



John Deere Energy Wood Supply Chains

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3. Slash Bundling method



John Deere Today



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John Deere Manufacturing Locations



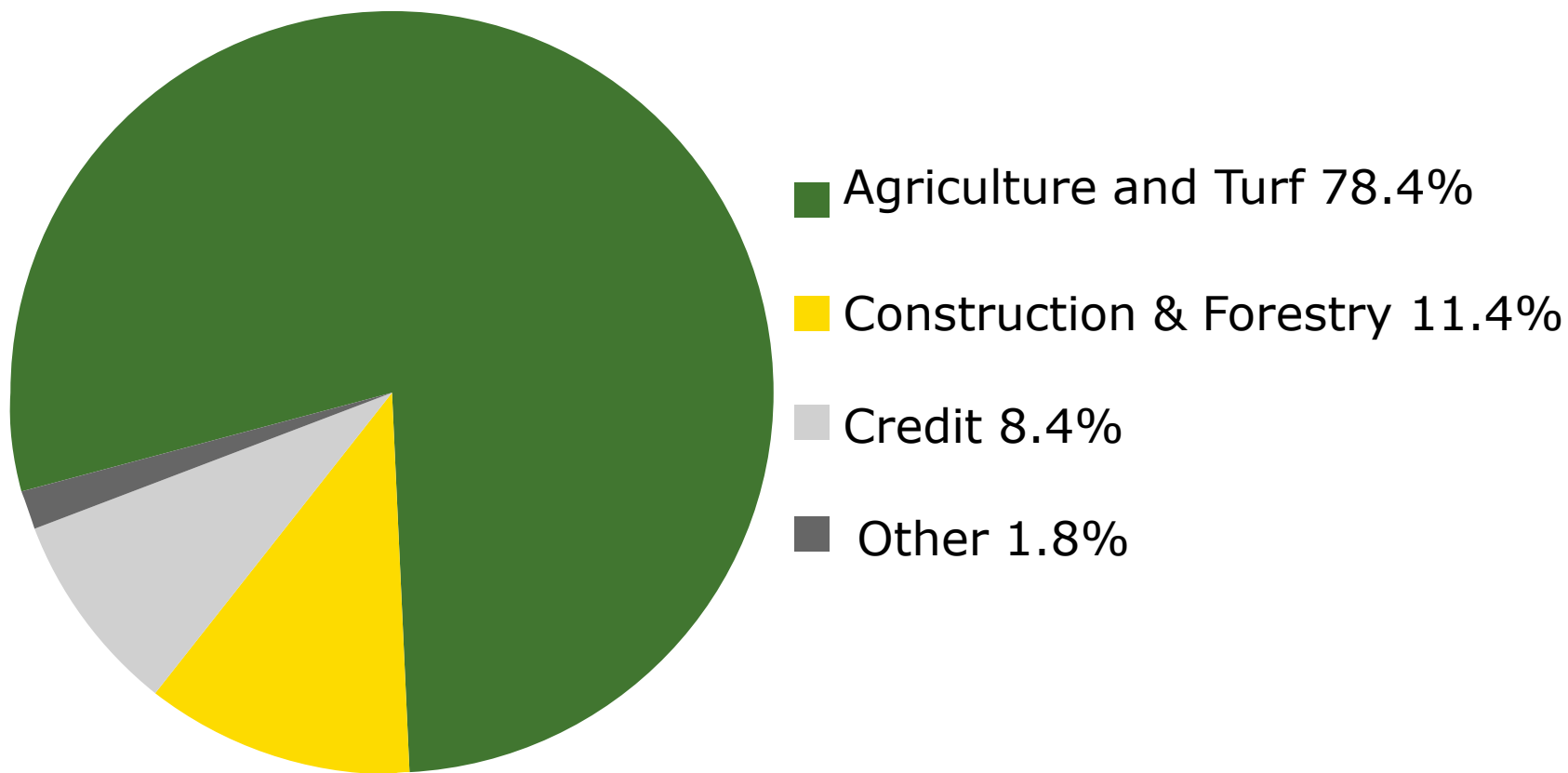
John Deere Today



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

Global Operating Model

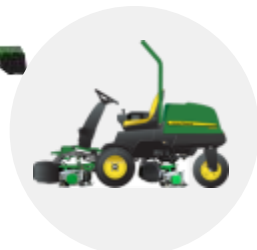
5 Global External Platforms –

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

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

643J WHEELED FELLER BUNCHER 174 SAE gross hp (130 kW)		810D FORWARDER 122 SAE net hp (91 kW)		2154D PROCESSOR 164 SAE net hp (122 kW)		744K LOADER 304 net hp (227 kW)	
643J WHEELED FELLER BUNCHER 225 SAE gross hp (168 kW)		1010D FORWARDER 115 SAE net hp (86 kW)		2454D PROCESSOR 182 SAE net hp (136 kW)		824K LOADER 333 net hp (248 kW)	
753J TRACKED FELLER BUNCHER 241 SAE gross hp (180 kW)		1110D FORWARDER 161 SAE net hp (120 kW)		2954D PROCESSOR 166 SAE net hp (140 kW)		844K LOADER 380 net hp (283 kW)	
759J TRACKED FELLER BUNCHER 241 SAE gross hp (180 kW)		1410D FORWARDER 173 SAE net hp (129 kW)		2154D ROAD BUILDER 164 SAE net hp (122 kW)		450J LT/LGP DOZER 77 net hp (57 kW)	
853J TRACKED FELLER BUNCHER 294 SAE gross hp (219 kW)		1710D FORWARDER 215 SAE gross hp (160 kW)		2454D ROAD BUILDER 182 SAE net hp (136 kW)		590J LT/LGP DOZER 85 net hp (63 kW)	
903J TRACKED FELLER BUNCHER 294 SAE gross hp (219 kW)		1490D ENERGY WOOD HARVESTER 182 gross hp (136 kW)		2954D ROAD BUILDER 180 SAE net hp (140 kW)		690J LT/LT/LGP DOZER 89 net hp (74 kW)	
909J TRACKED FELLER BUNCHER 294 SAE gross hp (219 kW)		540G-III CABLE SKIDDER 129 gross hp (96 kW)		3554D ROAD BUILDER 240 SAE net hp (182 kW)		700J LT/LT/LGP DOZER 115 net hp (86 kW)	
953J TRACKED FELLER BUNCHER 294 SAE gross hp (219 kW)		640H CABLE SKIDDER 172 gross hp (128 kW)		2154D DELIMBER 164 SAE net hp (122 kW)		750J STD/LT/WLT/ LGP DOZER 145-155 net hp (108-116 kW)	
959J TRACKED FELLER BUNCHER 294 SAE gross hp (219 kW)		540G-III GRAPPLE SKIDDER 129 gross hp (96 kW)		2454D DELIMBER 182 SAE net hp (132 kW)		890J STD/LT/WLT/ LGP DOZER 185-200 net hp (137-132 kW)	
770D WHEELED HARVESTER 115 SAE gross hp (86 kW)		648H GRAPPLE SKIDDER 172 gross hp (128 kW)		244J LOADER 64 net hp (48 kW)		950J STD/LGP DOZER 247 net hp (184 kW)	
1070D WHEELED HARVESTER 182 SAE gross hp (136 kW)		748H GRAPPLE SKIDDER 189 gross hp (141 kW)		304J LOADER 73 net hp (54 kW)		1050J DOZER 335 net hp (250 kW)	
1270D WHEELED HARVESTER 215 SAE gross hp (160 kW)		848H GRAPPLE SKIDDER 203 gross hp (151 kW)		344J LOADER 98 net hp (73 kW)		870D TAND-DRIVE MOTOR GRADER 185 net hp (138 kW)	
1470D WHEELED HARVESTER 241 SAE gross hp (180 kW)		339G KNUCKLEBOOM 170 SAE gross hp (127 kW)		444K Z-BAR/ POWERLLEL LOADER 128 net hp (95 kW)		672D SIX-WHEEL-DRIVE MOTOR GRADER 185 net hp (138 kW)	
700JH TRACKED HARVESTER 180 SAE net hp (133 kW)		437C KNUCKLEBOOM 170 SAE gross hp (127 kW)		524K Z-BAR LOADER 146 net hp (110 kW)		770D TAND-DRIVE MOTOR GRADER 215 net hp (160 kW)	
753JH TRACKED HARVESTER 220 SAE net hp (164 kW)		2154D LOG LOADER 164 SAE net hp (122 kW)		544K Z-BAR/ POWERLLEL LOADER 167 net hp (123 kW)		772D SIX-WHEEL-DRIVE MOTOR GRADER 230 net hp (172 kW)	
759JH TRACKED HARVESTER 220 SAE net hp (164 kW)		2454D LOG LOADER 182 SAE net hp (132 kW)		624K Z-BAR/ POWERLLEL LOADER 198 net hp (147 kW)		870D TAND-DRIVE MOTOR GRADER 235 net hp (175 kW)	
853JH TRACKED HARVESTER 274 net hp (219 kW)		2954D LOG LOADER 188 SAE net hp (140 kW)		644K Z-BAR/ POWERLLEL LOADER 232 net hp (173 kW)		872D SIX-WHEEL-DRIVE MOTOR GRADER 245 net hp (183 kW)	
903JH TRACKED HARVESTER 274 net hp (219 kW)		3594 LOG LOADER 246 SAE net hp (183 kW)		724K LOADER 264 net hp (197 kW)			
909JH TRACKED HARVESTER 274 net hp (219 kW)							

Construction Equipment

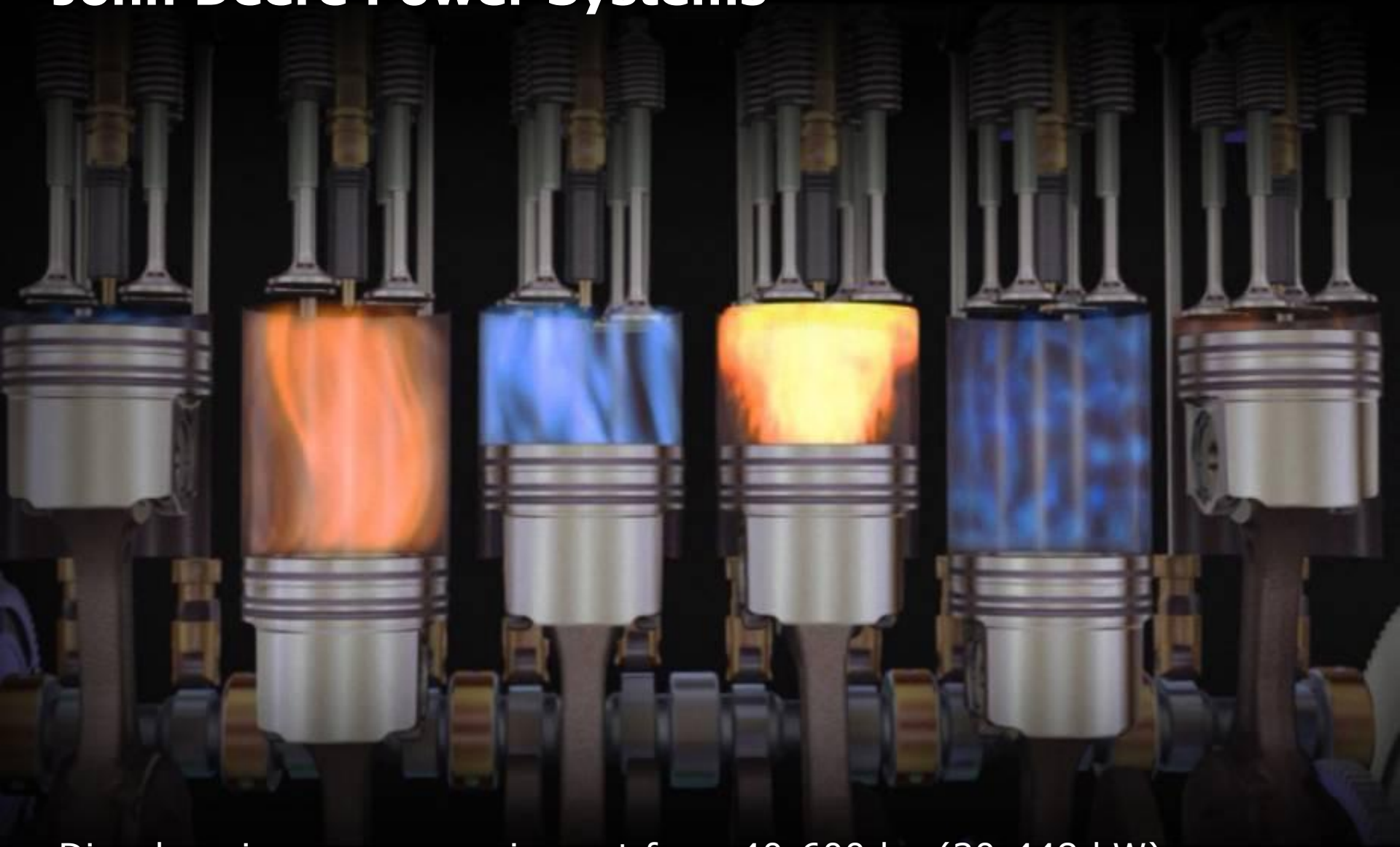


Forestry Equipment

World's premier producer of
timber-harvesting equipment



John Deere Power Systems



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

A close-up photograph of green corn leaves. Several large, clear water droplets are visible on the surface of the leaves, reflecting light. The leaves are vibrant green and show some signs of insect damage, such as small holes. The background is a soft-focus field of more corn plants.

John Deere Water

Exciting growth potential

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

Marica Kilponen



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John Deere Energy Wood products

- Base machines for cutting [\(video\)](#)
 - 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



John Deere Cut to Length Machines

Energy Wood Harvester 1190E



Wheeled and Tracked Feller-Bunchers



643K
843K
753J
759J
853J
903J
909J
953J
959J

Tracked Harvesters



703JH
753JH
759JH
853JH
903JH
909JH

John Deere Full Tree Machines

Grapple and Gable Skidders



548G III
648H
748H
848H
540G III
640H

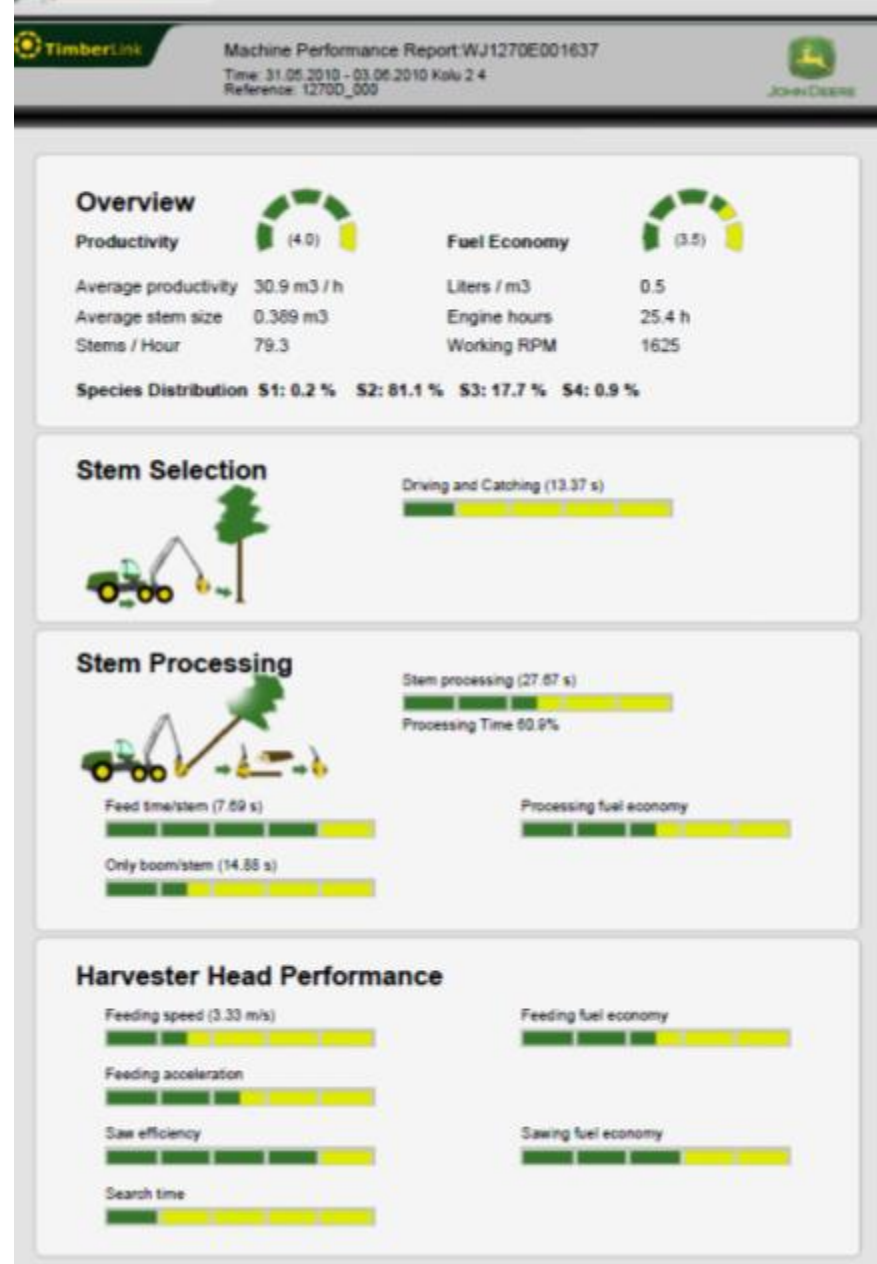
TimberLink

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:

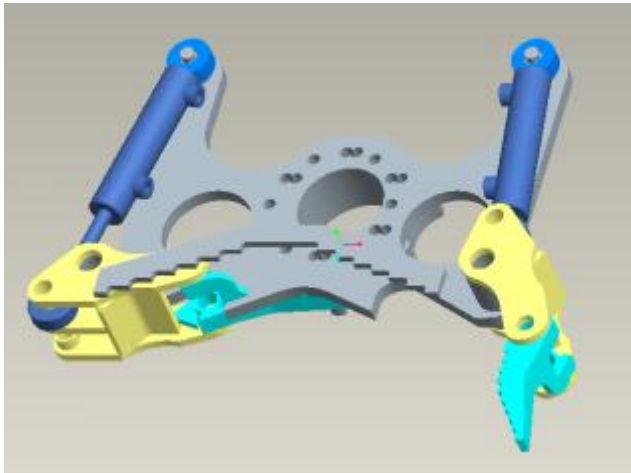
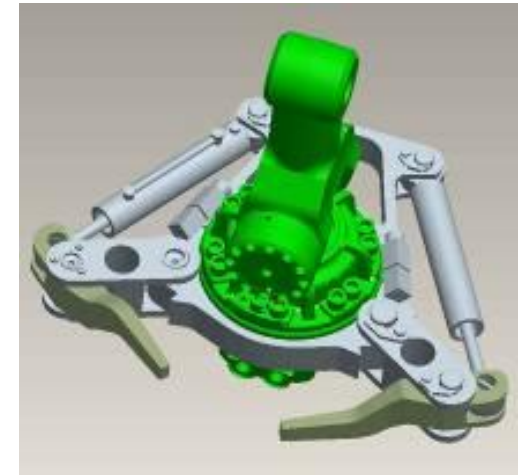
- Intelligent measuring and data analysis will replace guessing in all lifecycle phases



Harvester heads for E-series harvesters



John Deere Multi-Tree-Handling



Structure of boom scale system





Slash bundling



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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

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Off-road and on-road transportation



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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.

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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

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Space requirement is reduced



- Bundle compression ratio: average 80%
- Savings with transportation and storing costs

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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



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!

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