In June 2009, a unique event took place between Rotorua in New Zealand and Melbourne in Australia. This event, cleverly named by its organizers “Residues to Revenues” focused on how to improve the generation of renewable sources of energy from biomass harvesting in this part of the world. It featured influential speakers from around the world, as well as from Australia and New Zealand, who analysed the developments of power generation from biomass recycling under different economic, financial, academic and technological perspectives. While the economics of this industry and interesting case studies were presented, the following message was sent to the highly specialized audience: “Australia and New Zealand are 20 years behind in applying biomass recycling technologies for the generation of energy”. Though the Government has not helped by creating a welcoming and challenging legal framework for this sector to develop, all industries have kept on relying on traditional carbon intensive sources of energy. So far the Labour Government in Australia has started with high promises but it seems it is getting tangled in the lobbying tactics of the parliamentary machine and those promises are being watered down to much lower targets of carbon emissions for the near future. However, the private sector has started to promote various technologies for harvesting biomass and for creating fuel in liquid, gas and/or solid form. A part from traditional systems for collecting forestry residues and mulching them into static grinders, which involve several activities, machinery and operators, one company who is a worldwide leader with 20 years of experience in the mulching industry has come up with an extremely innovative solution. Primetech, 100% owned by FAE Group, was founded with the aim of designing and assembling the PT range of machines. Today the PT range features 3 models and a wide array of accessories and options: PT 200 (180 HP), PT 300 (275 HP) and PT 400 (415 HP). Please visit www.prime-tech.com for more detailed information.
Today FAE Group have a worldwide presence both with commercial operations, as well as technical support and service. FAE Australia Pacific Pty Ltd is the hub for Oceania and Asia and it is well equipped with stock of machines, parts and service for supporting its market locally. As an evolution of the PT series and in cooperation with the FAE engineering department, an innovative biomass harvesting and recycling solution was implemented by combining the all-terrain characteristics of the PT range with a specially designed biomass harvesting head. This combination gave birth to the PT 300 and PT 400 Biomass Harvesting Solution.

Borrowing its leading experience in forestry applications, FAE Group has developed this project with the idea of a machine that is able to:

- operate in any condition of terrain: designed to work up to 40 degrees of inclination and with an extremely low ground pressure of up to 3.1 psi with the head on;
- harvest any type of vegetation and timber up to 300 mm of diameter with high productivity;
- provide a dual solution with a chute that can collect the mulched biomass into a trailer following the unit laterally or with a built-in tank of different capacities and shapes to operate in marginal and steep country, as well as in orchard environments where access is limited.
A strong hydraulic lifting and discharging mechanism is built-in the system in order to unload the mulched biomass once the tank is full. The bigger tank can collect approximately 9 m$^3$, while the narrow version approximately 5 m$^3$. The unloading height can be up to 4.5 m from the ground, thus allowing the haulage of the recycled material into conventional trucks.
The harvesting head has been conceived by applying FAE mulching technology to a rotor designed for picking up and mulching the material against an increased series of toothed and adjustable breaker bars to obtain the requested fine mulch. A screening mechanism is also available for the most demanding applications and the chute is completely adjustable hydraulically. The hydraulic front bonnet enables an additional control of the particle size, while the adjustable skids minimize the contamination of the material by limiting the contact of the rotor with the ground.

![Figure 5. BMM 225 Biomass Harvesting and Mulching Head](image)

The following table gives some technical data on the performance of a 500U FAE industrial mulching head installed on a PT 400 as an indication of its performance:

<table>
<thead>
<tr>
<th>Tree Breast Height Diameter</th>
<th>Tree Height</th>
<th>Tree Type</th>
<th>Minutes to Mulch Complete Tree</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 mm</td>
<td>19.80 m</td>
<td>Pine (high humidity level)</td>
<td>2.44</td>
</tr>
<tr>
<td>430 mm</td>
<td>18.15 m</td>
<td>Pine (high humidity level)</td>
<td>2.39</td>
</tr>
<tr>
<td>400 mm</td>
<td>16.50 m</td>
<td>Pine (high humidity level)</td>
<td>2.22</td>
</tr>
<tr>
<td>390 mm</td>
<td>13.80 m</td>
<td>Pine (high humidity level)</td>
<td>1.04</td>
</tr>
</tbody>
</table>

The test was done using a stop watch started as the tree was attacked driving forward and stopped at the last reverse movement of the mulcher with the front bonnet closed to finish off the material as per picture below.
Please consider that mulching pine with a high humidity content to these levels takes more effort than hardwood. Pine tends to absorb the attack of the mulching hammers due to its elasticity, while hardwood tends to shatter under the attack of the mulching hammers.

The PT series of Forestry Prime Movers has been distributed around the world in the last 4 years with the majority of the sales concentrating in Europe and North America. Anyhow, PT Prime Movers are also active in Australia, New Zealand and Japan now. One of our customers in NSW has been using a PT 400 for the last 10 months now with excellent results and productivity. One of the major jobs he performed successfully was the preparation of a 12 m wide by 34 km long strip through native hardwood forest for laying down gas pipelines. Initially they had started with traditional methods such as bulldozing, excavating, tub grinding, chaining, burning, etc. This was involving various machines and operators and they were still behind schedule. When the PT 400 was brought to the scene, one man with one machine completed the job in 3 months. Here is a picture of the completed work. If you want to see more, please go to www.youtube.com and search for “PT 400 NSW”.

Figure 6. Mulched Pine Tree
Figure 7. Mulched Hardwood

For more detailed information and follow up on your biomass harvesting needs, please contact us at **FAE Australia Pacific Pty Ltd – Email: info@fae-ap.com.au; Phone: 03 97064088**