

Incompatible trends – Hazardous Chemical Usage in Building Products Poses Challenges for Functional Circular Construction

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**Henning
Larsen —**



Original study



Original study: Undesired Chemicals
in Sustainable Building, 2016

List of Undesirable Substances (DK)

REACH – Candidate List (EU)

SPIN – Usage database (Nordic)



Original study

Substances evaluated in four building phases:

- Construction
- Use, polluting local environment
- Use, off-gassing
- Demolition

Gruppe	Stofnavn	LOUS og regulering	Omfatter af Svovleniveauet Max 100 ppm i faste byggematerialer	EC Nummer CAS Nummer	Klassifikation efter O.P.	SVOC, VOC, Fast stof	Opførelse	Brug	Brug	Nedrivning	Angivelsesproduktet relateret til byggeri (SPH DK 2012)	Angivelsesmateriale relateret til byggeri
							Forurening af omgivelserne	Forurening af omgivelserne	Exponering af bygningsbrugere	Forurening af affald		
	Toluen	LOUS	Ja	203-625-9 108-88-3	Flam. Liq. 2; H225, Repr. 2; H361D, Asp. Tox. 1; H304, STOT RE 2; H373, Skin Irrit. 2; H315, STOT SE 3; H336	VOC				2 Færdigt affald af typen HP10 klassificeres reproduktivt toksisk ved konc. ≥3,0%. Dog forventeligt meget lavt niveau i affaldsfasen på afslutning i opløsnings- og brugsfasen.	Byggematerialer Maling og lak Overfladebehandling Binde midler Fyldstoffer Imprægnering Korrosionsbeskyttelse Opløsningsmidler Pesticider/konservering smidler	Kan findes i malede overflader (vægge, gulve, facader etc.), metal, træ produkter og i fyldstoffer og fugemasser
	Phenol	LOUS	Ja	203-632-7 106-95-2	Muta. 2; H341, Acute Tox. 3; H331, Acute Tox. 3; H311, Acute Tox. 3; H301, STOT RE 2; H373, Skin Corr. 1B; H314	SVOC, Fast stof				1 Neurotoksik. Forekommer i indeluften fra mængde sidder	Byggematerialer Maling og lak Overfladebehandling Binde midler Fyldstoffer	Kan findes i mineraluld - sternuld og glasuld (til isolering), plast, gummi og malede overflader
	Tris(2-chlor-1-methylethyl)fosfat, TCPP	LOUS	Nej	237-158-7 13674-84-5	Acute Tox. 3; H302, Eye Irrit. 2; H319, Aquatic Chronic 3; H412 (MST); Muta. 2; H341, Repr. 2; H361I	SVOC				2 Mellemprodukt der indgår med kovalente bindinger i færdige produkter	Byggematerialer Binde midler Fyldstoffer Isoleringsmateriale Skummidler	Kan findes i isoleringsmateriale og installationskum af PUR samt i fyldstoffer, evt. i limede komponenter/materialer (LOUS rapport)



Original study



Conclusion 2016:

49 substances likely to be used in building products are priority undesirable substances (at least one phase = red evaluation)



Methodology

SPIN

www.spin2000.net

Substances in Preparations in Nordic
Countries

[Database](#) [Documents](#) [Download](#) [Contact](#) [Userguide](#)

Welcome to the SPIN website

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Methodology

SPIN usage categories reviewed:

Construction materials (incl. flooring, boards,)

Paints, laquers & varnishes

Surface Treatments

Adhesives, binding agents

Fillers

Insulation

Impregnation

Corrosion protection

Solvents

Foaming agents

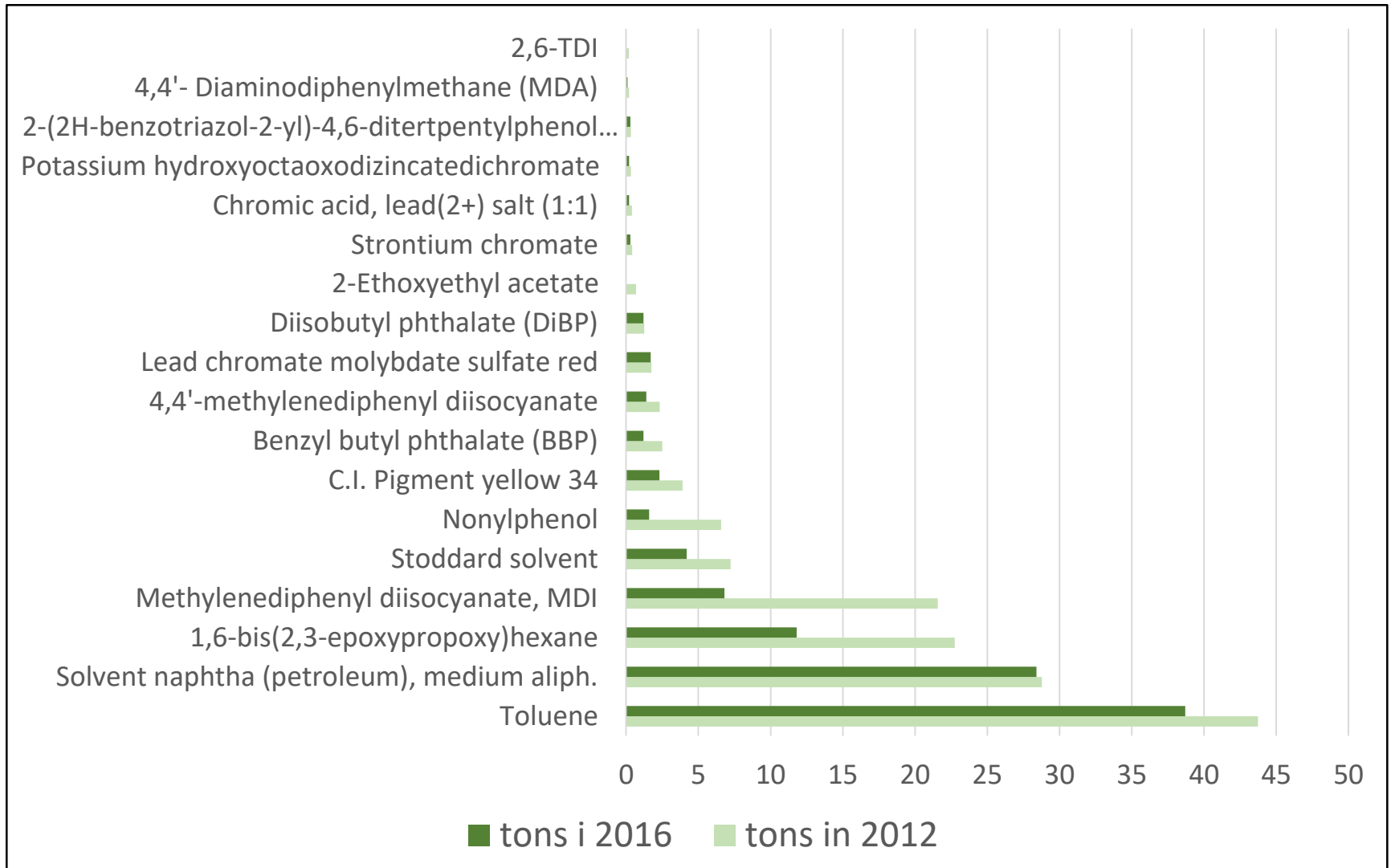
Non-agri pesticides

Electroplating agents



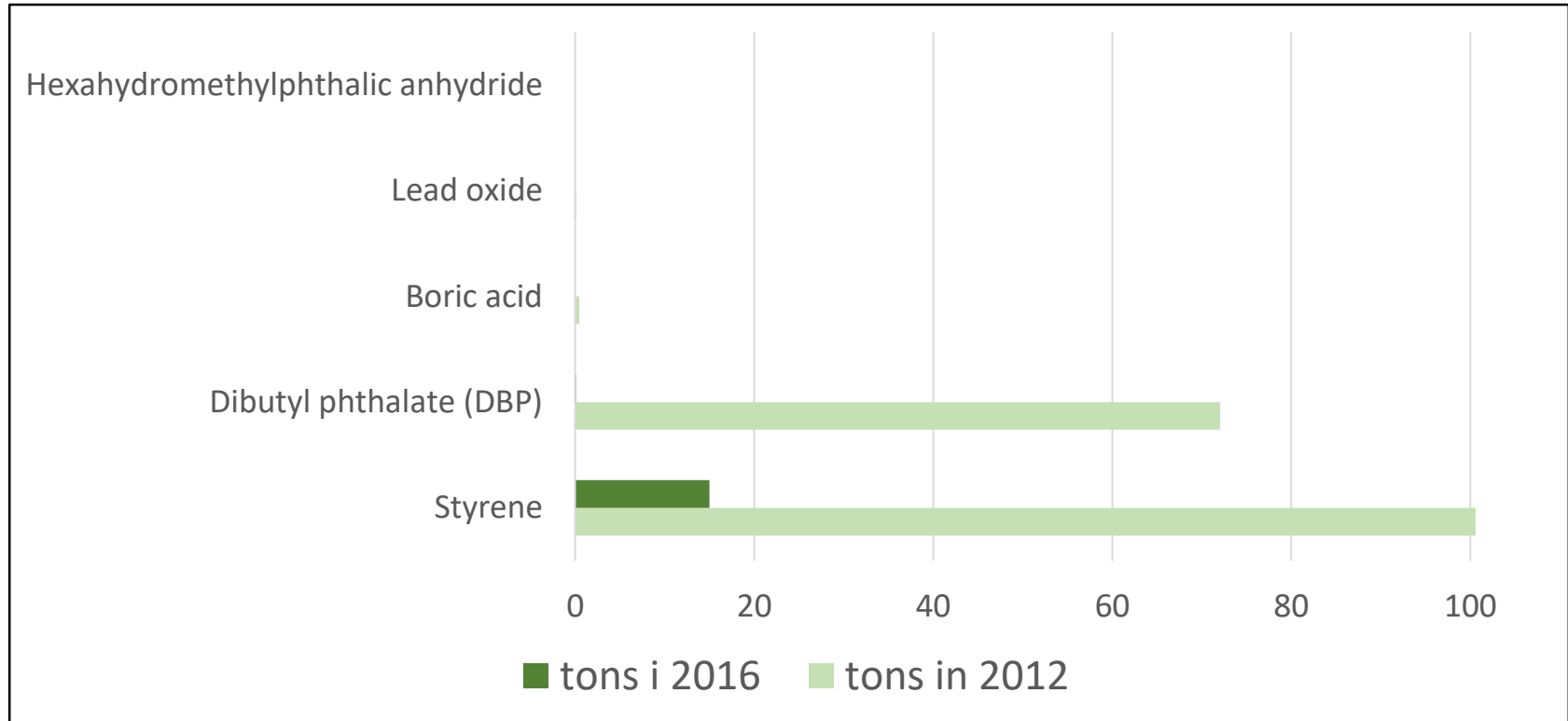
Comparison of usage over time

Decreases in Danish use of LOUS & SVHC list chemicals used in paints, lacquers and varnishes in 2012 and in 2016.



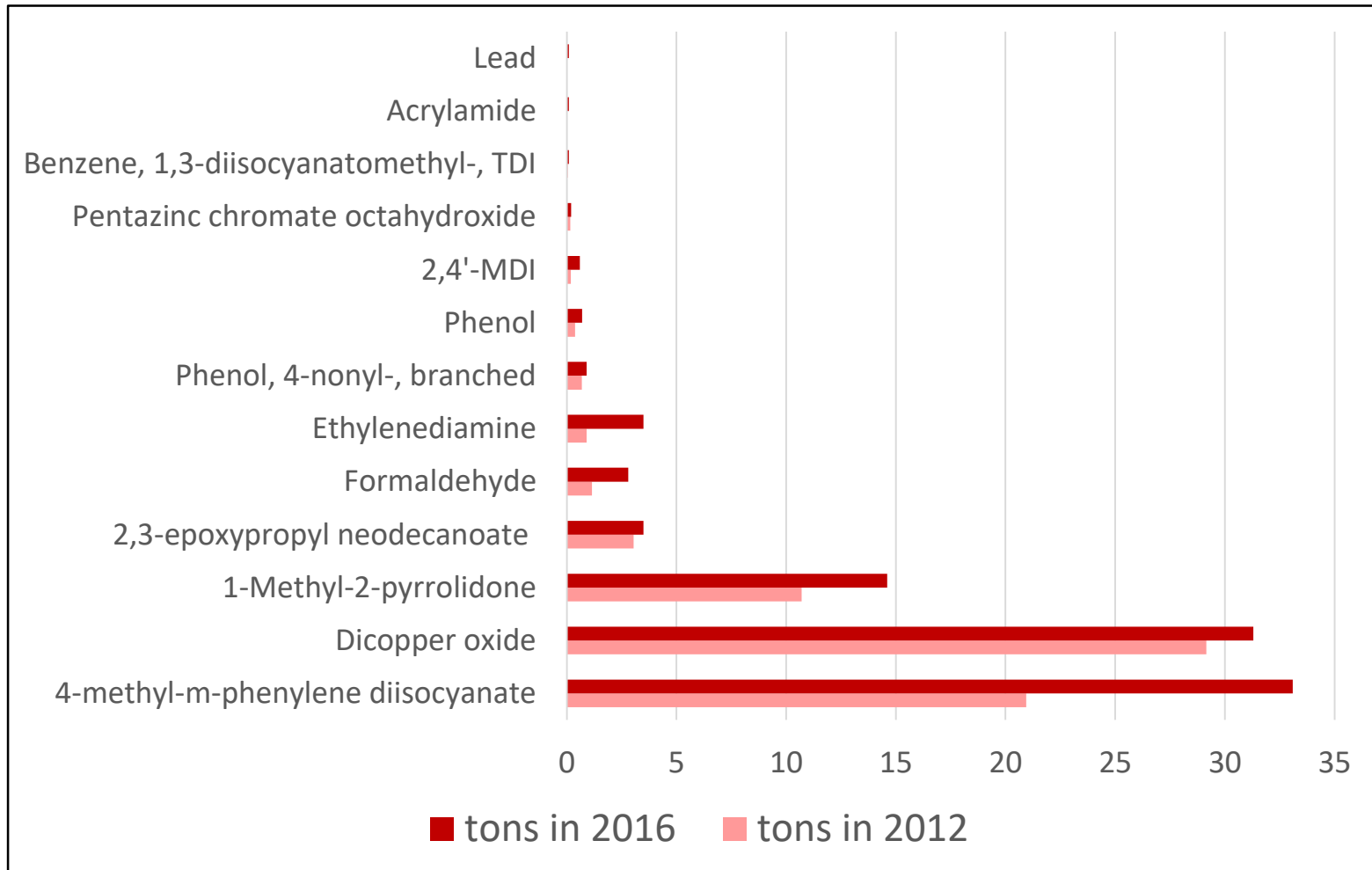
Comparison of usage over time

Extreme decreases in Danish use of LOUS & SVHC list chemicals used in paints, lacquers and varnishes in 2012 and in 2016.



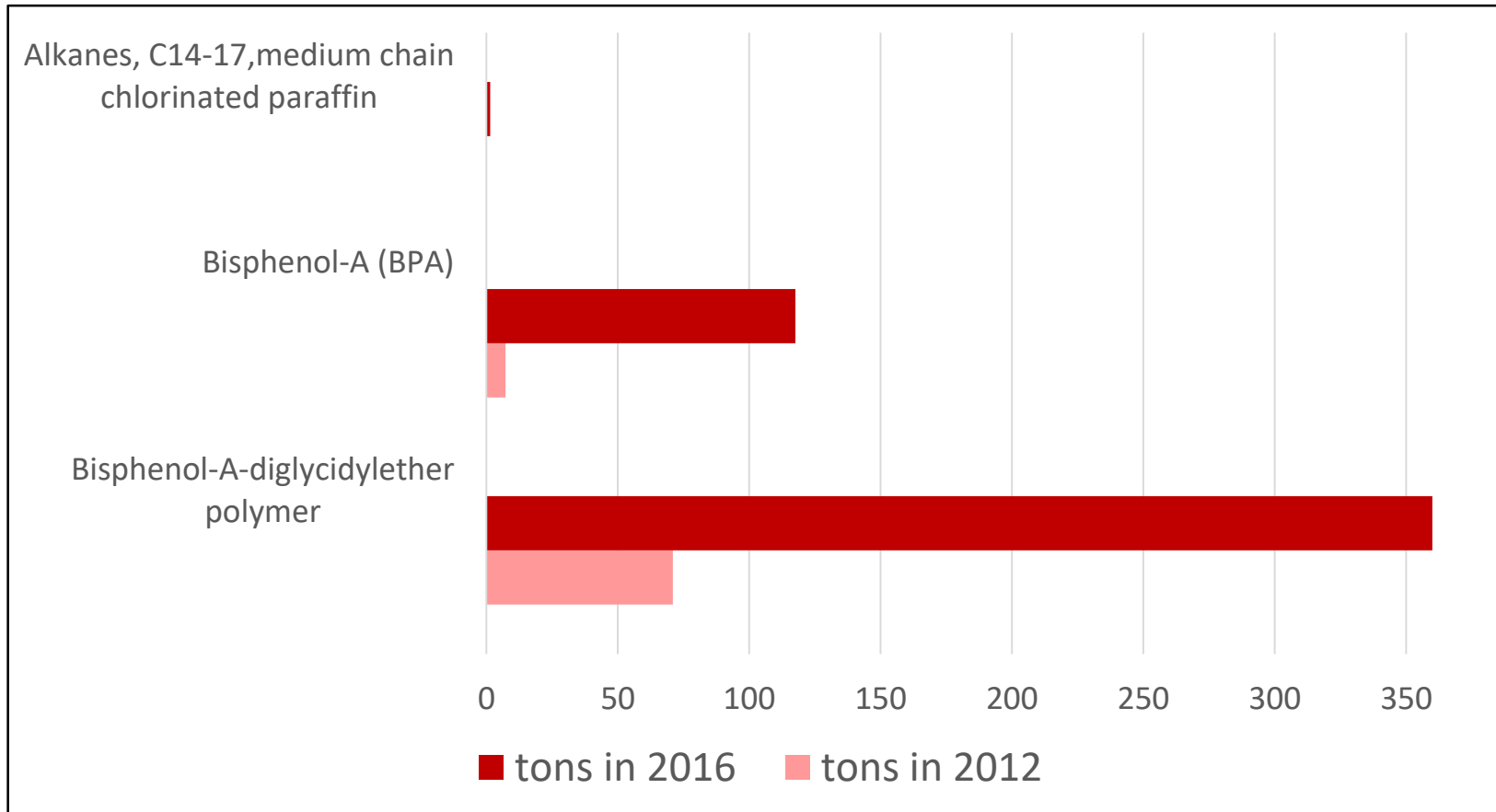
Comparison of usage over time

Increases in Danish use of LOUS & SVHC list chemicals used in paints, lacquers and varnishes in 2012 and in 2016.



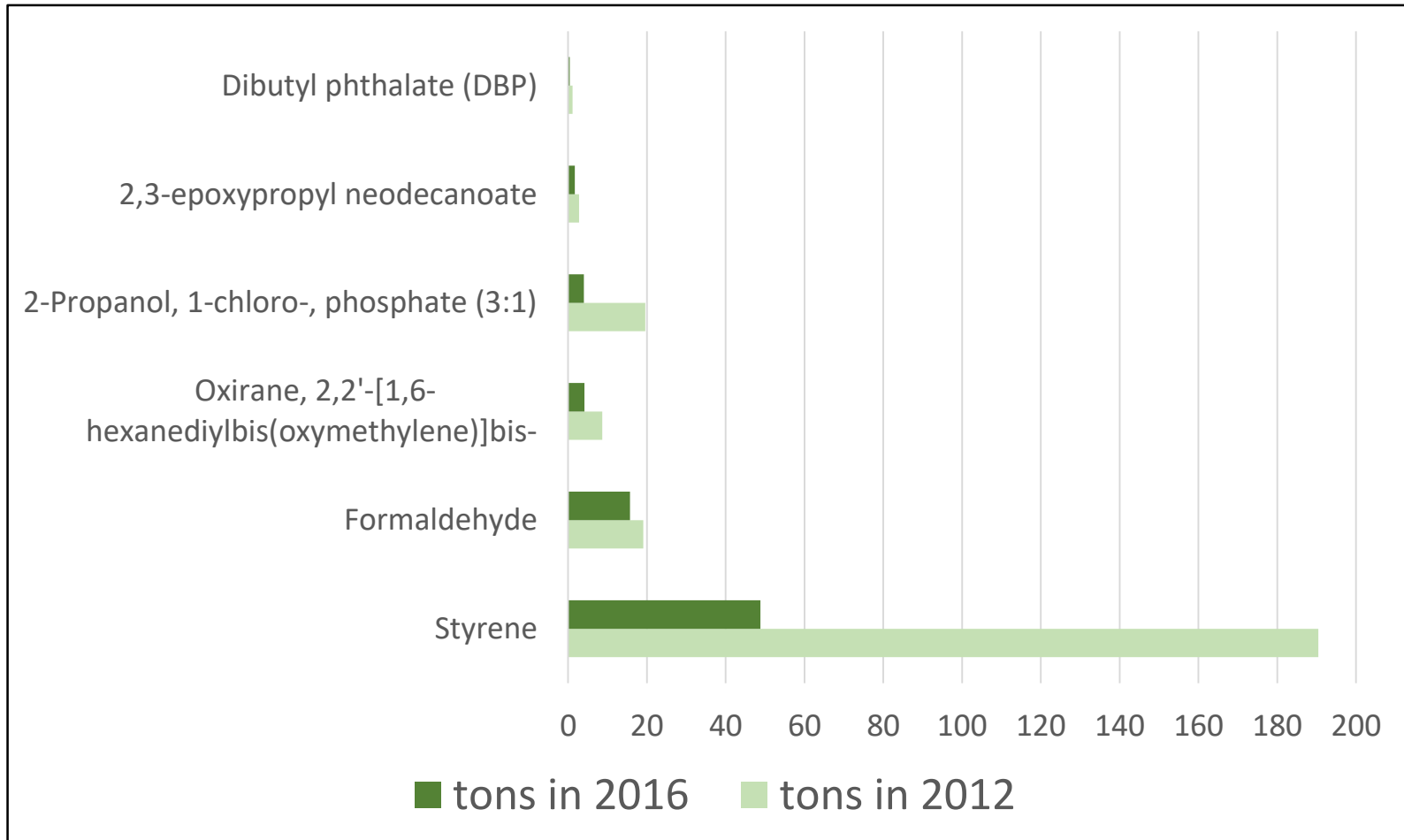
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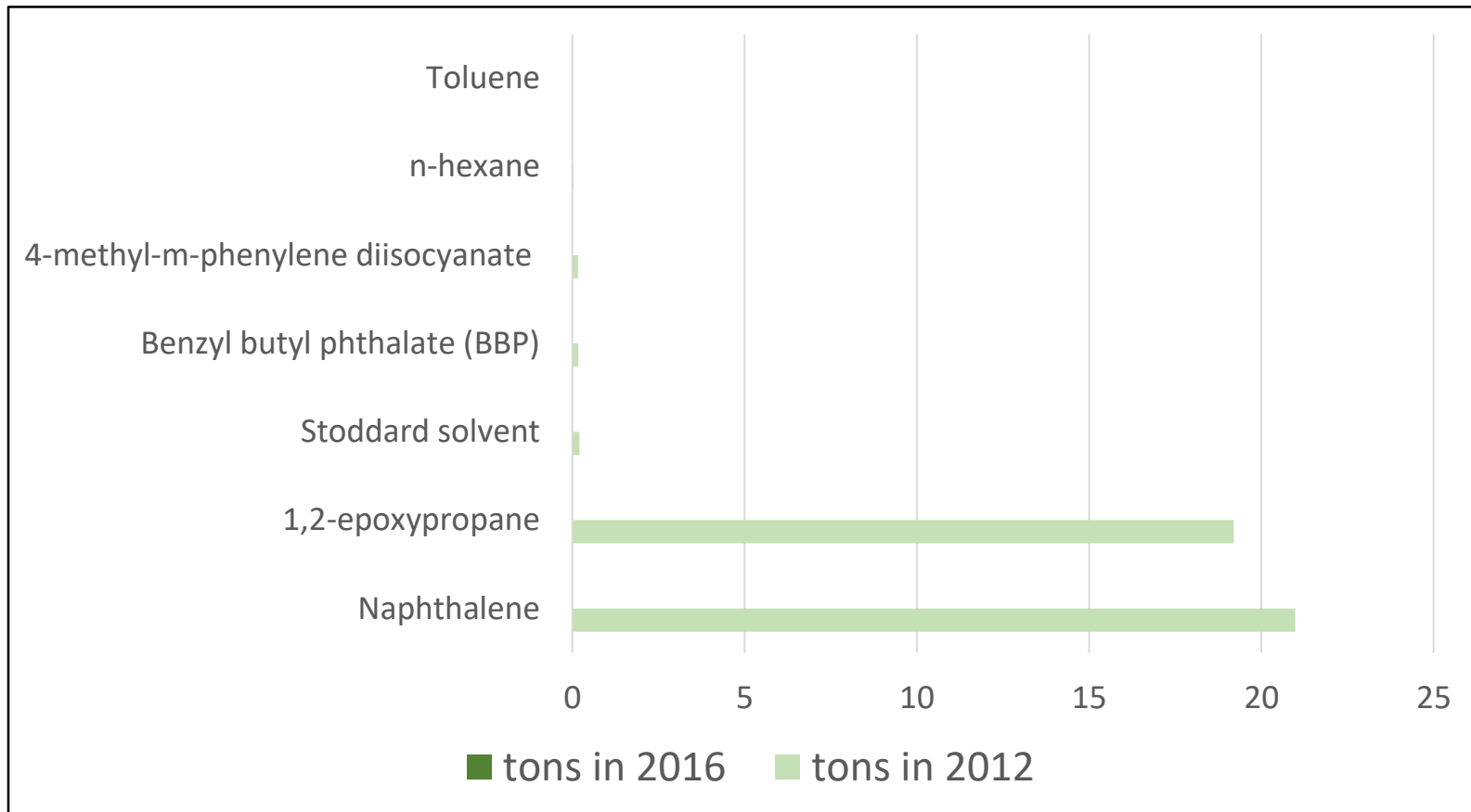
Comparison of usage over time

Decreases in Danish use of LOUS & SVHC list chemicals used in construction materials in 2012 and in 2016.



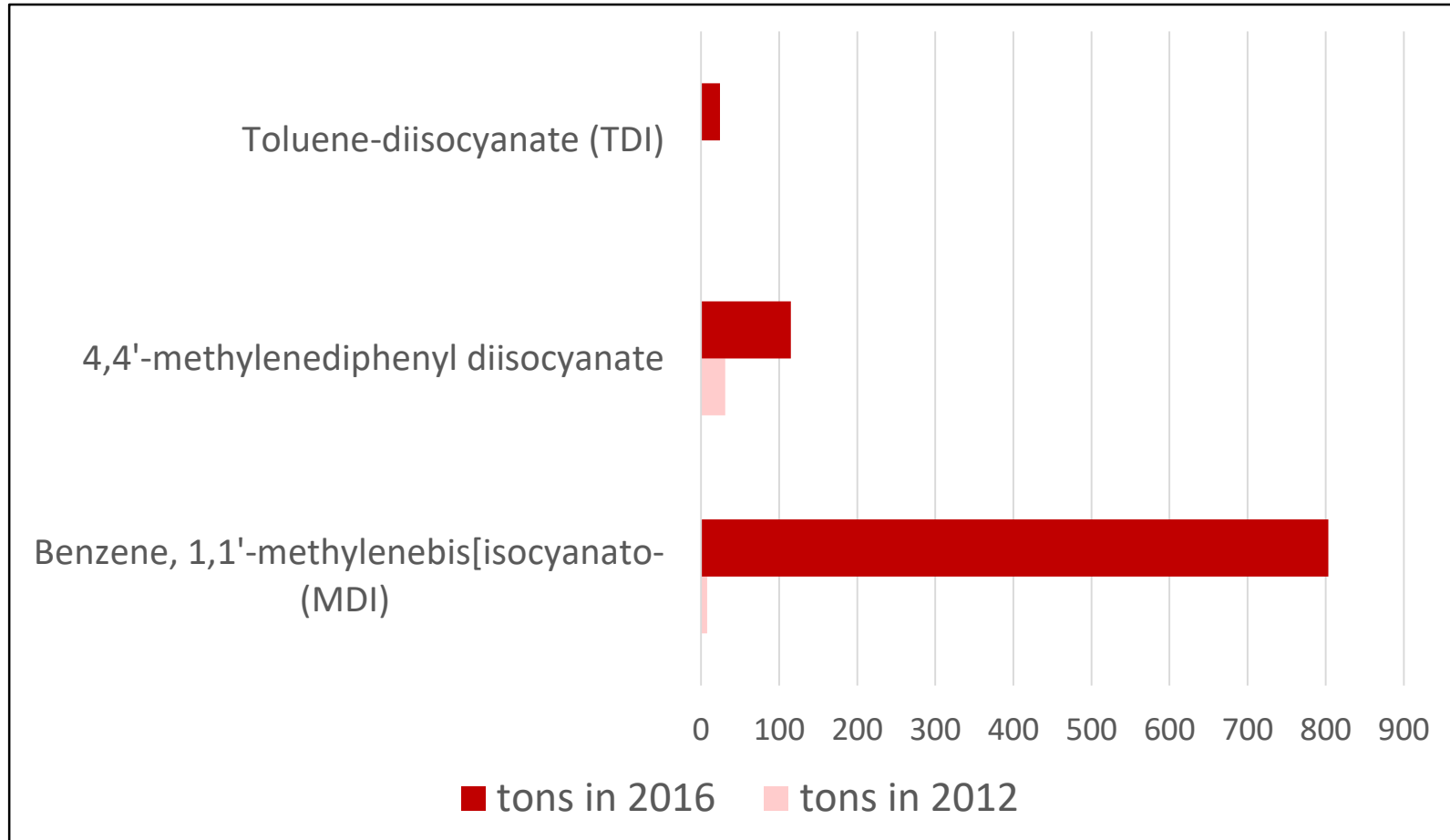
Comparison of usage over time

Decreases to under 100kg/ year in Danish use of LOUS & SVHC list chemicals used in construction materials in 2012 and in 2016.



Comparison of usage over time

Extreme increases in Danish use of LOUS & SVHC list chemicals used in construction materials in 2012 and in 2016.



Increases in Danish use of LOUS & SVHC list chemicals used in DK building materials in 2012 and in 2016.

Usage categories	2012 USAGE			2016 USAGE		
	LOUS	REACH's 2015 SVHC	LOUS & SVHC	LOUS	REACH's 2018 SVHC	LOUS & SVHC
Source: SPIN database, usage in Denmark	number of substances	number of substances	total tonnage	number of substances	number of substances	total tonnage
Construction materials	22	4	326	19	6	1034
Paints, lacquers & varnishes	35	21	466	32	23	686
Surface Treatments	21	7	62	21	12	85
Adhesives, binding agents	25	7	3644	21	11	2467
Fillers	24	5	333	22	9	291
Insulation	3	0	30	2	0	8
Impregnation	5	0	93	4	0	89
Corrosion protection	7	1	4	6	1	3
Solvents	8	2	8906	5	1	7893
Foaming agents	1	0	2,5	0	0	0
Non-agricultural pesticides	11	4	349	8	2	9947
Electroplating agents	0	1	1,6	0	1	3,1

Increases in Danish use of LOUS & SVHC list chemicals used in DK building materials in 2012 and in 2016.

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Substances from REACHs Authorization List (as of July 2018) used in DK building materials in 2012 and 2016 (SPIN data).

Substance name	CAS No.	Sunset Date	Tons in 2012	Tons in 2016	SPIN usage category
4,4'- Diaminodiphenylmethane (MDA)	101-77-9	21/08/2014	0,2	0,1	Paints & Lacquers
Bis(2-ethylhexyl) phthalate (DEHP)	117-81-7	21/02/2015	0,3	0,5	Fillers Paints & Lacquers
Benzyl butyl phthalate (BBP)	85-68-7	21/02/2015	3,5	1,3	Fillers Paints & Lacquers
Dibutyl phthalate (DBP)	84-74-2	21/02/2015	74,1	0,5	Construction Materials Paints & Lacquers Surface treatments Fillers
Diisobutyl phthalate (DIBP)	84-69-5	21/02/2015	2,2	2	Fillers Paints & Lacquers
Lead chromate	7758-97-6	21/05/2015	0,4	0,2	Paints & Lacquers
Lead sulfochromate yellow	1344-37-2	21/05/2015	3,9	2,3	Paints & Lacquers
Lead chromate molybdate sulfate red	12656-85-8	21/05/2015	1,8	1,7	Paints & Lacquers
Chromium trioxide	1333-82-0	21/09/2017	7,1	8,9	Surface Treatments Electroplating Agents
Strontium chromate	7789-06-2	22/01/2019	0,4	0,3	Paints & Lacquers
Potassium hydroxyoctaoxodizincatedichromate	11103-86-9	22/01/2019	0,3	0,2	Paints & Lacquers
Pentazinc chromate octahydroxide	49663-84-5	22/01/2019	0,2	0,2	Paints & Lacquers



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Conclusion 2018:

48 substances likely to be used in building products are priority undesirable substances (at least one phase = red evaluation)

24 of these substances are evaluated to be highly problematic in the demolition phase





THANK YOU!

