Atlantic Concrete Association

Association béton Atlantique

Say "Yes" to Fair Competition among environmentally responsible choices

Presentation to
HRM Environment and Sustainability Standing Committee
January 10, 2013

by Mary Macaulay, P.Eng.

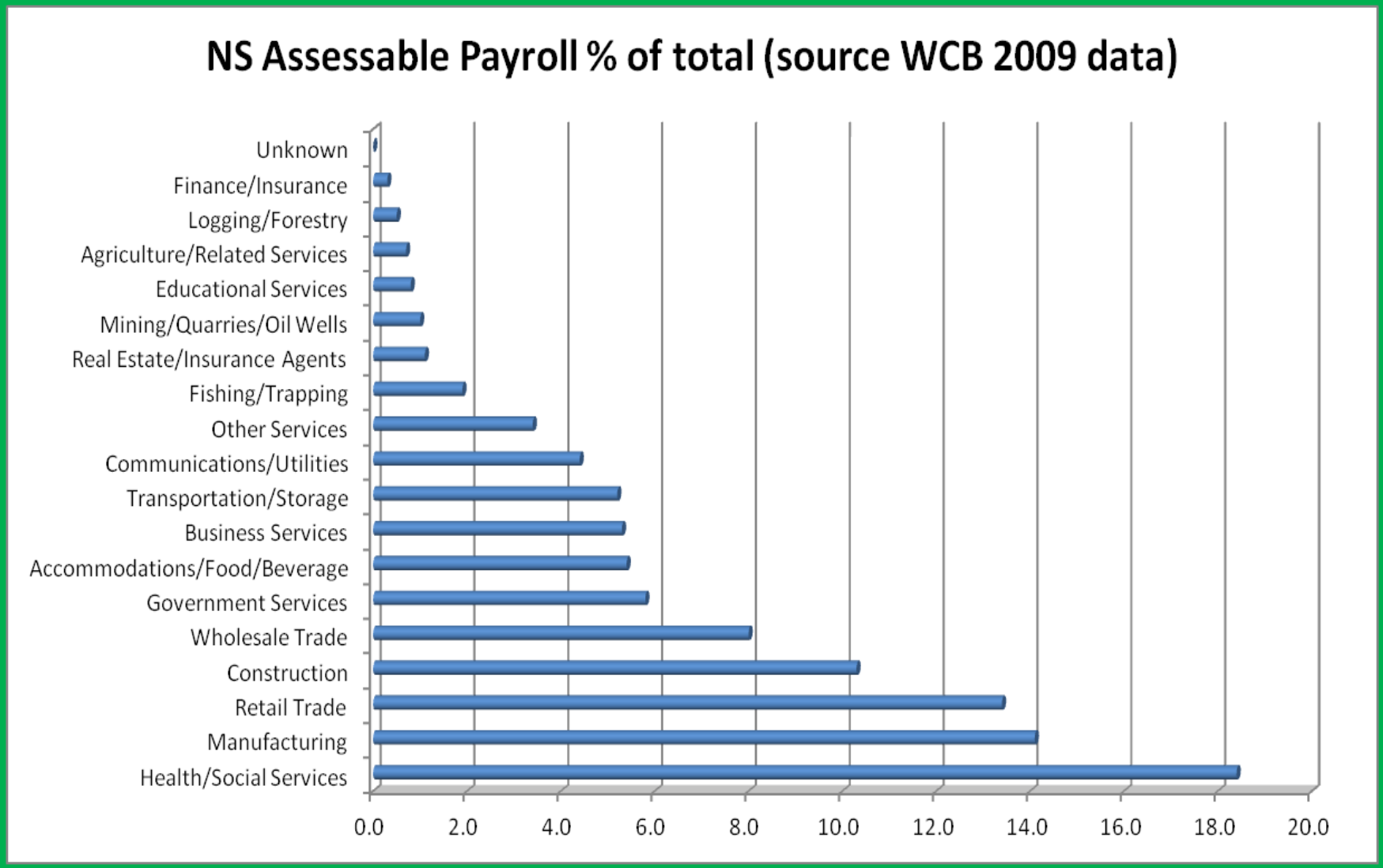
Acknowledgments to: NRMCA, PCA, CAC
for some slides/content used with permission

This Presentation is a response to a December 6, 2012 staff recommendation *“that Halifax Regional Municipality give wood first consideration, subject to financial and performance feasibility for structural and material options when designing new and recapitalization facility projects*”.

WoodWORKS Claim Number one:

Wood is Cost Efficient...

True - but this is because only 10% of Nova Scotia's forests are harvested sustainably. The rest (thousands of acres) are clear cut using big machines and very few personnel. If your aim is to build with certified wood you will be paying at least three times as much for the wood.



WoodWORKS Claim Number two:

Wood is Versatile...

True – but so is locally produced ready mix concrete. In fact both wood and concrete are even more versatile when combined with each other and/or with other building materials as recommended by the excellent architects and engineers you hire to design and build as appropriate for the uses you specify.

WoodWORKS Claim Number three:

Wood meets Code...

False– the wood lobby is trying to change building codes across the country to allow wood to be used in high rises and other buildings at risk in fire situations. The wood lobby claims that with fire retardants and sprinklers wood can perform as well as other materials (such as concrete which does meet code). Fire retardant and other chemicals used to improve the performance of wood are some of the most toxic known to man (hexavalent chromium, arsenic, dioxins, furans, hexachlorobenzene, pentachlorol phenol etc. – source Environment Canada)

WoodWORKS Claim Number four:

Wood is renewable...

Debatable – the tree may eventually grow back (see age classes below); however the many other species that were dependent on an intact healthy forest may never recover. Less than 1% of Nova Scotia's forests are Old Growth due to widespread unsustainable clear cutting.

TREE AGES (source Nova Scotia Nature Trust)

Tree Species	Ave. 'Mature' Age by Forest Industry	Actual Old Growth Life Span
White Ash	60-80	100-200
American Beech	60-80	300-400
White Birch	60-70	120-150
Yellow Birch	70-90	150-250
Eastern Hemlock	100-140	300-800
Red Maple	50-80	100-150
Sugar Maple	100-120	300-400
Red Oak	70-90	200-350
Red Pine	60-70	200-250
White Pine	100-120	200-450
Black Spruce	70-90	200-250
Red Spruce	60-80	250-400
White Spruce	50-60	150-200

WoodWORKS Claim Number five:

Wood Minimizes Carbon Footprint...

False - Although oceans store most of the Earth's carbon, soils contain approximately 75% of the carbon pool on land — three times more than the amount stored in living plants and animals. The net sink for carbon in long-lived wood products is still relatively small, and forest cutting ultimately acts to reduce the storage of carbon on land (source Ecological Society of America).

Graph from ForestPolicyResearch.com

WoodWORKS Claim Number six:

Wood is significant to the economy...

True – But every job in Nova Scotia is significant to the person working in that position. It is unfair and anti-competitive to displace jobs in other equally viable, environmentally responsible local industries. It is not sensible to politically promote and prop up one local industry at the expense of other competing local industries. We are all your constituents and all of us deserve your support.

Ready Mix Concrete is very Local!

If your object is to go green and boost the regional economy at the same time, make sure we're on board!

Certified Ready Mixed Concrete Plants in the region

Summary of Environmental Benefits of Ready Mix Concrete

- **Made from the most abundant materials on earth**
- **Locally Produced from Local ingredients by Locals**
- **Durable finished product**
- **Recyclable**
- **Disaster Resistance**
- **Energy Efficiency**
  - **Thermal Mass**
  - **Light color**
    - **Minimizes lighting needs**
    - **Reduces Heat Island**
  - **Fuel Economy**
    - **Rigid concrete pavements offer better fuel economy**
- **Waste Minimization**
- **Recycled Content**

We are happy that you will be focussing on green building here in HRM. Please allow us to compete for green building projects on a level playing field and vote down “wood first”.

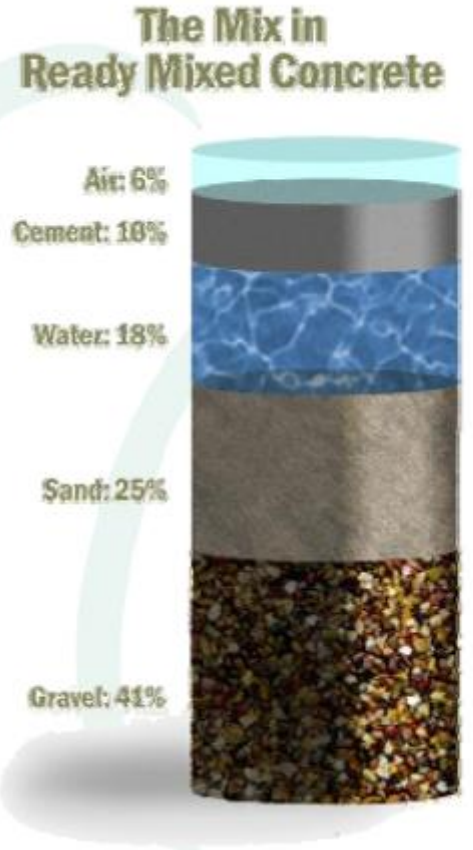
Questions?

About the author:

- *Mary Macaulay, P.Eng. has been the Executive Director of the Atlantic Concrete Association (ACA) since January 2009. She is an environmental engineer and naturalist with a special interest in Nova Scotia's ecology. She is an active member of the Nova Scotia Wild Flora Society, the Halifax Field Naturalists, and the Federation of Nova Scotia Naturalists. Her past work history includes working for the Victorian Order of Nurses and the Nature Conservancy of Canada. She also served on the Chignecto Central Regional School Board (CCRSB) and initiated and spearheaded the successful implementation of policies to prevent tobacco use, to plant native species, and to provide healthy food at CCRSB sites.*

APPENDIX – Why feel good about choosing Ready Mix CONCRETE

- Most materials requires little processing
- Low energy of production
- Manufactured and harvested locally
- Low transportation energy
- Contributes to local economy



Impact of Extracting Materials

- Extraction of any raw material has impact on the environment
- Natural Resources Canada compared impacts in research study
  - Logging (wood)
  - Iron ore mining (steel)
  - Aggregate quarrying (concrete)
- Extracting aggregate for concrete has lower impact than other materials

Impact Index

Resource Impact Index		
Concrete	Aggregate Quarrying Limestone Quarrying	1.00 1.50
Steel	Iron Ore Mining	2.25
Wood	Boreal Timber Harvesting Coastal Timber Harvesting	2.50 3.25

Source: Natural Resources Canada

Logging for Wood

- Disruption per unit of building material is high
- Renewal takes generations
- Stream damage from landslides is common

Source: Natural Resources Canada

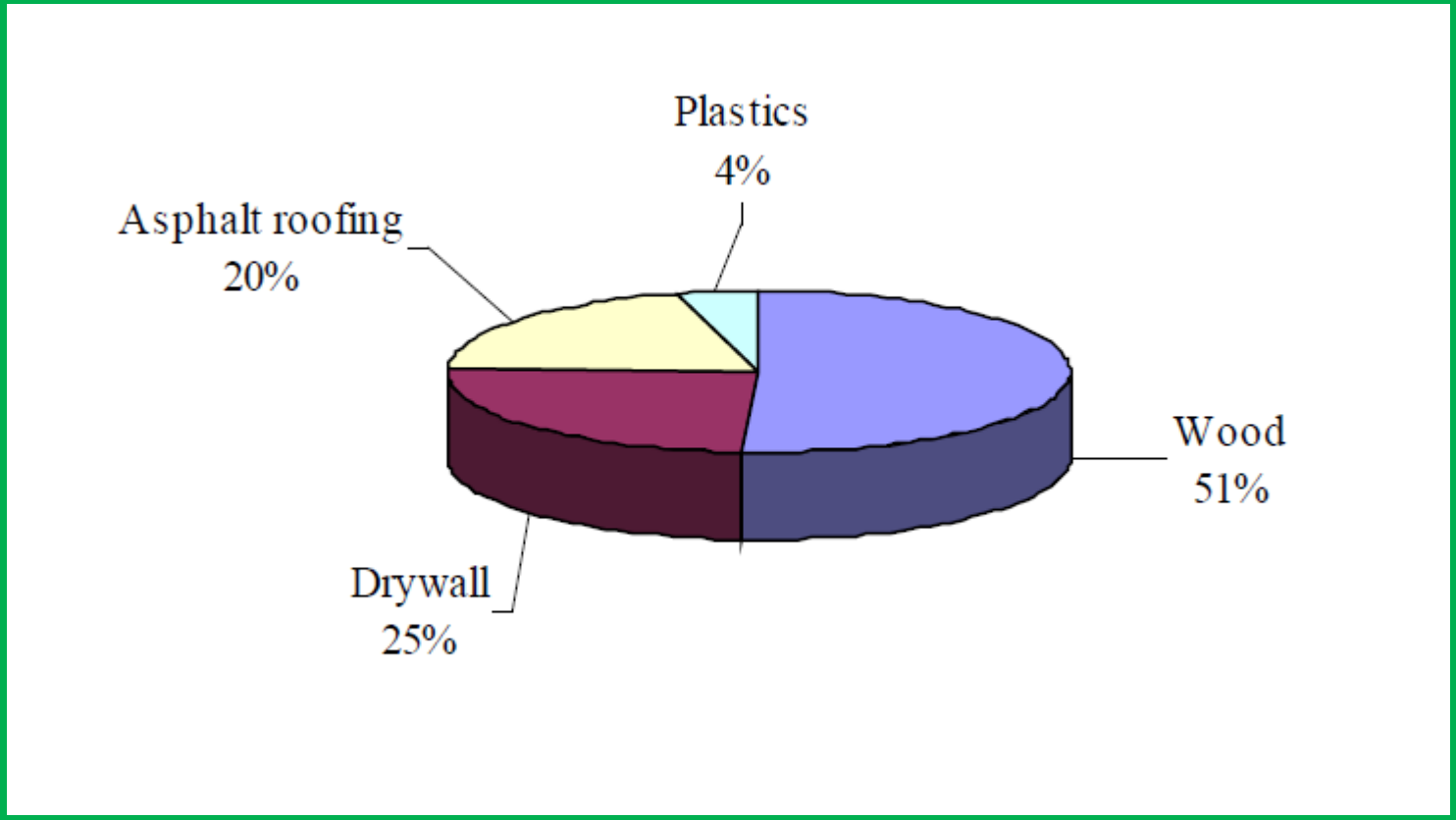
Aggregate & Limestone Quarrying

- Closely contained and temporary
- Restored within 1 to 2 years
- Most abundant materials on earth

Source: Natural Resources Canada

Concrete is easily diverted from the Construction & Demolition (C&D) waste stream. Below is what is primarily landfilled as C&D waste in Nova Scotia and it's not concrete:

(source NS gov)



Ask the Province about their problems with wood construction waste

Composite and Coated Wood

- Categories
  - Plywood, particle board, MDF, etc. Composed of glues and adhesives
  - Painted wood
  - Laminate wood i.e. laminated with plastics
- Very limited diversion potential
- Landfill site road amendment (traction)
- Landfill cover
- New R&D projects
  - Bulking agent in compost
- Other potential uses
  - Use to produce more composite wood

NOVA SCOTIA

Concrete is part of the solution – we use waste in our ingredients!

Recycled Industrial Byproducts

- Uses of industrial byproducts
  - Fly ash
  - Blast furnace slag
  - Silica fume
- Supplement a portion cement
- Otherwise end up in landfills
- Called supplementary cementitious materials (SCMs)
- Improves strength and durability
- Reduces CO_2 embodied in concrete
  - Typical values 15% to 40%
  - As much as 70%

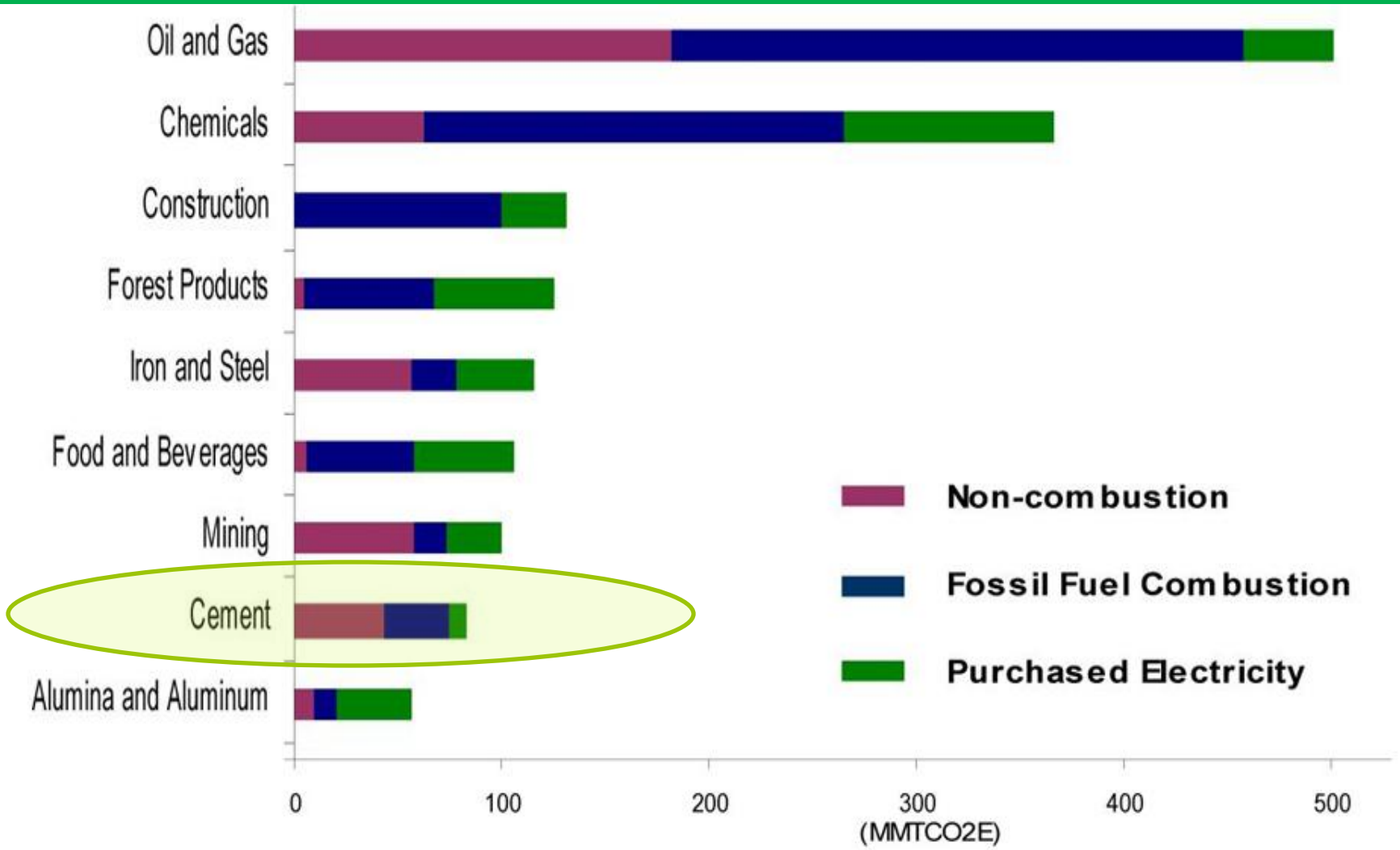
Concrete Construction

- Made specifically for each order
- Little to no waste is generated
- Short transport
- No shipping carton or wrapping
- Leftovers
  - landscaping blocks
  - Traffic barriers

How does concrete compare to other building materials?

- Concrete has low energy consumption and CO_2 emissions compared to:
  - Steel
  - Wood
  - Asphalt

How Big Are We?

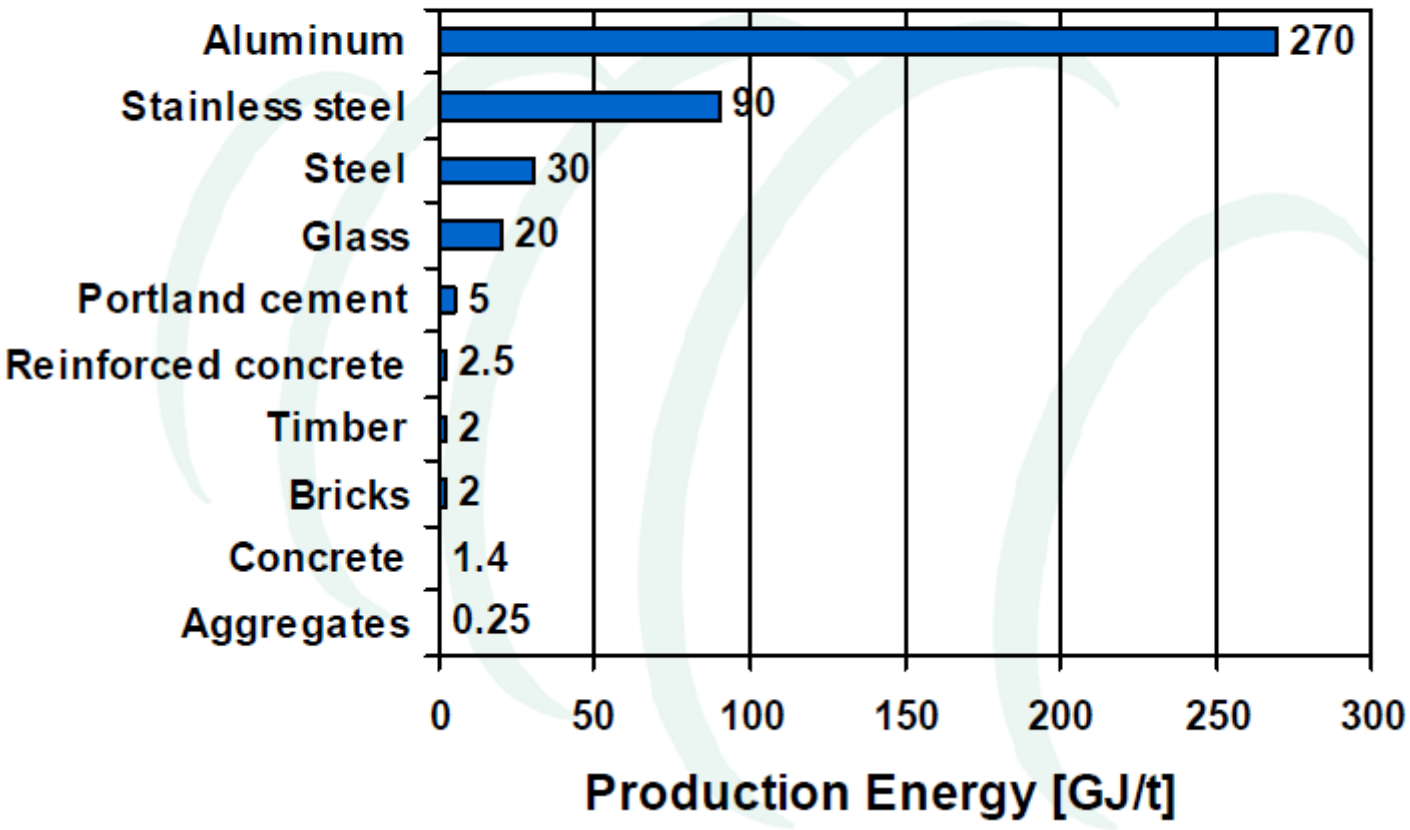


U.S. EPA, **"Quantifying Greenhouse Gas Emissions from Key Industrial Sectors in the United States, 2008 report**

Does concrete manufacturing produce CO_2?

- Water, sand, stone or gravel and other ingredients make up about 90% of concrete
- Mining sand and gravel, crushing stone, combining the materials and transportation concrete requires very little energy
- Emits a relatively small amount of CO_2
- Amounts of CO_2 embodied in concrete primarily function of cement content
- Structures are built with concrete and not cement

Energy of Production



Energy & Atmosphere
Operational Impact - Results

Concrete walls save energy and reduce costs

3 factors contribute to thermal performance

- **R-value**
- **Air infiltration**
- **Thermal Mass**

Greater R-value, more energy savings

- **Concrete = R 26.98**
- **Metal stud = R 11.49**

Concrete buildings use significantly less fuel for heating and cooling.

Concrete's thermal mass and conductivity properties lowers energy cost and emissions <u>up to 23% compared to wood</u>

Indoor Environmental Quality – we do it best

Indoor Air Quality

Building Material	*VOC Emission (mg/m^3h)*
Vinyl flooring	2.3
Particle board	2.0
Plywood	1.0
Acrylic Latex Paint	0.43
Linoleum	0.22
Carpet	0.080
Gypsum board	0.026
Concrete	0.003

Source: University of Western Ontario

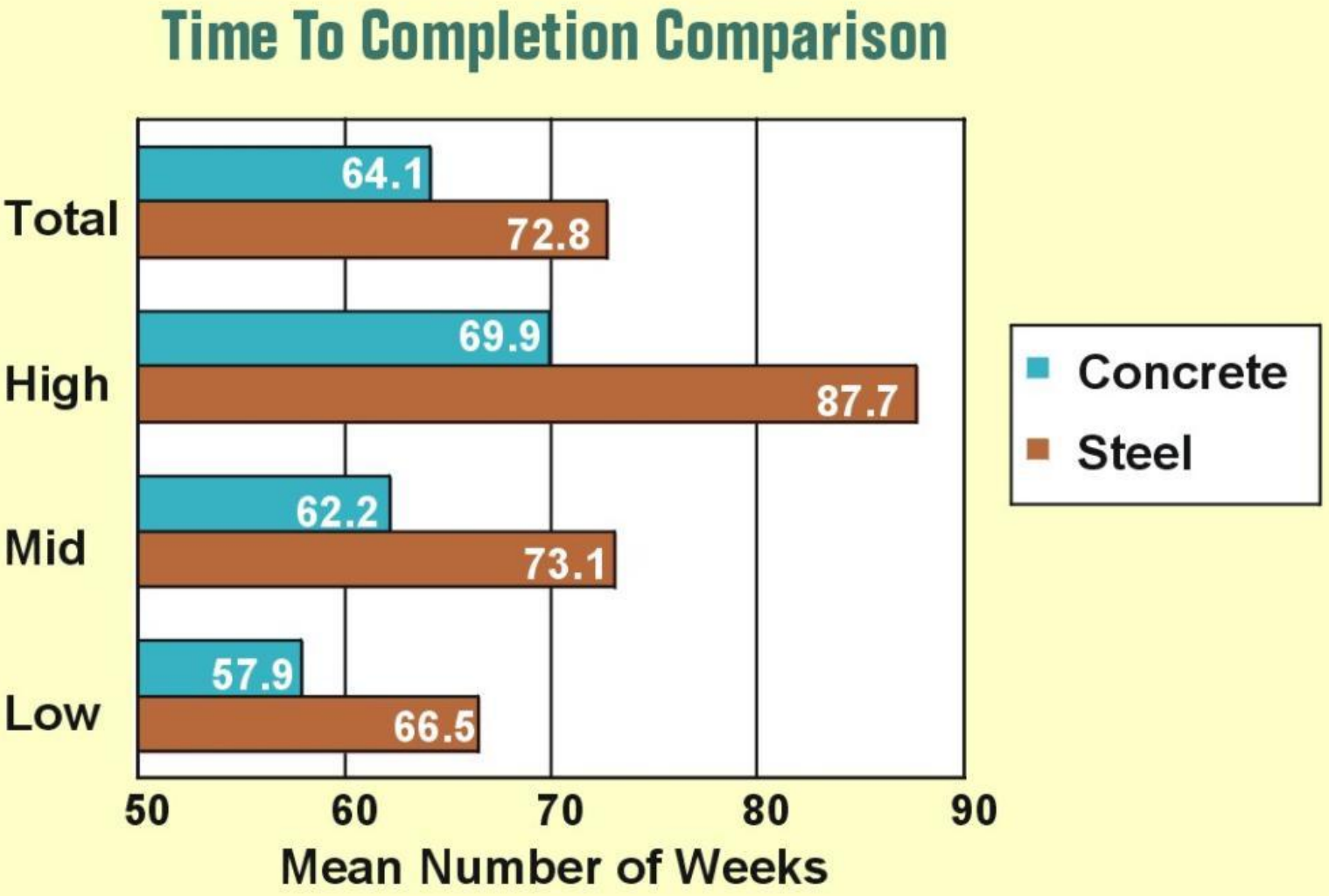
Longevity/Durability
What it means

Concrete is the most durable, long-lasting building product available.

Durable is Sustainable

- **Optimal material utilization– less waste from replacement**
- **Lower maintenance costs and construction congestion**
- **Lower total cost of ownership**
- **Long life = smaller eco-footprint**

Concrete Construction Saves Time



Concrete is Fire Resistant

- **History of good performance in fire**
- **Non-combustible**
- **Low thermal conductivity**
- **Maintains cool inner core during fires**

Missile Penetration Testing Debris

Hurricane and Tornado Resistance

Concrete is the leading choice for hurricane and tornado resistant structures

How Concrete Helps

Concrete structures have proven to withstand natural and man-made disasters.

Concrete products provide no food for mold growth

Local Investment in the Community

The concrete industry creates local high quality jobs

Energy Resources

Did you know?

Average distance between ready mix concrete manufacturing site and project site is only

30 kms?

Durability and Versatility

- Most widely used building material
- Extremely durable
  - Doesn't rot
  - Doesn't rust
  - Doesn't burn
- Low maintenance
- 2000 year track record of performance

In Conclusion

Concrete Structures over their lifecycle are efficient users of energy, water, land, human and other resources