

Energy Use in Cotton

Improving Energy Efficiency on Irrigated Australian Cotton Farms

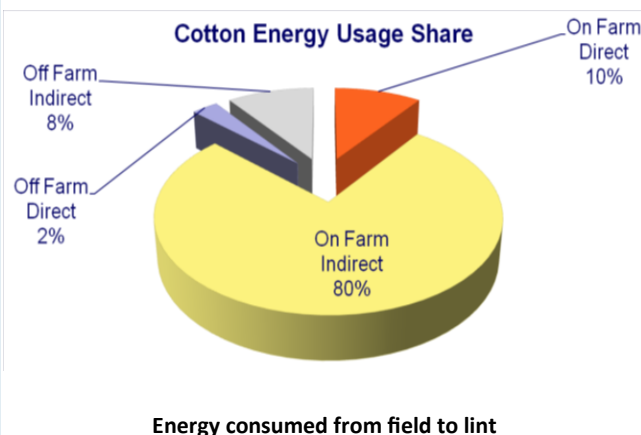
The Improving Energy Efficiency on Irrigated Australian Cotton Farms project aims to deliver an industry-wide awareness campaign that provides tailored energy efficiency information and tools to irrigators and their advisors. This activity received funding from the Department of Industry as part of the Energy Efficiency Information Grants Program.

Why energy use?

Rising energy costs are no surprise to farmers. Peak oil and an exponentially expanding world population are maintaining strong upward pressure on the price of energy. Cotton is sensitive to energy price because it is a high-input crop that relies on energy intensive inputs such as diesel, fertilisers and chemicals. This is why the Cotton Research and Development Corporation (CRDC) has initiated projects to meet the energy challenge for Australian cotton production into the future.

On & off-farm, direct & indirect

The terms 'on-farm' and 'off-farm' simply provide a demarcation as to where the energy is used. 'Direct' energy use is diesel, electricity, LPG, gas, etc. used directly. Indirect energy is the energy that used to produce the fertilizers, chemicals, machinery and other inputs. 90% of energy used in lint production is used on the farm.

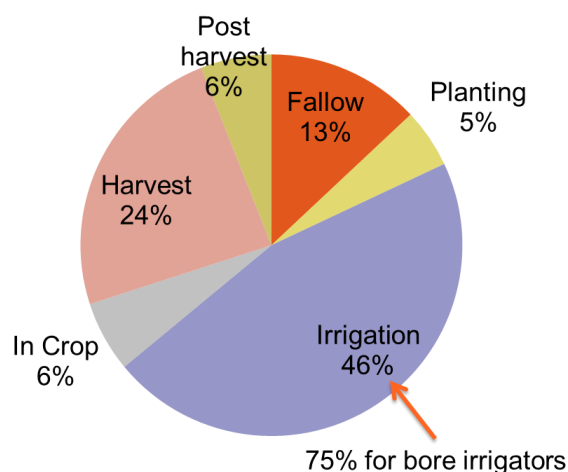


90% of energy that is used in cotton production is used on the farm and only 10% is used in the ginning process.

Most of the energy used to produce cotton lint is consumed indirectly, that is, it is the energy used to manufacture fertilizers, chemicals, machinery etc. Nitrogen use accounts for half of all energy used in lint production.

Direct on-farm energy use

Although direct, on-farm energy use accounts for only 10% of total energy use, it is a significant portion of the costs of farming and, importantly, it is an area where savings might be able to be made.



Pumping water accounts for roughly half to three-quarters of all on-farm direct energy consumption

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What is a MJ?

A mega-joule, written as MJ, is a measure of energy. For example, one litre of diesel contains 38.6 MJ, one litre of LPG contains 25.7 MJ and one kWh of electricity contains 3.6 MJ.

One giga-joule, GJ, is equal to 1,000 MJ.

What is kg CO₂e?

This refers to the greenhouse gas (GHG) emissions. Different gasses have different effects on global warming; 1 kg of methane has the same effect as 21 kg of CO₂ and 1 kg of nitrous oxide equals 310 kg of CO₂. By relating to equivalent kilograms of CO₂, different gas mixtures can be compared. One litre of diesel emits 2.68 kgCO₂e and 1 kWh of electricity emits around 0.88 kgCO₂e.

How much energy do I use on farm?

A recent, large-scale benchmarking project, which ran over multiple seasons and from Emerald to Hillston was conducted to determine cotton energy use. On average, diesel supplied 88% of cotton grower's energy needs.

	per ha	per bale
GJ of energy	10.9	1.18
kg CO ₂ e	1,091	119
cost \$	310	34

Average energy consumed, GHG emissions and cost of energy per hectare and per bale for cotton production.

For further information on Energy Use in Cotton or the Improving Energy Efficiency on Irrigated Australian Cotton Farms project please contact the Cotton Research and Development Corporation on 02 6792 4088 or the CottonInfo Team member in your area.

What about individual operations?

	Fuel Use L/ha	MJ/ha	kg CO ₂ -e /ha
Bed forming	8.3	320	22
Boll Buggy	4.0	154	11
Boom Spraying	0.7	27	2
Cotton Picking combined	40.0	1,544	107
Cotton Picker	33.0	1,274	88
Discing	9.5	367	25
Fertiliser bar	5.9	228	16
Fertiliser spreader	2.3	89	6
Inter-row Cultivating	5.1	197	14
Levelling	44.0	1,698	118
Lillistons	6.0	232	16
Module Builder	3.1	120	8
Mulching	7.7	297	21
Planter	3.5	135	9
Ripping	10.0	386	27
Roller	3.1	120	8
Root Cutting	3.4	131	9
Rotabucks	0.4	15	1
Shielded sprayer	2.3	89	6

Library of fuel use L/ha, energy use MJ/ha and GHG emissions kgCO₂e for various farming activities

Measurement is the key

Without properly assessing energy it is difficult to accurately quantify the savings that can be made. CottonInfo team members are conducting energy audits in your area now. To arrange an on-farm audit, contact your CottonInfo team today.