Substitution and phasing-out

- Endocrine Disrupting Substances

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Agenda:

- Substitution
- Examples of tools to use
- Examples of Lists with Endocrine Disruptors
- Short tips on substitutes finding
- Broader picture: frameworks, role of companies producing
- Extra links and resources as examples included!

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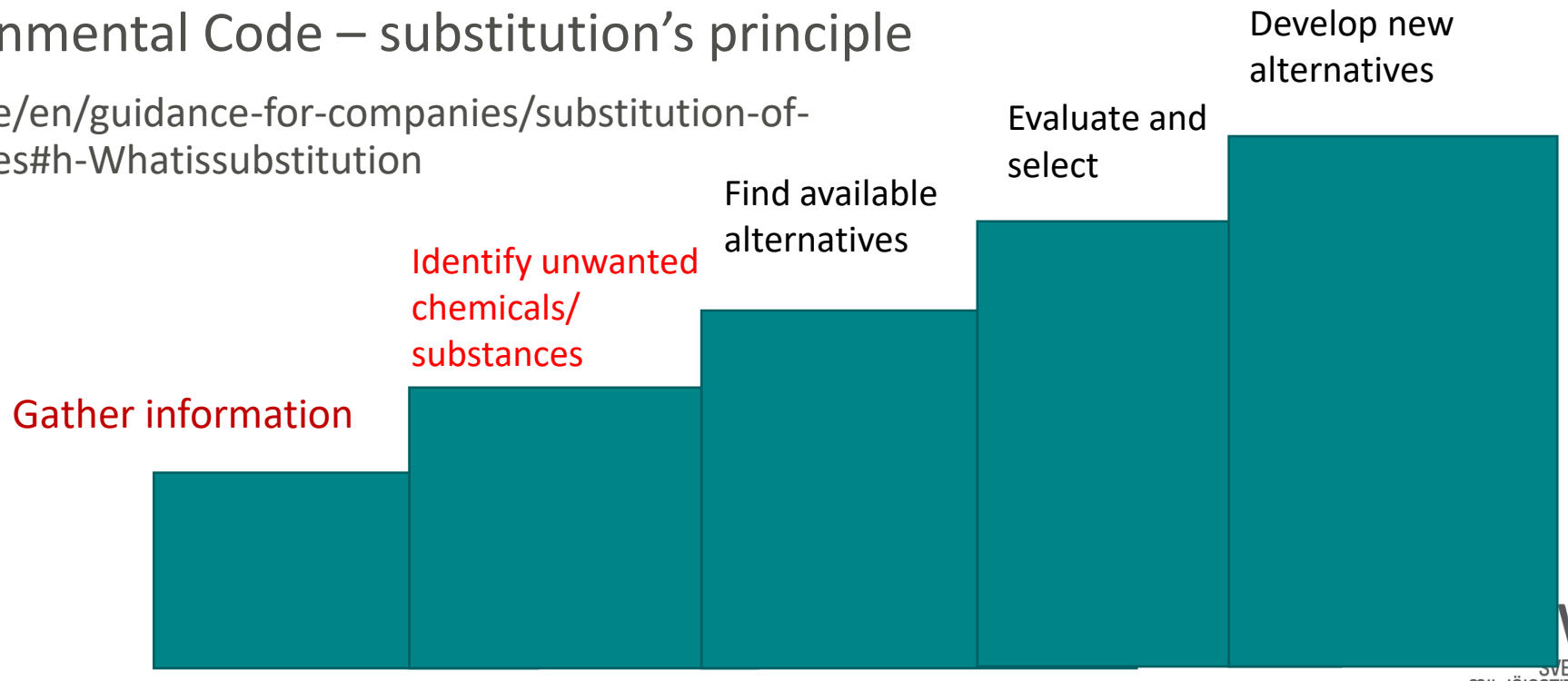
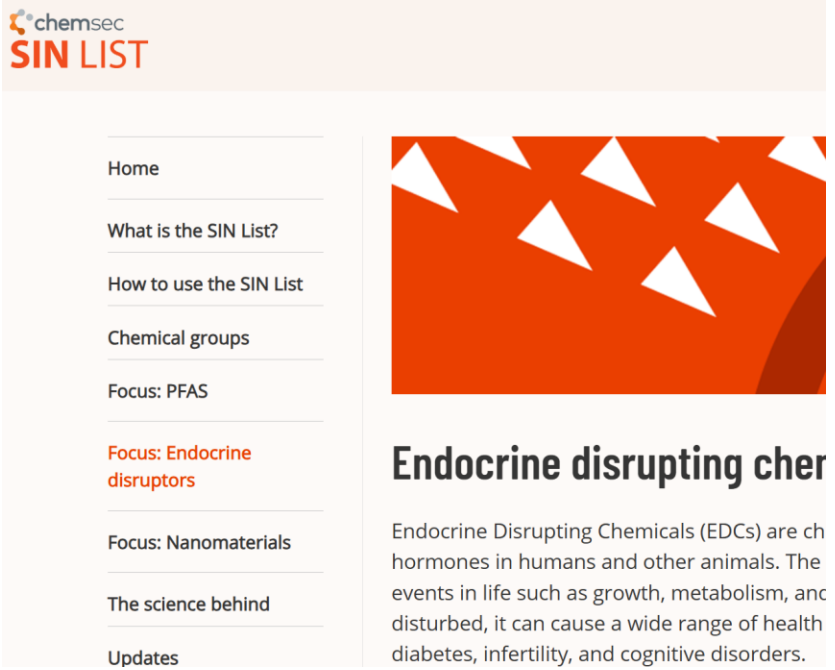
Substitution

- To eliminate (or replace) hazardous chemicals in products or processes with less hazardous or non-hazardous substances.
- Swedish Environmental Code – substitution's principle
- https://www.kemi.se/en/guidance-for-companies/substitution-of-hazardous-substances#h-Whatissubstitution



SIN list (Substitute It Now)

- 32 substances that have been placed on the SIN List due to ED properties
- https://sinlist.chemsec.org/endocrine-disruptors/



Source: https://sinlist.chemsec.org/endocrine-disruptors/

Name	CAS
Di-n-octylphthalate, DnOP	117-84-0
Diisodecylphthalate, DiDP	68515-49-1, 26761-40-0
Diundecyl phthalate, DuDP	3648-20-2
Dicyclohexyl phthalate, DCHP	84-61-7
Diethyl phthalate, DEP	84-66-2
Dihexyl phthalate, DHP	84-75-3
Bisphenol S, BPS	80-09-1
Bisphenol F, BPF	620-92-8
4,4′-dihydroxybenzophenone	611-99-4

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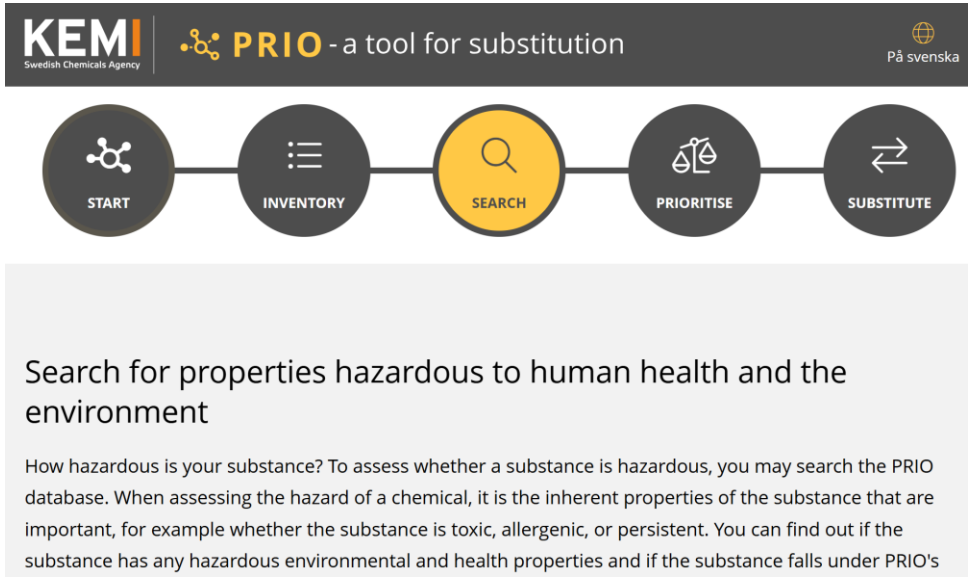
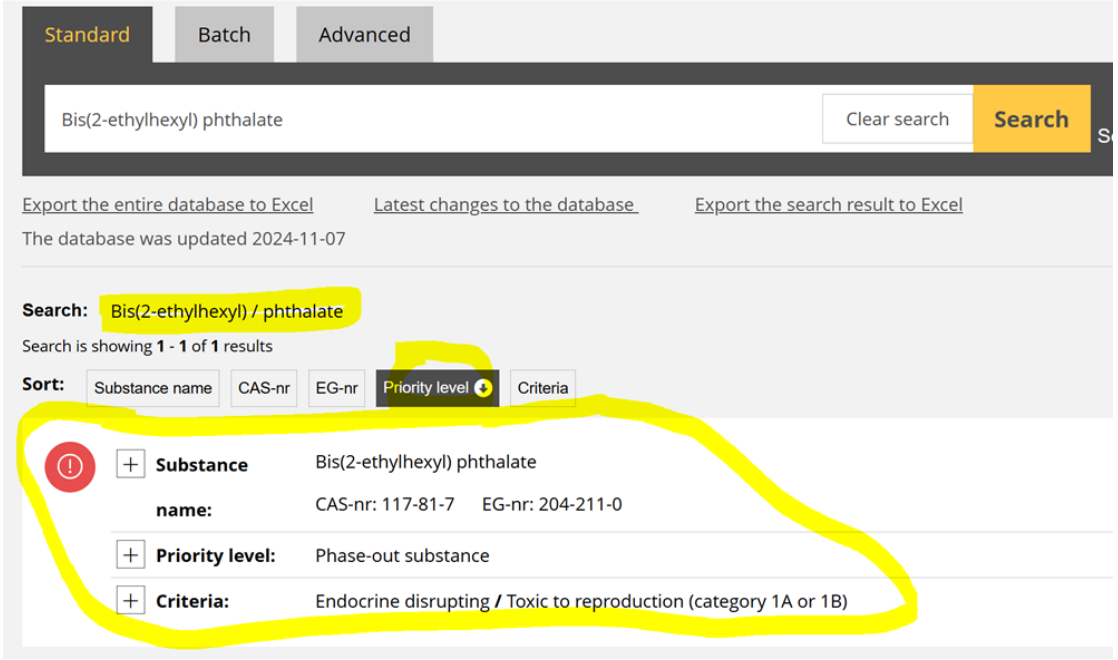
PRIO - hazard based tool by the Swedish Chemicals Agency

- Two priority levels:
  - *phase-out substances*
  - *priority risk-reduction substances*.

Criteria for the PRIO substances are based on the environmental quality objective A Non-Toxic Environment (the Swedish government) and on the EU REACH





Source:
https://www.kemi.se/prioguiden/english/start

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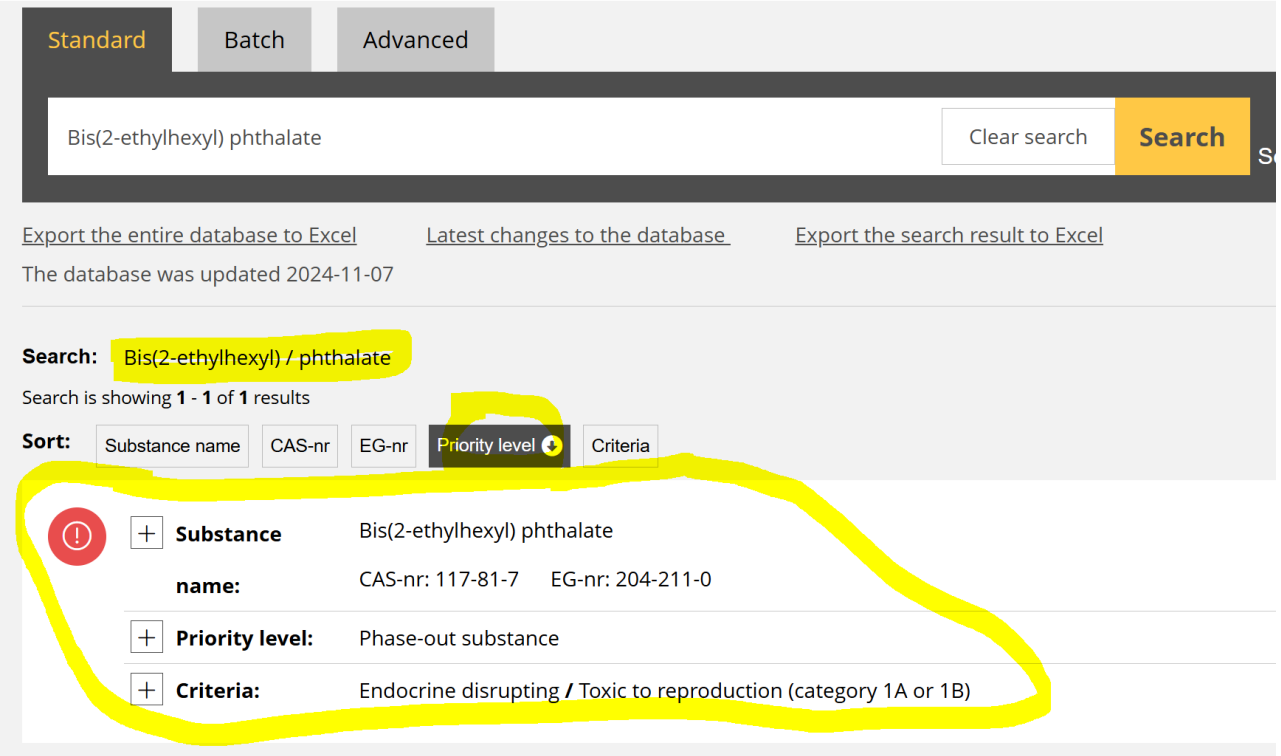
PRIO – Prioritizing yours chemical for substitution

Phase-out



Prioritize?

Priority risk-reduction:

- Hazard (inherent properties)
- Exposure (how used/handled)

Analyze risks
Address the risks

Tips: Review regularly risks

Source:
https://www.kemi.se/prioguiden/english/prioritise

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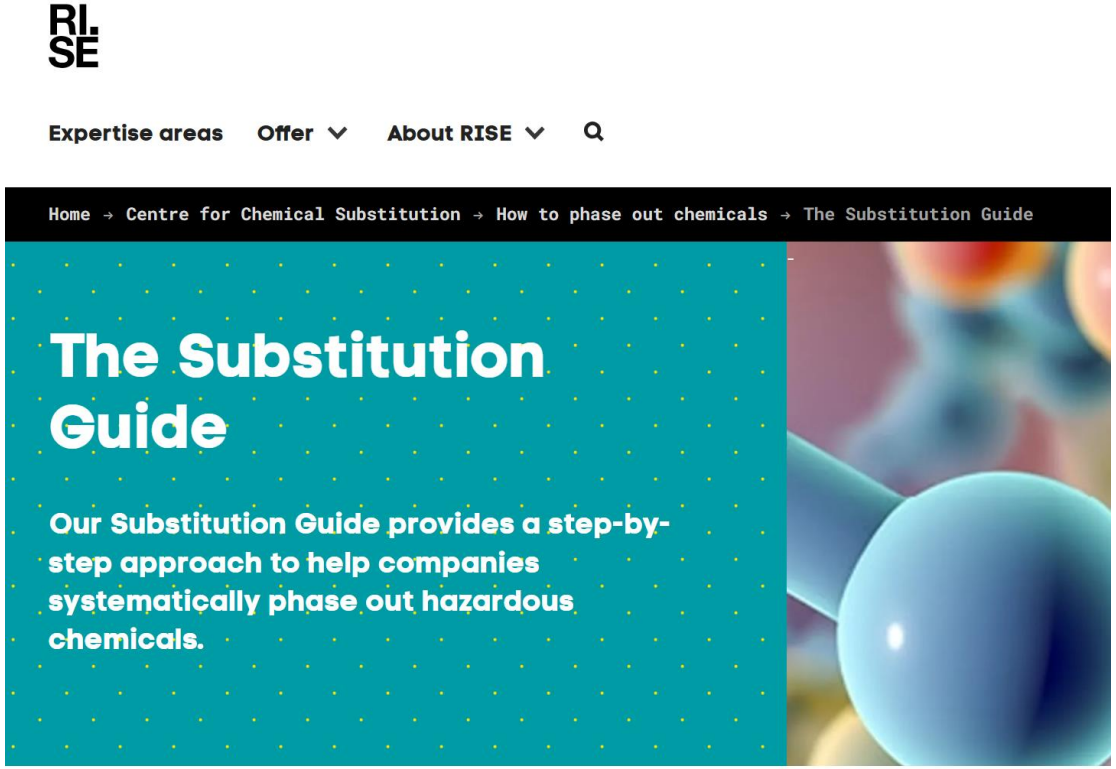
Lists with EDs, examples

- Lists with substances identified as Endocrine Disruptors:
- **ED Lists EU level** (three lists), e.g. List I: https://edlists.org/the-ed-lists/list-i-substances-identified-as-endocrine-disruptors-by-the-eu
- **ED list by CHEMTrust**: https://chemtrust.org/edcs-list/
- **List of Endocrine Disrupting Chemicals, by Hass et al. DTU:** https://backend.orbit.dtu.dk/ws/files/162337566/DK_ED_list_final_2018.pdf

Swedish Center for Substitution

- Substitution guide
- https://www.ri.se/en/centre-chemical-substitution/substitution-guide



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SUPSPORT – substitution Support Portal

About the portal

The SUBSPORTplus Portal is the result of the → SUBSPORT PROJECT and aims to be a reliable source of

- SUBSPORTplus
- Regulations
- Database – hazardous substances
- Overwiev of criteria
- Substitutions tools
- Cases and case studies
- Good practice

Source: https://www.subsportplus.eu/subsportplus/EN/Home

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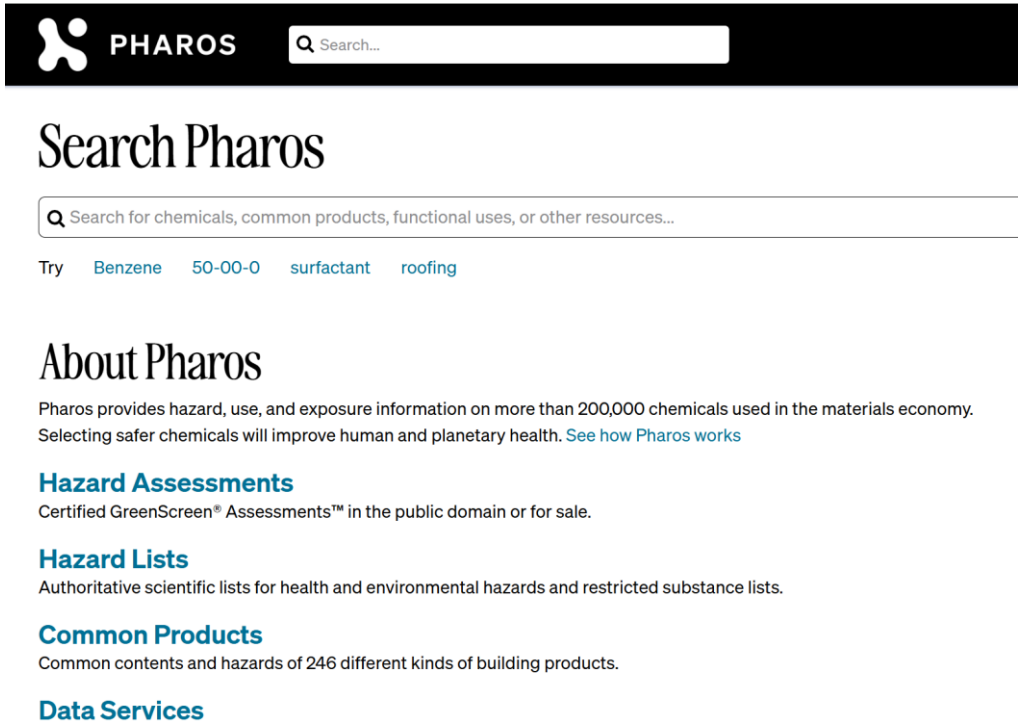
Finding substitute?

ECHA Guideline - Substances of concern: Why and how to substitute?
(https://echa.europa.eu/documents/10162/3079426/why_and_how_to_substitute_en.pdf/93e9c055-483c-743a-52cb-1d1201478bc1)

- https://marketplace.chemsec.org/

- https://pharos.habitablefuture.org/



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Substitution and phasing-out as companies' strategy?

- Work with decision-making frameworks
- Alternative evaluation as iterative process (work with alternative assessment)

- Life-Cycle thinking might help to identify "red flags"

- Avoiding regrettable substitution!

Chemicals production – shift towards more sustainable solutions

- EU Chemicals Strategy,
- Safe and Sustainable by Design (SSbD) EDs are addressed
- **Research initiatives (green chemistry) providing tools for industry/stakeholders/** developing safer products(e.g. Mistra SafeChem: Toolbox https://mistrasafechem.se/projekt/mistra-safechem/toolbox.html)

- *Role of in-silico tools*

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Interesting /good to know

- **EU REACH - alternatives** (https://echa.europa.eu/sv/alternatives-to-harmful-substances-subject-to-authorisation) → *an Excel list with alternatives can be downloaded*
- ***Safe and sustainable by design*** *(https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/chemicals-and-advanced-materials/safe-and-sustainable-design_en)*
- **US EPA Safer Choice Program** (https://www.epa.gov/saferchoice)
- ToxCast program – EPA - screening for Eds: https://www.epa.gov/comptox-tools/toxicity-forecasting-toxcast

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Might be of interest?- Examples

- Malloy et al., (2017). Advancing Alternative Analysis: Integration of Decision Science, EHP, 125, 16 https://doi.org/10.1289/EHP483

- Caldeira C., et al. (2024). Safe and sustainable chemicals and materials: a review of sustainability assessment frameworks, Green Chemistry, 26, 13, 7456-7477 DOI: 10.1039/D3GC04598F,
- Zheng, Z. et al., (2021) Environmental Science & Technology 2021 55 (2), 1088-1098 DOI: 10.1021/acs.est.0c02593

- *UCLA Multi-Criteria Decision Analysis:* MCDA method

- *Alternatives Assessment at the IC2 (https://www.theic2.org/programs/alternatives-assessment/)*
- *The BizNGO Chemical Alternatives Assessment Protocol (https://www.bizngo.org/alternatives-assessment/chemical-alternatives-assessment-protocol)*

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https://www.ivl.se/english/ivl/our-offer/our-focus-areas/chemicals.html