

CDOT Workshop

CRSI's Industry Perspective on EPD's

CRSI Concrete Reinforcing
Steel Institute

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Concrete Reinforcing Steel Institute

What is CRSI?



Founded in 1924 to represents industry members

Maintains industry standards and specifications

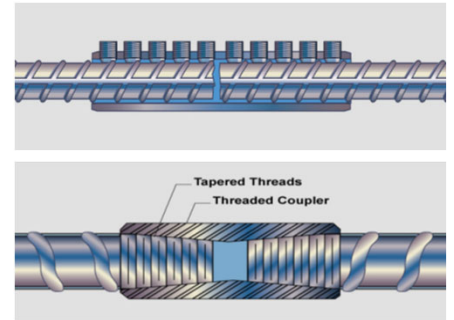
Develops and offers technical fabrication, design and construction expertise

Promotes the use of quality reinforced concrete construction



CRSI Membership

- Producers
- Fabricators
- Placers
- Suppliers of related products & services



CRSI Technical Resources



Ranges from introductory to in-depth guidance and reference information on commonly used applications.

- Tech Notes
- Manual of Standard Practice
- Design Guides
- Field Inspection and Placement Manuals
- CRSI App
- Research reports
- Rebar-U - On-line continuing education

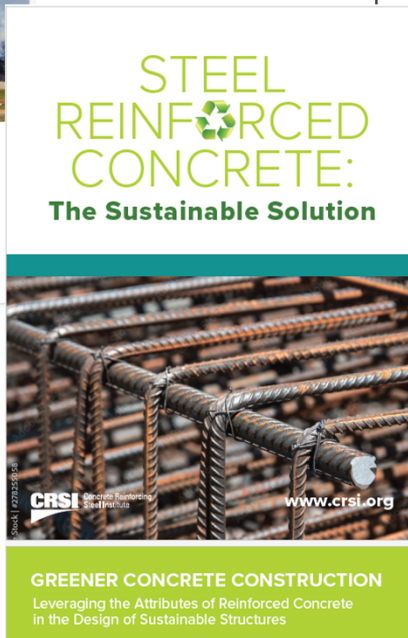
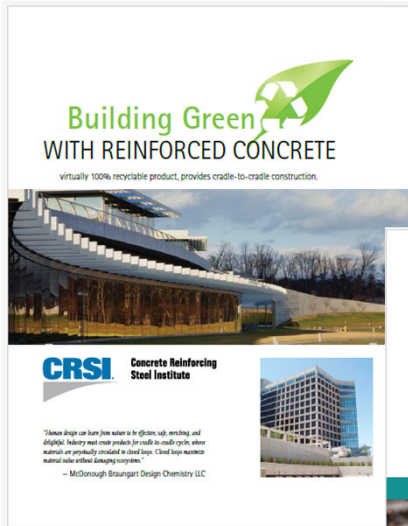
Available on www.crsi.org
In .pdf and print versions

CRSI – Sustainable Reinforcing Steel

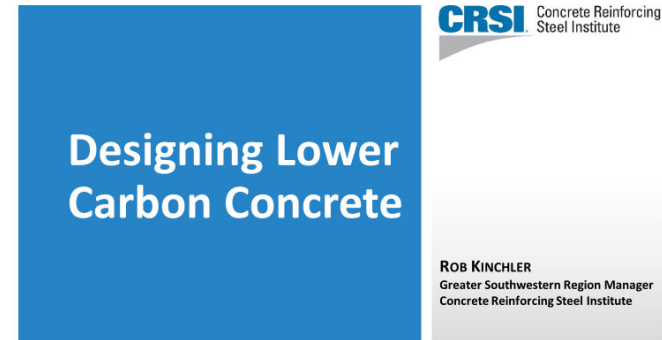
- The American steel industry is the cleanest and most energy efficient in the world
- In 2020, 70.6 percent of U.S. steelmaking came from EAFs, compared to 26.3 percent worldwide. One Ton of steel today is produced with ½ the energy needed in 1980
- U.S. Energy Grid is cleanest in the world with reliance on natural gas and renewables. Steel is the most recycled material on the planet. 60 to 80 Million Tons/Year
- U.S. Steel Industry has reduced its CO2 emissions 37% since 1990
- Since 1980 U.S. Steel Industry has reduced manhours /ton from 12 to .5 manhours per ton



CRSI Sustainability



- Architectural Firm Presentations
- Informational Building Owner Brochures
- AIA Conferences
- AGC Meetings
- Sustainable Products
- Industry Wide EPD's



CRSI – The Mill

- **Integrated Mill – (BOF)**

Inputs - Iron Ore, Coal, Limestone
3X More expensive to build than Mini
70% of worlds steel mills (2016)
90% of China's
Uses up to 25% scrap as input, pellets
Sheet Steel, Plate, Auto Industry quality

- **Mini Mill – (EAF)**

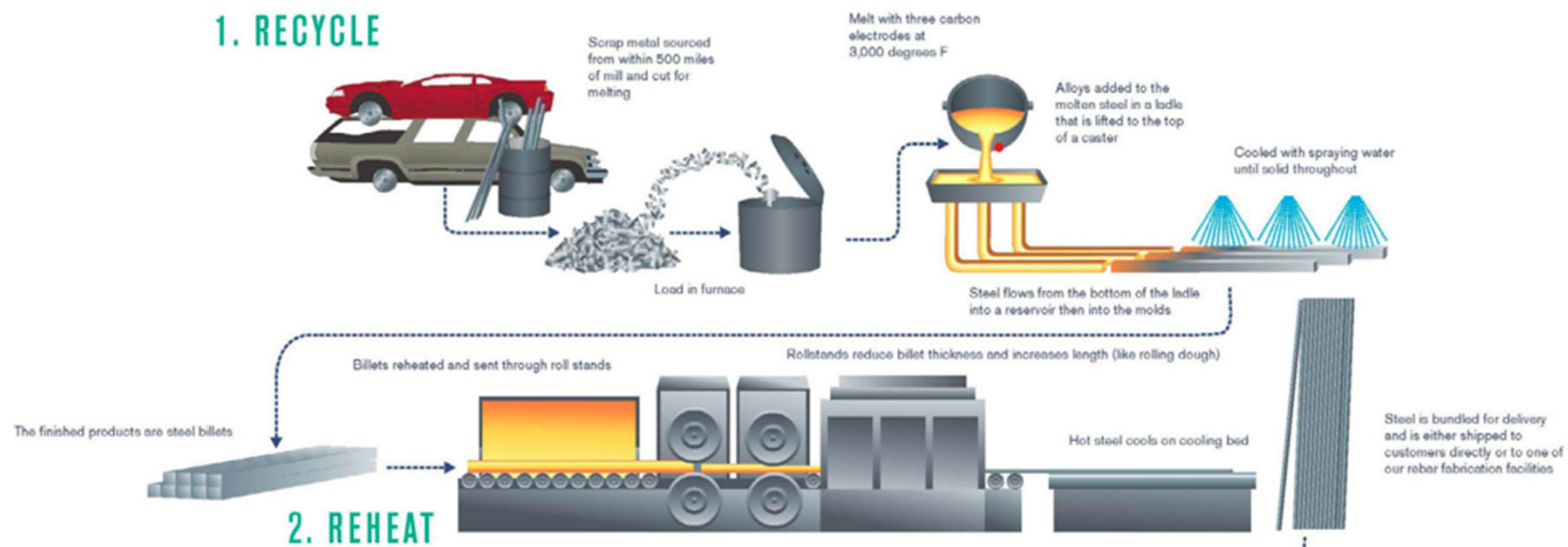
Inputs – Scrap and Alloys
70% of U.S. Production, leads world
650k to 1000k tons per plant
Up to 98% scrap as input

- **Micro Mill – (EAF)**

Inputs – Same as Mini Mill
250k to 300k tons per plant
Reduces transportation costs and CO2



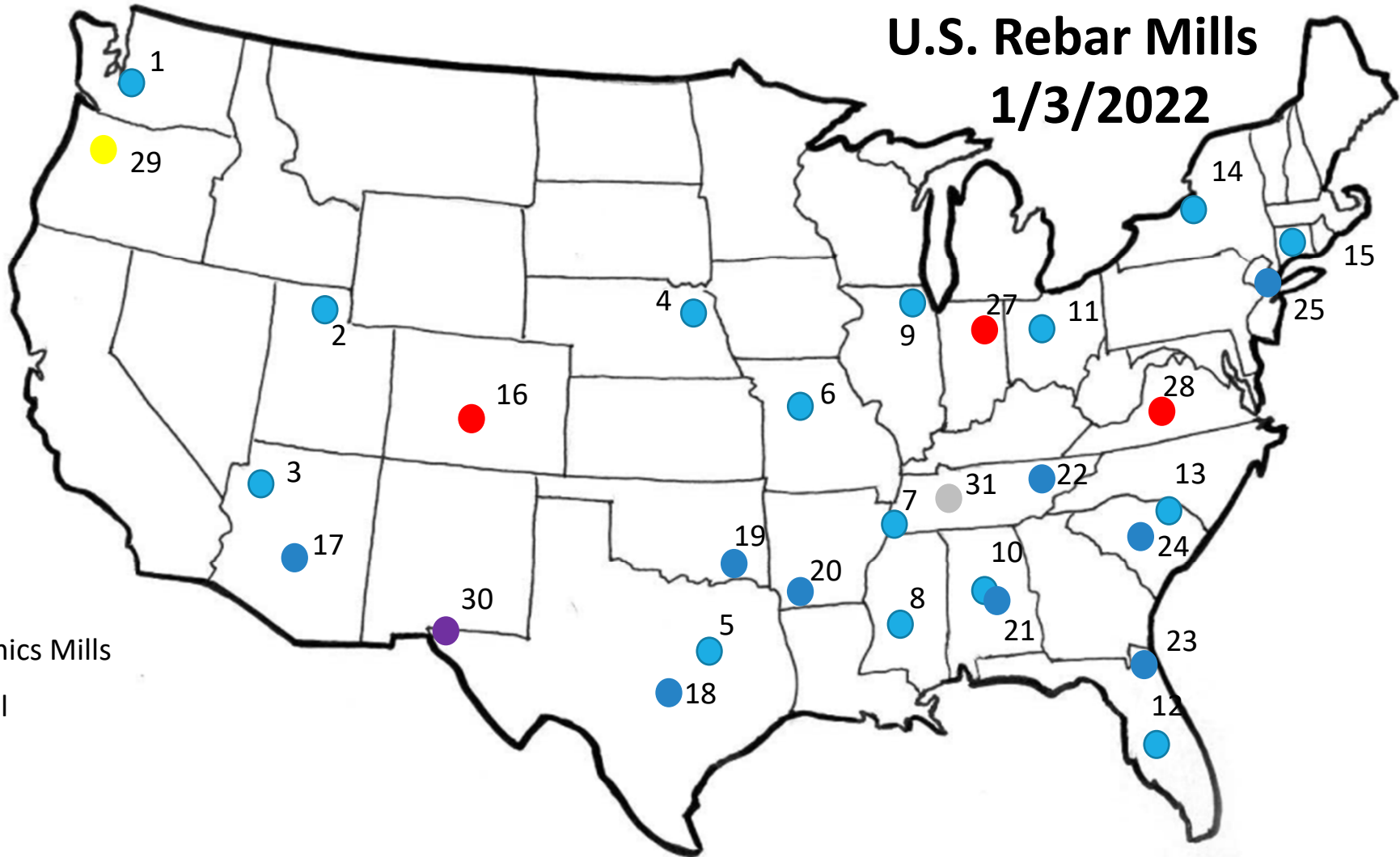
CRSI – EAF (Electric Arc Furnace)



CRSI Member Mills

U.S. Rebar Mills
1/3/2022

- Nucor Mills
- Evraz Mill
- CMC Mills
- Steel Dynamics Mills
- Cascade Mill
- Vinton Mill
- Gerdau Mill



CRSI – Mill Products

Bar Specifications

- A615 – Plain carbon steel
- A706 – Low alloy steel
- A996 – Rail/Axle steel
- A1035 – Low carbon/
chromium steel

Coated & Corrosion Resistant

- A775 & A934 – Epoxy coated rebar
- A767 – Galvanized rebar
- A1055 – Zinc / Epoxy coated
- A955 – Stainless steel

CRSI – Bar Grades

- **Grade 60**
- **Grade 80**
- **Grade 100**
- **Grade 120**



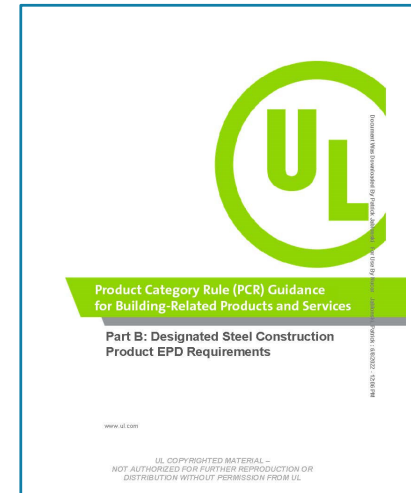
Rebar PCR's - Documents



SCS Global

2015 to 2020

- The steel reinforcing bars included in the scope of this PCR are those defined in one of the following specifications:
- ASTM A615/A615M and ASTM A706/A706M
- Coated reinforcing bars are excluded from the scope of this PCR.
- Scope Boundaries: A1 to A3
- Reference Service Life Not Included



UL

2020 to 2025

- The steel reinforcing bars included in the scope of this PCR are all of them including coated.
- Scope Boundaries: A1 to A3, optional C1 to C4, optional D
- Reference Service Life Not Included

Rebar PCR's - Boundaries

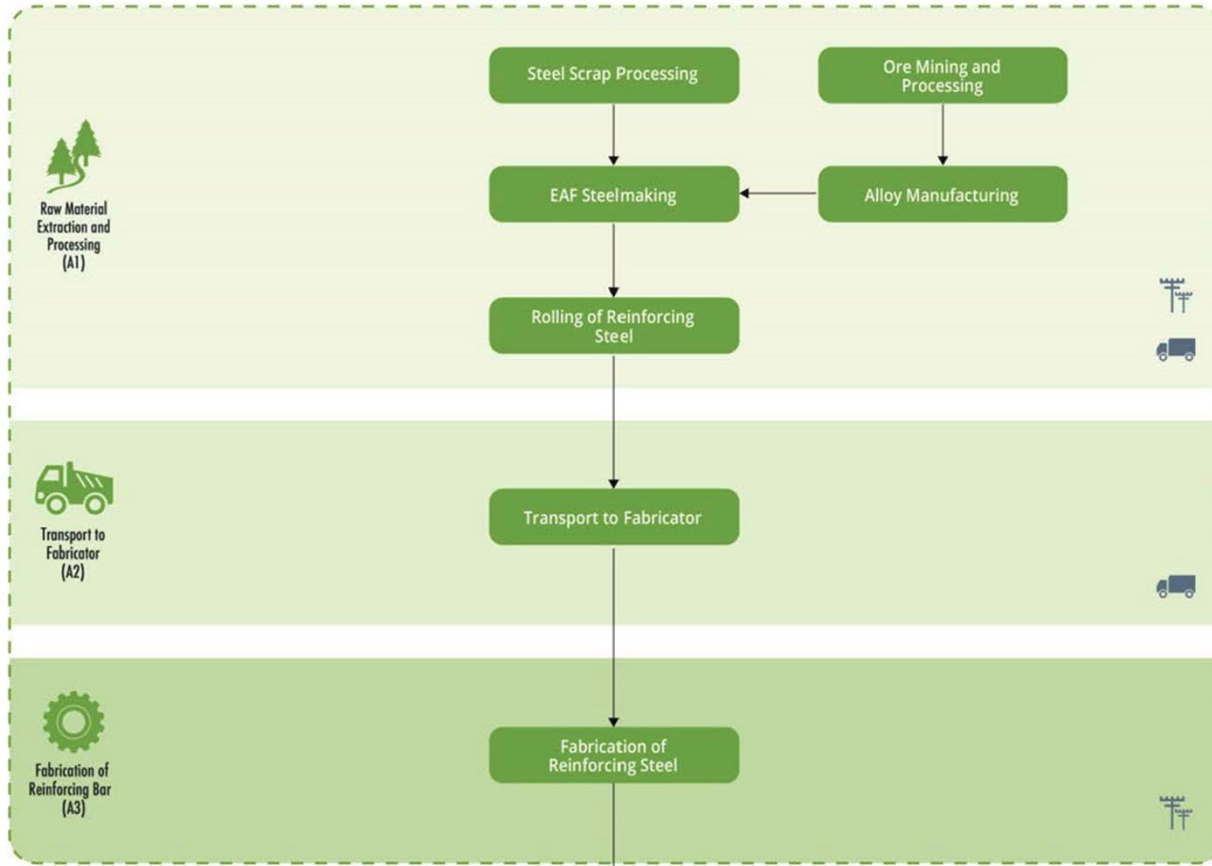
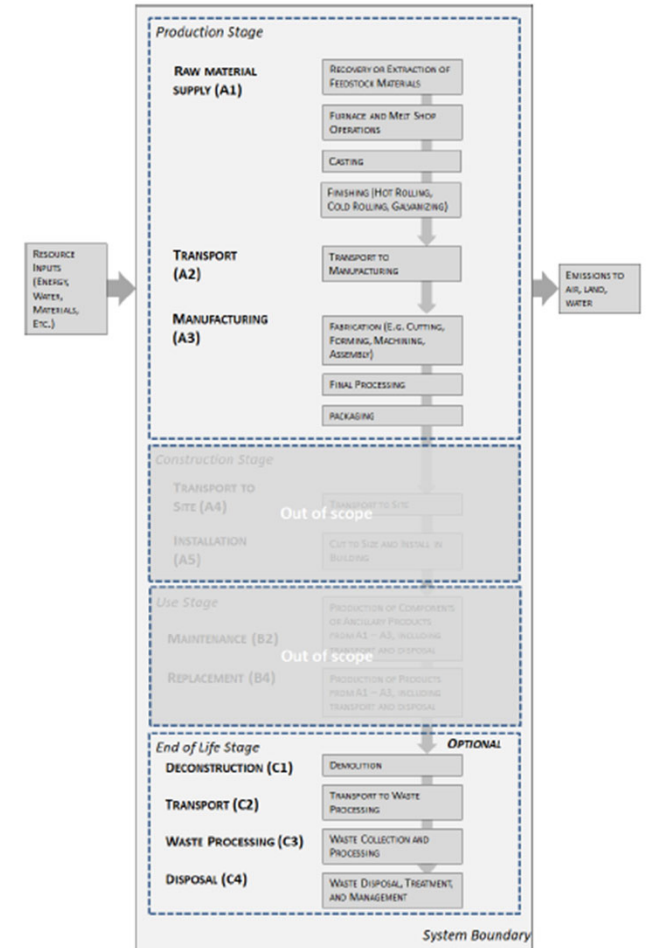
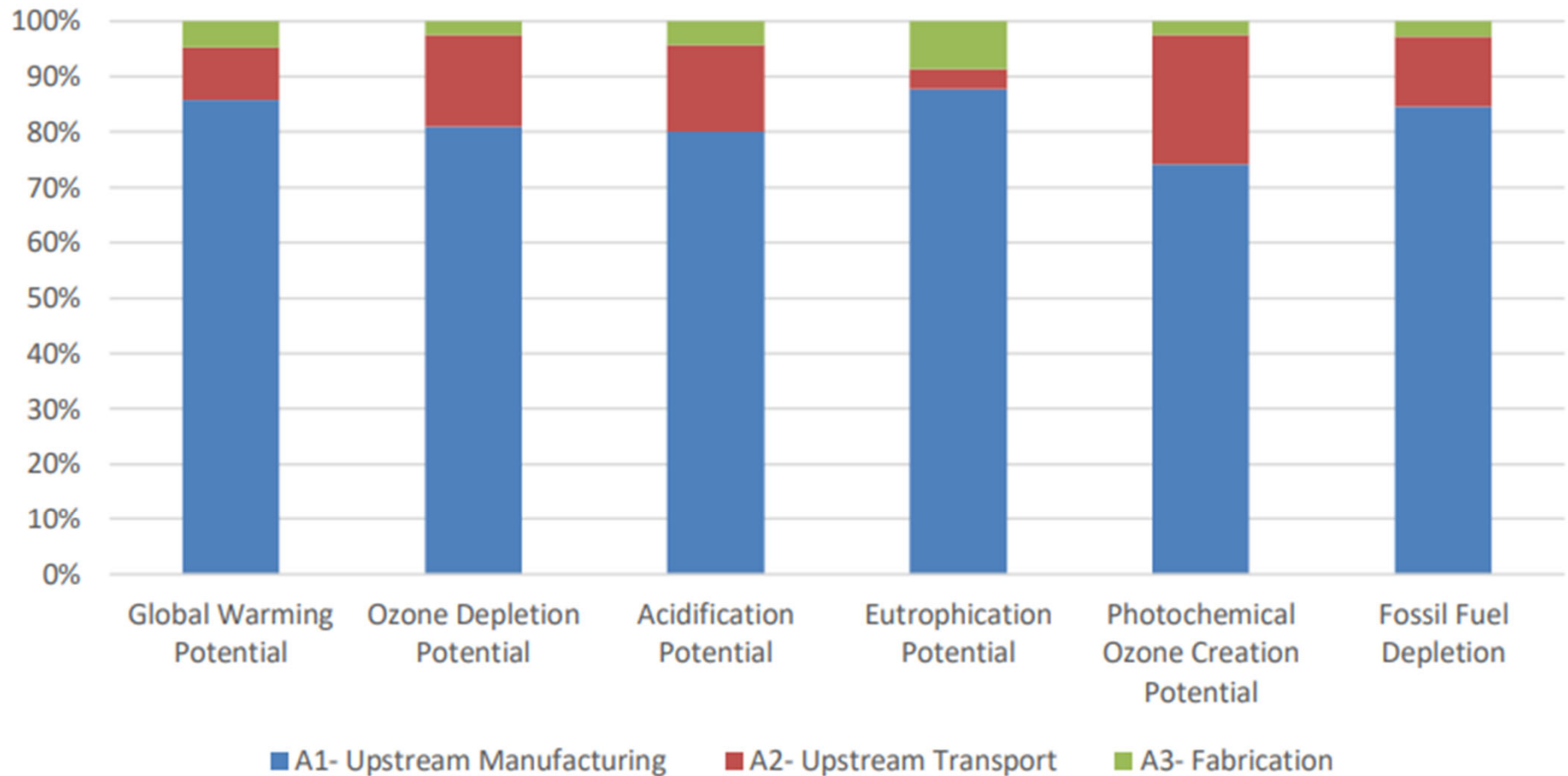


FIGURE 1. EXAMPLE PRODUCT FLOW DIAGRAM*



EPD - GWP Contributions



Member Mills – EPD

Mill Expires GWP

- 1 7/1/22 .49
- 2 8/29/26 .86 OpenLCA EcoInvent
- 3 3/1/21 .85
- 4 6/6/26 .65 OpenLCA EcoInvent
- 5 12/19/24 1.05
- 6 10/30/24 1.00 OpenLCA V1.9
- 7 1/18/22 .58

EPD – Comparison Issues per PCR

- Different LCA Software
- Different LCI datasets
- Allocations of resources and waste products assumptions
- Transportation distances
- Different results for upstream or downstream life cycle stages



CRSI Reinforcing Steel EPD

- Industry Average EPD - Expires 8/28/22
- Covers ASTM A615, A706
- Covers Life Cycle Stages A1 to A3
- A1 is mill component/A3 is fabrication component
- GWP = .97 Metric Tons/Metric Ton Steel
- Primary data from CRSI members
- Secondary data from GaBi2017

A1: Raw material extraction and processing

A2: Transport to fabricator

A3: Fabrication



Environmental Product Declaration

According to ISO 14025

Fabricated Steel Reinforcement



CRSI Concrete Reinforcing Steel Institute

Issue Date: August 29, 2017

Use of this EPD is limited to CRSI members.
Member names are available online at www.crsi.org/index.cfm/epd.

Valid Until: August 28, 2022

Copyright ASTM International, 300 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19380-2959, United States.

Declaration Number: 070

New CRSI Reinforcing Steel EPD

Participating Members

19 Mills

17 Fabricators

Currently being verified
Ready by Sept 2022?

Mills		Fabricators	
Evraz	Pueblo, CO	Western States Rebar	Pleasant View, UT
CMC	Mesa, AZ	Rebarfab Inc.	New Brighton, MN
CMC	Jacksonville, FL	Katy Steel	Katy, TX
CMC	Sayreville, NJ	CMC	Dallas, TX
CMC	Durant, OK	CMC	Kissimmee, FL
CMC	Cayce, SC	CMC	Tracy, CA
CMC	Knoxville, TN	CMC	Auburn, WA
CMC	Seguin, TX	Nucor	Zellwood, FL
Cascade	McMinnville, OR	Nucor	New Braunfels, TX
Steel Dynamics	Roanoke, VA	Nucor	Kansas City, MO
Nucor	Auburn, NY	Dimension Fabricators	Scotia, NY
Nucor	Wallingford, CT	Farwest Steel	Vancouver, WA
Nucor	Flowood, MS	Farwest Steel	Eugene, OR
Nucor	Bourbonnais, IL	Re-Steel Supply Co	Eddystone, PA
Nucor	Kingman, AZ	Victory Steel Company (Re-Steel)	Baltimore, MD
Nucor	Marion, OH	Conco	Benicia, CA
Nucor	Jewett, TX	Conco	Rochester, WA
Nucor	Brigham City, UT		
Nucor	Birmingham, AL		

EC3 Database Reinforcing Steel EPD

Other publicly available

EPDs

22 Mills

6 of those company wide

Category	Company	Location
Fabricated	A&H Steel	Edmonton, AB
Fabricated	ArcelorMittal	Contrecoeur and Longeuil
Fabricated	Gerdau Long Steel	Gerdau Whitby Steel Mill
Fabricated	Gerdau Long Steel	Gerdau Midlothian Steel Mill
Fabricated	Gerdau Long Steel	Gerdau Charlotte Steel Mill
Fabricated	Nucor	Nucor Steel Auburn - Bar Mill
Fabricated	Nucor	Nucor Steel Birmingham - Bar Mill
Fabricated	Nucor	Nucor Steel Connecticut - Bar Mill
Fabricated	Nucor	Nucor Steel Jackson - Bar Mill
Fabricated	Nucor	Nucor Steel Kankakee - Bar Mill
Fabricated	Nucor	Nucor Steel – Kingman - Wire
Fabricated	Nucor	Nucor Steel Marion - Bar Mill
Fabricated	Nucor	Nucor Steel - Texas- Bar Mill
Fabricated	Nucor	Nucor Steel - Utah - Bar Mill
Fabricated	Sherwood Steel	Edmonton
Fabricated	Sherwood Steel	Calgary
Fabricated - CO	Gerdau Long Steel	Gerdau North America Steel Mills (7 Plants)
Fabricated - CO	Midvalley Rebar	Multiple Plants (3 Plants)
Fabricated - CO	Nucor	Nucor Plants (9 Plants)
Fabricated - CO	Re-Steel	Re-steel Plants (8 Plants)
Fabricated - CO	Salit Steel	Rebar Plants (12 Plants)
Fabricated - CO	Vinton Steel, LLC	US Southwest (4 plants) with CRSI A3 data

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Future Trends

- **2020 UL PCR states it covers coated rebar, doesn't seem right, new PCR needs to be developed**
- **Resiliency of product needs to be included**
- **LCIA's need to be defined for impacts due to maintenance and upkeep**
- **PCRs need to be developed for pavement sections with above mentioned resiliency requirements**
- **Software, allocation, assumptions need to be same for comparative EPDs**
- **Application of BRECC considered**