Hydro

Fassadenbau – Nachhaltig in Aluminium

Florian Vogel

Nachhaltigkeit

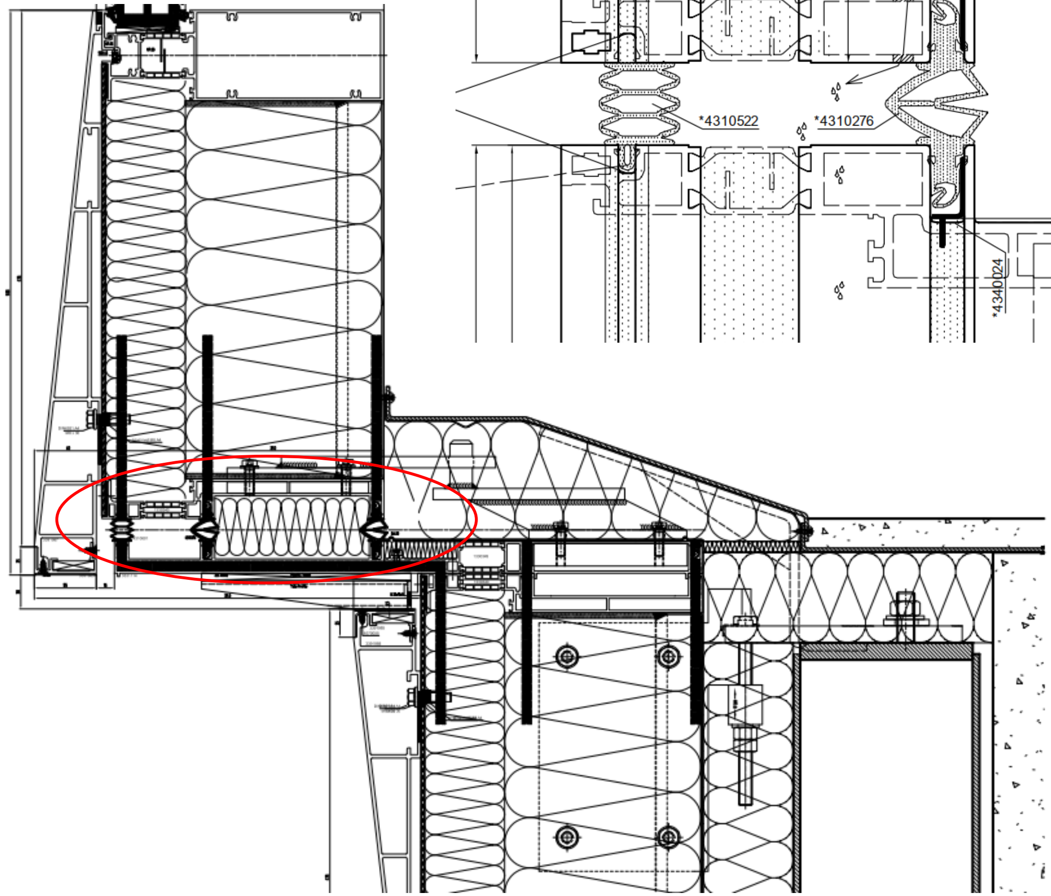
Für was wir stehen!

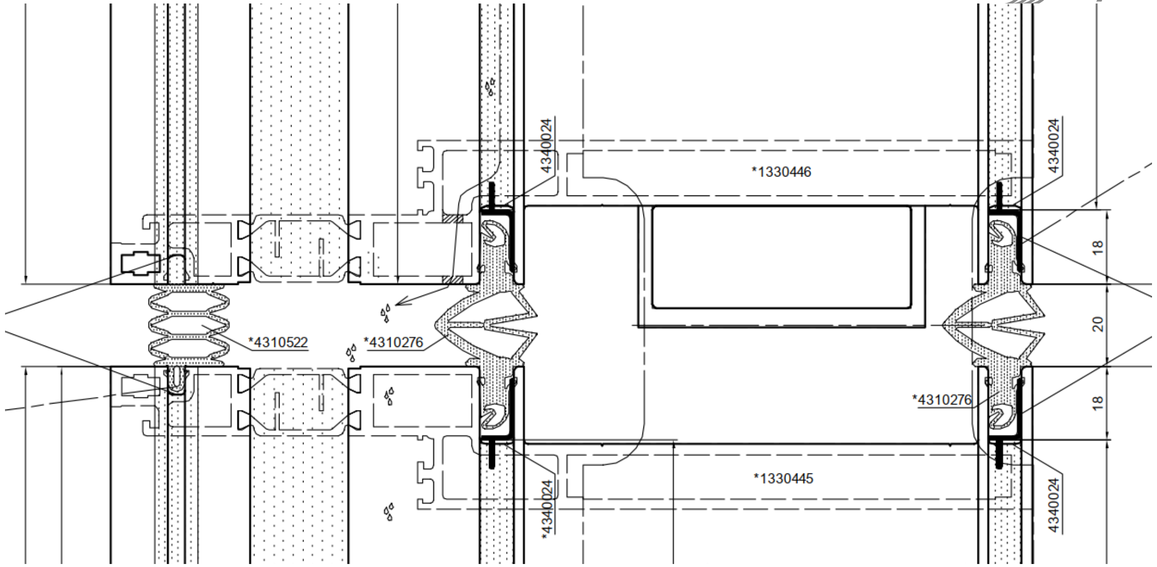





Nachhaltigkeit

Für was wir stehen!

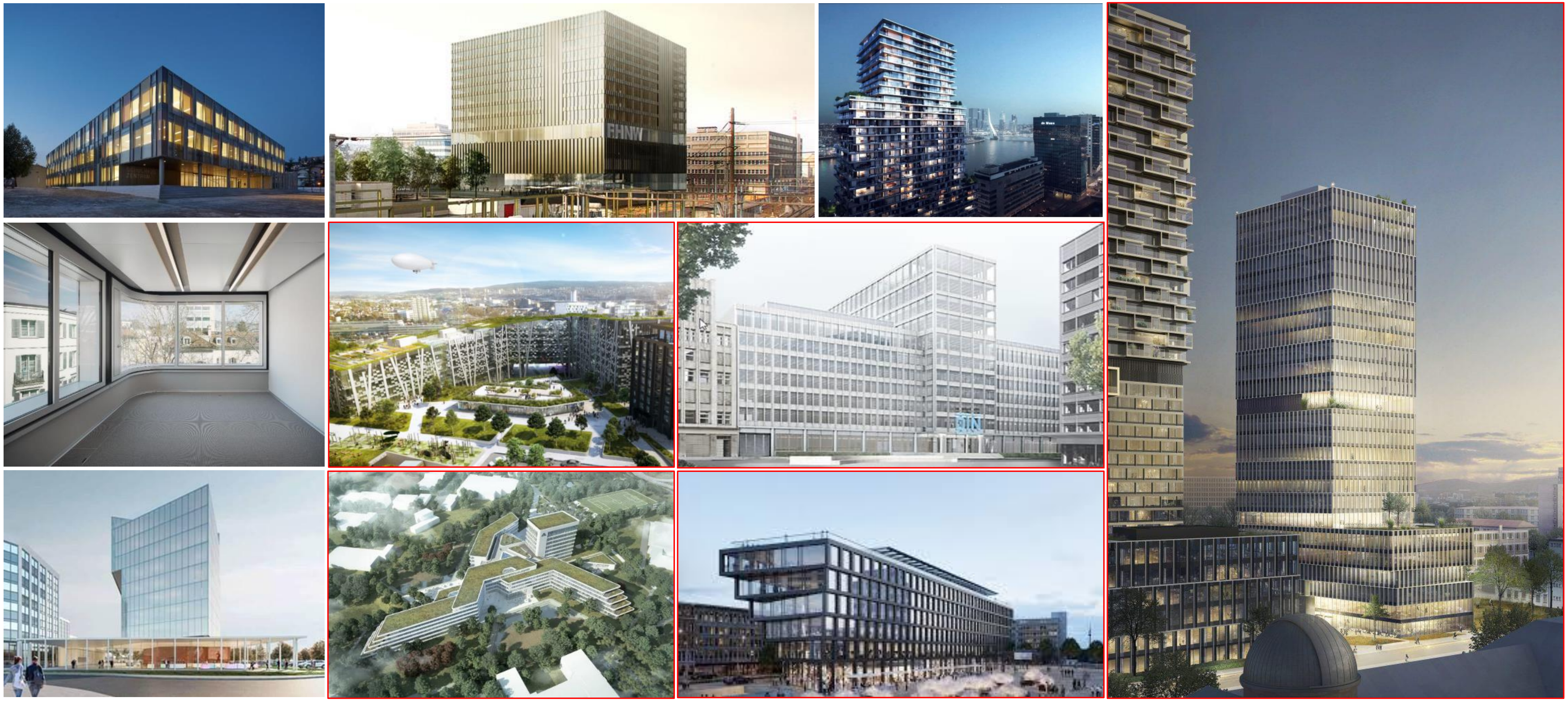




Nachhaltigkeit

Hydro

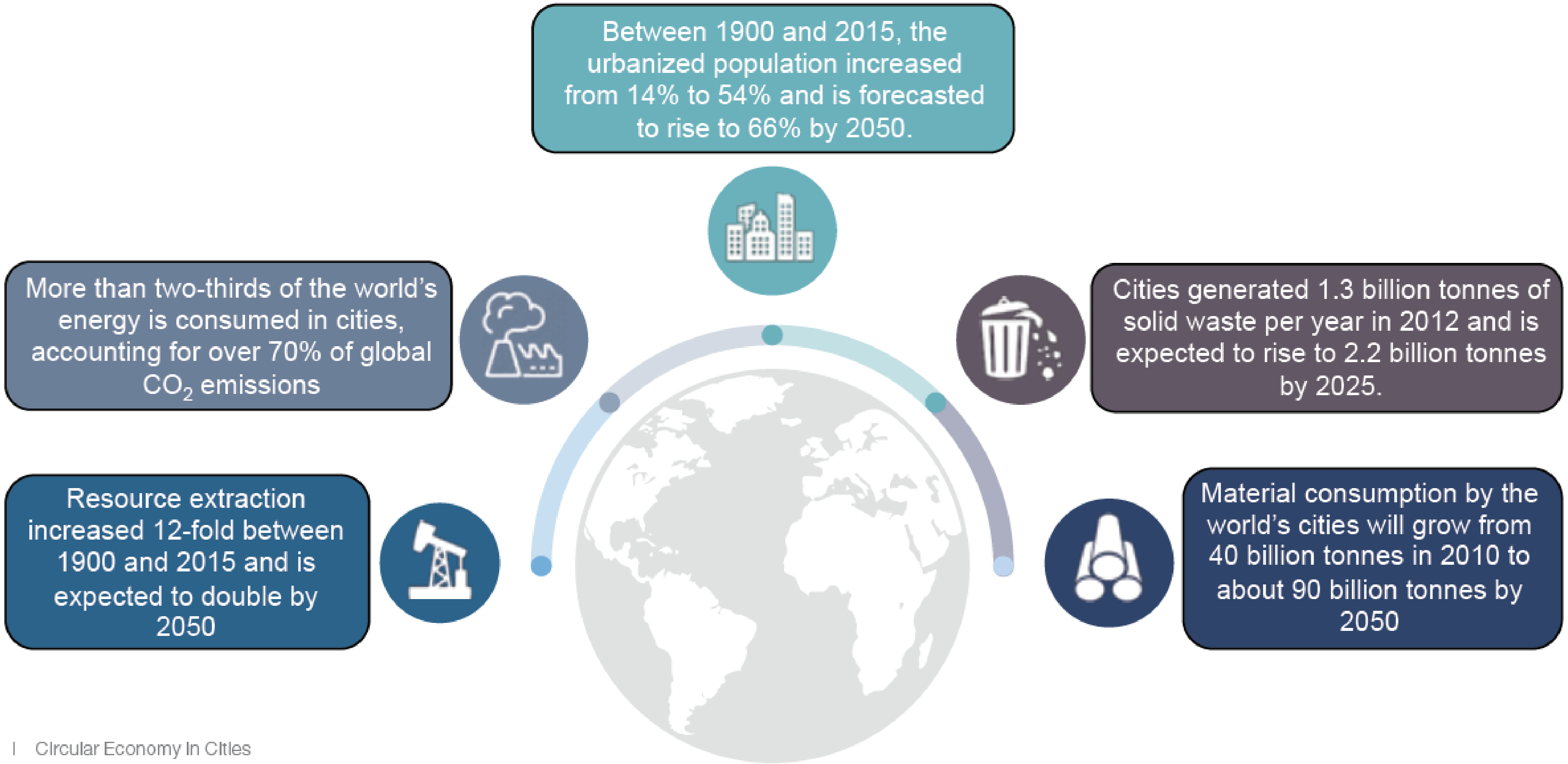
Für was wir stehen!



Klimawandel

Circular Economy - Faktoren

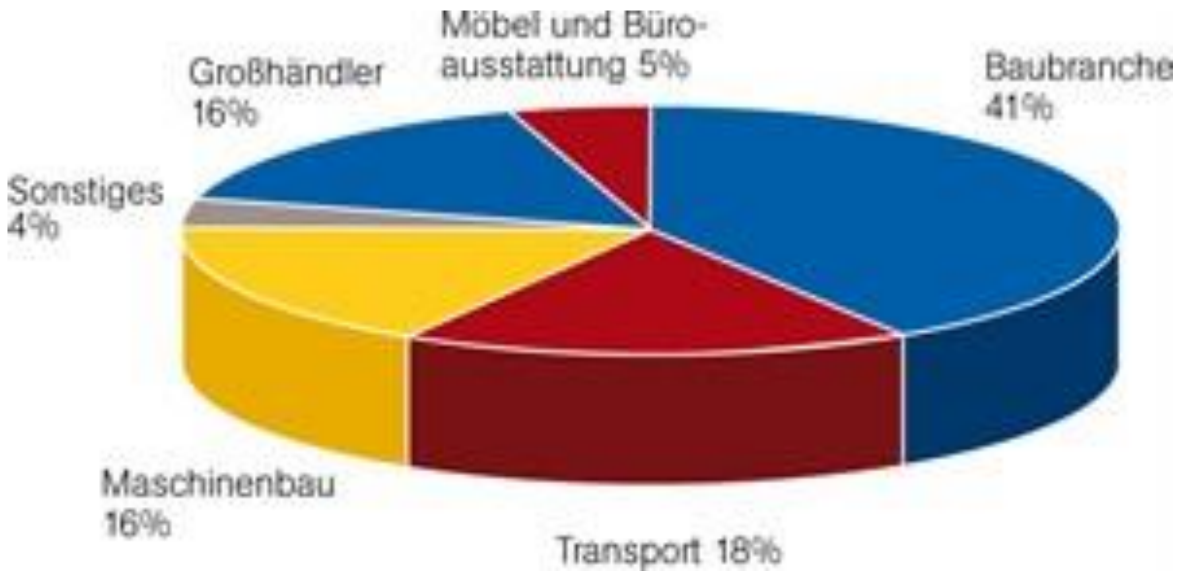
Zukünftige Trends – Ressourcen - Bedarf von Städten



Circular Economy - Faktoren

Zukünftige Trends – Ressourcen - Bedarf von Städten

- Jährliche Produktion an Aluminium Weltweit beträgt 50 Mio. Tonnen
- In Europa werden 41% des Aluminiumbedarfes im Bauwesen verbraucht

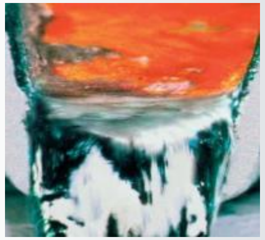


Ziel: CO_2 – neutral im Lebenszyklus von 2020 an

Hydro

Produktion
– Verringerung
eigener Emissionen

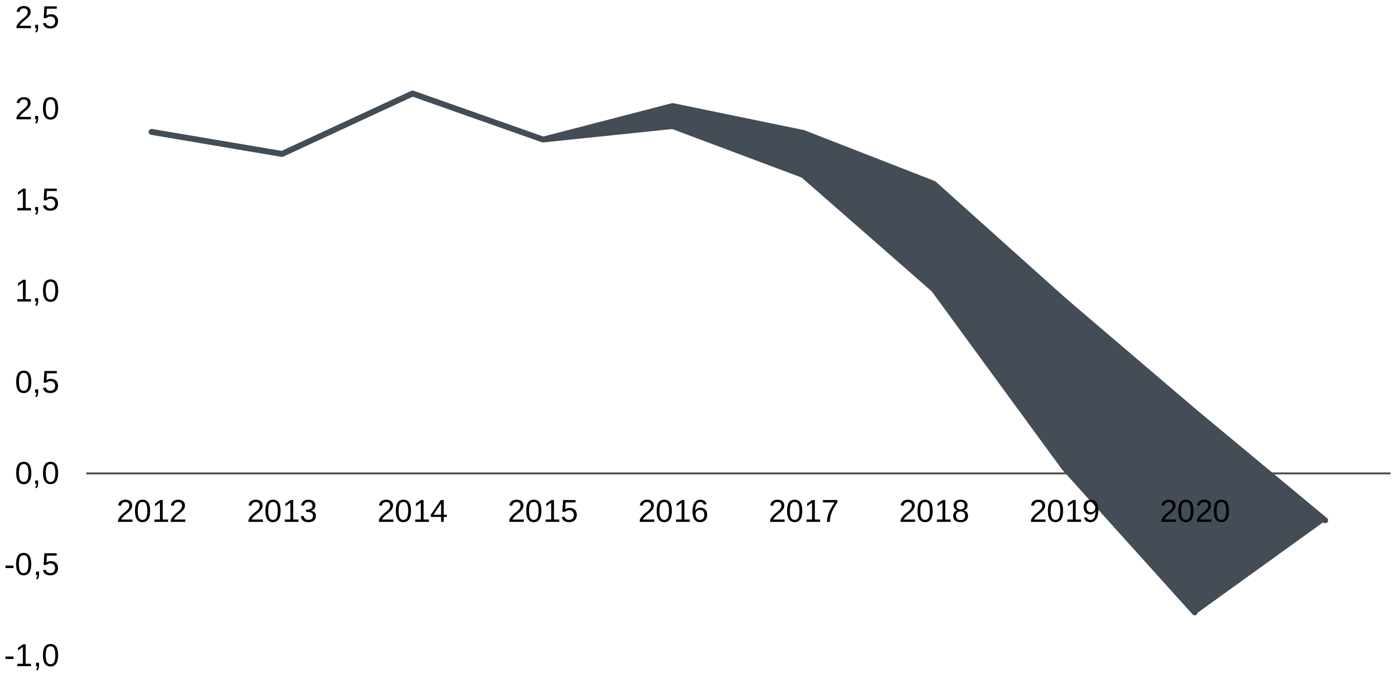
Produkte – Vorteile in der Nutzungsphase



Recycling von
Post-Consumer
Schrotten

Hydro's CO2 Emissionen aus Sicht des Lebenszykluses

Million kg Co2



* Incl Extruded Solutions from 2018

Circular Economy - Faktoren

Zukünftige Trends – Lineare Ökonomie

Entnehmen
TAKE

Herstellen
MAKE

Nutzen
USE

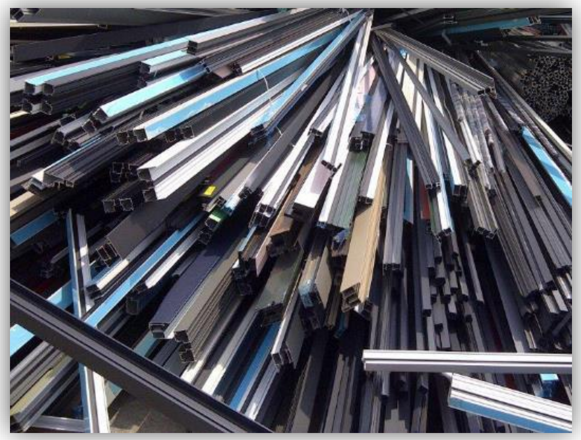
Deponieren
WASTE

Circular Economy - Faktoren

Zukünftige Trends – stoffliche Kreislaufwirtschaft

Herstellen
MAKE

Nutzen
USE



Zurück
RETURN

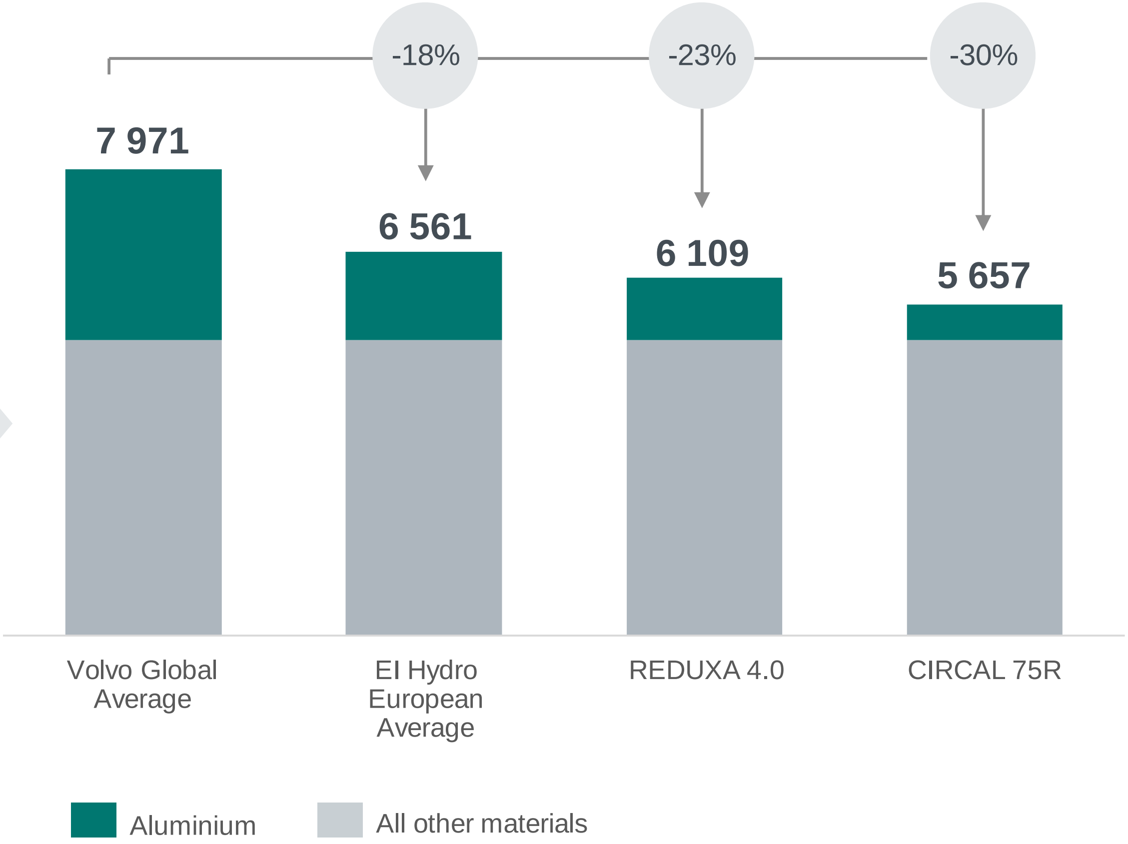
Wie hoch ist der CO2-Fußabdruck bei der Produktion eines Volvo XC60?

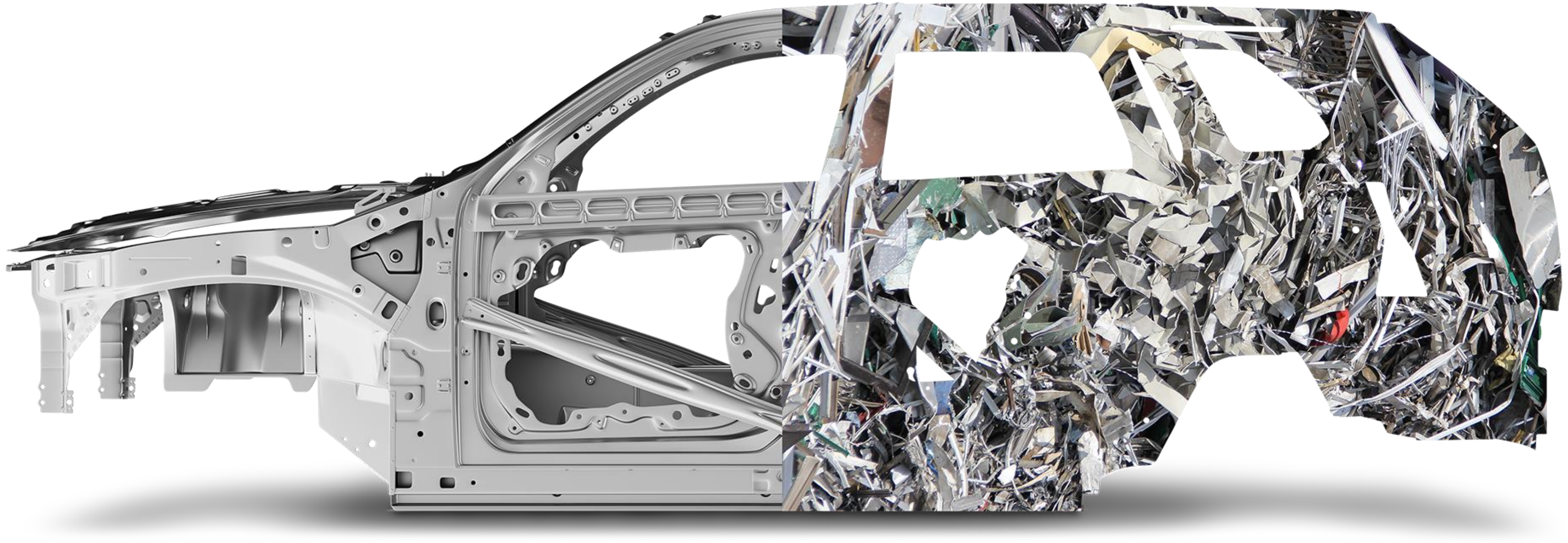
7 971 kg CO2 equivalent

Die Gelegenheit für die Automobilhersteller, den CO2-Fußabdruck bei der Herstellung eines Autos zu reduzieren

Volvo-Fall - die CO2-Emissionen der Herstellung wären mit 75R um 30% niedriger

Volvo Global Average: 12 kg CO2 / kg Al
EI Hydro European Average: 5,7 kg CO2 / kg Al
Reduxa 4.0: 4,0 kg CO2 / kg Al
Circal 75R: 2,3 kg CO2 / kg Al

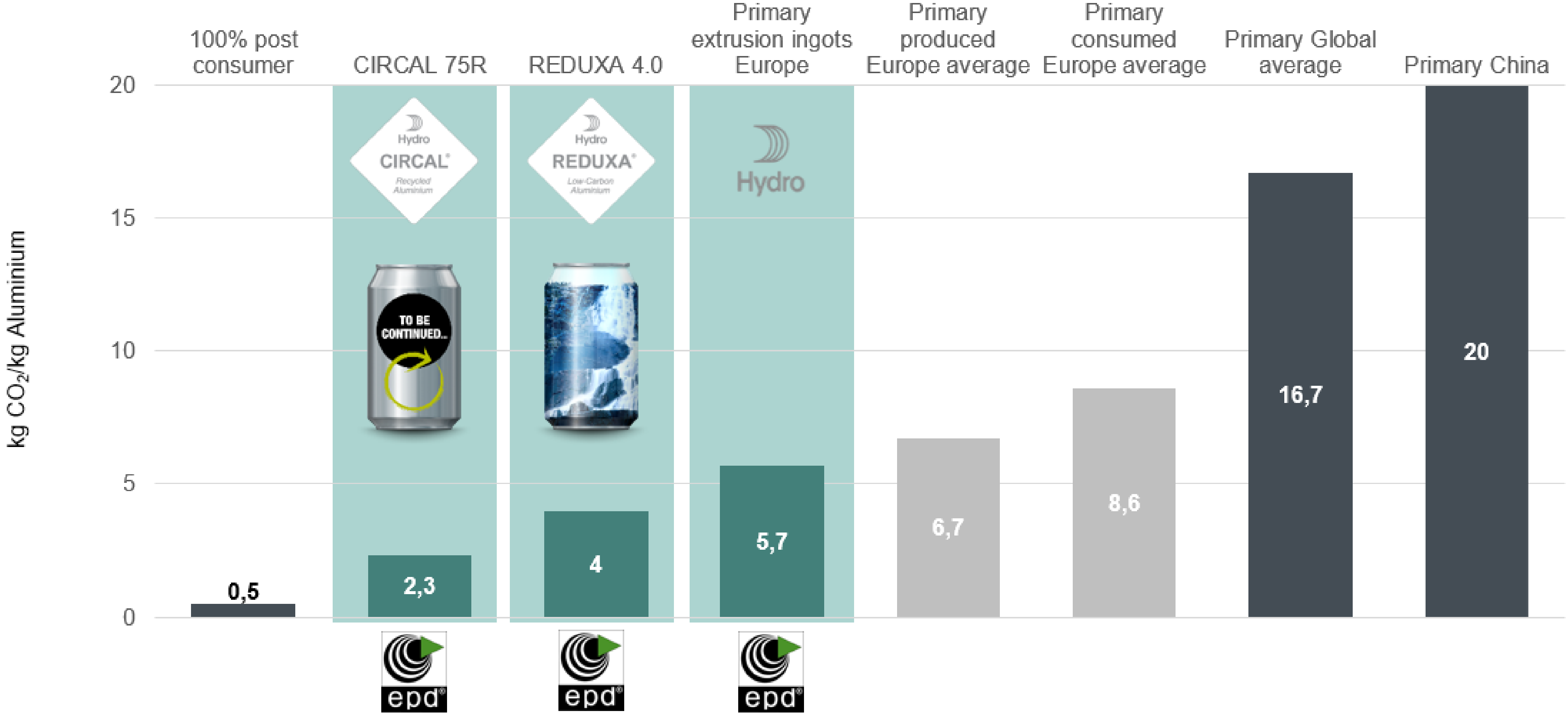




Durch die Verwendung von **kohlenstoffarmem Aluminium** wären die gesamten CO2-Emissionen bei der Herstellung eines Autos um **bis zu 42% niedriger** als im globalen Durchschnitt.

Aluminium CO_2 Footprint

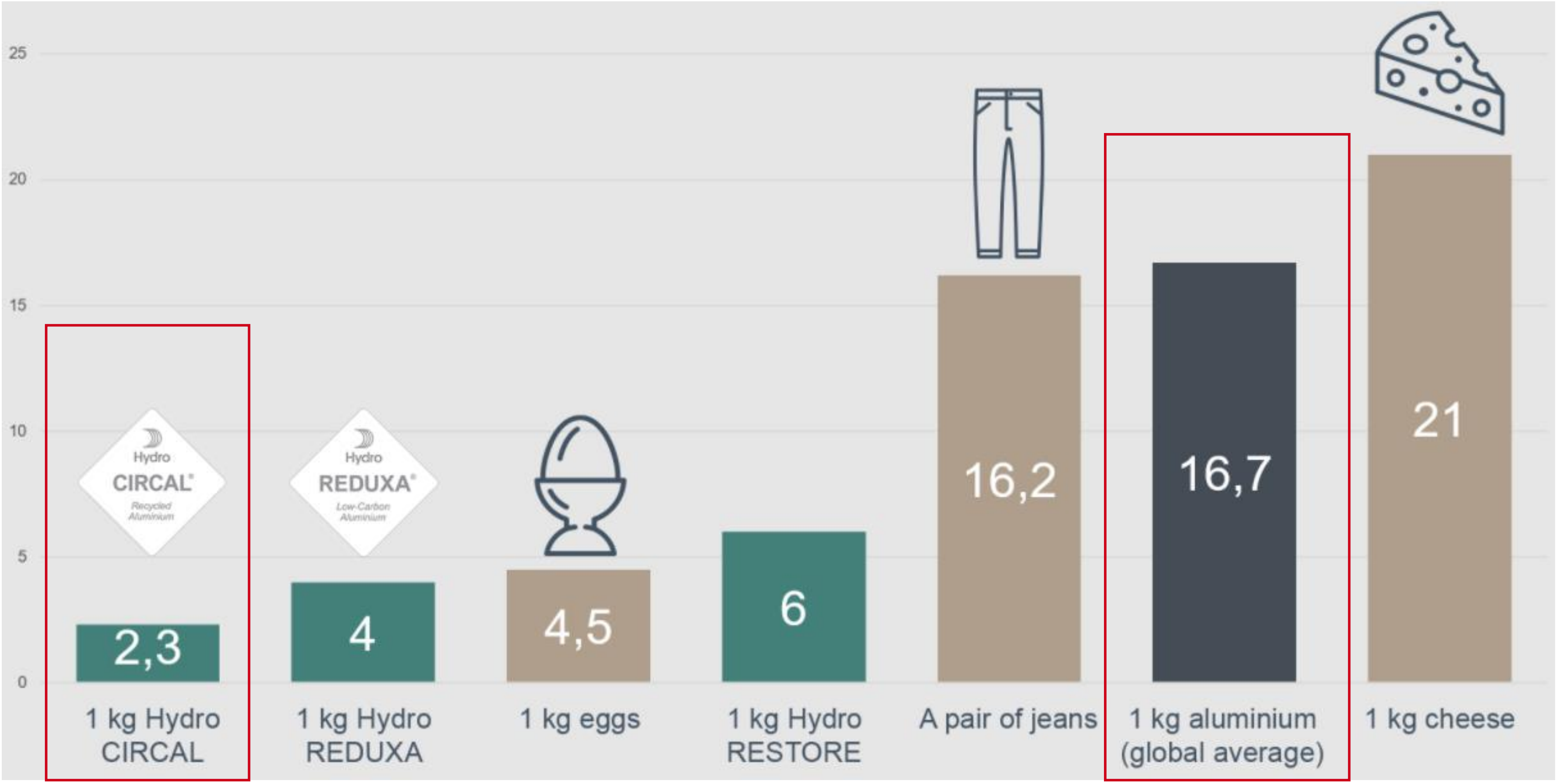
nach Herkunft



*75% EOL Scrap + 10% Process Scrap + 15% Primary Ingot: 2,3 kg CO_2/kg 75R

Aluminium CO_2 Footprint

Materialien im Vergleich



Aluminium CO_2 Footprint

Materialien im Vergleich

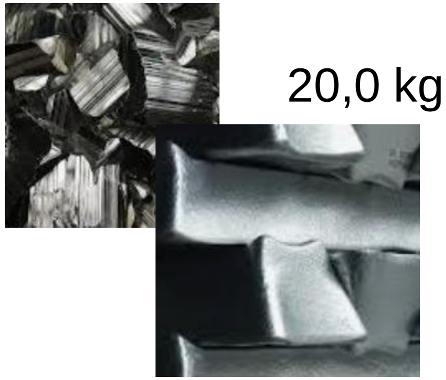
1 kg Butter bis zu 24 Kilogramm $CO2_{äqu}$

100 km Autofahrt bis zu 20 Kg $CO2_{äqu}$ oder mehr

1 kg Tomaten (Treibhaus) bis zu 9,5 Kilogramm $CO2_{äqu}$

1 kg Käse bis zu 8,5 Kilogramm $CO2_{äqu}$

1 kg Tomaten (Freiland, regional) bis zu 0,35 Kilogramm $CO2_{äqu}$



20,0 kg $CO2_{äqu}$

Hydro REDUXA Low Carbon Aluminium: 4,0 kg $CO2_{äqu}$

Hydro CIRCAL Recycled Aluminium: 2,3 kg $CO2_{äqu}$

Quelle:
T-online.de
Tomgarten.de
https://www.swrfernsehen.de/marktcheck/hintergrund/CO2-Bilanz-auf-dem-Teller-Diese-Lebensmittel-sind-die-groessten-Klimakiller,article-swr-5774.html

https://www.youtube.com/watch?v=aEc2UmNJzO8

Aluminium Energiebedarf

Primärerzeugung der HYDRO beinhaltet alle Stufen – DNV-GL zertifiziert

epd-norge.no
The Norwegian EPD Foundation

ENVIRONMENTAL PRODUCT DECLARATION
in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	Hydro Aluminium AS
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-1840-468-EN
Registration number:	NEPD-1840-768-EN
ECO Platform reference number:	-
Issue date:	05.08.2019
Valid to:	05.08.2024

Hydro 4.0 Aluminium Extrusion Ingot

Hydro Aluminium AS

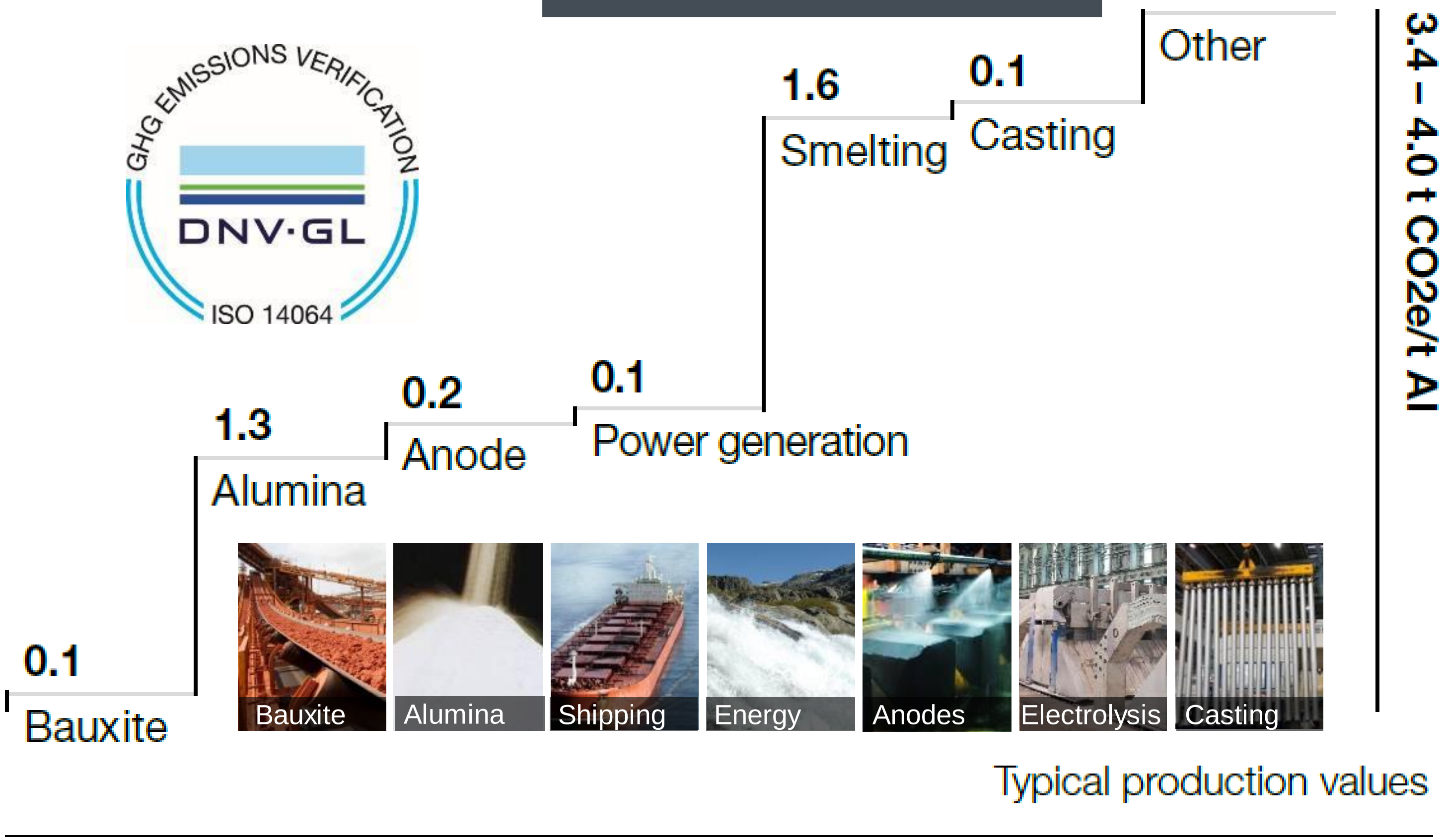
Hydro

www.epd-norge.no

Product description:
This EPD covers the Aluminum under the brand Hydro 4,0. The primary Aluminum used in the products is produced based on renewable power production in Norway, ensuring maximum Carbon footprint of 4,0 tons CO_2-eq/ton Aluminium. The carbon footprint of the Aluminum is calculated on individual batches, and the methodology complies with ISO 14064-1. The calculation covers the integrated process route of Aluminum production covering Bauxite Mining, Alumina Refining, Anode production, Smelting, Power Generation and Casting.The calculation covers the integrated process route of Aluminum production covering Bauxite Mining, Alumina Refining, Anode production, Smelting, Power Generation and Casting. Other contributions: Includes: Transport of raw material, Aluminum from alloying elements, cold metal and external scrap. The calculation of the carbon footprint does not include infrastructure and a few process inputs, which explains the discrepancy between the results reported in this EPD and Hydro's reported carbon footprint. The infrastructure accounts for 0.15 tons CO_2-eq/ton Aluminium.

GHG EMISSIONS VERIFICATION
DNV·GL
ISO 14064

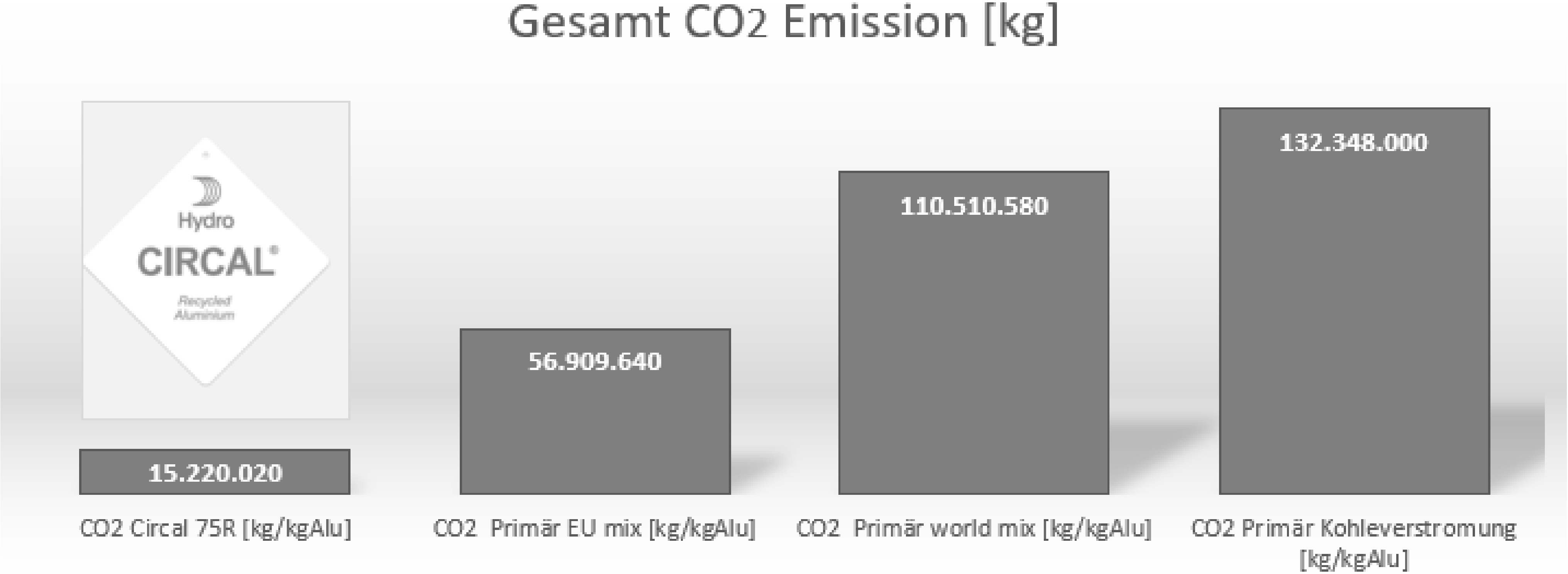
«All-in» nach Hydro



Aluminium CO_2 Footprint

Es kommt auf die Quelle an

Unsere Kunden in den letzten 18 Monaten – 40.000 Tonnen CO_2 Einsparung durch CIRCAL 75R



[1)] Im Vergleich zur Primär-Aluminiumherstellung mit Europäischem Energiemix.

a. HYDRO CIRCAL 75R mit 2,3 kg CO_2 Emission/ kg Aluminium
b. 8,6 kg CO_2 Emission/ kg Primäraluminium, welches mit dem EU Energiemix hergetsellt wird (cradle to gate) – Quelle: European Aluminium 2018 Report
c. 12,7 kg CO_2 Emission/ kg Primäraluminium, welches mit dem WORLD Energiemix hergestellt wird – Quelle: International Aluminium Institute 2018 Report
c. 20,0 kg CO_2 Emission/ kg Primäraluminium, welches mit dem CN Energiemix hergestellt wird – Quelle: International Aluminium Institute 2017 Report

PRE-CONSUMER

Extrusion, industrial & fabrication scrap
Has never become a product

POST-CONSUMER

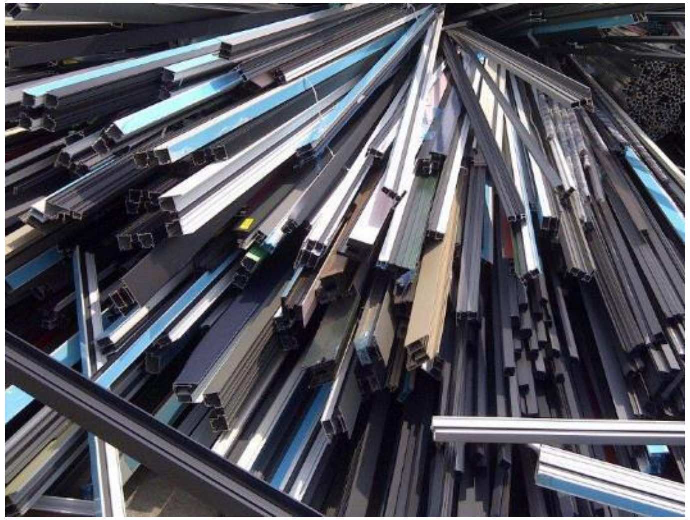
Façades and windows that have been dismounted from buildings;
goes into Hydro CIRCAL

Hydro CIRCAL® Recycled Aluminium

by Hydro

HYDRO Klimastrategie und die CO_2 Reduktion

Recycling von End-of-Life Material gibt die höchste CO2 Einsparung



Prozeß- und Produktionsschrott

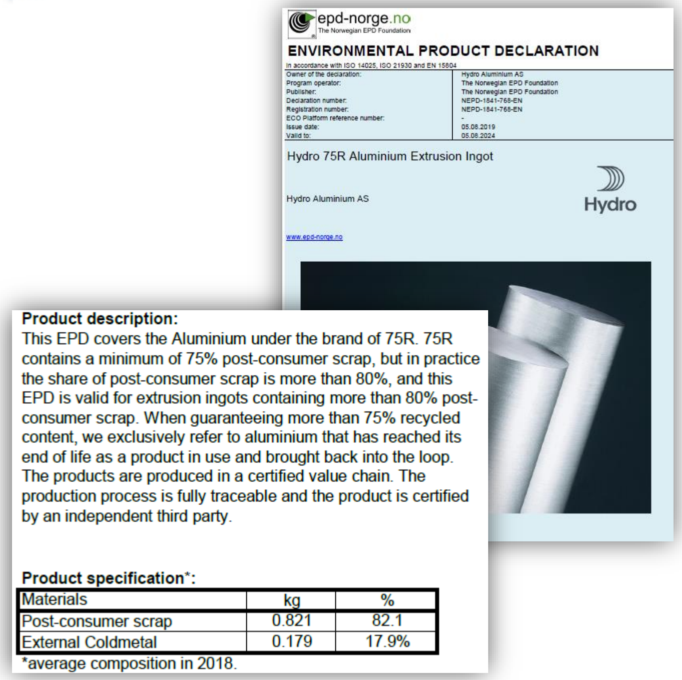
100% EoL Wertstoff

War noch nie ein eingebautes Produkt

=

CO2 footprint der primär Erzeugung + CO2 footprint des Recyclings

#INFINITEALUMINIUM by WICONA



epd-norge.no
The Norwegian EPD Foundation

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Owner of the declaration:	Hydro Aluminium AS
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-1841-768-EN
Registration number:	NEPD-1841-768-EN
ECO Platform reference number:	-
Issue date:	05.08.2019
Valid to:	05.08.2024

Hydro 75R Aluminium Extrusion Ingot

Hydro Aluminium AS

Hydro

www.epd-norge.no

Product description:
This EPD covers the Aluminium under the brand of 75R. 75R contains a minimum of 75% post-consumer scrap, but in practice the share of post-consumer scrap is more than 80%, and this EPD is valid for extrusion ingots containing more than 80% post-consumer scrap. When guaranteeing more than 75% recycled content, we exclusively refer to aluminium that has reached its end of life as a product in use and brought back into the loop. The products are produced in a certified value chain. The production process is fully traceable and the product is certified by an independent third party.

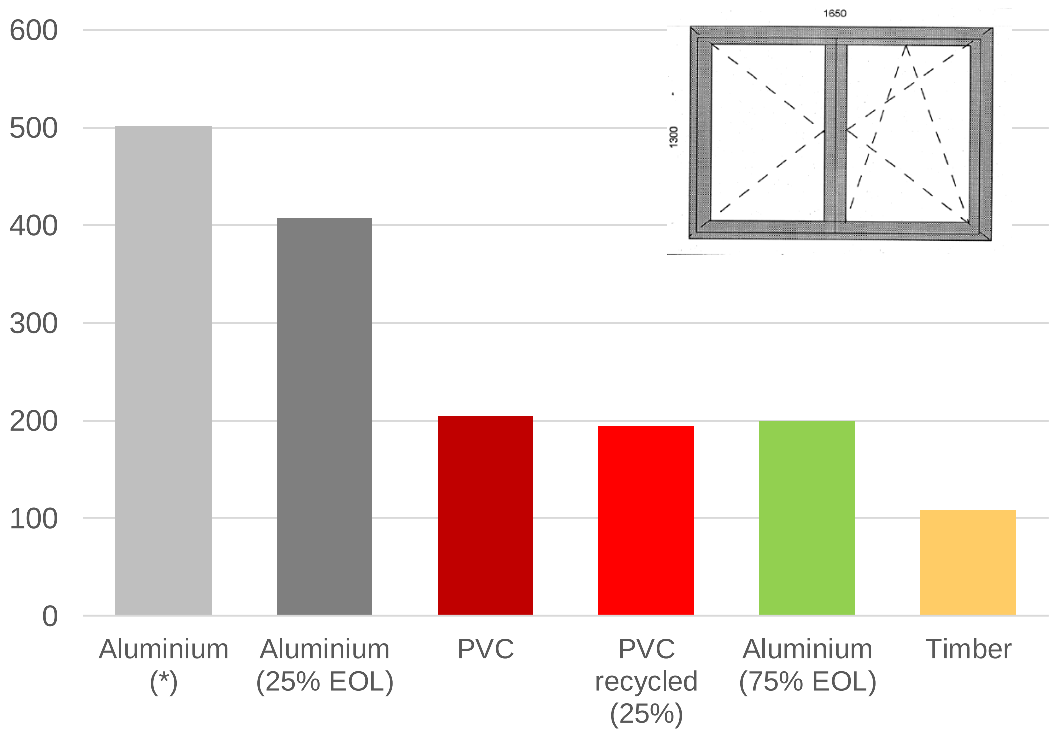
Product specification*:

Materials	kg	%
Post-consumer scrap	0.821	82.1
External Coldmetal	0.179	17.9%

*average composition in 2018.

Based on data from: Teenou, MSc Thesis Mid Sweden Univ.,2012 (values for European Electricity Mix, with Argon insulated glass unit)

CO2 Fußabdruck unterschiedlicher Materialien (kg/Fenster)



*Based on world averag

Hydro

Volle Wertschöpfungskette

Zertifizierung macht den Unterschied

Key Words

» Grüne Gebäude
» Gebäude im Zertifizierungsprozess
» Öffentliche Gebäude mit dem Fokus Nachhaltigkeit

» Urban Mining
» Recycling
» Produktion
» Architekten und Investoren mit Langzeitplanung

Hydro

Weltweit erstes INFINITE ALUMINIUM BY WICONA Projekt

DNV·GL

VERIFICATION STATEMENT

Statement no:	Valid from:	Valid to:
250232-2017-OTH-NOR	21.11.2017	31.12.2018

Hydro Aluminium AS

DNV GL Business Assurance AS (DNV GL) was commissioned by Hydro Aluminium AS (Hydro) to provide a reasonable assurance third-party verification of the claim made under Hydro's 75R product line. The 75R claim secures that a minimum of 75% end-of-life (or post consumer) aluminium is contained in each production batch under this product line.

The verification was conducted under the requirements of Hydro's developed Standard Operating Procedure (SOP) for the 75R product line.

The verification was conducted in the period from week 44 to week 47 2017. The verification has undertaken the following approach:

- Confirmation of organizational boundaries
- Document review, including review of SOP and audit of key personnel to confirm sufficient implementation of the SOP
- Traceability and segregation of end-of-life aluminium in the supply chain within the scope of the 75R related production
- Review of calculation methods to confirm an accurate calculation of minimum of 75% end-of-life aluminium in production batch is attainable
- Interviews with key personnel

To maintain the validity of this verification statement, DNV GL shall conduct two additional audits in 2018.

In our opinion, the procedure undertaken in the 75R product line follow a good industry practice and the claim made under the Hydro 75R product line is fairly stated. We believe that 75R product line contain a minimum of 75% end-of-life aluminium.

Place and date: Høvik, November 21, 2017

DNV GL Business Assurance Norway AS

Lars Erik Mangset
Senior Consultant

Rafi-ud-Din Khawaja
Lead auditor and Technical reviewer

DNV GL Business Assurance (Norway) AS, Veritasveien 1, 1322 Høvik, Norway. Tel: +47 67 57 99 00. assurance.dnvgl.com

INFINITE ALUMINIUM BY WICONA

Verifizierungserklärung

DNV·GL

VERIFICATION STATEMENT

Statement no:	Valid from:	Valid to:
250233-2017-OTH-NOR	21.11.2017	01.02.2018

Hydro Aluminium ASA

DNV GL Business Assurance AS (DNV GL) was commissioned by Hydro Aluminium ASA (Hydro) to provide a reasonable assurance third-party verification of the claim made under Hydro's 4.0 product line. The 4.0 product line claims that less than 4 ton CO_2 has been emitted per ton produced aluminium from Hydro smelters in Norway under the 4.0 specified production.

The verification was conducted under the requirements of ISO 14064-1 and the Greenhouse Gas Protocol of the WBCSD/WRI.

Within this verification, Hydro include emission from bauxite, alumina, smelters, casting and associated seaborne transport, considering direct and indirect GHG emissions as well as estimated emissions caused by other legal entities, so-called scope 3 emissions. In DNV GL's view, there are no material omissions of GHG emission sources in Hydro's defined organizational and operational boundary.

DNV GL has conducted a pre-verification of the Karmøy smelter in Norway in the period from June to November 2017 with the following approach:

- Document Review
- Interviews with key personnel
- Review of calculation methods including application of emission factors
- Routines for gathering, aggregation and consolidation of activity data used in the calculations; and
- Organizational and operational boundaries

In our opinion, the pre-verification of the Karmøy facility confirms attained carbon footprint levels claimed under Hydro's 4.0 product line. We have no reason to believe that Hydro will not succeed in securing a final verification of Karmøy or other smelters in Norway based on the requirements of the ISO 14064-1 and the GHG Protocol in light of the claim made under the 4.0. product line.

Place and date: Høvik, January 01, 2018

DNV GL Business Assurance Norway AS

Thomas Haug Lead Auditor	Rafi-ud-Din Khawaja Lead auditor, Technical Reviewer

DNV GL Business Assurance (Norway) AS, Veritasveien 1, 1322 Høvik, Norway. Tel: +47 67 57 99 00. assurance.dnvgl.com

DNV·GL

VERIFICATION STATEMENT

Statement no:	Valid from:	Valid to:
250232-2017-OTH-NOR	21.11.2017	31.12.2018

Hydro Aluminium AS

DNV GL Business Assurance AS (DNV GL) was commissioned by Hydro Aluminium AS (Hydro) to provide a reasonable assurance third-party verification of the claim made under Hydro's 75R product line. The 75R claim secures that a minimum of 75% end-of-life (or post consumer) aluminium is contained in each production batch under this product line.

The verification was conducted under the requirements of Hydro's developed Standard Operating Procedure (SOP) for the 75R product line.

The verification was conducted in the period from week 44 to week 47 2017. The verification has undertaken the following approach:

- Confirmation of organizational boundaries
- Document review, including review of SOP and audit of key personnel to confirm sufficient implementation of the SOP
- Traceability and segregation of end-of-life aluminium in the supply chain within the scope of the 75R related production
- Review of calculation methods to confirm an accurate calculation of minimum of 75% end-of-life aluminium in production batch is attainable
- Interviews with key personnel

To maintain the validity of this verification statement, DNV GL shall conduct two additional audits in 2018.

In our opinion, the procedure undertaken in the 75R product line follow a good industry practice and the claim made under the Hydro 75R product line is fairly stated. We believe that 75R product line contain a minimum of 75% end-of-life aluminium.

Place and date: Høvik, November 21, 2017

DNV GL Business Assurance Norway AS

Lars Erik Mangset Senior Consultant	Rafi-ud-Din Khawaja Lead auditor and Technical reviewer

DNV GL Business Assurance (Norway) AS, Veritasveien 1, 1322 Høvik, Norway. Tel: +47 67 57 99 00. assurance.dnvgl.com

INFINITE
ALUMINIUM
BY WICONA

Hydro

We are aluminium