

58th
Anniversary
1961 - 2019 Celebration

cspi
corrugated steel pipe institute

www.cspi.ca

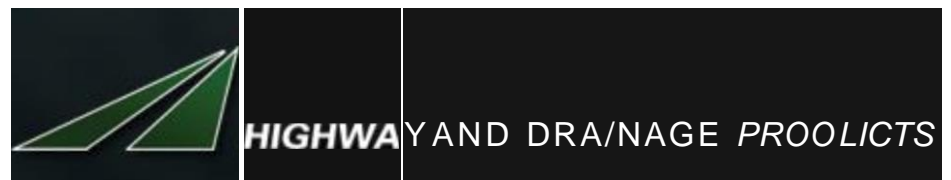
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CSPI

corrugated steel pipe institute

armtec

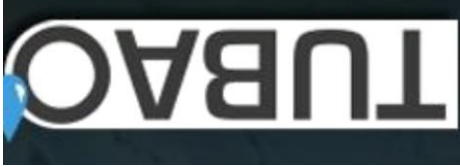
Atlantic Industries Limited





AKStee





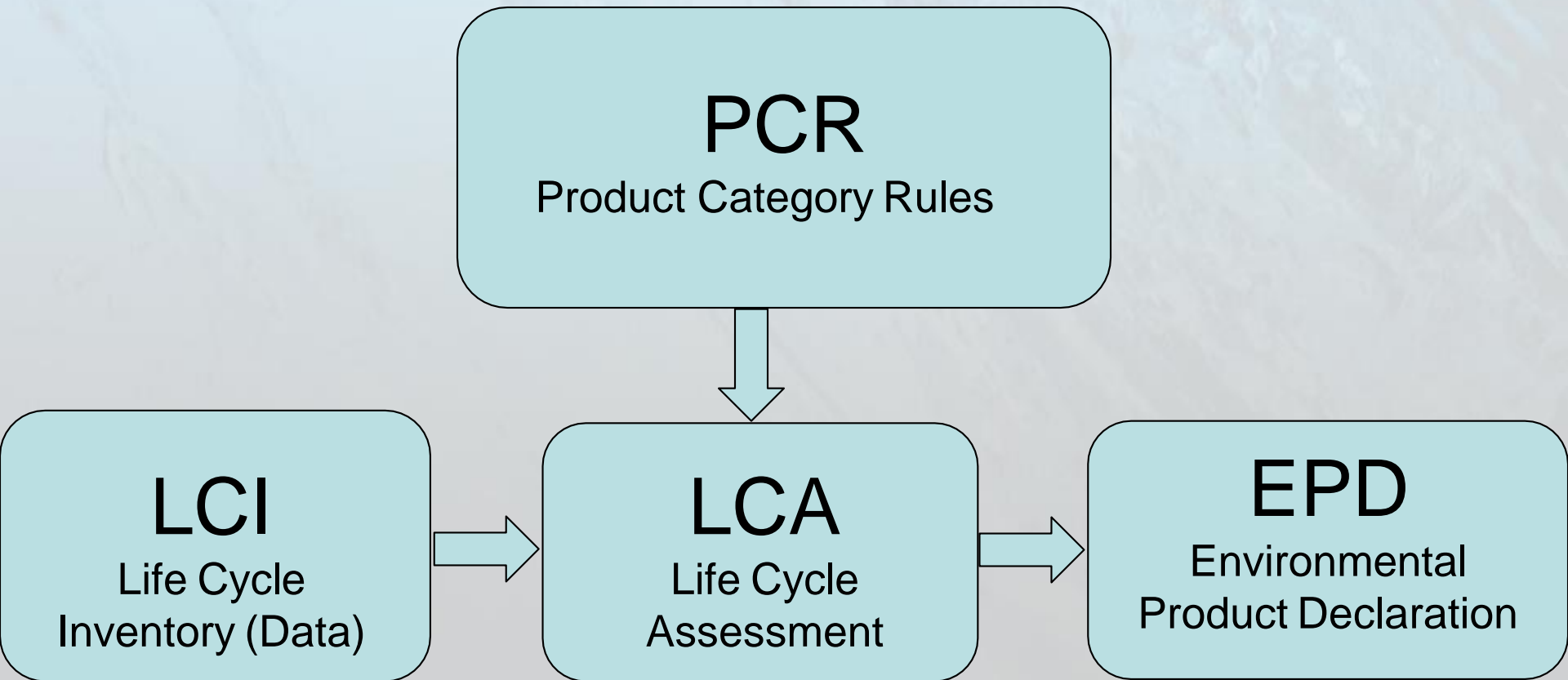
Environmental Impact of CSP

- **Cradle to Gate plus end of life recycling option review by 3rd party**
- **Snapshot in time as to what impact one's product has on the environment**
- **Declared Unit – 1 metric ton**
- **In accordance with ISO 14025, 14040, 14044 & 21930**

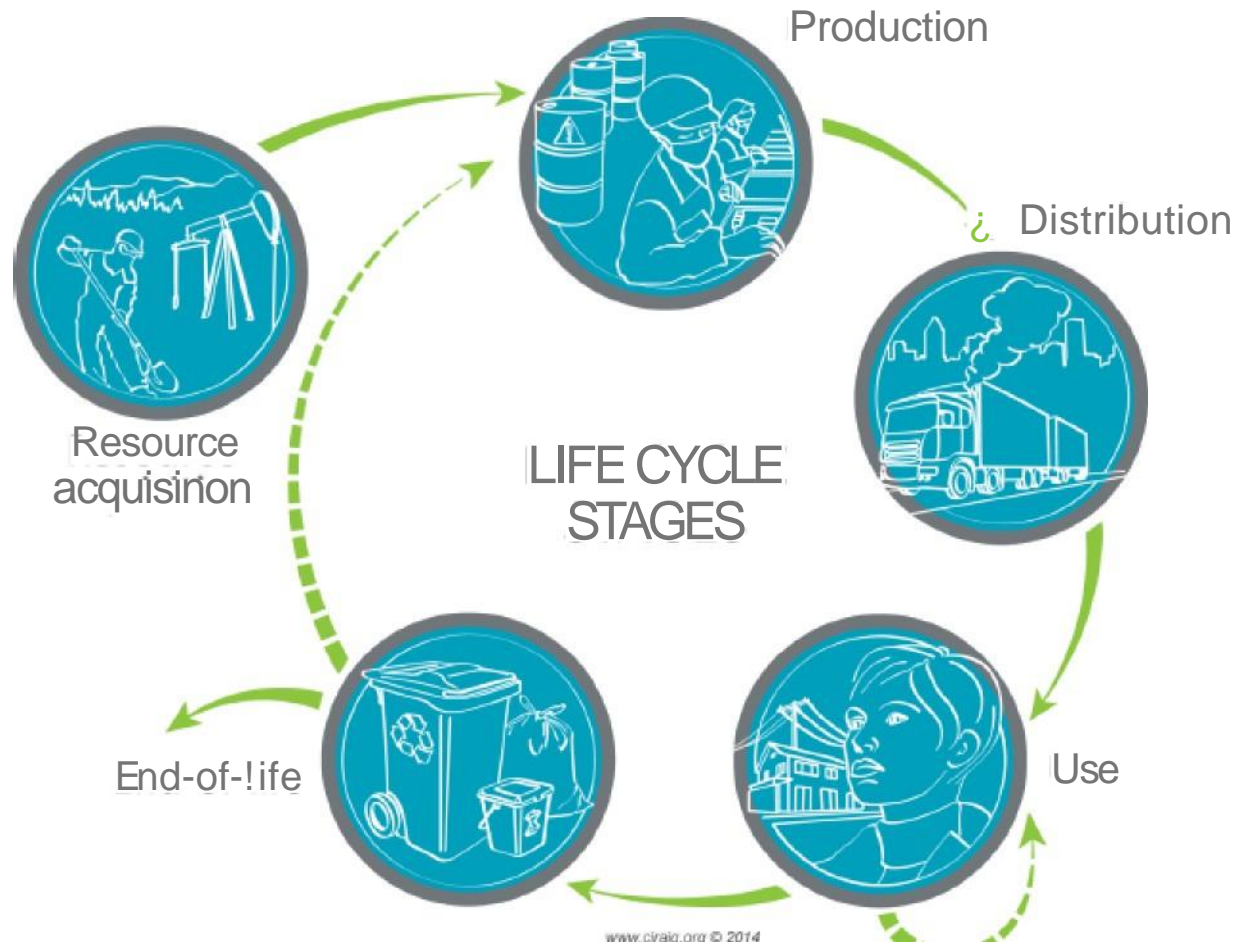
Determine the Environmental Impacts of CSP Production



Definitions



Life Cycle of a Product



Resource Acquisition

Raw material extraction & processing – Energy & transportation (all scrap used in CSP)



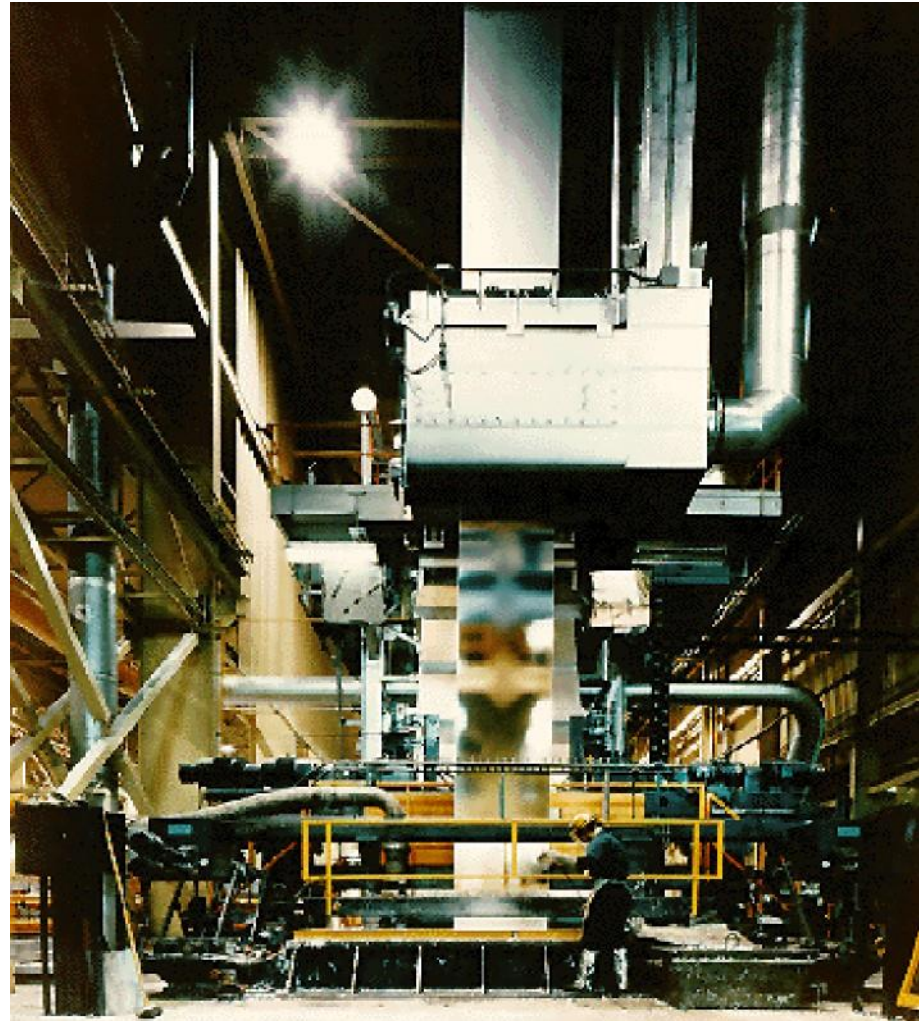
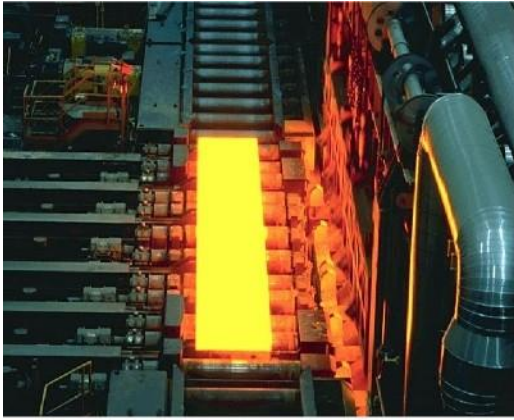
Transportation to Steel Mill – scrap piles near by



Production



Manufacturing - Coated Steel Coil



Inventory



Transportation to Manufacturer



MANUFACTURING PIPE



Use of Energy



Transportation to Customer



Environmental Impact of CSP

Example

Storm Sewer

Spiral Rib

450mm diameter

2.0mm thickness or gauge

1 metric ton = 37 meter length or 6 pieces of pipe



Environmental Impact of CSP



Storm Sewer



Results

Table 2. LCIA results for 1 metric ton of corrugated steel conduits.



Global Warming Potential	Climate Change Potential (CO ₂ eq)	0.0202	0.0311	-0.760
Ozone Depletion Potential	Metabolic CFC-11	5.06×10^{-8}	1.79×10^{-13}	5.39×10^{-5}
Acidification Potential	Metric ton SO ₂ eq	0.0119	8.1×10^{-4}	1.19×10^{-3}
Eutrophication Potential	Metric ton N eq	5.11×10^{-3}	7.2×10^{-4}	-6.52×10^{-4}
Photochemical Ozone Creation Potential	Metric ton O ₃ eq	0.175		
Depletion of Abiotic Resources Elements	Metric ton Fe eq	-5.7×10^{-3}	3.5×10^{-3}	-2.18×10^{-3}
Depletion of Abiotic Resources (Fossil)	Metric ton calorific eq	$25,600$	285	7,280

Results of 1 Metric Ton of Steel

Global Warming Potential

1.5 tons of CO₂

Greenhouse gas emissions from



0.319



Passenger
vehicles driven
for one year

-or-



3,671



Miles driven
by an average
passenger
vehicle



0.262



homes'
electricity use
for one year



61.4

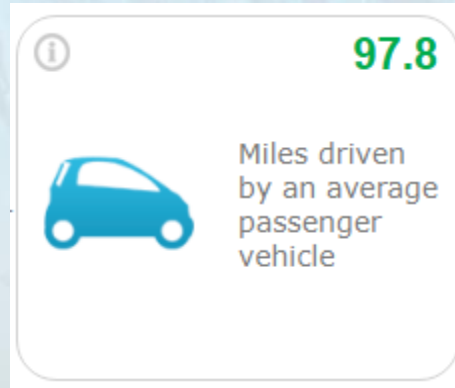


propane
cylinders used
for home
barbeques

GHG of 1M Length of Pipe 450mm Diameter

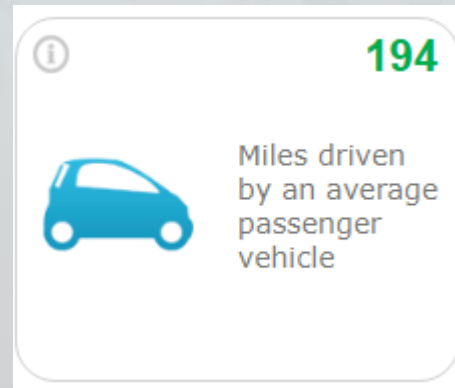
CSP

40 Kgs CO2

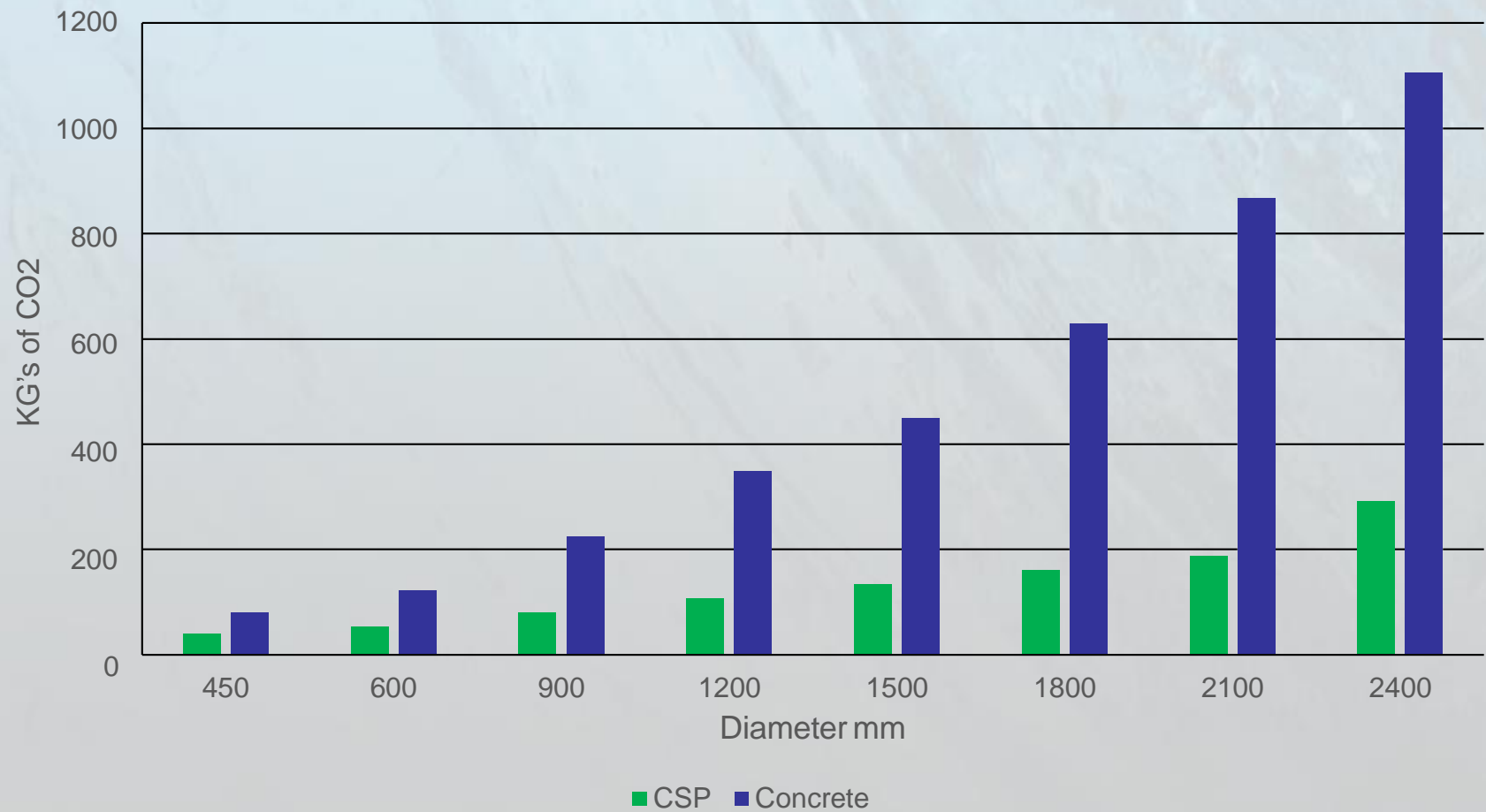


Concrete

80 Kgs CO2



GHG's – CSP versus Concrete



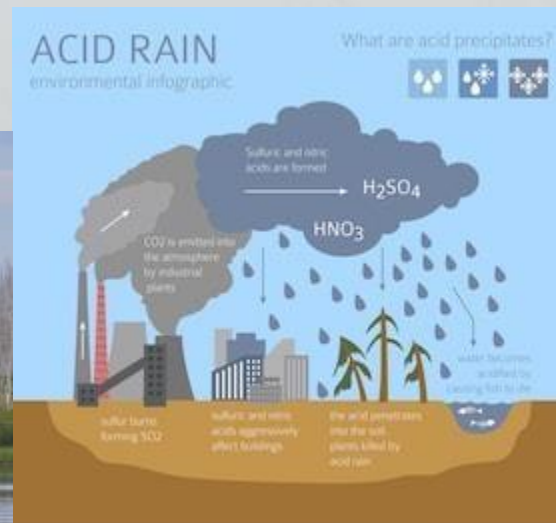
Acidification Potential Results – Acid Rain

Measured by sulfur dioxide – KG SO₂ per Meter of 450mm diameter

CSP .29 of a KG

Concrete .42 of a KG

46% increase in the acidification potential impact indicator



Eutrophication Potential Results

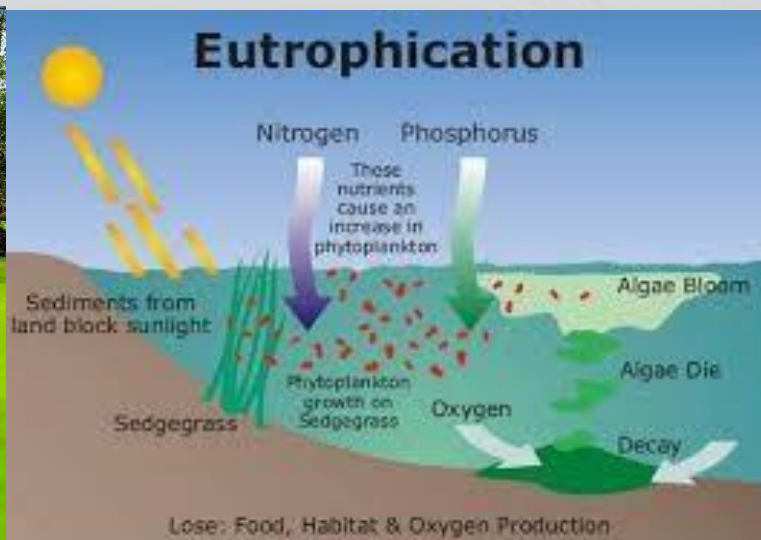
Pollution of Water & Soil

Measured by Nitrates & Phosphates - KG N per Meter of 450mm diameter

CSP .012 of a KG

Concrete .028 of a KG

124% more pollution of water & soil



Petrochemical Ozone Creation Potential Results

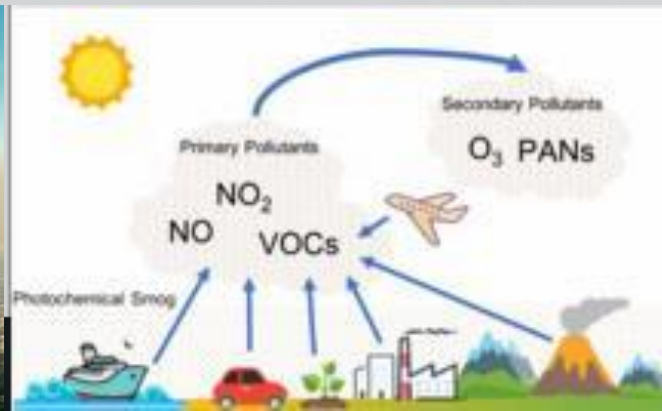
Smog Creation

Measured by Ozone Depletion - KG O₃ per Meter of 450mm diameter

CSP 4.24 of a KG

Concrete 5.10 of a KG

20% more smog creation



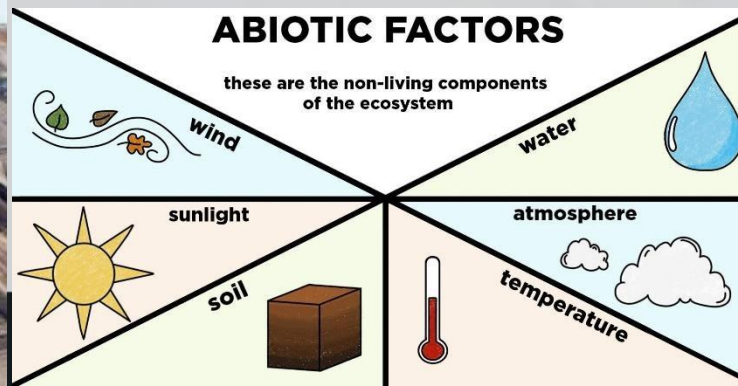
Depletion of Abiotic Resources Results Fossils

Measured by Energy Consumption – MJ (Megajoules) per Meter of 450mm diameter

CSP 516 MJ

Concrete 1049 MJ

103% more embodied energy consumption



Legislation

Buy Clean California Act

By 2020 / 2021 will be using EPD's to determine if suppliers fall within the stated GWP (Global Warming Potential)

Canadian Federal Government

LCA based procurement initiative – using EPD's



Treasury Board of Canada
Secrétariat

Secrétariat du Conseil du Trésor
du Canada

Canada



Low-Carbon Assets through Life Cycle Analysis (LCA)²

April 2019

Centre for Greening Government (CGG)

www.canada.ca/greening-government

www.canada.ca/gouvernement-vert

Recent Design
900M Length
1500 MM Diameter Storm Sewer

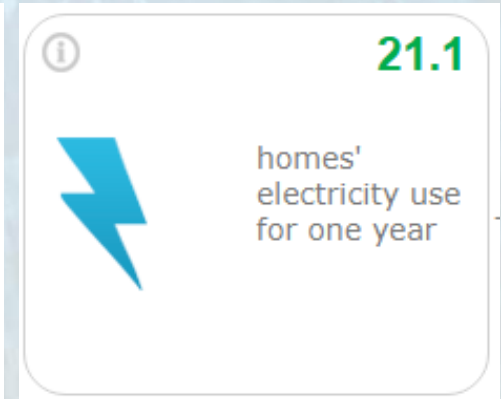
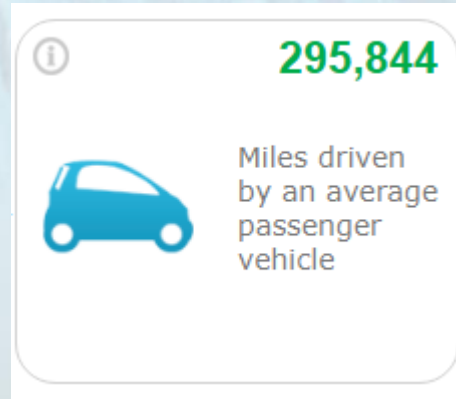
Comparison

<u>Requirements</u>	<u>SPR</u>	<u>RCP</u>	<u>Advantages</u>
Total # of Pieces	100	369	73% less
Total Weight KG	80,100	1,832,000	4.3% of weight
Total # of Trucks	25	62	60% fewer trucks
Excavation Volume	4,205 m ³	5,097 m ³	18% less volume
Backfill Material	3,301 m ³	3,969 m ³	17% less material
Installation Time	34 Hours	123 Hours	72% less time

GHG of 900M Length of Pipe 1500mm Diameter

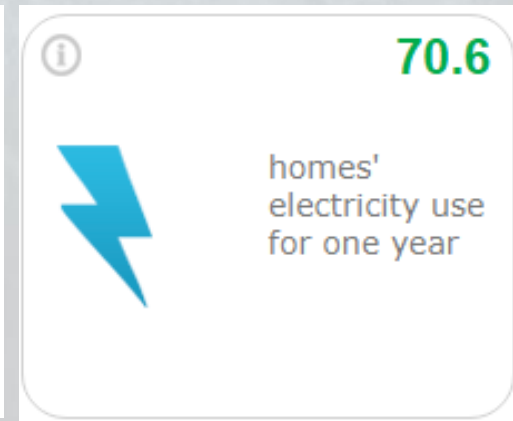
CSP

121 MT CO2

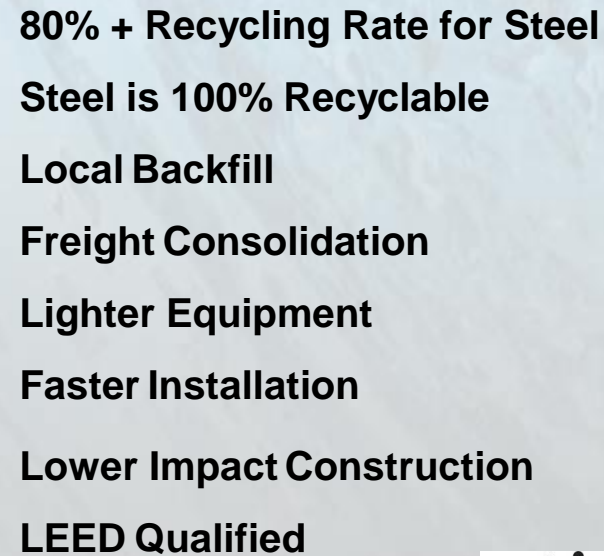


Concrete

405 MT CO2



A large, corrugated metal pipe is being lowered into a trench by a crane. The pipe is suspended by cables and is positioned above a concrete structure. The background shows trees and a clear sky.



CSP can help obtain up to 7 LEED v4 Points!

Environmental Product Declarations	2 points
Sourcing of Raw Materials (Corporate Sustainability Report, Recycled content)	2 points
Construction Waste Management	2 points
Material Ingredients Reporting (get a point for disclosure and possible extra point for meeting the threshold 100ppm)	1 points
TOTAL	<hr/> 7 points