

Author with friends, trying to figure out what to do now. Photo: Pelle Berglund, Znapshot.



# After the war - before the peace

## Being the devil's advocate preparing for a new steelmaking landscape

The world has turned into a mess right now but that has happened before and it has so far always resulted in a new world order emerging sooner or later. In the mean time we must figure out how to position the steel industry and look out for opportunities, argues **Rutger Gyllenram\***.

It is easy to become discouraged in today's news flow. Wars and threats of wars are forcing countries to shift resources from welfare and development to security-enhancing activities, threats of trade wars are creating increasing regionalization that is reducing the benefits of globalization, and it looks like the transition to a low-carbon society will be significantly delayed at best.

As we now enter the second half of this decade, it is impossible to have even the slightest credibility in a prediction of what the world will look like in 2030. It is an uncertainty limiting industrialists and investors and confusing politicians and their voters. A new world order will

eventually emerge, rising as a Phoenix from the flames. Hopefully the new order will be better than its predecessor.

### How did we get here?

The idea with an international organisation for conflict mitigation is not new. It was suggested by the philosopher Immanuel Kant (1724-1804) living in Prussian Königsberg (today Kaliningrad). In *Perpetual Peace (Zum ewigen Frieden, 1795)* he states that even a world populated by devils would invent such an institution to avoid extinction. An early deployment in his spirit was the Concert of Europe created at the Congress of Vienna (1814-1815) ending the Napoleonic wars. With the war between

Prussia and France (1870-1871) as a major exception the system, based on mainly confidential diplomacy with occasional transparent meetings, was successful in mitigating conflicts until the First World War that started in 1914.

The first worldwide organisation taking up the baton was the League of Nations, LN, founded in 1920 by the Paris Peace Conference which, apart from world peace, had extensive social ambitions covering, for example, trafficking, slavery, treatment of prisoners of war and protection for the humanitarian organisations Red Crescent and Red Cross. It had an institutionalised way of working, different from the non-disclosed way the diplomacy of the previous

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century worked, and it is in this latter aspect that LN is said to have left an important legacy to the United Nations, UN.

Last year it was 80 years since the Second World War ended and the UN charter was formulated as a basis for a new world order, far reaching in its rules for territorial integrity and social ambitions. Not perfect but good enough to, at least until now, foster development and avoid a nuclear war.

What has led to the current situation will occupy historians for generations to come. But as another philosopher, Georg Wilhelm Friedrich Hegel (1770-1831), poetically put it: "The owl of Minerva spreads its wings only with the falling of the dusk" so divine wisdom in this case will have to wait.

### Three topics on the agenda (at least for some countries)

The top three subjects in today's international political debate can be listed as security, resilience and climate. Let's leave aside the diplomatic and military part of geopolitics, since most of us can't do anything about it anyway. Instead, we should discuss aspects of the latter two: regionalisation and the creation of more diversified supply chains and the difficulties that new low-emission iron and steelmaking technologies have in penetrating the market. We start with the last.

### Pitfalls on the road to climate neutrality

The present decarbonisation situation is dire where the pink unicorn of wishful thinking is suffering from serious wounds. There is now little room for unsubstantiated dreams of quick fixes, and projects strive with problems to finance new plants due to uncertain profitability, resource availability and perceived technical risks. Instead, our legacy steel industry with blast furnaces and electric arc furnaces using fossil coal and average electricity is still present, the big grey elephant in the room. Although it is possible to improve with systematic, tedious research, continuous process improvement and sustainable reinvestments, plant professionals fear that this line of decreasing emissions will find it harder to acquire necessary funds. This is due to policy makers of different kinds strengthening their grip on both research funds and financial institutes. They do not restrict themselves to set goals but insist on directing how to reach them. However, this

requires knowledge that only professionals in the industry with decades of experience together with unbiased research have. So, politicians and NGOs end up in a swamp of unconscious and conscious ignorance when meeting stakeholders. Even if everyone involved has good intentions, the rules of a capitalist market can make things go very, very wrong when decisions are based on commercial deliberations and uninformed opinions for which the failed hydrogen hype in Europe is the latest proof.

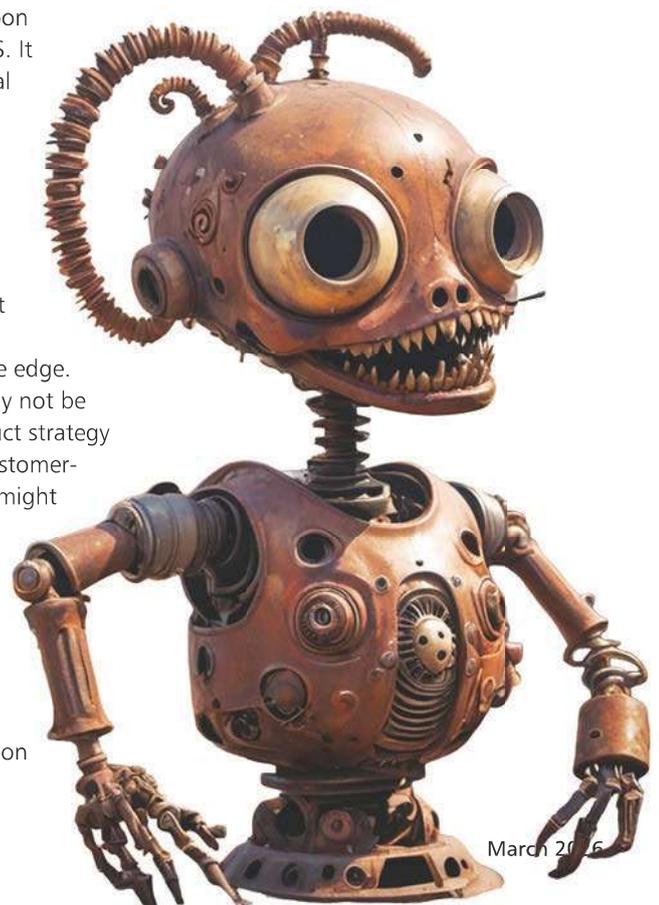
### Choosing a relevant strategy

In contrast to large blast furnaces and mega module sponge iron production in multi-million tonne per year scale, new process ideas often emerge as plans for small scale modular plants. They may be well-suited for niche products where the scale is of less importance or niche production where local resources can be used at low cost. But the communicated goal is, however, almost always to replace the blast furnace with a large number of modules working in parallel. As a consequence, the emissions they benchmark themselves against are those from the traditional blast-furnace-BOF steelmaking route indicating a large potential for emission abatement. This is, however, misleading since in a production landscape allowing for these low emission, small-scale processes to emerge, the traditional processes will be forced to develop, using for example, Carbon Capture, Usage or Storage, CCUS. It is with these enhanced traditional processes that new technology must compete regarding economy, environment and resource consumption. A fair comparison is the key to avoid wishful thinking and, in order to succeed, new candidates must find conditions and supporting technologies giving a competitive edge. A price-performance strategy may not be sustainable, but perhaps a product strategy based on product-superiority, customer-closeness or resource-closeness, might do the trick. Supporting processes like cold bound agglomeration and other techniques saving CAPEX and OPEX, integrated smartly into the process, might also change the entire picture. Keep in mind that today's mega-scale production is made possible by the ease by

which we transport ore and coal over the oceans and have access to piped natural gas. Small scale production modules need other conditions.

### Resilience - the driver for regionalisation

Companies that depend on raw materials have always reduced risk by having at least two, often more, suppliers of key raw materials. However, the globalization trend in recent decades has resulted in a situation where this is not possible to maintain for many materials, and efforts are being made to create alternative supply routes often based on local raw materials. In many ways, this situation is reminiscent of that for new process routes for low-emission iron, and perhaps there is something to be learned here regardless of where in the world you are and what raw material is involved. For this magazine we can restrict the discussion to iron and ferro-alloys which is tricky enough. In order not to be dependent on importing high grade steels with low levels of tramp elements, the first step is to avoid contaminating scrap with copper and high alloy steel shrapnel. When in some parts of the world blast furnaces are closed and the ratio of scrap-based production increases, the access to clean scrap sources becomes essential. The technology to process scrap to avoid tramp elements is there, but



policies to make the methods mandatory need to be developed. Separating copper and alloys in scrap may help to improve regional self-sufficiency in metals and ferro-alloys, but market mechanisms need to be developed. Starting production of ferroalloys from local/regional mineral sources in order to diversify supply chains may face the same challenges as the new low emission ironmaking projects. This means developing plants where the initial production is small-to-medium scale and the technology beyond pilot size needs to be proven. The conditions for financing these projects probably vary globally but my experience from Europe is that the financing situation is quite good for a pilot plant and for a mega plant but difficult for small-to-mid-size plants. Investment banks need a certain volume to engage in a project, which is understandable but hinders them to participate in projects with upscaling in several steps.

In short, transforming the market towards lower emissions and reduced dependencies requires not only technological development but also a reformed financial sector and a developed regulatory framework beyond carbon taxes.

#### Water - the fourth topic

While the first three topics are mainly handled by each region at its own pace, the fourth is global and, in my opinion, cannot wait. The issue of importance for many countries is the availability of clean water. It is affected by the climate and places great demands on the local steel industry, which uses large amounts of water in production. Acute water shortages lead to famine and

large-scale population movements, and in the absence of a functioning international community, the possibilities for dealing with such a situation are limited. There are technologies to reduce consumption and certainly more that can be developed. Co-operation and support in this area should be possible regardless of ongoing disagreements and conflicts and without waiting for the global mess to be sorted out.

#### Where do we go from here?

We need to reflect on today's situation and how to avoid repeating our mistakes. Here are some suggestions given in good faith as a basis for discussion.

Two things for the industry to stop doing:

- Surrender to unrealistic demands from uninformed politicians.
- Engage in politically motivated mega projects with unproven technology.

Three things for the industry to continue doing:

- Develop roadmaps to become climate neutral but keep them realistic under prevailing conditions.
- Keep funding and engage industrially in basic research in process technology and fundamental metallurgy projects. Not all endeavours can be fancy and many obstacles to reduce emissions lie on this side of the horizon.
- In key areas like abating climate change: maintain, deepen and broaden global contacts and co-operation in research, standardisation and policy development and if possible, regardless of political concerns. Personal relations and working procedures in these fields take

decades to develop and form a foundation for bridging regions and getting results.

Three things for the industry to start doing:

- Formulate a rules-based working order for politics, science and industry based on facts. Building for sustainability and resilience starts with building trust.
- Develop a culture in large financial institutions to engage in projects scaling up from small via medium to mega. We will have more of those in the future.
- Engage in projects to support knowledge dissemination, technology development and deployment to improve emission abatement and water management in the steel industry globally.

#### To conclude

Immanuel Kant claimed that moral reasons are not a necessary base for creating a conflict resolution body to sustain peace. It can be managed by people (or devils) governed by pure self-interest. A pre-requisite is, however, that decisions are based on reason. There is always a caveat, which brings to mind the former United Nations Under-Secretary-General for Legal Affairs, Hans Corell (born 1939), who used to quote the final chorus from Sophocles' tragedy Antigone (442 BC). ■

*Reflection – that is our supreme path to happiness. And do not violate the eternal law!*

*On lords with mighty words in their mouth shall punishment strike down with mighty blows and teach them at the end of their days - reflection.*

Being an optimistic engineer, I believe that we, after some turbulent years, will have created a new, hopefully better, rules-based world order where reflection and reason are ruling and in which our industry can develop and prosper. In the meantime, there is a lot to do.

- Read also: Time to sober up, STI October 2025 and Between a pony and a pink unicorn, STI October 2021.
- Antigone chorus in an English interpretation of Hjalmar Gullberg's Swedish translation from Greek.
- Visit the Future Steel Forum in Bologna (3-4 June) and meet Rutger in person. He will be presenting a paper and chairing sessions. ■

