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Utilizing BOF/EAF Energy Recovery for Vacuum Generation in RH and VTD Type Degassers

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Traditionally, RH recirculatory degassers and large vacuum tank degassers use superheated steam to generate the vacuum required for their metallurgical process. The steam is supplied, as required, to a number of steam jet pumps, which can create vacuum levels of less than one mbar absolute.
Usually, the steam for these vacuum pumps is generated either from an independent package type boiler or, from larger plant wide boilers. These boilers are often fuelled by burning gas or oil based media and hence have a significant carbon footprint.
In order to reduce the carbon emissions and the high operating costs associated with these types of boilers, there has been a move in recent times to mechanical type vacuum pumps, powered entirely by electrical energy. Whilst this solution offers a very environmentally clean method of vacuum generation, with operating costs significantly lower than those associated with steam, the capital costs of such systems can be many times greater than that for an equivalent steam pump. In addition, the space requirement for an equivalent mechanical vacuum pump system can often be prohibitive.
As an alternative to a mechanical based pump, it is also possible to utilise the excess energy created during the steelmaking process, from either the BOF or EAF, to generate the steam required to operate a steam vacuum pump. The challenges of this solution lie within the sequencing and storage of the steam, which is batch generated, and ensuring that the quality of the steam at the user is sufficient for good pumping performance and overall plant longevity.
This paper aims to describe a solution that can meet the operational steam requirements of large vacuum degassing plants, using energy recovery techniques, at a lower capital and real estate investment than that required for a mechanical vacuum pumping system.

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