Comparison between the production of the Primary Aluminum and Secondary Aluminum

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Our model describes the production of Aluminum in the manufacturing stage which is called the primary Aluminum that is manufactured from the ore called bauxite. The next is the recycling phase where all the Aluminum which collected from different sources as scrap waste etc is remanufactured to produce secondary Aluminum.

What we show in Gabi is whether it is preferable to produce Secondary Aluminum.

The following slides show the required inputs for the GABI modeling.

Some theory about the Aluminum manufacturing process.

Bauxite ore is Crushed and Grained to get a very small pieces of bauxite. This is now put in the Digester where a chemical reaction takes place and the ore gets purified (i.e.) removing the unwanted compounds and waste. But further purification is required to remove the caustic soda an apparatus called Settling tank is used to remove the remaining caustic soda. The next process called Precipitation which purifies the residues sodium aluminates. The next process is Calcination which removes the water from the ore which forms the anhydrides power which is pure white in color called Alumina. Now this pure Alumina reacts carbon monoxide to get pure aluminum.

\[ \text{Al}_2\text{O}_3 + 3\text{CO} \rightarrow 3\text{CO}_2 + 2\text{A} \]

The whole of the above mentioned process is modeled in the manufacturing plan of GABI
Crushing and Grinding

Digesting

Settling

Precipitation
In the recycling phase:
Remanufacturing of Aluminum from the scraps is modeled. The manufactured Aluminum is called Secondary Aluminum.
The scrap aluminum is melted in gas- or oil-fired reverberatory or hearth furnaces. Impurities are removed using chlorine or other fluxes until the aluminum reaches the desired purity. This process is modeled in the recycling plan.
So in the GABI a comparison between the production of the Primary Aluminum and the Secondary Aluminum is done.