John Deere
Energy Wood
Supply Chains

Marica Kilponen
FOCUS 2010, Mpumalanga
Content

1. John Deere Today

2. John Deere Energy Wood Products

3. Slash Bundling method
John Deere Manufacturing Locations
FOCUS on Forest Engineering 2010

John Deere Today

Helping to establish sustainable, alternative energy sources

• Biodiesel from soybeans
• Ethanol from corn and sugar
• Agricultural waste products
• Biomass from forests
2009 Net Sales and Revenues: $23.11 Billion

- Agriculture and Turf: 78.4%
- Construction & Forestry: 11.4%
- Credit: 8.4%
- Other: 1.8%
Agriculture and Turf

Global Operating Model
5 Global External Platforms –
A platform consists of a portfolio of ‘like’ product lines

Crop Harvesting
- Combines
- Front-End Equipment
- Cane
- Cotton

Turf and Utility
- Utility Vehicles
- Riding Lawn Equipment
- Commercial Mowing
- Golf
- Walk-Behind Mowers

Hay and Forage
- Self-Propelled Forage Harvesters
- Heads
- Balers
- Mowing

Crop Care
- Seeding
- Tillage
- Application Equipment

Tractors
- Large (7000, 8000, 9000)
- Medium (6000)
- Utility (2000, 3000, 4000, 5000)
- Loaders

FOCUS on Forest Engineering 2010
Agriculture and Turf

High-performance harvesting machines

A world leader in providing advanced products and services for agriculture
Agriculture and Turf

John Deere Sugar Cane Harvester 3520
### Deere Forestry Product Line-up

#### Forestry
46 Models

#### Construction
26 Models
Construction Equipment
Forestry Equipment

World’s premier producer of timber-harvesting equipment
John Deere Power Systems

Diesel engines power equipment from 40-600 hp (30-448 kW)
John Deere Water

Exciting growth potential

FOCUS on Forest Engineering 2010
John Deere Intelligent Solutions Group

Extending human capabilities through machine intelligence and information management.

Enabling all John Deere Divisions to deliver integrated intelligent electronic and information-based worksite solutions to customers – fueling superior revenue and SVA growth.
John Deere Energy Wood products

- Base machines for cutting
  - Harvesters
  - Feller-bunchers
- Base machines for hauling
  - Forwarders
  - Skidders
- Bundler (Energy Wood Harvester)
- Harvester Heads with Multi-Tree-Handling
- Weight scaling system
Wheeled Harvesters
770D
1070E
1170E
1270E
1470E

Forwarders
810E
1010E
1110E
1210E
1510E
1910E

Energy Wood Harvester 1190E

John Deere Cut to Length Machines
## Wheeled and Tracked Feller-Bunchers

<table>
<thead>
<tr>
<th>Model</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>643K</td>
<td><img src="image" alt="643K" /></td>
</tr>
<tr>
<td>843K</td>
<td><img src="image" alt="843K" /></td>
</tr>
<tr>
<td>753J</td>
<td><img src="image" alt="753J" /></td>
</tr>
<tr>
<td>759J</td>
<td><img src="image" alt="759J" /></td>
</tr>
<tr>
<td>853J</td>
<td><img src="image" alt="853J" /></td>
</tr>
<tr>
<td>903J</td>
<td><img src="image" alt="903J" /></td>
</tr>
<tr>
<td>909J</td>
<td><img src="image" alt="909J" /></td>
</tr>
<tr>
<td>953J</td>
<td><img src="image" alt="953J" /></td>
</tr>
<tr>
<td>959J</td>
<td><img src="image" alt="959J" /></td>
</tr>
</tbody>
</table>

## Tracked Harvesters

<table>
<thead>
<tr>
<th>Model</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>703JH</td>
<td><img src="image" alt="703JH" /></td>
</tr>
<tr>
<td>753JH</td>
<td><img src="image" alt="753JH" /></td>
</tr>
<tr>
<td>759JH</td>
<td><img src="image" alt="759JH" /></td>
</tr>
<tr>
<td>853JH</td>
<td><img src="image" alt="853JH" /></td>
</tr>
<tr>
<td>903JH</td>
<td><img src="image" alt="903JH" /></td>
</tr>
<tr>
<td>909JH</td>
<td><img src="image" alt="909JH" /></td>
</tr>
</tbody>
</table>

## Grapple and Gable Skidders

<table>
<thead>
<tr>
<th>Model</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>548G III</td>
<td><img src="image" alt="548G III" /></td>
</tr>
<tr>
<td>648H</td>
<td><img src="image" alt="648H" /></td>
</tr>
<tr>
<td>748H</td>
<td><img src="image" alt="748H" /></td>
</tr>
<tr>
<td>848H</td>
<td><img src="image" alt="848H" /></td>
</tr>
<tr>
<td>540G III</td>
<td><img src="image" alt="540G III" /></td>
</tr>
<tr>
<td>640H</td>
<td><img src="image" alt="640H" /></td>
</tr>
</tbody>
</table>

---

**John Deere Full Tree Machines**
TimberLink

A software application monitoring machine performance and condition

A breakthrough tool to increase productivity and uptime and to reduce operating costs

Flexible software framework enabling fast next steps:

- Intelligent measuring and data analysis will replace guessing in all lifecycle phases
Harvester heads for E-series harvesters

H412

H414

H480C

H754
John Deere Multi-Tree-Handling
Structure of boom scale system
Slash bundling
Slash Bundling

- Bundling method
- JD1190D Bundler
- Slash Bundler market
Advantages of bundling method, 1/3

1. The machines involved in procurement chain operate independently of each other making the system cool and reliable.

2. The integration of bundle production in the procurement of industrial roundwood is simple, as off-road and on-road transportation is able to be performed with standard equipment.

3. Increases the access to forest biomass in the areas which are inaccessible to chip vans and big chippers
Advantages of bundling method, 1/3

1. The machines involved in procurement chain operate independently of each other making the system cool and reliable.

2. The integration of bundle production in the procurement of industrial roundwood is simple, as off-road and on-road transportation is able to be performed with standard equipment.

3. Increases the access to forest biomass in the areas which are inaccessible to chip vans and big chippers
Off-road and on-road transportation
Off-road and on-road transportation
Advantages of bundling method, 1/3

1. The machines involved in procurement chain operate independently of each other making the system cool and reliable.

2. The integration of bundle production in the procurement of industrial roundwood is simple, as off-road and on-road transportation is able to be performed with standard equipment.

3. **Increases the access** to forest biomass in the areas which are inaccessible to chip vans and big chippers.
Increases the access to forest biomass
Advantages of bundling method, 2/3

4. Reduces a **risk of forest fires**

5. The **reliability** of the woody biomass deliveries is greatly improved, while the overhead costs are reduced.

6. Bundles can be **unloaded** from a vehicle and stored at any stage of the production chain. This possibility, as well as reliable information about the biomass inventories, creates excellent conditions for efficient process control.
Advantages of bundling method, 2/3

4. Reduces a risk of forest fires

5. The reliability of the woody biomass deliveries is greatly improved, while the overhead costs are reduced.

6. Bundles can be unloaded from a vehicle and stored at any stage of the production chain. This possibility, as well as reliable information about the biomass inventories, creates excellent conditions for efficient process control.
Advantages of bundling method, 2/3

4. Reduces a **risk of forest fires**

5. The **reliability** of the woody biomass deliveries is greatly improved, while the overhead costs are reduced.

6. Bundles can be **unloaded** from a vehicle and stored at any stage of the production chain. This possibility, as well as reliable information about the biomass inventories, creates excellent conditions for efficient process control.
Advantages of bundling method, 3/3

7. The bundler produces accurate real-time information about the daily production and inventories. Measuring becomes cost-free.

8. The storage of bundles is simple: storage space requirement is reduced, little loss or deterioration of biomass occurs, and long-term storage for the winter season is easy.

9. Remain good biomass quality
   • Stores without spontaneous combustion
   • Air-dries while being stored
Advantages of bundling method, 3/3

7. The bundler produces accurate real-time information about the daily production and inventories. Measuring becomes cost-free.

8. The **storage of bundles is simple**: storage space requirement is reduced, little loss or deterioration of biomass occurs, and long-term storage for the winter season is easy.

9. Remain **good biomass quality**
   - Stores without spontaneous combustion
   - Air-dries while being stored
Space requirement is reduced

- Bundle compression ratio: average 80%
- Savings with transportation and storing costs
Advantages of bundling method, 3/3

7. The bundler produces accurate **real-time information** about the daily production and inventories. Measuring becomes cost-free.

8. The **storage of bundles is simple**: storage space requirement is reduced, little loss or deterioration of biomass occurs, and long-term storage for the winter season is easy.

9. Remain **good biomass quality**
   - Stores without spontaneous combustion
   - Air-dries while being stored
Slash Bundler Productivity

• Productivity in Scandinavian conditions:
  • Mainly spruce: 90-120 bundles/ha
  • Spruce & Pine: 70-90 bundles/ha
  • 25-45 bundles/h

• A 1490D can bundle enough biomass to power 1490+ homes for 1 year, which is the equivalent of 2.5 MW’s of CHP capacity. (USA)
A Bundle Is….

- Logging residuals (limbs, tops, leaves, needles, etc)
- 60 to 80 cm (24” to 32”) in diameter
- Any length, but 3 meters (~ 10 feet) is most common
- 340 to 680 kg (750 to 1500 lbs)
- Energy content: around 1 MWh / bundle
- Wrapped with ordinary baling twine (sisal or propylene)
- Transported on log trailers or flatbeds
JD1190E Slash Bundler (Energy Wood Harvester)

Interesting new features and improvements in:

- Diesel Engine
- Hydraulics
- E-cabin
- E-Automation
- Serviceability
- Bundling unit
Slash Bundler Market

[Map showing the European Union with stars indicating the Slash Bundler Market locations]
Summary and Conclusions

• Using bundles as part of logistic solution in biomass supply chain can offer several benefits to the forest energy sector: they improve capabilities to *storage woody biomass for energy* use peaks and against price competition.

• Handling of energy wood can be improved by using bundles, when *loading and unloading* can be done in effective way.

• In the optimized supply chain bundling can improve also *yield and quality of biomass*.

• When demand of woody biomass is growing, most probably the transportation distances are also becoming longer: *bundling improves payload* of different transportation methods.

• Bundles and bundlers have *bright future* in growing bioenergy business.
John Deere Forestry – flexible harvesting solutions for forest energy
John Deere Forestry – flexible harvesting solutions for forest energy
It all started in a blacksmith shop...

Integrity – Quality – Commitment – Innovation
THANK YOU!
KIITOS!

KilponenMaricaA@JohnDeere.com