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# Plastic bottle maker benefits from higher throughput and lower energy use with motor-drive package

Drive energy assessment leads to 60 percent fall in energy costs and 30 percent higher output for plastic container manufacturer.

When a 23 year old plastic bottle blow molding machine was failing to deliver its proper output, Northern Ireland's PrimePac faced a dilemma. The machine uses a hydraulic motor to run an extruder on a blow molder. Because it had spent its life running 24 hours a day, five days a week, its motor was operating inefficiently and suffered poor speed holding properties.

Previously it took 10 seconds to create a bottle. In recent years this had extended to 12 seconds. The extruder was also creating long tails of excess plastic that needed to be trimmed and recycled in a very energy intensive process.

PrimePac was quoted £30,000 to refurbish the machine. This work would have kept it running but with the same technology and still using the same amount of energy. This was a critical factor as the site's 600 kVA electrical capacity was at its limit. Therefore, plans to introduce an additional all-electric injection molding machine to produce a new type of medicine bottle would require an investment of over £250,000 in upgrading the electrical supply

## Energy assessment reveals opportunities

To find an alternative, PrimePac asked its energy and automation partner, Advantage Control, an ABB authorised value provider, to carry out an energy assessment of the existing machine.

Over a week, its energy use was measured against an existing all-electric model. This proved that when making bottles of the same size and weight the old machine consumed significantly more energy. Its power use was also erratic and consumption was high due to the hydraulic pack requiring extra torque on start up.

Furthermore, the old blow molding machine's speed regulation was causing issues that resulted in a poorly formed bottle.

It was decided that a package comprising ABB's synchronous reluctance motor (SynRM) and an ACS880 drive would not only reduce electricity use, improve speed holding and the quality and consistency of the finished product but would also free electrical capacity that could be used to power the new injection molding machine.

## Energy saving

Following the installation, logged data revealed a 60 percent energy saving. Even with the modifications that were required to the machine, the £7,400 purchase of the 55 kW, IE4 SynRM package is expected to payback in under 12 months.

## Speed regulation critical to success

The ABB industrial drive features direct torque control (DTC) that has provided a real step forward in terms of the actual speed holding on the drive. It is now much more accurate, leading to a consistent

length and weight of plastic through the extruder and into the mold. This means less wastage – no more long tails - as there is no product overspill.

### **Improved throughput**

Previously, only 63 percent of extrusions actually became bottles. This was due to the erratic and sporadic movement of the machine. Following installation of the SynRM package, 96 percent of extrusions turn into bottles. The missing four percent is purely due to when the machine is ramping down.

Because there is less waste, the 18.5 kW granulator used to recycle the waste is used less often. This has saved around five percent of the energy on its own.

Other benefits include a significant reduction in noise and vibration, and operators can now hear what their colleagues are saying while standing alongside the motor.

### **Beating expectations**

Clifford Craig, engineering manager at PrimePac, says: “We couldn’t install a new electric machine because we didn’t have the available power. But with the 60 percent energy saving we achieved on the old blow molder we have been able to install another new all-electric injection molding machine. This is beyond our wildest ambitions. We have managed to massively increase our production, just by installing one SynRM package from ABB.”

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**Caption:** An ABB SynRM and drive package has achieved a 60 percent reduction in energy costs and a 30 percent increase in output for plastic bottle manufacturer PrimePac.



**Caption:** Before the installation of the ABB SynRM and drive package, only 63 percent of extrusions at the Northern Ireland plant became bottles. Now, 96 percent of extrusions are turned into bottles.

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