

Closing the loop on steel: what we can learn from a manufacturer in Ecuador

By Wayne Visser

Extractive companies need to recast themselves as resource stewards and embrace the circular economy by investing in recycling, not mining.

In the next few decades, as resource scarcity starts to bite, and resource prices steadily climb, mining and metals companies will be forced to shape-shift from primary extractors to secondary recyclers. Necessity, rather than an unexpected attack of conscience, will be the driving force behind this transition to a circular economy. So let's look at some lessons from the sector most ripe for revolution, namely the steel industry.

In 2013, world crude steel production totalled 1.6bn tonnes and employed 50 million people, either directly or indirectly. The industry is vocal in its support for sustainable development, claiming that – despite massive growth in demand – the amount of energy required to produce a tonne of steel has been reduced by 50% in the past 30 years.

A far stronger virtue in its pursuit of sustainability is that steel is 100% recyclable and backed by an impressive business case: more than 1,400kg of iron ore, 740kg of coal, and 120kg of limestone are saved for every tonne of steel scrap made into new steel (because these products are required if steel is produced as raw material). It is puzzling, therefore, that usage of scrap steel in 2013 was still only around 580m tonnes. Why is closing the loop on steel so difficult?

Lessons can be learned from Adelca, an Ecuadorian steel manufacturer that is trying to blaze a trail for the circular economy in Latin America. Ecuador is still a relatively small player, making up about 1% of the Latin American crude steel market, which is dominated by Brazil at 53% and Mexico at 27% (ranked nine and 13 respectively in the world market).

Adelca supplies Ecuador, Venezuela, Colombia, Peru and Chile with a variety of rolled and stretched steel products. Before 2008, Adelca was importing billets (a narrow, generally square, bar of steel) from China and elsewhere, but after analysing the economic and environmental benefits, the company decided to invest in an electric arc furnace (EAF) and start recycling metal scrap in order to make products for the construction sector.

The first part of Adelca's sustainable technology solution was to install the EAF, thus allowing it to make its own steel billets from recycled scrap steel. According to Isabel Meza, head of integrated management at Adelca, by importing fewer billets, they are saving \$12m (£7.6m) on the 20,000 tonnes of steel they produce every month. Apart from using fewer mineral resources, each tonne of recycled steel uses 40% less water, 75% less energy and generates 1.28 tonnes less solid waste than steel from raw materials. There is also an 86% reduction in air emissions and a 76% reduction in water pollution.

The second part of Adelca's sustainable technology solution was to help to stimulate and organise the metals recycling sector in Ecuador, since it does not have enough supply of scrap metal to meet its own steel production demand. Today, Adelca's Recyclers Network generates about 4,000 jobs (direct and indirect), with income exceeding \$1m (£637,000) a month. Also, the steelworks, scrap iron preparation process, transportation system and complementary services generate more than 1,500 direct jobs for 50 small companies. Although Adelca still imports \$80m (£51m) a year in raw materials, it estimates it contributes \$120m (£76.5m) a year to the national economy just from the avoided imports.

The third part of Adelca's sustainable technology solution was to install a bio-digester that turns the company's organic waste into methane gas for community use, as well as to generate fertiliser for local crops. Although the financial savings are not big at about \$35 (£22) a day in energy savings for

the community and \$100 (£63) in waste disposal costs for the company, there is a significant payoff in terms of "social license to operate", ie improved community relations.

Lessons learned

1. Financial returns

The EAF technology was bought from the US and funded by taking a substantial mortgage from the bank. Commercially, the scale of the investment represented a significant risk, but the expected financial returns from the technology allowed the company to take this risk. Environmental benefits alone would not have sufficed.

2. Community education

Adelca lost eight months in delayed production due to community resistance to the EAF. The community feared that the heat, power and radiation from the furnace would endanger the health of the community, and that its heavy electricity demands would negatively affect the community's own supply. Despite being unfounded, these fears required a substantial and expensive education effort to gain a social license to operate.

3. Supplier relations

Since Adelca's demand for scrap metals is greater than the supply – and recycled scrap costs less than imported billets – the company has invested in building up its network of recyclers, including donating metal cutting equipment, offering loans, providing and paying for training and promising the best price for the scrap metals provided.

4. Marketing benefits

By investing in sustainable technologies, Adelca has differentiated itself in the market. In its public corporate mission, it is able to claim to be "leaders on recycling for the steel production, with excellence in... environmental protection and social responsibility". This commitment helped it to become the first Ecuadorian company to achieve the Latin American S2M certification for corporate responsibility and sustainability.

The Adelca case shows us why the resource revolution is worthwhile, yet still so slow in happening. The positive impacts on manufacturing and natural capital are clear, but challenges remain in getting access to financial capital and ensuring the human and social capital benefits are effectively communicated.

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