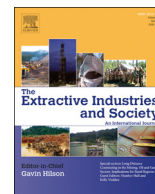




Contents lists available at ScienceDirect

# The Extractive Industries and Society

journal homepage: [www.elsevier.com/locate/exis](http://www.elsevier.com/locate/exis)

Original article

## Is There a Supply Crisis? Sweden's Critical Metals, 1917–2014

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## ARTICLE INFO

## Keywords:

Critical metals  
Sweden  
Resource scarcity  
Supply crisis

## ABSTRACT

While global metal production has increased almost exponentially over the last hundred years, actors have constantly worried about future scarcities. This article explores why state and business actors within a small country, Sweden, have perceived metals as critical and which strategies they have advanced to cope with potential shortages. It analyzes four reports and/or records of meetings from 1917, 1954, 1980 and 2014, years when the debate about resource scarcity flourished both in Sweden and internationally. The reasons why actors feared the future supply were largely connected to price increases, potential supply disruptions because of war or political instability, and soaring demand for technologies containing metals. Even Sweden, a neutral country, feared shortages because of political instability in foreign countries because of the transnational metal flows. The actors attempted to manage shortages by increased domestic production, technological development, stock-piling, international agreements and recycling. Tracing this issue over time, the article unpacks the importance of and concerns with metal flows in an age of rapid industrial, technological and geopolitical change.

### 1. Introduction

“Never before has the supply of metals reached such a high.” This could have been said yesterday, twenty, fifty or even a hundred years ago. Global metal production has increased almost exponentially since the early 1900s (see Fig. 1). In spite of this tremendous growth, over time actors have come to fear metal shortages. Such fears are not new, but they continuously plague the world as metals have long formed a basis for industrial and technological development.

One of the key problems with metals is that they are unevenly distributed in the world. No country – no matter how large and powerful – can be self-sufficient. Hence, access to metals becomes a problem that crosses political borders (Keenleyside, 1949). This transnational aspect of metal flows began to be problematized in earnest during World War I. The war interrupted the previously invisible international flows, causing many countries to face enormous supply problems. In this context, crucial resources that were beyond a country's or industry's immediate reach began to be classified as “strategic” and “critical” (Haglund, 1986).

Historical research has largely centered on the strategic or critical nature of metals from the perspective of large countries such as Britain, the US, Germany, France and Japan. Alternatively, it has focused more narrowly on the history of one or a few strategic or critical metals (Ingulstad et al., 2015; Gendron et al., 2013; Lael and Killen, 1982; Dumett, 1985; Limbaugh, 2010; Mangone, 1984). In his work *Resources and Strategy*, Ian Lesser focused on how Western nations gained access

to crucial raw materials from the outbreak of World War I until the 1980s (Lesser, 1989). There are also other perspectives: Alfred Eckes in *The United States and the Global Struggle for Minerals*, shows that metals and minerals, primarily those that were classified as critical or scarce, played a role in shaping US foreign policy and national politics from the end of World War I up until 1970 (Eckes, 1979). Mats Ingulstad, in *Winning Hearths and Mines* (2011, 7), also examines US foreign policy in relation to strategic metals, mentioning that the U.S. list of strategic metals grew in just a few years from 17 at the end of World War I to 75 at the end of the Korean War.

We know less about how and why smaller nations have perceived various metals as strategic or critical. This article discusses Sweden, a smaller country with a large mining and manufacturing tradition, particularly well known for its special steels. Steel consists mostly of iron, of which Sweden has large domestic deposits, but to manufacture different types of steel, Swedish steelworks added alloying metals which they were forced to import (Vikström, 2016). Historians have focused on Swedish exports of iron and steel, but access to imported metals is largely black-boxed in the literature (e.g. Hedberg and Håkansson, 2008; Fritz, 1974, *Jernkontoret*, 2011). This is unfortunate, because it is precisely these metals that have typically been viewed as critical. Furthermore, while Sweden did not participate in the two world wars, and declared itself neutral in the Cold War, it still had to manage a variety of relations on the global arena to access metals. Against this background, this article seeks to answer the following questions: Which metals have Swedish business and/or state actors

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<https://doi.org/10.1016/j.exis.2018.03.012>

Received 19 October 2017; Received in revised form 23 March 2018; Accepted 23 March 2018  
2214-790X/ © 2018 Published by Elsevier Ltd.

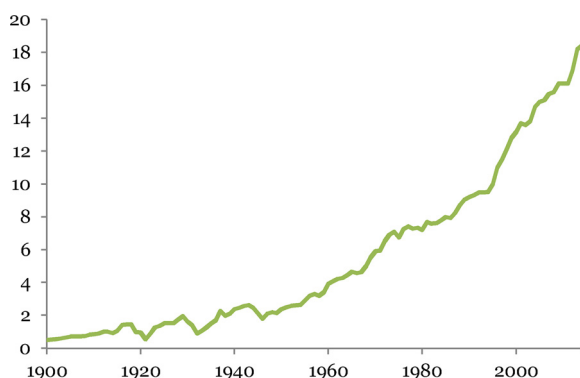


Fig. 1. Global production of copper [million tons], 1900–2010. Source: USGS (2013).

perceived as critical at various points in time, and why? And how did they plan to deal with potential future shortages?

To understand the evolution of metals as strategic and critical in Sweden since the early twentieth century, I have compared actors' perceptions at four different points in time over the last hundred years. I chose years when the issue appeared on the Swedish industrial and political agenda: 1917, 1954, 1980, and 2014.<sup>1</sup> Each of these years featured either important meetings and/or publications regarding shortages and potential future shortages of natural resources and metals. I base my research mainly on three official reports and one set of detailed records of a meeting, published 26 to 37 years apart. To contextualize the debate, I also searched through the digitalized Swedish State's Official Investigations (SOU) from 1922 until 2014.<sup>1</sup> Taken together, the sources provide a rich material that allows us to better understand the ideas and debates in Sweden during the past hundred years. The arguments targeted an influential audience within Sweden, comprising decision makers in both government and industry. As such, the materials provide a firm basis for understanding the key issues of interest here. A long timeperiod of this kind, while brief, allows slow changes over time to be traced and analyzed.

## 2. Conceptualizing resources as strategic and critical

Why does a metal come to be classified as strategic or critical? Resources are not critical or strategic per se, but are constructed as such by actors situated in a specific historic context, in texts, in debates, through political decisions or technological innovations. Categorizations, according to the political geographer Gavin Bridge (2009), are merely a reflection of a society's values. The underlying notions of why certain resources are viewed as critical cannot be understood without a political and historical context. Both international circumstances and national conditions play a role. A metal can be critical in one place during a specific time or country and non-critical in another context.

Judging from the existing literature, a resource that is classified as strategic or critical is one that is essential to national defense, society and economy, and is largely imported. The concepts were introduced after the severe global resource shortages in 1917 and 1918, which shaped actors' perceptions of how disrupted flows could affect manufacturing processes. The classification originates in a fear of shortage, especially if the importers are dependent on what they perceive to be an unreliable supplier. Important to point out is that there does not seem to be any consensus as to what exactly is implied using these different terms. For the most part actors have seemingly thought of "strategic" metals as being more closely related to military contexts, whereas the

notion of "critical" metals seems to relate to industries at large. In other instances the argument the definition of a metal as "strategic" implies that it is subject a higher supply risk than if classified as "critical" (Haglund, 1986; Eckes, 1979).

In the aftermath of World War I, through the Interwar Era, World War II and the Cold War, reliable access to metals became a prominent topic on the agenda both for state and industrial actors; often these fears of shortages were connected to metals used in military applications. Later, from the 1970s on, the focus was rather on politically induced supply disruptions.

Throughout the twentieth century, fears and perceptions of metals as critical, strategic, and scarce also influenced actors' behavior and actions. State and business actors both showed particular concern about metals classified as strategic or critical. As a result, they took great care, through media, laws, regulations, political decisions, technology and foreign policy to prevent – and cope with – future shortages.

## 3. Sweden's critical metals

### 3.1. The Swedish industrial meeting, 1917

Sweden did not participate in World War I. Nonetheless Sweden's raw materials supply was severely affected by the intensifying warfare in Europe. Swedish industries managed the material shortages of the first war years by restricting exports and consumption through legal regulations, increased production, and the procurement of substitutes. But in 1917 the country was on the edge of an acute resource shortage. International trade was severely limited. The import of goods to Sweden decreased severely as a result of unrestricted German submarine warfare (Vikström, 2016, 776; Lundberg, 2006, 94–111; Schön, 2012, 274–5). Ships with raw materials destined for Sweden were seized during transport, since there was a "complete dearth of them" in the belligerent nations (Svalin, 2017, 399). The disrupted shipping routes made Swedes cry out for raw materials and metals, the prices of which reached unprecedented levels. To make matters worse, the value of the Swedish krona declined (Ramén, 1917, 419–20; Larsson, 2014, 202–3; Eckes, 1979, 16; Vikström, 2016).

In this situation, *Sveriges Industriförbund* (Sweden's Industrial Association) and *Svenska Teknologföreningen* (The Swedish Engineering Association) decided to convene for what became known as The Industrial Meeting, which was held on 19 and 20 September 1917. It served as a forum for state and business actors to discuss the severe shortages of raw materials including metals, fuels, and materials used in the textile, leather, match and porcelain and chemical industries, in Sweden, to collectively understand their scope and agree on ways to cope with them. Well before the meeting, the banquet hall at Grand Hôtel was filled to the brim with attendees eager for it to begin. The organizers quickly decided to move it to a larger venue with 750 seats, but even there it was standing room only. Government representatives and wartime commission members were present, alongside directors of parastatals and industrial businesses. Even Prime Minister Carl Swartz attended. *Svenska Teknologföreningen's* engineering journal, *Teknisk Tidskrift*, printed detailed summaries of the discussions and lectures (Teknisk Tidskrift, 1917a, 1917b).

War Material Commission (*Krigsmateriel-kommissionen*) member and chief engineer Arthur Ramén was one of the main speakers on Sweden's metal situation.<sup>2</sup> "This time of crisis can be characterized primarily by scarcity and high prices of goods," he said, "especially for industrial goods of necessity that do not occur within this country" (Ramén, 1917, 419). Industries struggled as it became very expensive to buy raw materials. Even worse, Ramén feared that the belligerent countries were attempting to cut neutral nations out of legitimate trade.<sup>3</sup> Another

<sup>1</sup> I searched through all relevant SOU's – related to mining, steel and resources – using keywords including specific metals and the words "critical" and "strategic".

<sup>2</sup> For more information on Arthur Ramén see Lundgren (2017), 92–3, 176.

<sup>3</sup> For details, see Limbaugh (2010).

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