Electric Vehicle Council of Ottawa

February 22, 2021

Electric Vehicle Council of Ottawa Monthly Meeting

Agenda

- Overview of agenda/introductions – Raymond Leury
  - Election update
- Energy and carbon in the hard to decarbonize sectors
- EV News – Mitchell House
- Past/Upcoming Events – Raymond Leury
- Round table

Election Update

- Raymond Leury – President
- Mike Banks – Vice President
- Gérard Gavrel – Treasurer
- Darren Robichaud – Corporate Secretary
- Nicolas Leury
- Matthew Eglin
- Mitchell House
- Craig Sweetnam

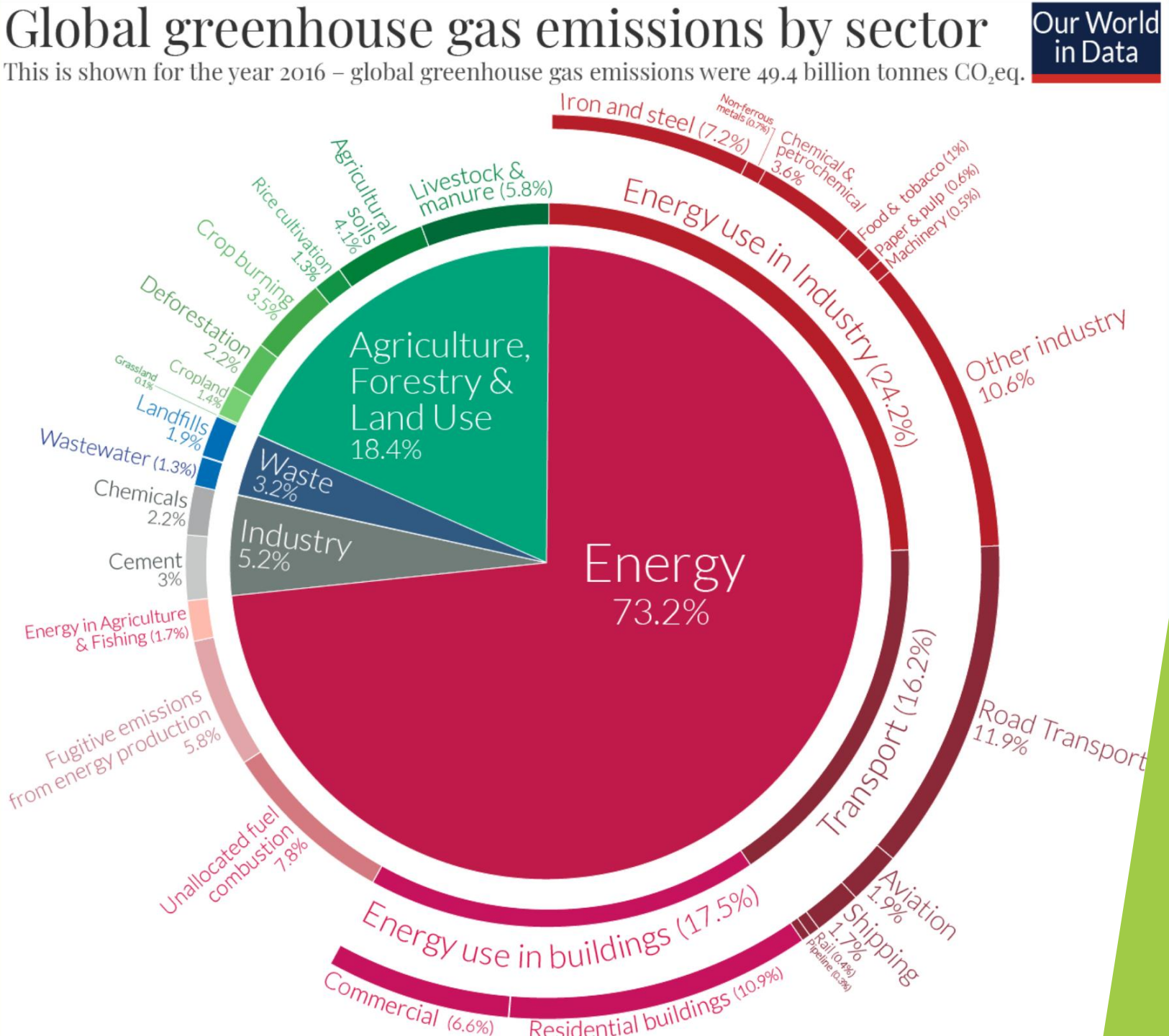
Energy and carbon in the hard to decarbonize sectors

Report on the

Decarb Connect Digital Festival 2021

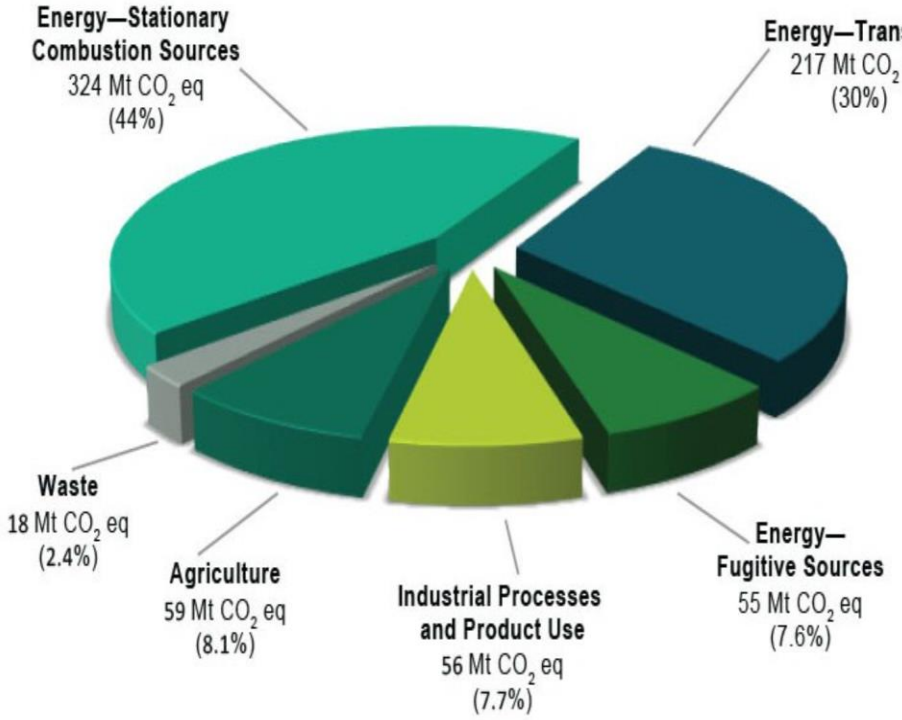
Worldwide GHG Numbers for 2016

- Cement 3+%...8%
- Energy use in industry – 24.2%
  - Iron and steel 7.2%
- Cement and steel
  - Embedded energy in our buildings
    - LRT has lots of concrete
  - Not counted in Energy Evolution Model



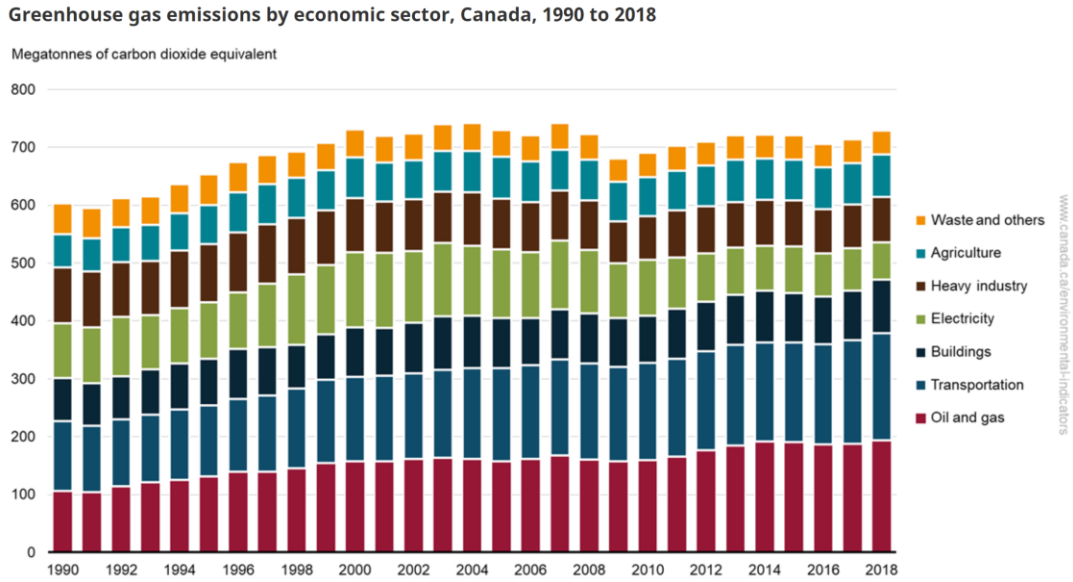
Canadian GHG numbers 2018

Figure ES–2: Breakdown of Canada's emissions by Intergovernmental Panel on Climate Change sector (2018)



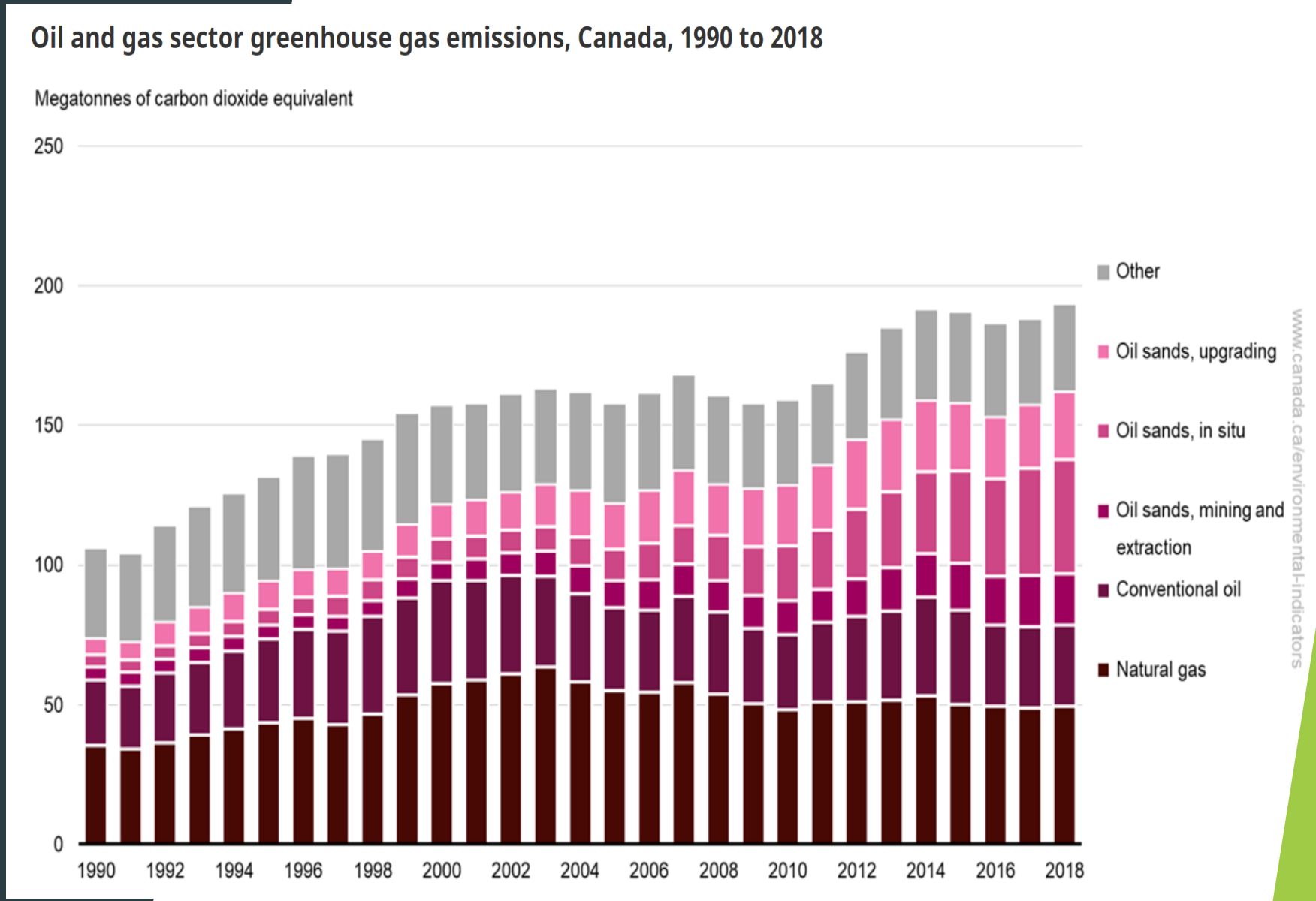
Canadian GHG for 2018

- Oil and Gas – 26%
- Transportation – 25%
- Buildings - 13%
- Electricity - 9%
- Heavy Industry – 11%
- Agriculture – 10%
- Waste – 6%



Oil and Gas Canada 2018

- ….going in the wrong direction



Decarb Connect Digital Festival 2021

- Focused on hard to decarbonize industries
  - Cement and steel in particular
  - Wide consensus that transport up to heavy duty trucks will be EV
- Key Points
  - Last year seems to have been a turning point for industry
  - **Volkswagen** is pursuing the goal of becoming balance sheet CO_2-neutral by 2050. See here.
  - By **2030 Microsoft** will be **carbon negative**, and by 2050 **Microsoft** will remove from the environment all the **carbon** the company has emitted either directly or by electrical consumption since it was founded in 1975. See here.
  - Focus needs to be on elimination of CO_2 production, not CCS
- PODCAST: How can we respond to, and deliver on, the EU Green Deal? - YouTube

Decarb Connect - Cement

- Concrete is made up of cement plus additives/fillers including sand and stone aggregates
- Concrete is one of the most used construction material
  - Inexpensive and versatile
- Production of cement generates CO_2
  - Chemical reaction
    - Exceedingly hard to get around this
  - The energy source – mostly methane - used for production emits CO_2

Cement Production

- Mix Limestone (mainly), sand, clay
  - Heat to 950^0C
    - $CaCO_3$ -> $CaO + CO_2$
    - 1 ton of $CaCO_3$ releases 440kg of CO_2
    - Need to remove the Carbon
  - Heat to 1450^0C
    - Ca_3SiO_5 – 50%
    - Ca_2SiO_4 - 25%
    - $Ca_3Al_2O_6$ - 12%
    - Ca_2AlFeO_5 - 3.5%
    - $CaSO_4\ 2H_2O$ - 3.5% (Gypsum)

Solutions - Chemistry

- Substitutes - Mass timber – sequesters carbon
- Geopolymer Cement
  - Fly ash and blast furnace slag
  - 80% reduction in CO_2
  - 3% of global cement production
  - Fly ash comes from coal plants…
- CCUS – Carbon Capture Utilization and Storage
  - What to do with the CO_2 which is captured?
- Low carbon cement
  - Curing with CO_2 instead of H_2O
  - Sequester it back into limestone
  - Concrete Carbon Capture. A pathway to net zero? - YouTube

Solutions - Energy

- Replacing Natural Gas
  - Biowaste
  - Non-recyclable waste
  - Electricity
  - Hydrogen
- Carbon offsets – I think we might run out ☺

Decarb Connect - Steel

- Alan Knight from ArcelorMittal
  - Will be 2100 by the time there is enough scrap steel to meet demand for new steel
  - Currently there is 5x more demand than available scrap, so that scrap can't be the only solution
  - Steel recycling rate is around 90%
  - **Primary steel is where there is a problem**
- Iron ore + coke + lime + heat in blast furnace
  - Steel and CO_2

Iron Ore

- Components
  - Magnetite - Fe_3O_4 – Used in blast furnace
  - Hematite - Fe_2O_3 – Used in blast furnace
  - Goethite - $FeO(OH).nH_2O$
  - Siderite - $FeCO_3$
- Need to eliminate Oxygen from ore to get the iron
  - Chemistry problem
  - Carbon used to combine with Oxygen -> CO_2
- Steel is iron with carbon added
  - Need to add carbon, hence addition of coke
  - Stronger than pure iron

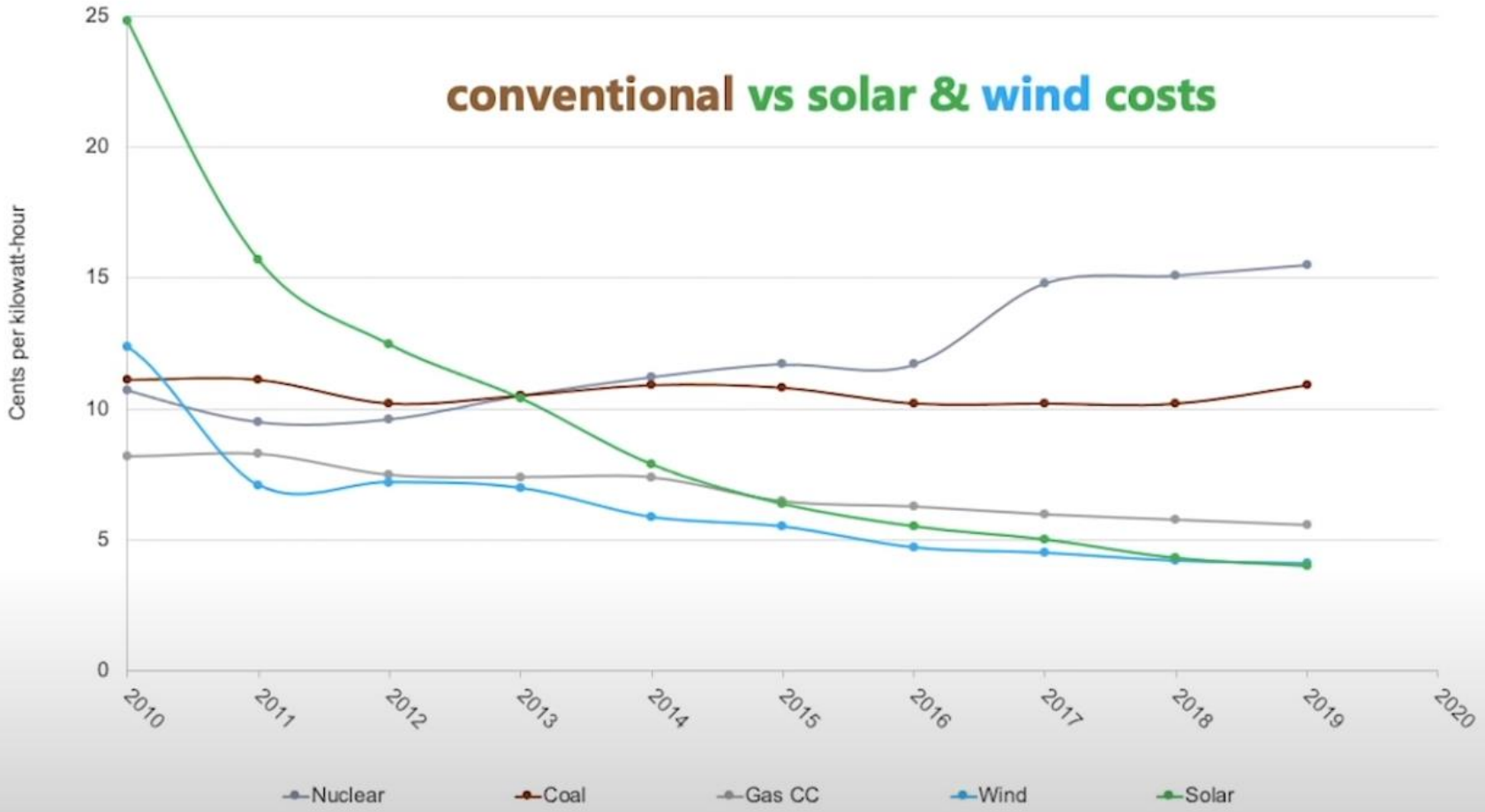
Solutions

- Scrap steel processed via Electric Arc Furnaces
  - 2/3 of US Steel production
  - Only meets 20% of world need
- Hydrogen reduction
  - Can be used to reduce Magnetite - Fe_3O_4 and Hematite - Fe_2O_3
    - $Fe_3O_4 + Fe_2O_3 + H_2$
    - $Fe + H_2O$
  - Heavily favored by industry
  - Still need to add carbon
- What is the source of hydrogen...
  - Brown hydrogen doesn't help – may be worse

Outside the box

- The price of green concrete and green steel is problematic
  - Government and industry needs to demand it
    - Lots of demand from the automotive industry – recall VW
  - Hydrogen is expensive to make steel or use as fuel for concrete
  - Green hydrogen needs to get much less expensive
  - R&D required to improve technologies
- Carbon Pricing
  - Required to ensure that non-carbon generating solutions are more economical
  - Levels the playing field
    - Between brown and green hydrogen in particular
  - Allows industry to determine best technical solutions
- Border carbon adjustments
  - Adjust for competitors in other jurisdictions

SOLAR, WIND ALREADY CHEAPEST SOURCES OF ENERGY



RethinkX

Sources: NextEra, GTM, Fool.com, RethinkX

Electric Vehicle Council of Ottawa

Electric Vehicle Society

EV News – February 2021

Summary

- Next-Gen Chevrolet Bolt & Bolt EUV
- Jaguar Zero-Emission Plan
- Ford Europe Zero-Emission Ambitions
- Shell EV Charging Stations

2022 Chevrolet Bolt and Bolt EUV

- $5,000 Cheaper Bolt (Starts at ~32,000 USD or 41,000 CAD)
- Bolt EUV adds rear leg room with overall longer vehicle and wheelbase
- Vehicle purchase comes with free home charger installation
- Same 65kWh battery pack for roughly 400 km range
- Wireless Apple Car Play/Android Auto, Autonomous SuperCruise

Jaguar Electrification Plan

- 6 all-electric models coming over the next 5 years, first to be launched in 2024
- 2.8 Billion Euros invested annually in transitioning to electric powertrains
- Jaguar intends to be 100% zero emission by 2030, Land Rover will be 60% emission free

Ford Zero Emissions for Europe

- Ford will begin producing zero emission vehicles in Europe by 2023
- First Ford EV to utilize VW's MEB platform
- 1 Billion USD investment to make Cologne plant capable of producing Evs
- All passenger vehicles to be plug-in or full electric by 2026, with 100% of sales to be all-electric by 2030
- All commercial vehicles to be zero-emission capable by 2024, and 2/3 of all sales to be plug-in or full electric by 2030
- Overall Ford Global investment of 22 Billion USD

Shell Zero-Emission Transmission

- Shell installing charging stations at existing gas stations
- Currently have 60,000, expanding to 500,000 by 2025
- Acquiring several different charging station providers
- Plans to sell 560 TWh of Renewable Energy by 2030 (Double Today's total)

Past Events

Reaching outside the bubble!

Electric Vehicle Council of Ottawa

Electric Vehicle Society

2021 VIRTUAL SHOWCASE RECAP

SMARTNet Sustainability Showcase & EV Exhibition

EVENT REGISTRATIONS	474
TOTAL LOG INS	430
TOTAL HOURS ONLINE	1496
TOTAL PAGE HITS	10223
SUSTAINABLE CONVERSATIONS	COUNTLESS

SMARTNet Alliance.ca

Accelerating Canada's Sustainable Economy

Electric Vehicle Council of Ottawa

Electric Vehicle Society

Electric Vehicle Council of Ottawa

Electric Vehicle Society

SMARTNet Alliance Virtual Sustainability Showcase – Jan 30th

- **11:30 E-buses in Ottawa – Raymond Leury**
- **Main stage – 12:30 – Demystifying EVs** - Raymond and Mike
  - **Why EVs are better than ICE vehicles**
- **1:30 Charging at home and on the road – Mitchell House**
- **2:30 EV's Currently Available in Canada – Mike Banks**
- **3:30 Mythbusting EV Misconceptions – Raymond Leury**
  - **Are EVs truly better for the environment**
- **4-5 - Networking area -** Transportation breakout Room

Electric Vehicle Council of Ottawa

Electric Vehicle Society

Virtual Booth Stats

- Main Stage recording:
- https://youtu.be/_xWVjlXJsb4?list=PLP7i0eO91qVDYhxUa0k7kybkqA1y-1nlf

	Unique	Total
EVCO - Booth/EV Area	202	629
EVCO - Meet/EV Area	110	291
EVCO - Download/EV Area	15	15
EVCO - Website/EV Area	12	13
EVCO - Video/EV Area	56	88

Upcoming Events

Electric Vehicle Council of Ottawa

Electric Vehicle Society

Upcoming Events - regular

March 11 - Green Drinks

Virtual via Zoom

http://bit.ly/GDOTTMar2021

March 29 - Next EVCO meeting

Upcoming Events

Electric Vehicle Council of Ottawa

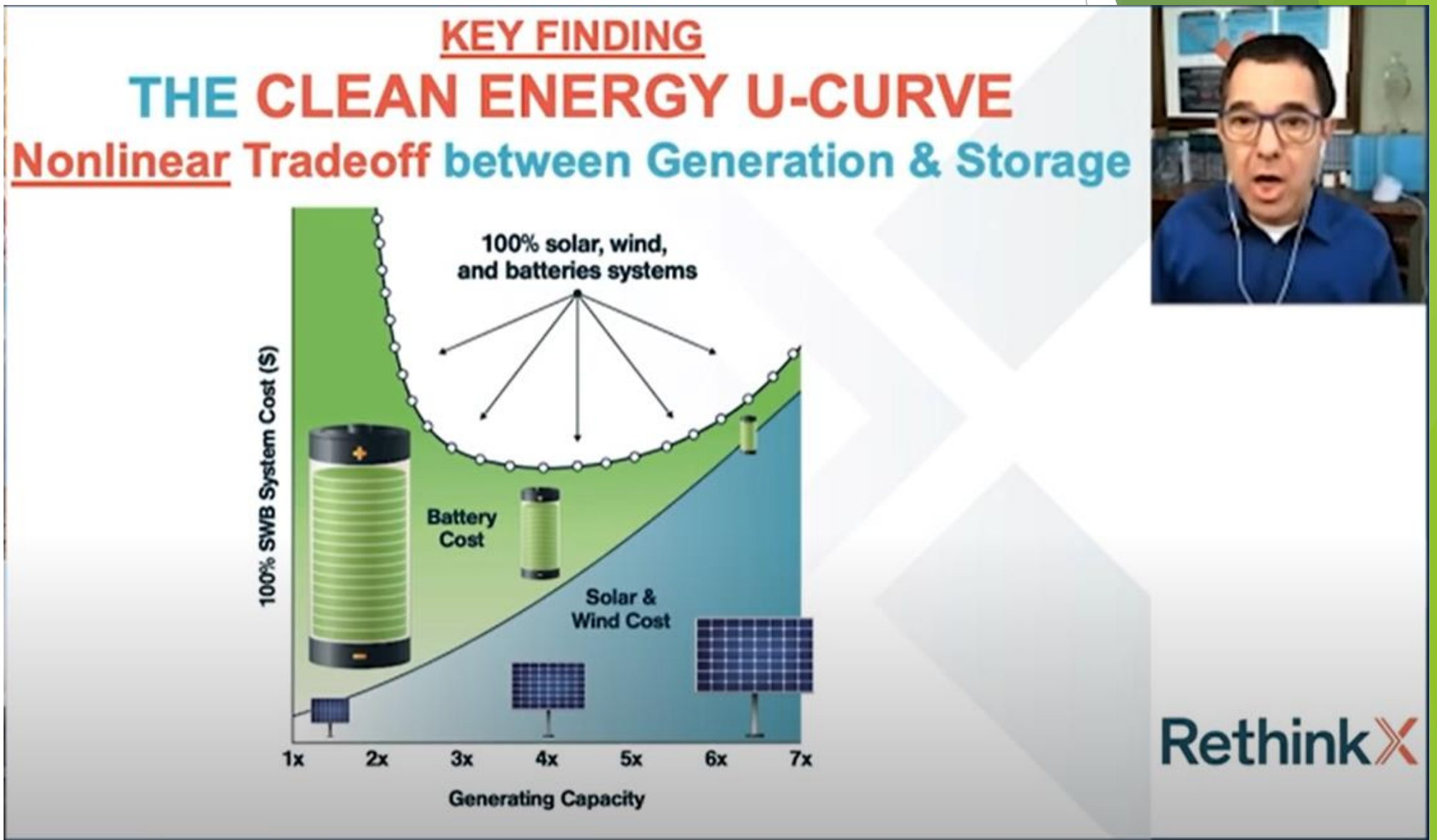
Electric Vehicle Society

Presentations

- If you would like to present at a future meeting:
  - Send me e-mail, I will send you the template
  - Provide your slides by the Sunday before the meeting
  - I will integrate into overall presentation

Roundtable!

- Rethinking Energy 2020-2030: 100% Solar, Wind, and Batteries is Just the Beginning - YouTube



Electric Vehicle Council of Ottawa

Electric Vehicle Society

Electric Vehicle Council of Ottawa