

MolyCop swirls into Energy Savings

Canonical: <https://northmoregordon.com/case-studies/molycop-swirls-into-energy-savings/>

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Case-study summary

This historical case study records the project, delivery approach and reported results behind MolyCop swirls into Energy Savings . It has been reorganised for clearer reading and linked to current Northmore Gordon guidance so the project evidence can be used without treating an earlier result as a present-day quote.

Evidence note: The source page is dated February 17, 2021. Figures, scheme names, equipment assumptions and client circumstances belong to that project period. Opportunities, targets and forecasts remain distinct from implemented or verified outcomes, and current eligibility should be checked before using the case as a new-project benchmark.

Project record

The EAF Swirl Burner is the latest in a series of upgrades we have undertaken at our Waratah Site. Northmore Gordon is a long-term valued and trusted partner of Moly-cop. Over many years they have unlocked substantial funding from the Energy Savings programs which has assisted in continual improvements in production efficiency and helped to lower emissions from our operations. – Jeffrey Neave, Environmental Manager – Molycop

The Client

Molycop's Australian operations began as Commonwealth Steel Company (Comsteel) in Waratah, Newcastle in 1918 here it pioneered the Electric Arc Furnace steel-making with the first EAF in the southern hemisphere. Molycop produces steel grinding balls and train wheels at the Waratah site. Grinding balls are used in milling and regrind applications for mineral processing, extraction and other grinding applications.

Key Facts

Equipment Upgraded: Higher electrical efficiency through higher voltage used in the furnace

Annual Energy Savings: Substantial reduction in Co2-e emissions through the reduction of electricity

Certificate Value: >\$500,000

Program: NSW Energy Savings Scheme (ESS The ESS was established in 2009. Financial incentives are in the form of tradeable certificates, called energy savings certificates (ESCs). Generally, householders and businesses who fund energy savings activities transfer the right to create ESCs to Accredited Certificate Providers (ACPs) in return for a discount on the cost of the energy savings activity. The MWh savings from the project determines the number of ESCs that can be created. The ESS works by allowing ACPs to create and register ESCs for energy savings that are supported with appropriate evidence. ESCs are then purchased each year by mainly electricity retailers operating in NSW to meet their share of a legislated annual energy savings target.)

Method: Project Impact Assessment M&V;

Wattly Partner: Northmore Gordon

The Project

The Electric Arc Furnace (EAF) was upgraded with a number of different energy conservation measures and improvements to the steel-making production. The EAF uses graphite carbon electrode rods to strike an electric arc and melt the scrap steel at the centre of the furnace whilst gas burners ensure the materials at the edge of the furnace remains in a molten state. By upgrading the furnace transformer to a higher voltage, a low current passed through the furnace resulting in higher efficiency as well as slower electrodes (consumption of the graphite rods). At the same time the gas burners were modified to from standard to swirl type with a higher temperature. More energy was used from gas, but less from electricity resulting in a net reduction in CO₂-e emissions.

Challenges

Drastic increased cost of graphite electrodes led to researching how to reduce electrode consumption

Reducing electrode current had the dual benefit of decreasing energy and electrode consumption

The project included savings from both electricity and gas and showing the interactive effects from the Electric Arc Furnace as well as the Swirl Burners

Additional Outcomes

The new swirl burner design reduces the build-up of steel and slag on the furnace wall reducing maintenance, downtime and heat loss

Our Role

Wattly/Northmore Gordon is accredited under the NSW Energy Saving Scheme and ran the projects to claim Energy Saving Certificates (ESCs) on behalf of Moly-Cop. Northmore Gordon created the M&V; plan, collected site data & supporting evidence, built the baseline and operating energy models to calculate both savings from the two different energy conservation measures. Subsequently we wrote the M&V; report, then registered & sold the Energy Saving Certificates on behalf of Molycop.

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Using the results for a new project

Start with the site's current operating profile, asset condition and business objective. Define the baseline, project boundary, variables that affect energy use and the evidence available before selecting a technology or incentive pathway. This makes the comparison auditable and keeps physical savings separate from grants, certificate revenue and other financial benefits.

For a comparable project, confirm current program rules and product requirements, document installation and commissioning, and plan post-project measurement early. Historical results can show what was possible in one setting, but they do not establish current eligibility, pricing, payback or emissions outcomes.

Related guidance

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Environmental certificates

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Why did Molycop pursue energy efficiency upgrades at the Waratah site?

Molycop faced a drastic increase in the cost of graphite electrodes used in its Electric Arc Furnace (EAF), which prompted research into reducing electrode consumption. The company recognized that upgrading the EAF transformer to a higher voltage would lower the current passing through the furnace, simultaneously reducing both energy consumption and electrode wear. This dual benefit—lower electricity demand and slower electrode consumption—made the investment economically attractive while also reducing operational costs and emissions from steel production.

How did the EAF transformer upgrade improve furnace efficiency?

Upgrading the furnace transformer to a higher voltage allowed a lower current to pass through the furnace, resulting in higher electrical efficiency. Lower current reduces resistive losses in the electrode and furnace circuit. The upgrade also slowed graphite rod (electrode) consumption, delivering a secondary operational benefit. This design change demonstrates how electrical infrastructure modifications can improve both energy performance and equipment longevity in industrial processes, particularly in high-temperature applications like steel melting.

What was the purpose of the swirl burner installation, and what advantages did it provide?

The EAF uses gas burners to keep materials at the furnace edge molten while electrode rods melt scrap steel at the centre. The new swirl burner design reduces the build-up of steel and slag on furnace walls, lowering maintenance needs, unplanned downtime, and heat loss. This operational improvement complements the electrical efficiency gains from the transformer upgrade. The swirl burner represents a technology change that improves process efficiency while reducing both energy demand and maintenance burden, illustrating how multiple measures can address different aspects of industrial performance.

How did Northmore Gordon measure and verify the combined energy savings from both upgrades?

We used the Project Impact Assessment M&V; (PIAM&V;) method, which compares modelled pre-project consumption with modelled post-commissioning consumption. The measurement challenge was accounting for interactive effects between the Electric Arc Furnace (electricity savings) and the Swirl Burners (gas savings). We created the M&V; plan, collected site data and supporting evidence, and built baseline and operating energy models to calculate savings from both measures separately while capturing their combined effect. This approach satisfied NSW Energy Savings Scheme requirements for certificate eligibility.

Why was claiming certificates under the NSW Energy Savings Scheme valuable for Molycop?

The project generated Energy Savings Certificates (ESCs) valued at more than \$500,000, providing substantial financial support for the capital investment. Under the NSW ESS, accredited providers like we can create ESCs from eligible energy-saving activities, and these certificates are tradeable in a market. By participating in the scheme, Molycop recovered a significant portion of upgrade costs through certificate proceeds while achieving lasting reductions in electricity and gas consumption, operating expenses, and emissions. The scheme aligned Molycop's operational efficiency improvements with government decarbonization policy.

What qualifications and role did Northmore Gordon hold in delivering this project?

We were accredited as a Certificate Provider under the NSW Energy Savings Scheme, enabling it to run energy-saving projects on behalf of customers and claim ESCs. For the Molycop engagement, we

acted as a long-term energy savings partner, creating the measurement and verification plan, collecting and analyzing site data, building energy models, writing the M&V report, and then registering and selling the Energy Savings Certificates on Molycop's behalf. This comprehensive service scope—from technical assessment through certificate commercialization—demonstrates our integration of engineering, measurement, and scheme compliance expertise.

How does this case illustrate the relationship between technology choice and measurement complexity in industrial energy projects?

The Molycop project demonstrates that industrial energy upgrades often involve multiple interacting systems (electricity and gas) whose savings cannot simply be added together. The swirl burner modification affects furnace wall temperature and heat loss, which influences the electrical load in ways that need careful modeling. Our approach—building separate baseline and operating models for each measure, then accounting for their interactions—shows how rigorous measurement and verification becomes essential when claiming certificates in industrial settings. This complexity is why early involvement of measurement specialists improves project outcomes and scheme eligibility.

What makes the Molycop case a relevant example for other industrial manufacturers considering efficiency upgrades?

The Molycop project illustrates a staged approach to industrial efficiency: identifying a business problem (electrode costs), targeting the root cause (furnace electrical efficiency), pursuing complementary improvements (burner design), and capturing available financial support (energy certificates). The case shows that industrial energy savings often emerge from solving production challenges rather than from energy-focused interventions alone. For manufacturers facing rising input costs or emissions targets, the project demonstrates how combining technical improvements with government scheme participation can improve competitiveness. Our role as a long-term partner—returning repeatedly to unlock additional funding as improvements emerge—reflects how continuous assessment supports incremental decarbonization in industrial operations.