Cat® Product Information

Performance Report

Cat® D11 XE vs. D11 Productivity and Efficiency

July 2026

Objectives:
Demonstrate productivity and fuel efficiency of the new D11 XE vs. the D11.

Abstract:
The new D11 XE is designed to be highly efficient across a wide range of speeds and loads.

- In an average support application, users can expect a 20% reduction in fuel consumption with a 5% increase in productivity.
- In an average production application, users should expect a 10% increase in productivity with an 10% increase in fuel efficiency.

While engine power between the D11 XE electric drive and the D11 mechanical drive tractors is similar, the improved efficiency of the electric drive powertrain means more power is available to the ground under full load. When lightly loaded, the electric drive provides large fuel economy benefits with a moderate productivity improvement versus the mechanical drive machine. Under heavy loads, the electric drive puts more power to the ground, improving productivity substantially while still providing a significant fuel economy benefit.

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Contents

Productivity

BULLDOZER PRODUCTION OFF-THE-JOB

You can estimate bulldozer production using the production curves that follow and the correction factors that are applicable. Use this formula:

$$\text{Production } (Lm^3/hr) \text{ (LCY/hr)} = \text{Maximum production} \times \text{Correction factors}$$

The bulldozer production curves give maximum uncorrected production for universal, semi-universal, and straight blades and are based on the following conditions:

1. 100% efficiency (60 minute hour — level cycle).
2. Power shift machines with 0.05 min. fixed times.
3. Machine cuts for 15 m (50 feet), then drifts blade load to dump over a high wall. (Dump time — 0 sec.)
4. Soil density of 1370 kg/Lm^3 (2300 lb/LCY).
5. Coefficient of traction:*
   a. Track machines — 0.5 or better
   b. Wheel machines — 0.4 or better
6. Hydraulic controlled blades used.
7. Dig 1F**
   Carry 2F**
   Return 2R**

To obtain estimated production in bank cubic meters or bank cubic yards, appropriate load factor from the Tables section should be applied to the corrected production as calculated above.

$$\text{Production } Bm^3/hr \text{ (BCY/h)} = Lm^3/hr \text{ (LCY/h)} \times LF \times LF$$

*Coefficient of traction assumed to be at least 0.4. While poor traction affects both track and wheel vehicles, causing them to take smaller blade loads, wheeled units are affected more severely and production falls much more rapidly. While no fixed rules can predict this production loss, a rough rule of thumb is that wheel dozer production falls off 4% for each one-hundredth decrease in coefficient of traction below 0.40. If, for example, coefficient of traction is 0.30, the difference is ten-hundredths (0.10), and production is 60% (10 × 4% = 40% decrease).

**This gear sequence is based on level to downhill terrain, light to medium density material, and no blade extensions such as spill plates, rock guards, etc. Exceeding these conditions may require carry in 1F, but productivity should equal or exceed "standard conditions" due to the larger loads that can be carried in 1F.

Productivity *(continued)*

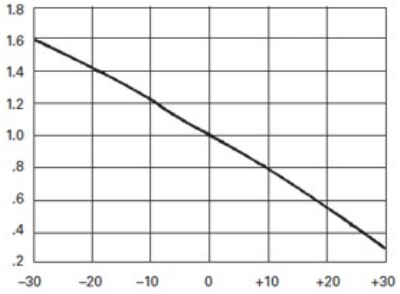
JOB CONDITION CORRECTION FACTORS

	TRACK-TYPE TRACTOR
OPERATOR —	
Excellent	1.00
Average	0.75
Poor	0.60
MATERIAL —	
Loose stockpile	1.20
Hard to cut; frozen —	
with tilt cylinder	0.80
without tilt cylinder	0.70
Hard to drift; "dead" (dry, non-cohesive material) or very sticky material	0.80
Rock, ripped or blasted	0.60-0.80
SLOT DOZING	1.20
SIDE BY SIDE DOZING	1.15-1.25
VISIBILITY —	
Dust, rain, snow, fog or darkness	0.80
JOB EFFICIENCY —	
50 min/hr	0.83
40 min/hr	0.67
BULLDOZER*	
Adjust based on SAE capacity relative to the base blade used in the Estimated Dozing Production graphs.	
GRADES — See following graph.	

*NOTE: Angling blades and cushion blades are not considered production dozing tools. Depending on job conditions, the A-blade and C-blade will average 50-75% of straight blade production.

% Grade vs. Dozing Factor

(–) Downhill
(+) Uphill



ESTIMATING DOZER PRODUCTION OFF-THE-JOB

Example problem:

Determine average hourly production of a D8T/8SU (with tilt cylinder) moving hard-packed clay an average distance of 45 m (150 feet) down a 15% grade, using a slot dozing technique.

Estimated material weight is 1600 kg/Lm³ (2650 lb/LCY). Operator is average. Job efficiency is estimated at 50 min/hr.

Uncorrected Maximum Production — 458 Lm³/h (600 LCY/hr) (example only)

Applicable Correction Factors:

Hard-packed clay is "hard to cut" material . . . –0.80
Grade correction (from graph) . . . . . –1.30
Slot dozing . . . . . –1.20
Average operator . . . . . –0.75
Job efficiency (50 min/hr) . . . . . –0.83
Weight correction. . . . . (2300/2650)–0.87

Production = Maximum Production × Correction Factors
= (600 LCY/hr) (0.80) (1.30) (1.20) (0.75) (0.83) (0.87)
= 405.5 LCY/hr

To obtain production in metric units, the same procedure is used substituting maximum uncorrected production in Lm³.

= 458 Lm³/h × Factors
= 309.6 Lm³/h

Productivity *(continued)*

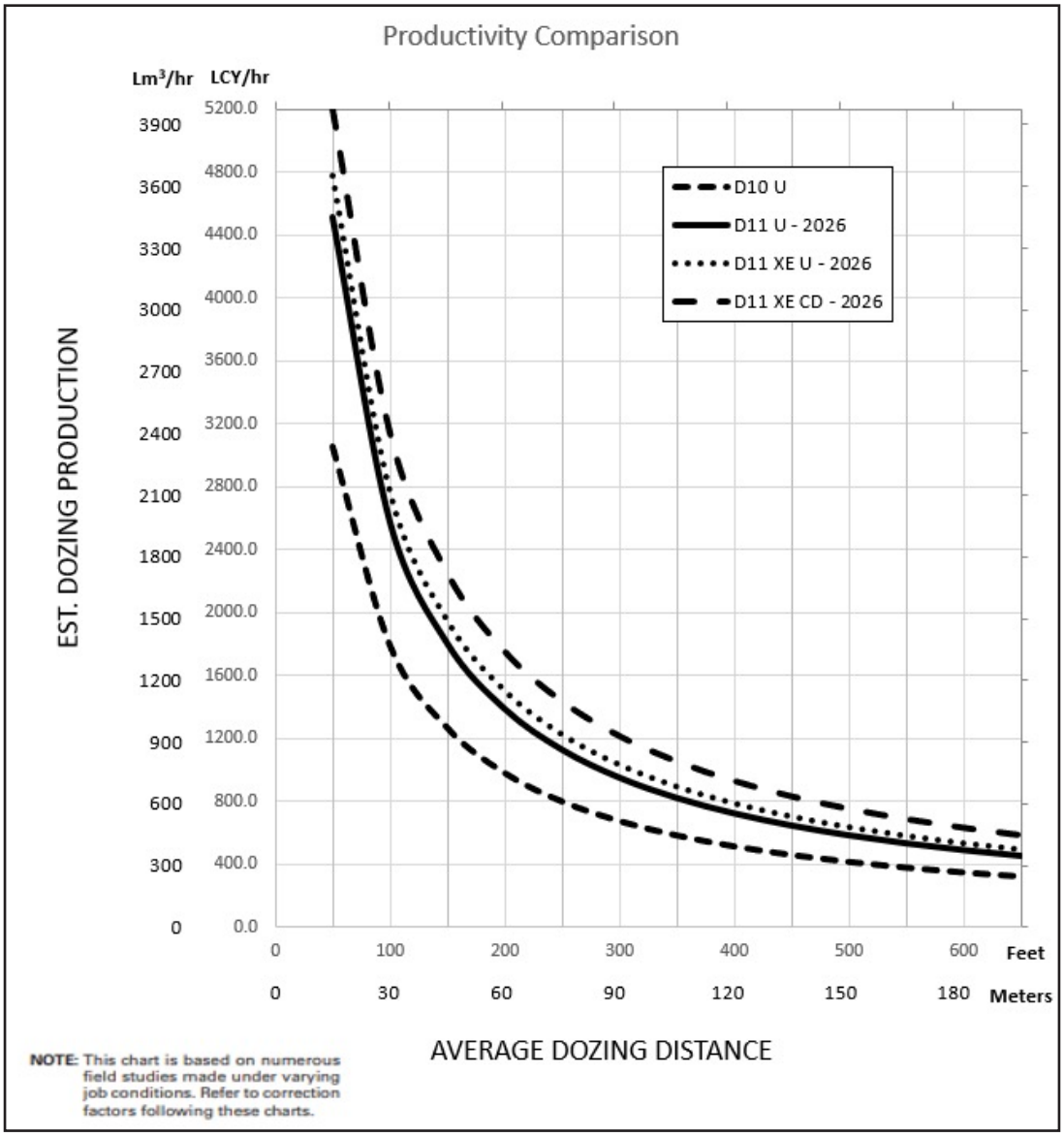


Figure 1. D10, D11, and D11 XE Dozer Productivity

Fuel Efficiency and Productivity Comparison – D11 vs. D11 XE

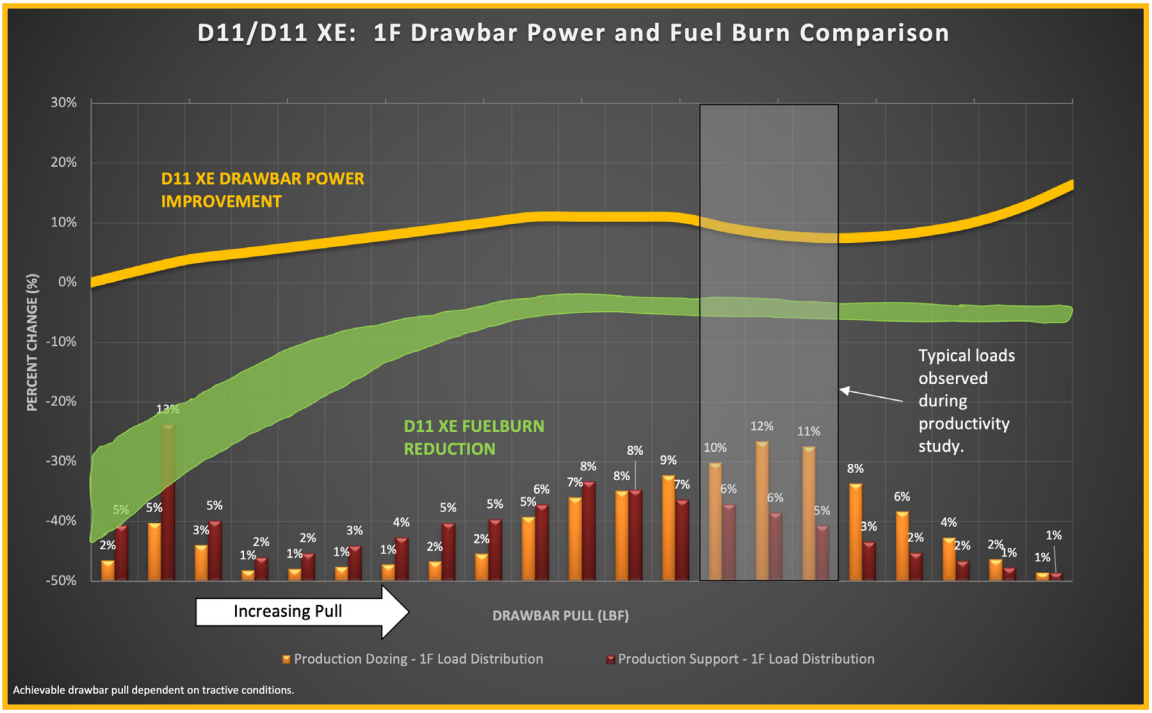


Figure 2. Relative Improvement in Drawbar Power and Fuel Efficiency with Production and Support Loads Shown

- Yellow curves highlight the percent increase in D11 XE drawbar power in 1st gear forward (1F) across the typical range of operating loads observed in heavy production dozing (top chart) and support applications (bottom chart)
- Green zones highlight the percent decrease in D11 XE fuel consumption in 1st gear forward (1F) across the typical range of operating loads observed in heavy production dozing (top chart) and support applications (bottom chart)
- **D11 XE has higher drawbar power and lower fuel consumption across the entire operating envelope, which equates to moving the same load faster on less fuel, for increased productivity and efficiency**
- Histogram bars represent the percent time spent at various loads in heavy production dozing and support applications – these bars shift to the left in lighter applications and to the right in extremeload applications (i.e., Carrydozer)
- Rectangular box highlights the relatively narrow range of loads typically observed in 1F during slot dozing productivity studies, where **the D11 XE is expected to move the load in the boxed section 5-10% faster on 5-10% less fuel, for an overall efficiency improvement of ~15%**
- However, when considering the overall load distribution experienced in 1F during production dozing and support applications, **the D11 XE's cumulative efficiency improvement is up to 25% through a combination of increased productivity and decreased fuel consumption**

Drawbar Power Maps – Tier 4 Engine

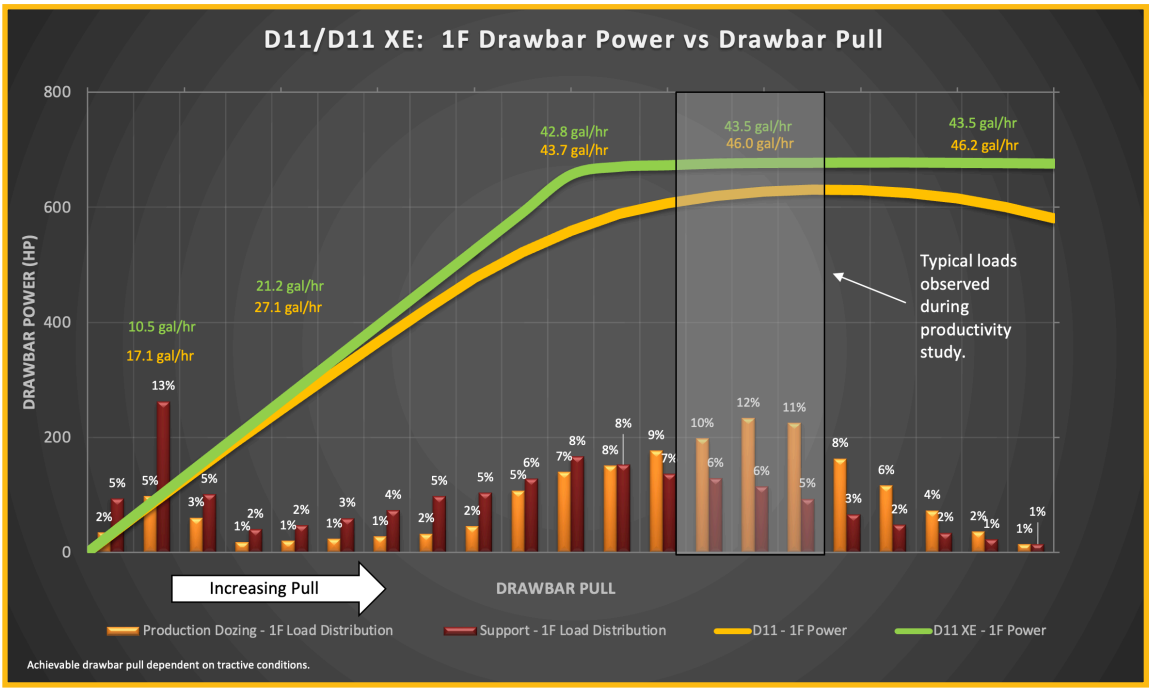


Figure 3. Drawbar Power vs. Machine Load with Production and Support Loads Shown (Tier 4 Engine)

- Green and yellow curves illustrate the D11 XE and D11 drawbar power in 1st gear forward (1F) across the typical range of operating loads observed in heavy production dozing (top chart) and support applications (bottom chart)
- Values shown along the green and yellow curves represent fuel consumption in 1st gear forward (1F) across the typical range of operating loads observed in heavy production dozing (top chart) and support applications (bottom chart)
- **D11 XE has higher drawbar power and lower fuel consumption across the entire operating envelope, which equates to moving the same load faster on less fuel, for increased productivity and efficiency.**
- Histogram bars represent the percent time spent at various loads in heavy production dozing and support applications – these bars shift to the left in lighter applications and to the right in extreme load applications (i.e., Carrydozer)
- Rectangular box highlights the relatively narrow range of loads typically observed in 1F during slot dozing productivity studies, **where the D11 XE is expected to move the load in the boxed section 5-10% faster on 5-10% less fuel, for an overall efficiency improvement of ~15%**
- However, when considering the overall load distribution experienced in forward and reverse gears in production dozing and support applications, **the D11 XE's cumulative efficiency improvement is up to 25% through a combination of increased productivity and decreased fuel consumption.**

Drawbar Power Maps – Tier 2 Engine

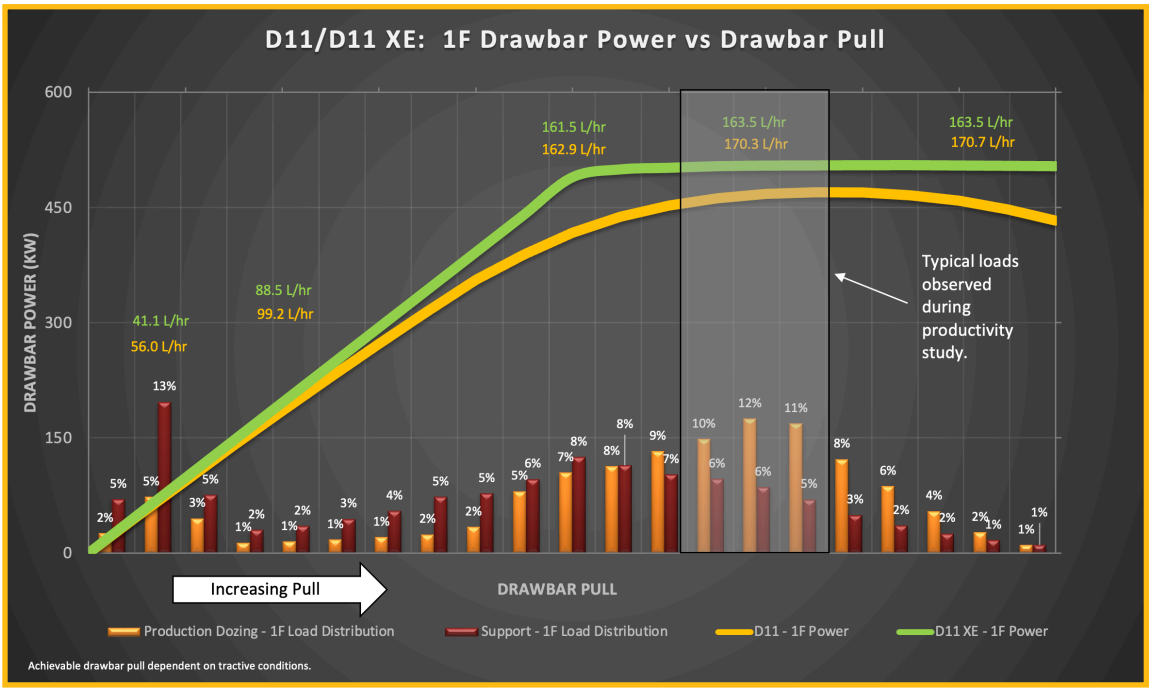


Figure 4. Drawbar Power vs. Machine Load with Production and Support Loads Shown (Tier 2 engine)

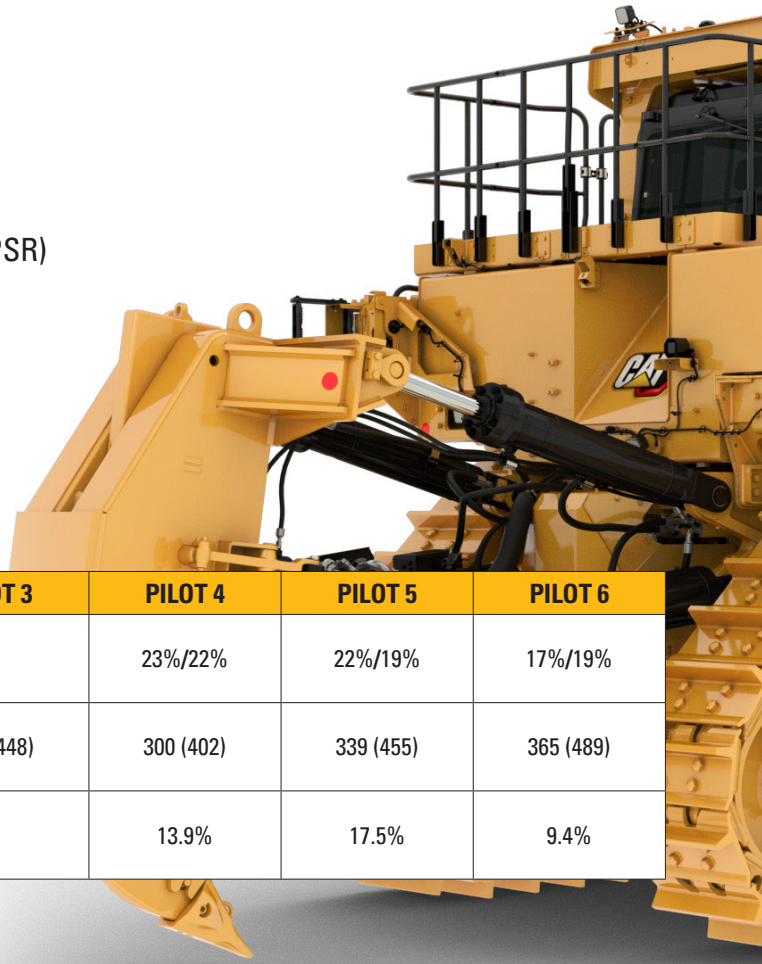
- Green and yellow curves illustrate the D11 XE and D11 drawbar power in 1st gear forward (1F) across the typical range of operating loads observed in heavy production dozing (top chart) and support applications (bottom chart)
- Values shown along the green and yellow curves represent fuel consumption in 1st gear forward (1F) across the typical range of operating loads observed in heavy production dozing (top chart) and support applications (bottom chart)
- **D11 XE has higher drawbar power and lower fuel consumption across the entire operating envelope, which equates to moving the same load faster on less fuel, for increased productivity and efficiency**
- Histogram bars represent the percent time spent at various loads in heavy production dozing and support applications – these bars shift to the left in lighter applications and to the right in extreme load applications (i.e., Carrydozer)
- Rectangular box highlights the relatively narrow range of loads typically observed in 1F during slot dozing productivity studies, **where the D11 XE is expected to move the load in the boxed section 5-10% faster on 5-10% less fuel, for an overall efficiency improvement of ~15%**
- However, when considering the overall load distribution experienced in 1F production dozing and support applications, **the D11 XE's cumulative efficiency improvement is up to 25% through a combination of increased productivity and decreased fuel consumption**

D11 XE Pilot Performance Comparison

The intent of this section of the report is to demonstrate fuel burn and productivity improvements in actual use cases in the field. For each D11 XE pilot, the improvement in fuel burn and productivity are listed. Since D11 and D11 XE machines at the same site did not always perform the same task and operate under similar loads, predictions of productivity under identical load conditions have been provided as well.

Please note the following:

- Data shown in the table and machine summaries below was collected between January 1, 2025, and April 1, 2026
- Fuel burn data was compiled from product status reports (PSR)
- Productivity estimates were calculated from machine data collected using SuperComm 2 devices on the D11 XE pilots and pertinent D11 powershift machines running at the sites



	PILOT 1	PILOT 2	PILOT 3	PILOT 4	PILOT 5	PILOT 6
D11 XE Percent Fuel Burn Savings Average/Working	21%/19%	18%/15%	-	23%/22%	22%/19%	17%/19%
Composite Working Drawbar Power kW (hp)	354 (475)	332 (445)	334 (448)	300 (402)	339 (455)	365 (489)
D11 XE Productivity Advantage As-Operated	6.7%	22.8%	-	13.9%	17.5%	9.4%

Figure 5. Summary Table of D11 XE Pilot Fuel Burn and Productivity

Pilot #1: Oil Sands – Production Dozing/Shovel Support

- Powershift load profile is higher load work cycle. That is why as-operated productivity advantage is the lowest value of the three productivity comparisons.
- The powershift machine cannot run the D11 XE cycle as effectively, since the cycle is primarily 2F-2R, and the D11 XE does not need to down shift at the higher loads. The efficiency of the drivetrain remains high across a wide range of speeds and loads.
- D11 XE was equipped with a 42 m^3 (55 yd^3) blade, while the powershift machines had 34 m^3 (45 yd^3) blades.

	D11 XE (HRC)	D11 (HRC)
% Idle Time	25%	23%
Average Fuel Burn L/hr (gal/hr)	81.8 (21.6)	104.1 (27.5)
Working Fuel Burn L/hr (gal/hr)	104.9 (27.5)	129.8 (34.3)
D11 XE Percent Fuel Burn Savings Average/Working	**21%/19%**	
Composite Working Drawbar Power kW (hp)	354 (475)	332 (445)
D11 XE Productivity Advantage As-Operated	**6.7%**	
Estimated Productivity Advantage – Both Machines Running D11 XE (HRC) Loads	16.1%	
Estimated Productivity Advantage – Both Machines Running D11 (HRC) Loads	9.9%	

Pilot #2: Copper Mine – Support

- D11 XE load profile is higher production work cycle. That is why as-operated productivity advantage is the highest value of the three productivity comparisons.

	D11 XE (LRC)	D11 (HRC)
% Idle Time	40%	39%
Average Fuel Burn L/hr (gal/hr)	58.3 (15.4)	70.8 (18.7)
Working Fuel Burn L/hr (gal/hr)	92.4 (24.4)	109.0 (28.8)
D11 XE Percent Fuel Burn Savings Average/Working	**18%/15%**	
Composite Working Drawbar Power kW (hp)	325 (436)	265 (355)
D11 XE Productivity Advantage As-Operated	**22.8%**	
Estimated Productivity Advantage – Both Machines Running D11 XE (HRC) Loads	8.5%	
Estimated Productivity Advantage – Both Machines Running D11 (HRC) Loads	7.6%	

Pilot #3: Power Plant – Coal Stockpile

- D11T's were the only other dozers operating onsite. SC2 data was not available for those machines and PSR history was not available.
- D11 XE equipped with multishank ripper. Other D11's on site are equipped with 8 plate counter-weight.
- D11 XE was equipped with a 75 m^3 (98 yd^3) blade.

	D11 XE (LRC)	D11 (HRC)
% Idle Time	55%	-
Average Fuel Burn L/hr (gal/hr)	47.7 (12.6)	-
Working Fuel Burn L/hr (gal/hr)	99.6 (26.3)	-
D11 XE Percent Fuel Burn Savings Average/Working	-	
Composite Working Drawbar Power kW (hp)	334 (448)	-
D11 XE Productivity Advantage As-Operated	-	
Estimated Productivity Advantage – Both Machines Running D11 XE (HRC) Loads	14.3%	
Estimated Productivity Advantage – Both Machines Running D11 (HRC) Loads	-	

Pilot #4: Coal Mine – Production/Support Dozing

- D11 XE load profile is higher production work cycle. That is why as-operated productivity advantage is the highest value of the three productivity comparisons.
- D11 XE was equipped with a 42 m^3 (55 yd^3) blade, while the powershift machines non-OEM blades.

	D11 XE (HRC)	D11 (HRC)
% Idle Time	28%	27%
Average Fuel Burn L/hr (gal/hr)	66.5 (17.3)	85.2 (22.5)
Working Fuel Burn L/hr (gal/hr)	87.1 (23.0)	111.7 (29.5)
D11 XE Percent Fuel Burn Savings Average/Working	**23%/22%**	
Composite Working Drawbar Power kW (hp)	300 (402)	263 (353)
D11 XE Productivity Advantage As-Operated	**13.9%**	
Estimated Productivity Advantage – Both Machines Running D11 XE (HRC) Loads	10.7%	
Estimated Productivity Advantage – Both Machines Running D11 (HRC) Loads	7.4%	

Pilot #5: Coal Mine – Production Dozing/Support/RC/SATS

- Both machines were configured to run in RC/SATS, but both machines were not always working side-by-side, or in the SATS locations simultaneously.
- D11 XE load profile is higher production work cycle. That is why as-operated productivity advantage is the highest value of the three productivity comparisons.
- D11 XE was equipped with a 42 m^3 (55 yd^3) blade, while the powershift machines had 34 m^3 (45 yd^3) blades.

	D11 XE (HRC)	D11 (HRC)
% Idle Time	35%	33%
Average Fuel Burn L/hr (gal/hr)	67.0 (17.7)	86.3 (22.8)
Working Fuel Burn L/hr (gal/hr)	99.6 (26.3)	123.0 (32.5)
D11 XE Percent Fuel Burn Savings Average/Working	**22%/19%**	
Composite Working Drawbar Power kW (hp)	339 (455)	289 (387)
D11 XE Productivity Advantage As-Operated	**17.5%**	
Estimated Productivity Advantage – Both Machines Running D11 XE (HRC) Loads	9.1%	
Estimated Productivity Advantage – Both Machines Running D11 (HRC) Loads	8.0%	

Pilot #6: Coal Mine – Carrydozer Production Dozing

- D11 and D11 XE machines were both equipped with Carrydozer blades and heavy multishank rippers.
- The combined load profile of the two machines was very similar, as shown by the productivity advantage similarities for all three conditions.

	D11 XE (HRC)	D11 (HRC)
% Idle Time	21%	23%
Average Fuel Burn L/hr (gal/hr)	86.3 (22.8)	103.7 (27.4)
Working Fuel Burn L/hr (gal/hr)	107.2 (28.3)	131.7 (34.8)
D11 XE Percent Fuel Burn Savings Average/Working	**17%/19%**	
Composite Working Drawbar Power kW (hp)	365 (489)	333 (447)
D11 XE Productivity Advantage As-Operated	**9.4%**	
Estimated Productivity Advantage – Both Machines Running D11 XE (HRC) Loads	9.6%	
Estimated Productivity Advantage – Both Machines Running D11 (HRC) Loads	9.4%	

Performance Report: Cat® D11 XE vs. D11 Productivity and Efficiency

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