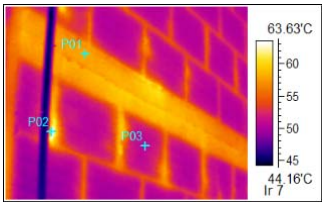
Drying one kilogram of prunes takes as an average 3.7 kW

Tunnel Insulation

Insulation of Dehydrators

- 6-12 % energy waste
- Insulation of doors, ceilings and walls

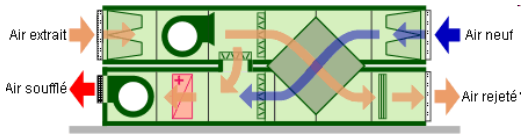


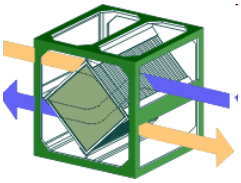


Energy Saving

Energy saving

Air processing (plate heat exchanger)

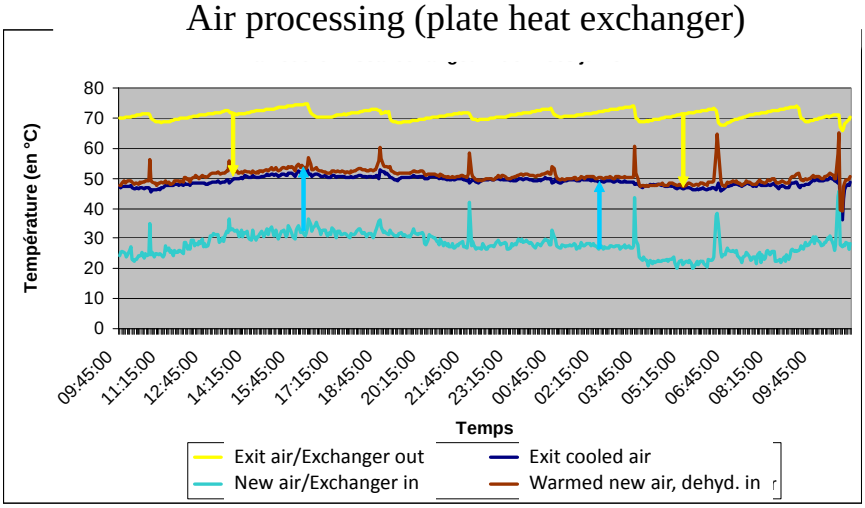




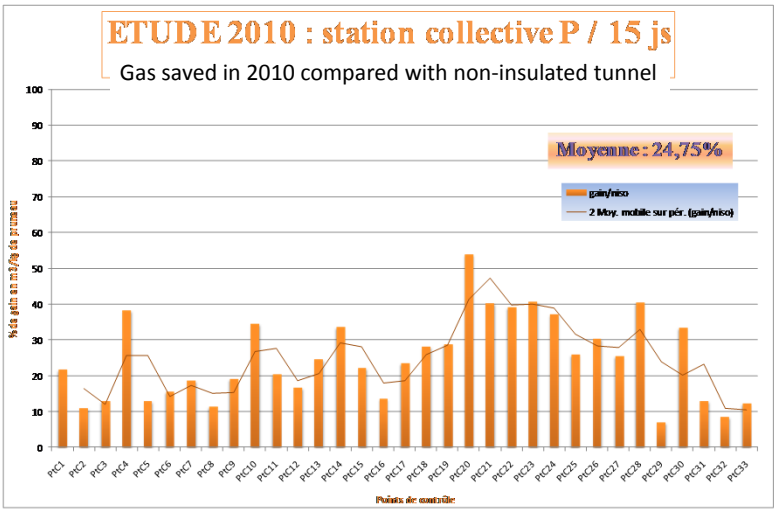
Energy saving

Air processing (plate heat exchanger)

Energy saving



Energy Saving
Insulated Tunnels with Heat Exchangers



Alternate Energies

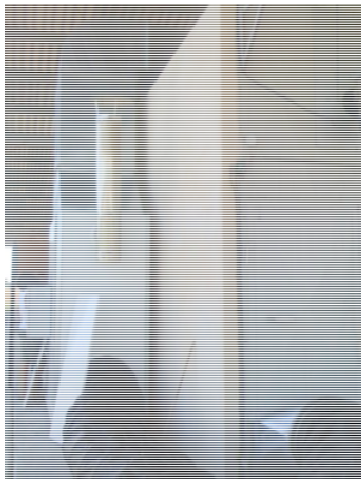
Alternate Energies

Sun pre-heating

Biomass Burners

Alternate Energies

Biomass Generator

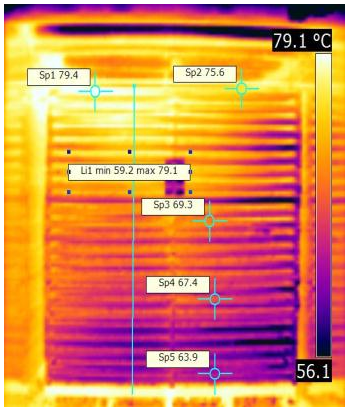


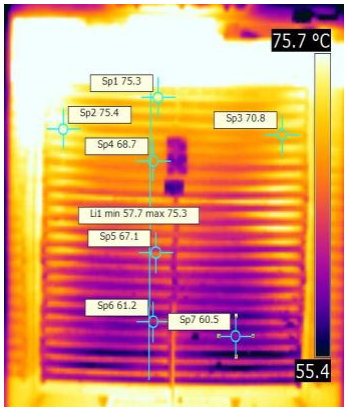
Alternate Energies
Biomass Burners

- **In 2010**, each dehydration batch with diesel gas gave an average consumption of 234 liters at €0.56 p/liter, i.e. €131.00. Use of wood granules at €200.00/ton comparatively gives a cost of €102.96, i.e. **21.4% less**
- **In 2011**, each dehydration batch with wood granules consumed an average of 460 kilograms at €200.00 per ton, i.e. €92.00. Using diesel fuel at €0.67 p/liter would give comparatively a cost of about €140.00, so we save **34.3%**. With an insulated dehydration tunnel we could expect saving a little more, about 40%.

Air-Flow Improvement

Air-Flow Improvement





Air-Flow Balance of a Tunnel

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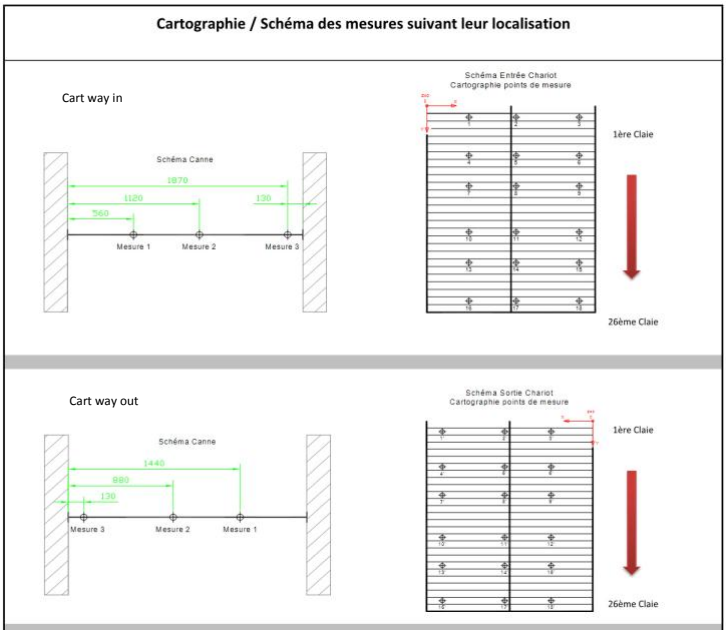
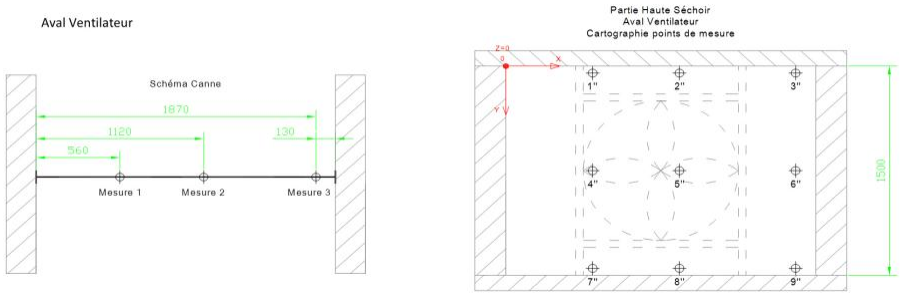
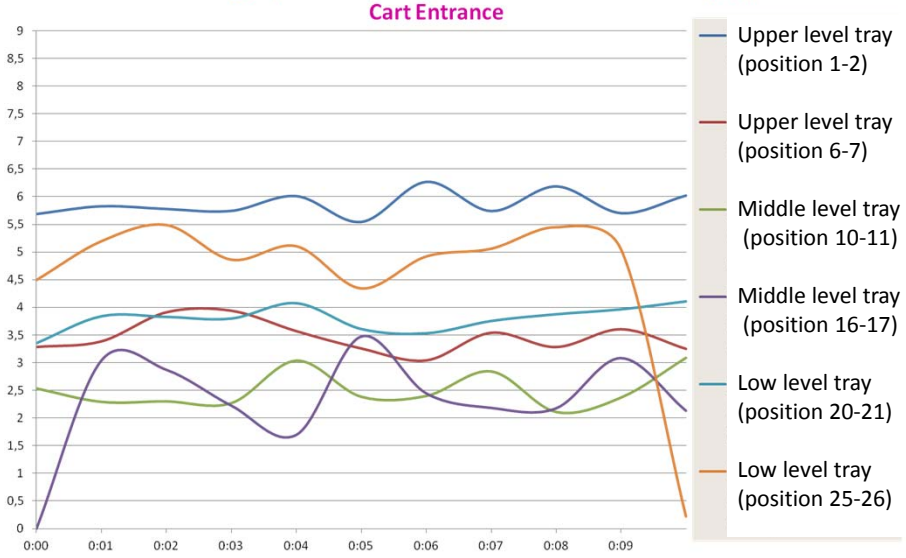
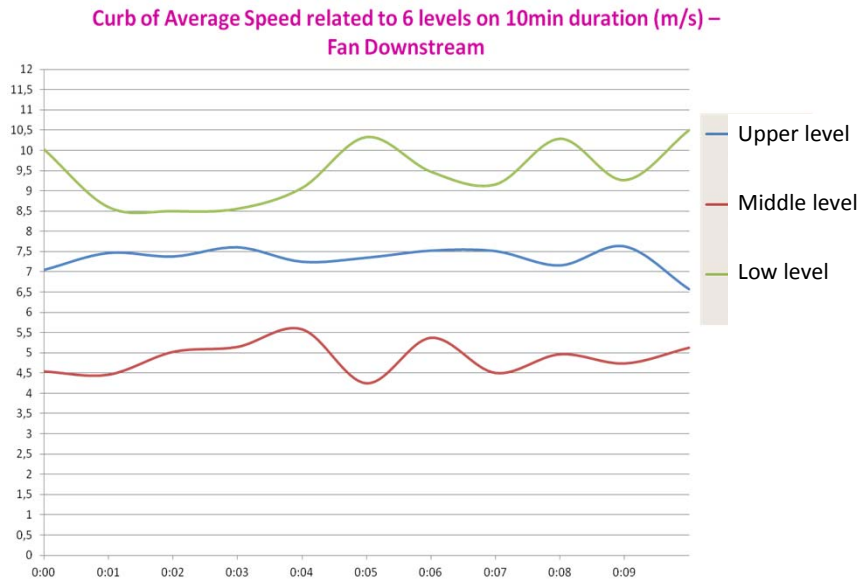


Air-Flow Balance of a Tunnel



Curb of Average Speed related to 6 levels on 10min duration (m/s) – Cart Entrance





BIP Results

- Insulation of tunnels, doors, ceilings, walls:

  6 - 12 % energy saved
- Heat Exchanger:

  15 % energy saved
- Switching burners from gas to biomass

  34 % energy saved
- Air-flow improvement

  Results on work

Thanks for your attention

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