



HYBRID  
TECHNOLOGY  
IN FOREST MACHINES

**LOGSET**



HYBRID TECHNOLOGY  
**THE LOGSET CHOICE**

---

The only  
manufacturer  
using  
**HYBRID  
TECHNOLOGY**  
in harvester

---

## LOGSET HYBRID PIONEER

The forest machine manufacturer Logset Oy was founded in Koivulahti 1992. The company launched its first harvester Logset 500H in May 1993. Since the beginning Logset has invested in developing its own products. Already the first harvester had the Logset 5-55 harvester head which was developed by Logset.

Even though Logset is a middle-sized machine manufacturer, throughout the years the company has had a clear policy to invest in research and development. For several years, the mission of the company has been to develop durable machines that have a low fuel consumption.

In 2016, Logset launched the world's first hybrid harvester, the Logset 12H GTE Hybrid. The hybrid system has drawn a lot of attention in the traditional forest industry. The mission of the company was crystallized in 2017 thanks to the hybrid harvester: to provide solutions for sustainable forestry.

Today Logset is like a young and agile adult. The Logset product range consists of six harvesters, seven harvester heads and seven forwarders. Logset has also developed its own control system for the products.



---

Sustainability  
without  
**COMPROMISING  
PRODUCTIVITY**

---

**SUSTAINABLE FORESTRY**

Forests form an important part of any country's environment and economy. When well managed, they provide clean air, homes for wildlife, beautiful scenery, places for recreation and several thousands of products that people can use every day.

In forest management, trees are harvested for a variety of reasons, such as for improving the health of the forest, controlling the types of trees that grow on the site, providing a source of income for the landowner, producing paper and numerous forest products, and improving access to the forest for hikers, hunters and other recreational users.

At Logset we believe that forests need to be harvested sustainably so that they remain healthy now and for generations to come. As a forest machine manufacturer, we want to contribute to this goal by providing top-of-the line solutions for sustainable forestry by developing, manufacturing, distributing and servicing forest machines that are reliable, productive and functional. All the Logset products meet these requirements, but the Logset hybrid harvester takes the development of the forest machine industry to a whole new level.





HYBRID TECHNOLOGY  
**HOW DOES IT WORK?**



## THE CLEVER COMBO

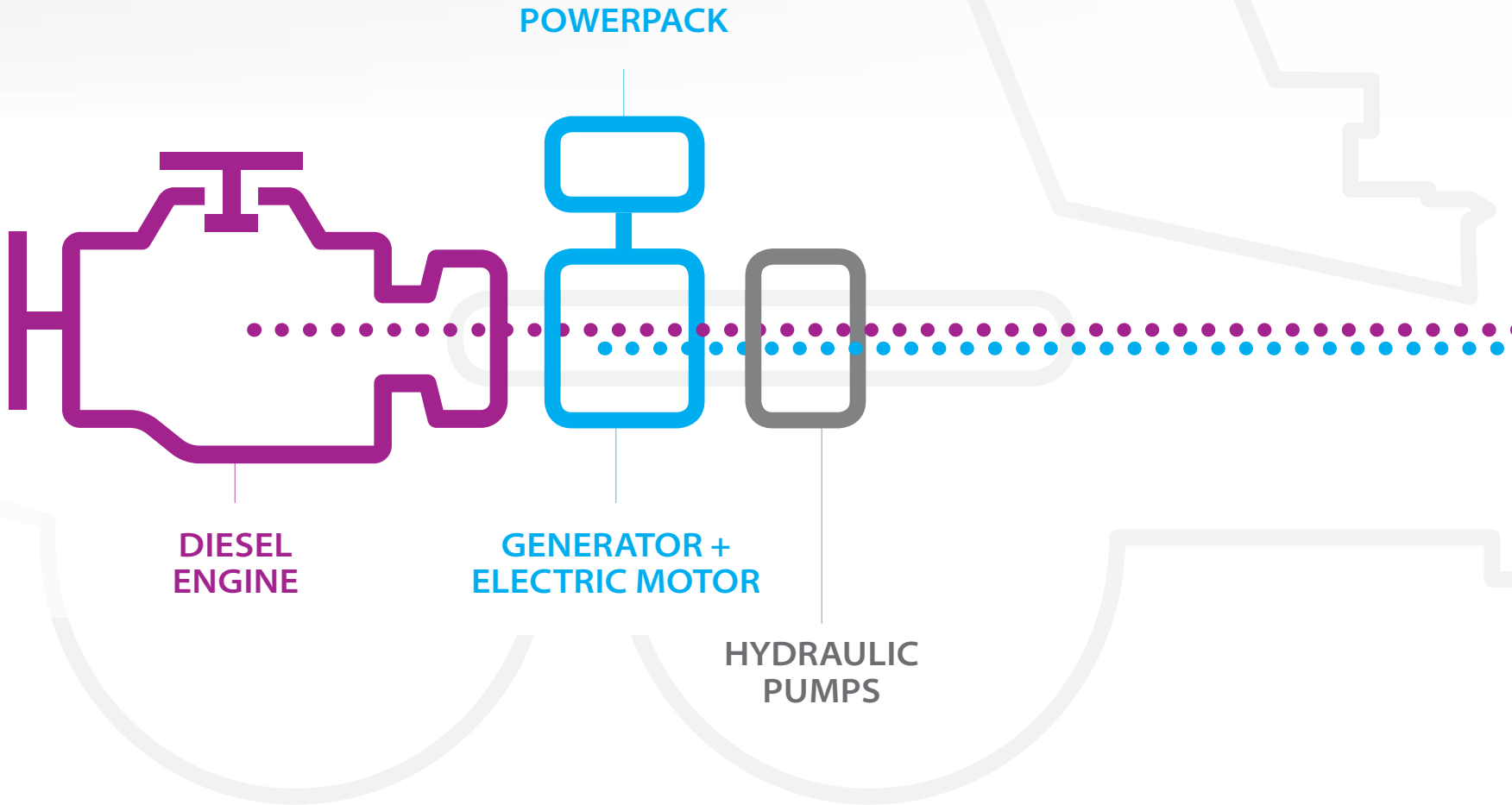
Logset has combined the diesel engine with the electrical motor in a way that is unique among the hybrid solutions that have been tested on forest machines. The main difference is that the Logset solution contains no accumulators. Instead, the hybrid technology is based on super capacitors that store and release energy within milliseconds.

The Logset hybrid harvester is **powerful, economical and environment-friendly**, which means the machine is beneficial both to the environment and its user.

*To read more, go to page 11.*

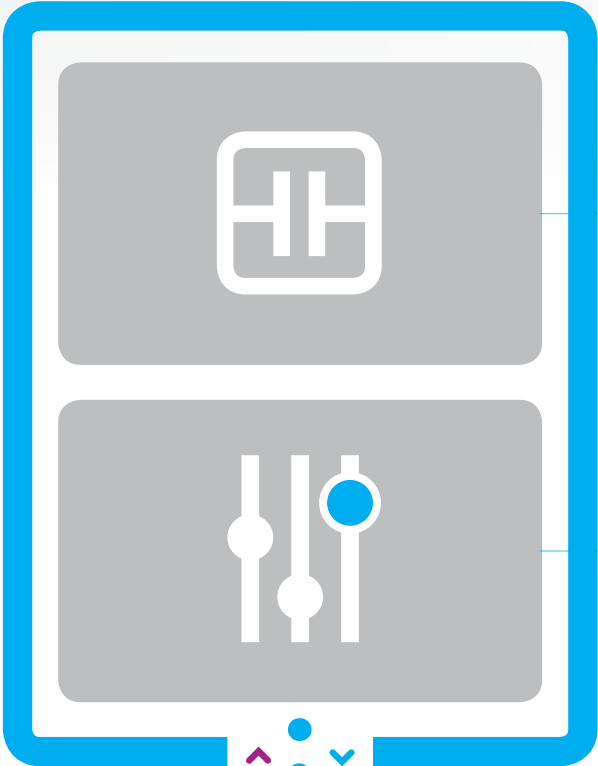
### MAIN COMPONENTS

The hybrid system makes the Logset hybrid harvester more productive than other wheel-mounted harvesters. The hybrid system consists of an electric motor and a power pack fitted between the harvester's diesel engine and the hydraulic pumps.



# POWERPACK

Inside the power pack there is an energy storage (super capacitors) and a control unit.



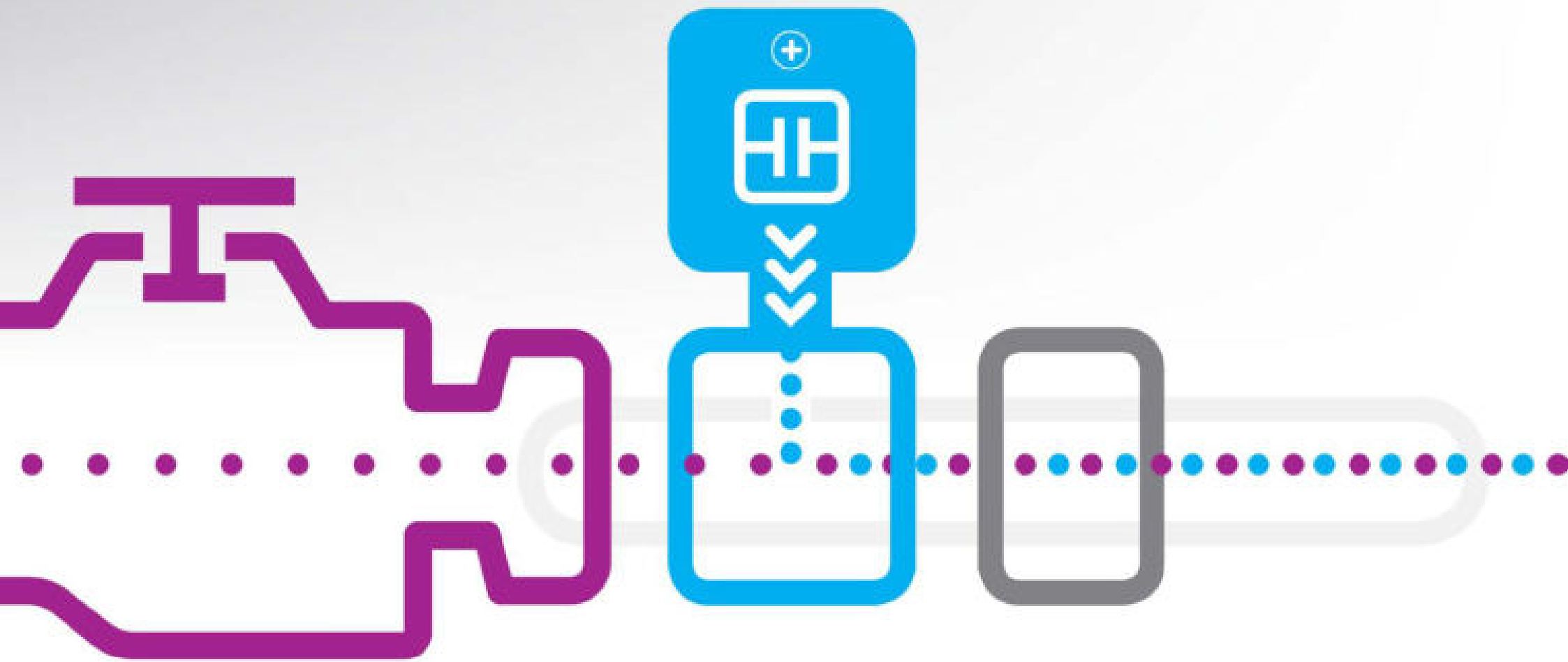
## ENERGY STORAGE (ES)

A super capacitor based energy storage that works as an energy buffer for the hybrid system. Extremely fast charging and discharging.

## GENERATOR CONTROL UNIT (GCU)

An inverter controlling the electric motor/generator functions and the energy flow in the hybrid system. The energy flow needs to work within milliseconds.

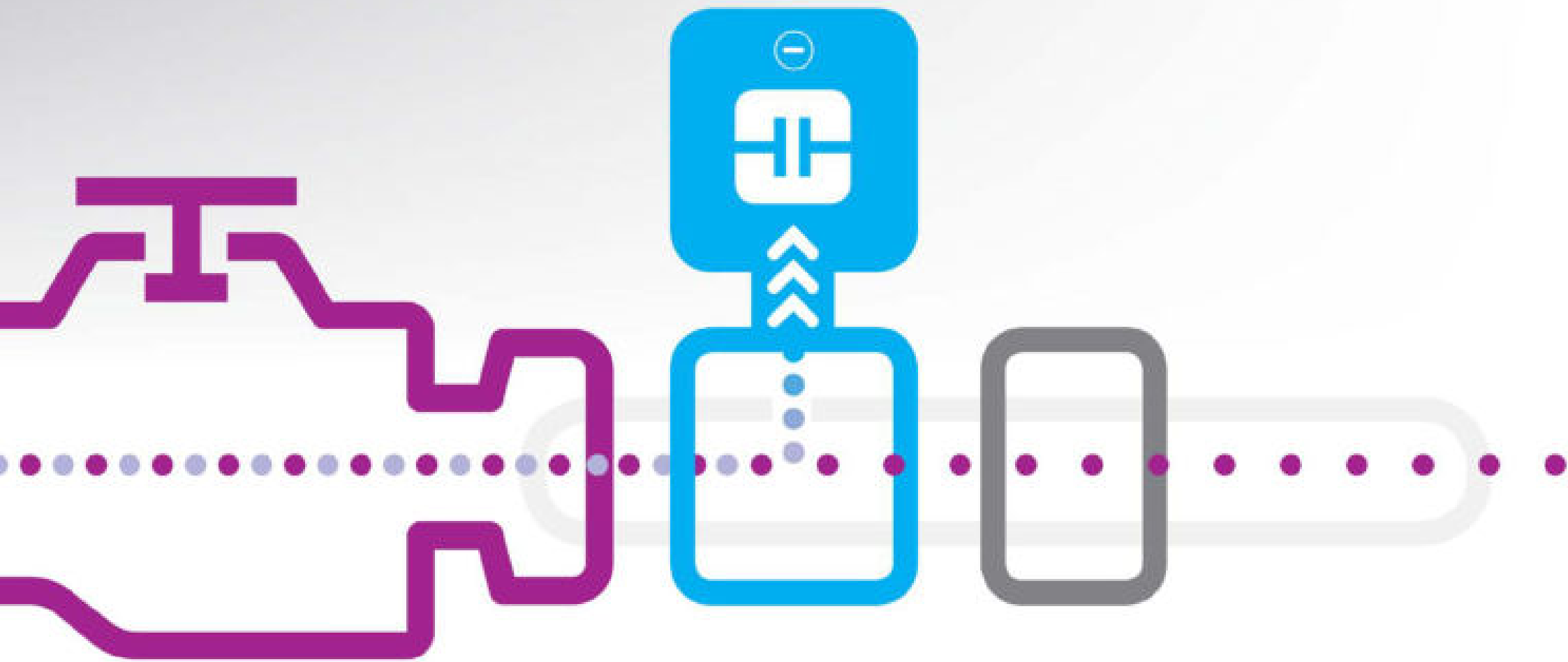




### TAKE WHAT YOU NEED

When the harvester requires extra power, for example when cutting a tree, the diesel engine of the harvester needs more power to run smoothly. This is when the hybrid system's electric motor works like a motor, and the control unit inside the power pack releases the charged energy.





### SAVE WHAT YOU DON'T USE

When the harvester does not require extra power, the hybrid system's electric motor works like a generator. The control unit inside the power pack charges the energy storage.





HYBRID TECHNOLOGY  
**GOING TOWARDS  
CLEANER FORESTRY**

Up to  
**30 %**  
increase  
in working efficiency\*

**510 hp**  
**380 kW**  
Powerful\*

\*Logset 12H GTE Hybrid



## POWERFUL

With the hybrid system as an integrated part of the machine's diesel engine, the Logset hybrid harvester offers a 60 % increase in power and torque. The hybrid system allows us to increase the power of the entire machine without increasing the size of the diesel engine.

During work cycles, the power requirements of a harvester can vary significantly. That's where the hybrid system is most effective: it compensates the peak loads of the engine. The result is a very constant diesel engine with an impressive output, which tackles all the challenges of felling trees.

Hybrid technology increases the working efficiency of the Logset 12H GTE Hybrid harvester by 27-30 %, which also notably decreases fuel consumption and emissions per harvested cubic meter, making the machine beneficial both to the environment and its user.

**25%**  
Fuel saving



## ECONOMICAL

All the peak loads on the harvester's working cycle are compensated by the electric motor. The electric motor gives power boost to the harvester when the work load requires it. Thanks to the hybrid system, the diesel engine works at a constant pace and lower rpm, saving fuel.

The fuel saving is easier to understand if the harvester is compared to another heavy vehicle, such as a timber truck. A timber truck consumes a lot less fuel when driven on a freeway at 90 km/h without unnecessary stops, than in a city where the driver needs to constantly stop and accelerate at traffic lights. The timber truck would consume twice as much fuel in the city as on an equal distance on the freeway.

The hybrid harvester maintains the regular working pace even with large trees, which increases the productivity of the machine.

**15 to 30%**  
Lower  
**CO**  
emissions **2**

---



## ENVIRONMENTALLY-FRIENDLY

Climate change is by far the most difficult challenge of the 21st century. Modern societies must invent ways for protecting the planet while simultaneously empowering the economy.

Transitioning into a fossil-free world is no easy task. Wood-based products are sustainable alternatives when replacing fossil-based solutions. However, to deliver on this promise, forestry needs to be sustainable from the beginning to the end. Sustainable harvesting is the first step in tackling this challenge – and we at Logset have the best solution for it.

For every wooden piece of furniture and every house being built, there is timber to be harvested. There is an urgent need to reduce the environmental footprint of harvesters. Forest operations worldwide must become more efficient, safer and sustainable so that we can better preserve the natural resources available to us.

Logset is committed to delivering credible solutions that drive and push the entire forest machine industry forward. Thanks to our technological progress and constant innovation, we are building the bridge towards cleaner forestry. As the only manufacturer of hybrid harvesters, Logset is the forerunner in sustainable forestry, delivering a real sustainable way to produce timber. Sustainability is followed by vital economic growth, expanding exports, jobs and factory expansions.

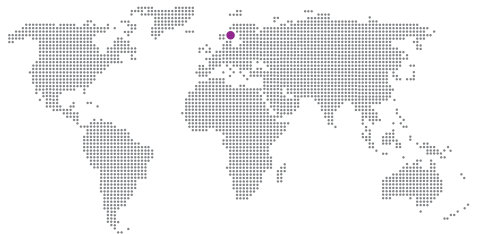


HYBRID TECHNOLOGY  
**LOGSET 12H GTE HYBRID**  
**IN ACTION**



## DENNIS OLSSON

Owner of D. Olssons Maskin Ab in Hällevadsholm, Sweden, has driven a Logset 12H GTE Hybrid harvester since October 2017. The harvester is equipped with a Logset TH85 harvester head. Olsson's company has several forest machines, which is why he mainly uses the hybrid harvester on clear fells.



***"I could definitely consider buying another hybrid harvester. The machine always has a lot of power, and my usual fuel consumption is approximately 16 liters/hour."***

**The hybrid system** - a maintenance-free and fantastic solution

*"The hybrid harvester really comes into its own in forests with big trees. I can compare the hybrid harvester to the Logset 10H GT harvester I used to drive. The hybrid harvester is much more efficient on thick tree trunks", Olsson says.*

He recommends the hybrid harvester to operators who work with thick trees. He usually works on clear fells where the average tree size is 0,6 m<sup>3</sup>. The hybrid harvester caught Olsson's attention because of the large harvester head.

*"The forests where I operate are a bit too small for the Logset 12H GTE Hybrid. However, the Logset TH85 was launched in 2017 and I wanted a large harvester head. The best machine for this size of head was the hybrid. I admit I wasn't that interested in the hybrid technology itself."*

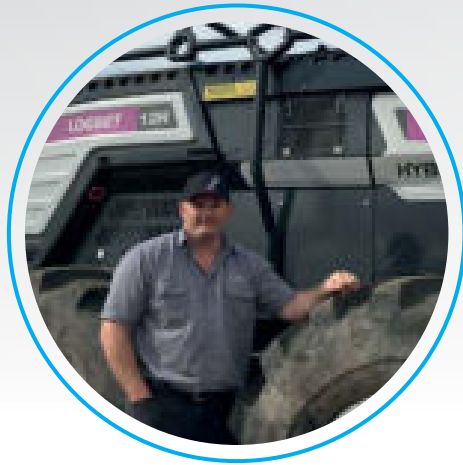
Olsson has driven forest machines since he was 16. In 2019, he will have been 30 years in the forest machine business.

*"I've had the chance to operate forest machines of many different types and sizes, and I have to say that the hybrid harvester is a fantastic solution. The machine always has a lot of power, and my usual fuel consumption is approximately 16 liters/hour. During a good day with the right conditions, I can get as much as 70 m<sup>3</sup>/hour with the same fuel consumption, but I usually produce around 55 m<sup>3</sup>/hour", Olsson says.*

At the time of the interview, Olsson had driven nearly 2 200 hours with the hybrid harvester. On a regular work day, he starts the machine at 6 a.m., takes a lunch and service break around noon, and then operates the machine until 5 or 6 p.m.

*"I usually service the harvester, like lubricate and add marking colour, during mid-day when it is light outside. Then I get some fresh air and move around a bit. The hybrid system is maintenance free. The only thing I've done on it is to check the water level. I could definitely consider buying another hybrid harvester", Olsson concludes.*





## HUGH GORDON

Owner of Lico Pty Ltd in Southern Australia, has driven a Logset 12H GTE Hybrid harvester since late 2017. The machine has a Logset TH85 harvester head. Previously Gordon has operated with track-based machines specifically built for forest operations.



***“I haven’t seen any other machine that has this many positive attributes both to the machine operators and the owner’s pocket.”***

### From a track-based machine to hybrid harvester

The Australian market received the first Logset 12H GTE Hybrid harvester in 2017. The harvester was bought by Hugh Gordon, owner of Lico Pty Ltd in Southern Australia.

*“I bought a Logset hybrid harvester because I wanted to see what the machine was capable of when it comes to fuel consumption versus production.” Gordon says.*

He has operated with track-based machines specifically built for forest operations since 1996. Moving from track-based machines to a hybrid harvester was a big step that was worth taking, because the hybrid harvester has surprised Gordon positively in several ways.

*“When I’m using many functions, I really notice the hybrid system kick in. The engine rpm level is stable, when normally with other machines I had to back off on the drive function to prevent the engine from stalling,” Gordon explains.*

On a regular work day, he operates the harvester 10-11 hours, plus the travelling to and from the site. The forest sites range from first thinnings to mature clear fells, and the tree stems are between 0,15 and 3,0 m<sup>3</sup>.

*“I’ve done some 5 m<sup>3</sup> trees with the hybrid harvester but it doesn’t like it. In my opinion, 2,5 m<sup>3</sup> is the ideal size for the machine. When producing 105 m<sup>3</sup>/hour, the machine consumes up to 24 liters/hour. The average fuel consumption for the year has been 19,91 liters/hour with all kinds of trees, so we are very happy considering the production level.”*

*Gordon adds: “The hybrid harvester certainly uses a lot less fuel, in some cases even 50 % less than other machines I’ve operated, in order to produce the same quantity or more timber.”*

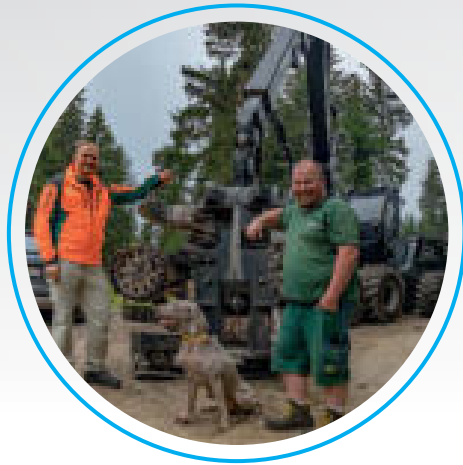
Gordon has been involved with forest machines since childhood, because his father was a contract mechanic and big on early learning. Gordon started off sitting in forwarder cabins as a young child, and he has operated harvesters himself since 1994.

According to Gordon, the Logset hybrid harvester is a versatile and suitable choice for the Australian market. Tree plantations, with trees planted in rows, are a common sight on the continent. This setup gives access for large machines, even for a first thinning.

*“This machine is suitable for operators who can’t get more out of the machines they currently operate. Also, the hybrid system is virtually maintenance free. I haven’t touched it since the machine went to the forest. In my opinion, the hybrid system helps the engine, and the pumps last even longer, as the load is more constant than in machines without hybrid technology.”*

Australia, with its large trees, also needs correctly dimensioned harvester heads.

*“We call the hybrid harvester “the beast” because it can carry the large Logset TH85 head. The harvester is stable, powerful, productive and efficient. The comfort of the machine has helped our operators, some of whom have a history of back pain. I haven’t seen any other machine that has this many positive attributes both to the machine operators and to the owner’s pocket.”*



## Dr MICHAEL KUTSCHER

With its over 800 000 hectares of forest, Bavarian State Forest Enterprise (Bayerische Staatsforsten, BaySF) is the largest forest enterprise in Germany. The organization employs about 2700 professionals who manage the Bavarian state forests according to the principle of sustainability - combining utilization and conservation in the best possible way. Forests do not only supply wood, but also provide a habitat for countless species, and are popular recreational areas. With an annual harvest of around 5 Mm<sup>3</sup>, Bavarian State Forest Enterprise is a major supplier to the German industry.



***“I believe this is certainly the best solution available today for tackling the environmental issues without compromising high productivity.”***

### A smaller carbon footprint with extreme performance

Dr. Michael Kutscher is the director of Forsttechnik BaySF, a 70-employee unit within the organization. Dr. Kutscher's unit manages road building and harvesting in the entire area. In harvesting, his unit uses a total of 12 harvesters. One of those machines is the Logset 12H GTE Hybrid they acquired in August 2018.

***“There is a lot of talk around the carbon footprint and diesel engines today. Therefore, it is only natural we do our best for CO<sup>2</sup> reduction also in our forestry operations,” says Dr Kutscher when he was asked why they decided to buy a Logset 12H GTE Hybrid.***

Forsttechnik BaySF operates sometimes in steep terrain. A Skyline operation with a processor at the landing and manual felling in the slopes are common ways of working. Access to forest can be very challenging, and due to the difficult access, trees have reached large diameters. The forests are a mixture of conifer and broadleaves, and are managed differently depending on long term objectives. In practise, BaySF applies the continuous-cover silviculture method where only the overgrown trees are harvested to preserve and regenerate the forest naturally.

***“We have used our Logset 12H GTE Hybrid to harvest mature large trees, and it performs very well with these. Just recently we had it working in a wind-throw stand with large-diameter beech. Our foresters were very happy when they saw how well and easily the machine was able to handle these difficult trees,” says Dr Kutscher.***

***“It is a big machine with very high performance. Having such a machine in our fleet, I now feel confident that we can tackle those harvesting jobs that used to be challenging. Especially in broadleaf forests, where it has been a fullymotor-manual job in the past. Being able to use our Logset 12H GTE Hybrid to mechanize parts of those operations brings a clear advantage,” explains Dr Kutscher.***

***“We are even trying to combine the skills of the motor-manual felling teams with the capacity of the harvester to be more efficient in all aspects. While felling teams do directional felling of large hardwoods more precise than a harvester operator is able to, processing crowns mechanically is easier, more efficient and much safer,” he continues.***

In February 2019, at the time of the interview, Forsttechnik BaySF had owned the machine for about 7 months. They have tested and demonstrated the machine's performance in the most demanding conditions they have found. The results have been very satisfying. Now the harvester will be moved to traditional thinning operations to see the benefits compared to machines without Hybrid solution.

***“From my point of view, a harvester like 12H GTE Hybrid is ideal for larger forestry contractors. The machine is special due to its size and performance. Owners of such a machine need to be able to keep it working with large trees to maximize its benefits. For us, it has proved to be an asset, and it works perfectly,” states Dr Kutscher.***

Logset forest machines in Germany are sold and serviced by MHD-Forsttechnik Müller-Habbel in Kirchundem. The company was established back in 1981 by Hubertus Müller-Habbel. Today the daily operations are run by the two sons of Hubertus, Daniel and David.

***“We have had a 250-hour service done to our harvester, and the next service is coming right up. In general, we have received good service from MHD, and if something goes wrong, we call directly to Daniel Müller-Habbel who sorts it out. I feel we are in good hands with MHD-Forsttechnik.”***

***“I would definitely buy another Logset Hybrid harvester. Especially if they come out with a hybrid smaller than the 12H. With a slightly smaller machine, we could handle the majority of our jobs and make the most of the performance that Logset's Hybrid solution offers,” concludes Dr Michael Kutscher as we are finishing our interview.***



Logset products range 03/19 - EN  
We reserve the right to make changes without prior notice.  
All technical specifications are for guidance only.  
The pictures and diagrams do not always show standard versions of the machines.  
Copyright Logset Oy.

**Logset Oy**  
Hännisentie 2  
FI-66530 Koivulahti  
FINLAND  
Tel. +358 10 286 3200  
info@logset.com



# LOGSET

SIMPLY BETTER

[www.logset.com](http://www.logset.com)