

SEAC's approach to assessing changes in producer surplus

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1. Introduction

This guidance document is targeted at applicants for authorisation who will undertake a socio-economic analysis (SEA) as part of their application for authorisation or for consultants who support applicants for authorisation. The aim is to provide detailed guidance to applicants to make case-by-case assessments or evaluations of, and motivate for, estimating producer surplus losses (when such losses are expected to occur). The guidance contains concepts that are also likely to be relevant to Annex XV restriction cases, and therefore may also be relevant to those preparing restriction dossiers. A section is included at the end of this document that describes the role of SEAC in reviewing assessments of producer surplus losses.

2. What is producer surplus and how can it be estimated?

Producer surplus represents the gain to trade a producer receives from the supply of goods or services less the cost of producing the output (i.e. the margin on additional sales). In the context of hazardous chemicals, regulatory-induced welfare changes can be thought of as the sum of changes in producer surplus, consumer surplus, externalities (i.e. spillover costs or benefits to humans and/or the environment) and the social opportunity cost of prematurely retired production capital (including unemployed workers and obsolete capital assets). In the event of a refusal of authorisation to use an Annex XIV substance (or a restriction of a use under Annex XV), there are expected to be negative impacts on producer surplus at those firms facing regulatory action (which may be partially offset by positive impacts on other firms). Therefore, there is a need for SEAC to assess these impacts in a robust and consistent manner. This guidance focuses on changes in producer surplus and provides applicants with default values to estimate producer surplus losses.¹

The loss of producer surplus at an affected firm or value chain can be estimated by an evaluation of foregone profits at the firm(s). **The loss of profits arises from the premature retirement of productive tangible or intangible assets**, the value of which should be equivalent to the discounted stream of future profits over the remaining life of the assets, minus any value recouped from the sale, scrappage or redeployment of existing capital assets (tangible or intangible). The cost of those capital assets is considered sunk at the point of retirement, such that only future returns (rather than costs) are foregone when the asset is retired.

This guidance addresses two issues: First, it discusses the relevant components for assessing the producer surplus loss. Second, the document elaborates on determining the time horizon which is relevant for assessing the expected future producer surplus loss if the use of a substance ceases as a result of a refused authorisation or Annex XV restriction.

¹ Consumer surplus (CS) changes are another pertinent welfare effect of regulatory decisions. They become especially important where demand is price inelastic, meaning that firms can pass through incremental production costs to the buyers of their goods and services. Where incremental costs accrue because of the use of an alternative substance or technology, changes in CS can hence be approximated by incremental production costs. One important exception relates to the non-availability of certain medicinal products, where patients stand to lose the corresponding health benefit. These impacts are not subject of this guidance.

This guidance seeks to provide practical advice on how to assess the net effect on producers (i.e. producer surplus loss) that results from the premature retirement of production capital in the EU/EEA.² Consequently, the approach is directly linked to the non-use scenario presented by the applicant. The approach is meant to be generic enough to account for real-life situations faced by applicants who apply for authorisation, whilst accounting for relevant firm-specific conditions and market environments.

3. Methodology

The net effect on producers from the premature retirement of capital incorporates the effects on both tangible assets (e.g. physical assets such as plant and machinery) and intangible assets (e.g. patents, software or research and development). The estimation of producer surplus loss is based on the remaining life of an asset (tangible and intangible). Tangible and intangible assets can have different life lengths. It is assumed that in the short run there is a fixed availability of tangible and intangible assets and in the long run, incumbent or rival firms can augment assets by making investments. Therefore, the focus of this guidance is on the short run and the transitional welfare effects arising from a refused authorisation. The effect of the premature retirement of tangible and intangible capital is discussed in more detail in the following subsections.

A. Tangible capital assets

Tangible assets include physical assets such as plant and machinery. The central assumption in this guidance is that regular tangible capital assets have a 10-year service life in total, and that, on average, at the time of the regulatory decision those assets will have 5 years of remaining service life. However, where applicable, this assumption should be adjusted by the applicant to reflect possible gains at rival firms³, which may, from a societal welfare perspective, partially offset the losses at the applicant.

Partial offsetting might arise, for example, if rivals could increase production of either the same product, a product with similar use, or one based on an alternative substance, at minimal cost (if they have spare capacity) or at a lower cost than the regulated firm (if there are low-cost or flexible opportunities for expanding capacity, such as adding an extra shift, which may or may not be available to the regulated firm).

The responses of rival firms and their ability or inability to offset impacts from the **premature retirement of production capital** by the applicant influences the extent of the potential impact (i.e. loss) to society. The ability of EU/EEA-based rival firms to react

² The note does not address approaches for quantifying the welfare implications of reduced externalities that are expected to result from a refused authorisation or the adoption of a restriction. These impacts are covered in the SEA Guidance and the SEAC paper on unemployment ([SEAC/32/2016/04](#)).

³ Note that this document considers “rival firms” and “competitors” to be other companies operating in the same market segment, supplying the same product or service, using any legal means to supply the market. This includes firms using alternative (non-SVHC) substances, and those using the existing SVHC, either outside the EU/EEA or inside the EU/EEA (covered through a previous authorisation decision).

to impacts on the applicant and extent of losses to EU/EEA society will depend on a series of case-specific factors, such as the extent of competition and contestability of the market; the market share of the regulated firm; the degree of specialisation and other barriers to entry; and the location of the main competitors (EU or non-EU⁴).

To account for cases where there is the **opportunity to partially offset** in contrast to cases where there is no opportunity to partially offset, upper bound and lower bound estimates are derived. The upper bound is based on the assumption of 5 years of remaining service life, and represents the average expected remaining life of a tangible asset, assuming there are no offsetting gains to rival firms. The lower bound of 1 year is considered a minimum frictional adjustment period, for example to allow for the applicant and/or rivals to identify new customers and adjust production levels to a new equilibrium.

Furthermore, **to account for 'SAGA' or 'no-SAGA' cases⁵**, two separate "default" point estimates for producer surplus losses from tangible assets are presented: for cases where there are considered to be suitable alternatives generally available (SAGA cases), the default is the midpoint of this range, i.e. 3 years of profit losses; while for no-SAGA cases the default is 5 years, on the basis that a lack of alternatives may reduce the scope for significant gains by rival firms in the EU/EEA.

If the existing production capital has a **positive resale or scrap value**, or it could be redeployed with minimal loss to the applicant, then it should be subtracted from the producer surplus loss. A production asset has resale (or salvage) value if it can be sold to a new user in its existing form. The sale price of a used asset should equate to the expected value of future profits derived from the asset, which can be deducted from the foregone profits at the selling firm. A production asset can be considered to have scrap value if it cannot be sold in its current form, and instead can only be sold for parts (in particular, chemical process equipment is often made of high-grade steel that may have a robust scrap value). **Residual asset values should be deducted from the eventual estimate of profit losses.**

B. Intangible capital assets

Intangible capital assets, also known as knowledge assets, are assets that do not have a physical form. Examples include software, research and development, branding, design, training and organisational capital. Research from Haskel and Westlake shows that investment in intangible assets across a selection of EU and non-EU countries is greater than investment in tangible assets⁶. On an industry basis (UK data), the ratio of intangible to tangible investment is highest in Professional and Scientific Activities, Financial Services and Information and Communication, but it is also as high as 1.68:1 in the manufacturing sector⁷ which may be considered the nearest analogue to the production and/or

⁴ This issue determines in particular whether economic activity is lost to the EU, even if rival firms are able to make gains, as only EU-based output is considered in REACH SEA assessments.

⁵ Further information on the SAGA concept can be found here: https://echa.europa.eu/documents/10162/13637/ec_note_suitable_alternative_in_general.pdf

⁶ Haskel, J, and S Westlake (2017), *Capitalism Without Capital The Rise of the Intangible Economy*. Figures also reproduced at [Vox](#) and [Bruegel](#), amongst others

⁷ [Investment in intangible assets in the UK - Office for National Statistics \(ons.gov.uk\)](https://www.ons.gov.uk/economy/governmentandbusiness/investmentandcapital/intangibleassets)

downstream use of chemicals. According to UK data, when viewed over a 20-year period, intangible and tangible investment (economy-wide) are roughly equal to each other⁸.

Estimates of the lives of intangible assets from both NIESR⁹ and Nesta¹⁰ show intangible assets tend to have shorter lives, generally in the range of 3-4 years (depending on the particular asset and sector). R&D knowledge, which is shown by Nesta to be particularly important in the production industries, is shown to have a somewhat longer life in the production sector, at 5.5 years¹¹ on average. A weighted average asset life in the production sectors¹², taking account of the relative prevalence of each asset type, is approximately 4.8 years.

Following the same methodology as for tangible assets, the expected remaining service life of an intangible asset is expected to be 2.4 years. After adjusting for potential offsetting gains to rival firms, the expected profit losses from intangible assets in SAGA cases is around 1.2 years, which can be rounded to approximately 1 year. In no-SAGA cases, the scope for offsetting gains is likely to be limited, so losses are instead expected to be equivalent to the remaining asset life of 2.4 years (or roughly 2-2.5 years).

As with tangible assets, any residual value of intangible capital assets that can be scrapped, sold or redeployed should be deducted from the estimated profit losses, to the extent this is feasible (noting that valuing intangible assets is not always straightforward).

4. Default time periods for estimating producer surplus losses

Based on the literature on intangible assets^{13,14,15}, the ratio of intangible capital investment to tangible capital investment is somewhere between 1:1 and 3:2 in favour of intangible investment. Due to uncertainty over the correct industry definitions and the use of single-year estimates, the suggested approach is to assume a 1:1 ratio of intangible to tangible investment, based on the long-term (economy-wide) average¹⁶. Applicants can argue for

⁸ [Measuring the Other Half: New Measures of Intangible Investment from the ONS - Josh Martin, 2019 \(sagepub.com\)](#)

⁹ [Measuring the Other Half: New Measures of Intangible Investment from the ONS - Josh Martin, 2019 \(sagepub.com\)](#)

¹⁰ https://media.nesta.org.uk/documents/investing_in_innovation.pdf

¹¹ This paper uses the concept of "benefit years" to determine asset life lengths, which are the number of years over which the owner of an asset is able to derive a benefit from that asset. Other concepts exist, such as including implementation periods, which may be relevant to understanding how long of a commitment is being made in R&D projects. However, as the aim is to assess how many years of value are remaining in a capital asset (to work out the loss if it is scrapped), then "benefit years" can be considered the most appropriate measure.

¹² Which may be the available breakdown that is most relevant to analysis of the chemicals sector

¹³ Haskel, J, and S Westlake (2017), *Capitalism Without Capital The Rise of the Intangible Economy*

¹⁴ [Investment in intangible assets in the UK - Office for National Statistics \(ons.gov.uk\)](#)

¹⁵ <https://journals.sagepub.com/eprint/8Y5WKDZCYJFQE7RSHSNN/full>

¹⁶ Note that this assumes that the ratio of *returns* on investment in tangible and intangible assets (i.e. profits that would be expected to be earned from those assets) is the same as the ratio of investment in tangible and intangible assets. This may not be representative of all cases, but the general assumption is made for the sake of simplicity.

a different ratio to justify deviation from the default values where they can demonstrate such an alternative is more appropriate.

Applying an equal weighting to the suggested periods of profit losses for tangible and intangible assets results in the following default values:

- For SAGA cases: **2 years of profit losses** (average of 3 years for tangible assets and 1.2 years for intangible assets, rounded to the nearest year)
- For no-SAGA cases: **4 years of profit losses** (average of 5 years for tangible assets and 2.4 years for intangible assets, rounded to the nearest year)

As a starting point **SEAC proposes that these default values be used for assessing producer surplus losses in socio-economic analyses** of AfA cases (and, where relevant, in Annex XV restriction cases), minus any residual values from the sale or scrapping of tangible or intangible assets. SEAC would expect applicants to use these default values in their assessments, unless there is a well-justified reason to use an alternative estimate.

SEAC notes that there may be case-specific factors that mean that a different figure from the default estimates could be justified. If so, it is possible for applicants to deviate from the default, as long as they provide a robust justification. Examples of potential case-specific factors that could be used to support deviations are discussed in the next section.

5. Key considerations when determining time periods for producer surplus losses

Potential justifications for using an alternative to the default time period

As explained in the previous section, the suggested default assumption for the number of years of profit losses to include is **2 years in SAGA cases, or 4 years in no-SAGA cases. SEAC would expect applicants to use these defaults in the majority of cases.** However, this section sets out some of the circumstances under which applicants might motivate for including a longer or shorter time period for producer surplus losses, based on case-specific factors. These considerations need to reflect the non-use scenario presented by the applicant.

The list below sets out some potential factors that might be used to justify a deviation from the default approach. Applicants may wish to motivate for an alternative time period based on one or many of the below criteria; they may also wish to make a case based on any other criteria they consider relevant – the following list should not be considered exhaustive. Where an applicant wishes to motivate for an alternative time period, they should explain which criteria their arguments are based on and provide a robust justification with supporting evidence.

- **Competition:** what is the extent of competition in the market segment under consideration? Are there significant barriers to entry in terms of investment requirements that mean the extent of contestability of the market is low? If it can be demonstrated there is limited competition and/or high barriers to entry, this might be given as justification for including a longer period of producer surplus

losses, since there would be limited scope for rival firms to make gains to partially offset losses at the regulated firm. The opposite case may also be made in situations where there is high competition and/or low barriers to entry. The exact market segment needs to be clearly defined, e.g. position in the value chain, business to business versus consumer-facing, etc. The location of competitors is discussed later; this criterion instead focuses on the competition structure.

- **Market share (of the regulated firm):** what proportion of the market segment under consideration is accounted for by the regulated firm? The larger the share that would need to be “reallocated” in the non-use scenario, the less likely it is that rival firms would be able to take on the additional volumes without needing to make significant investments themselves (i.e. the overall loss to society is likely to be greater). Again, the market segment in question would need to be clearly defined, and robust evidence provided of market shares.
- **Specialisation:** what is the degree of specialisation in the market segment under consideration? In particular, how pervasive is the use of intellectual property protection (such as patenting)? The greater the extent of specialisation and IP protection, the higher the barriers to entry to the market, which would limit the possibility for rival firms to make any gains that partially offset losses to the regulated firm. Another barrier to entry may arise from a supplier having specific know-how and long-standing relationships with customers (a form of intangible asset), which may make it harder for those customers to find alternative suppliers that meet their particular requirements in the non-use scenario.
- **Location:** are the applicants’ main competitors located primarily inside or outside the EU/EEA? The greater the share of competitors that are located outside the EU/EEA, the greater the societal loss, since SEA assessments under REACH focus on impacts within the EU/EEA economy (gains accruing to competitors in non-EU/EEA countries are not included). For the sake of simplicity, the primary interest in terms of location can be considered in terms of where rivals’ production is located, rather than ownership or control.

Examples of alternative time periods that may be included by applicants

As outlined in the previous subsection, applicants may, for a range of reasons, motivate for an alternative time period for producer surplus losses. This subsection provides some examples of what sort of alternative time periods might reasonably be argued for by applicants in different scenarios. SEAC expects that, for most of the cases where an alternative period is argued for, it would fall into one of the following two categories:

- In **SAGA cases** where applicants consider a longer time period for producer surplus losses to be appropriate (based on the above-mentioned considerations or any other relevant criteria), a reasonable alternative could be 3 or 4 years of profit losses. 3 years might represent a scenario where there is limited scope for rival firms in the EU/EEA to gain at the applicants’ expense; 4 years could represent a more extreme case where there is no possibility for EU/EEA-based rival firms to make offsetting gains (similar to the default for no-SAGA cases). In either case any deviation from the default value requested by applicants must be justified with robust supporting evidence.
- In **no-SAGA cases** where applicants consider a longer time period for producer surplus losses to be appropriate, it may be reasonable to include 5 years of profit losses. The methodology for no-SAGA cases already excludes the possibility of

offsetting gains to EU/EEA rival firms, however applicants may seek additional flexibility, e.g. on the basis of a lower prevalence of intangible assets or longer asset lifespans than assumed by this guidance. Again, any such arguments must be justified with robust supporting evidence.

It is also possible to include a shorter period of producer surplus losses, with the lower bound expected to be 1 year of profit losses. Applicants may wish to use the lower bound if they consider it appropriate to their case (for example in cases with high intra-EU competition and low specialisation) and/or if they choose to present a “cautious” or “worst-case” scenario in their SEA. Alternatively, in exceptional cases applicants may argue for a longer period of producer surplus losses, although there would need to be exceptionally strong arguments and supporting evidence for SEAC to consider the analysis to be convincing.

Residual values of existing assets

As discussed above, any residual value of capital assets (tangible and intangible) that are scrapped, sold, or redeployed should be deducted from the estimated profit losses. However, it should be noted that **residual asset values should be deducted from the eventual estimate of profit losses, rather than for determining the number of years of profit losses to include.**

6. The role of SEAC in reviewing assessments of producer surplus losses

SEAC is responsible for evaluating and providing opinions on applications for authorisation and restriction cases. The following section provides some detail on how the Committee intends to approach this task.

Where applicants use the default values for producer surplus losses in their SEA (2 years of profit losses in SAGA cases, 4 years of profit losses in no-SAGA cases), the expectation is generally that SEAC takes forward these estimates in its opinion, unless there is a particularly compelling reason to use an alternative approach (e.g. if the applicant has used the default for no-SAGA cases, but there is information indicating that there are alternatives available that are technically and/or economically feasible in the EU).

If, however, SEAC considers the producer surplus losses are likely to be lower than 2 years of profit losses, it should instead use the lower-bound estimate of 1 year of profit losses in the SEAC opinion.

Where applicants use an alternative to the default values in their assessment, SEAC will scrutinise the justifications and evidence given to support the alternative estimate. If SEAC considers the evidence clearly supports the applicants’ arguments, it would use these figures in the SEAC opinion. The alternative time periods SEAC expects to be most frequently argued for are set in Section 5.

7. Requested action

Following SEAC's discussion of, and agreement on this note, it will be published on the ECHA website under: <https://echa.europa.eu/en/applying-for-authorisation/evaluating-applications>.