



The Bowman Centre For Sustainable Energy

Second Richard Marceau Energy Symposium

A collaboration of:

IEEE Canada EPEC2020

Canadian Academy of Engineering

Bowman Centre for Sustainable Energy

November 12, 2020



The Bowman Centre For Sustainable Energy

Thanks to our sponsors:

Dr. Ben Luan: Western University, Associate of BCSE

McGill University

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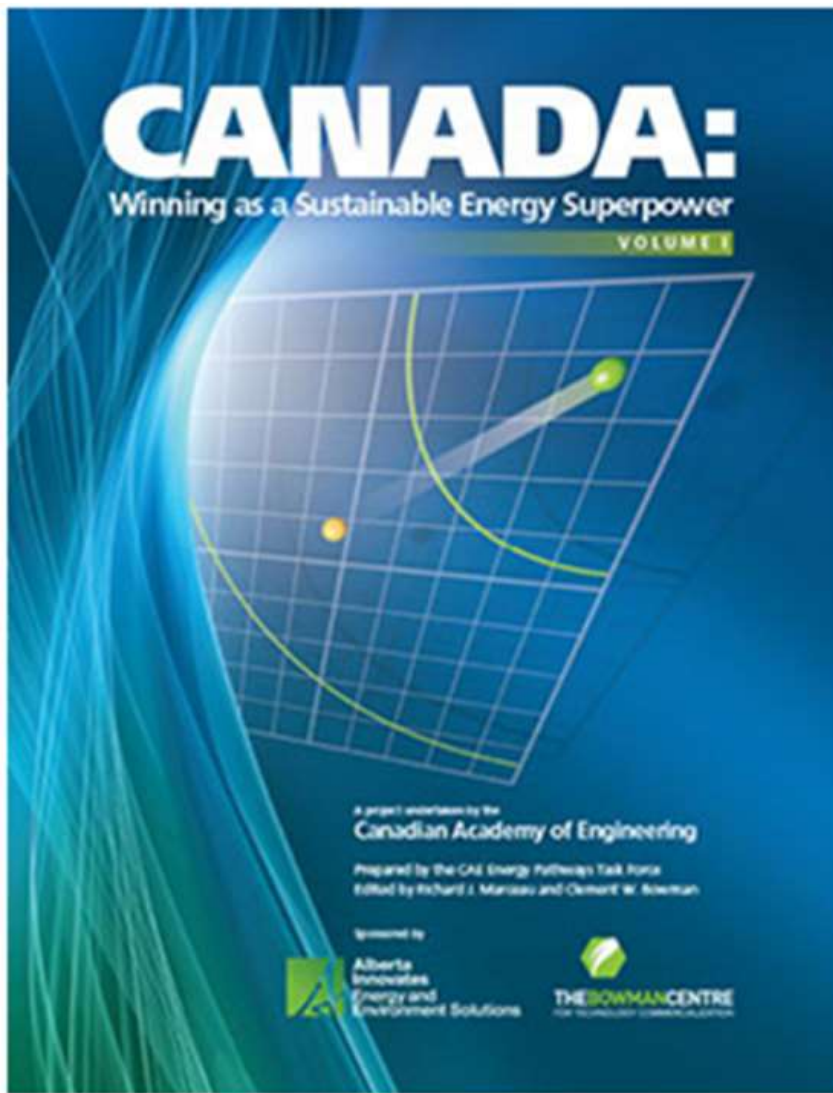
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National Electrical Corridor

Participation by Marshall Kern
President, Bowman Centre for Sustainable Energy
November 12, 2020

A National Electrical Grid

- We've been working this file for a decade
- We aren't the first.
- We aren't the only promoter!
 - C.D. Howe Institute
 - Canadian Electricity Association
 - Task Force for a Resilient Recovery
 - All major Federal political parties
 - *EPEC2020 Industry Panel*
 - *And others....*



“Canada’s electricity networks were historically designed and built on a province by province basis, with limited emphasis on provincial interconnections.”

2012

ISBN: 978-0-9730830-8-8

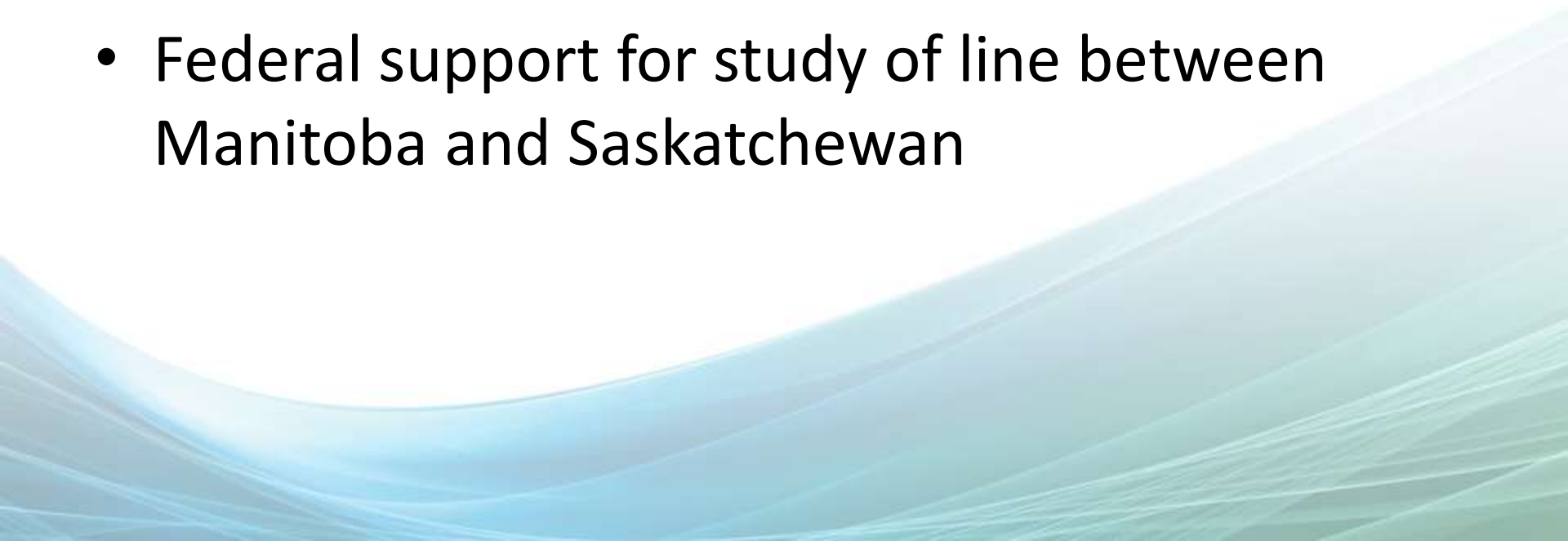


A	Lower Churchill River – Québec	2 lines	1,100 km
B	Québec – Fredericton	2 lines	1,000 km
C	Lower Churchill River – St John's	1 line	900 km
D	Fredericton – Halifax	1 line	700 km
E	Nelson River – Winnipeg	3 lines	800 km
F	Winnipeg – Regina – Saskatoon – Edmonton – Langdon	1 line	1,600 km
G	Winnipeg – Sudbury – Toronto	1 line	1,700 km
H	James Bay – Sudbury – Toronto	2 lines	1,400 km
J	Baie Comeau – Montréal – Toronto	1 line	1,200 km
K	Montréal – Ottawa – Toronto	1 line	500 km
L	Edmonton – Calgary – Vancouver	1 line	1,000 km

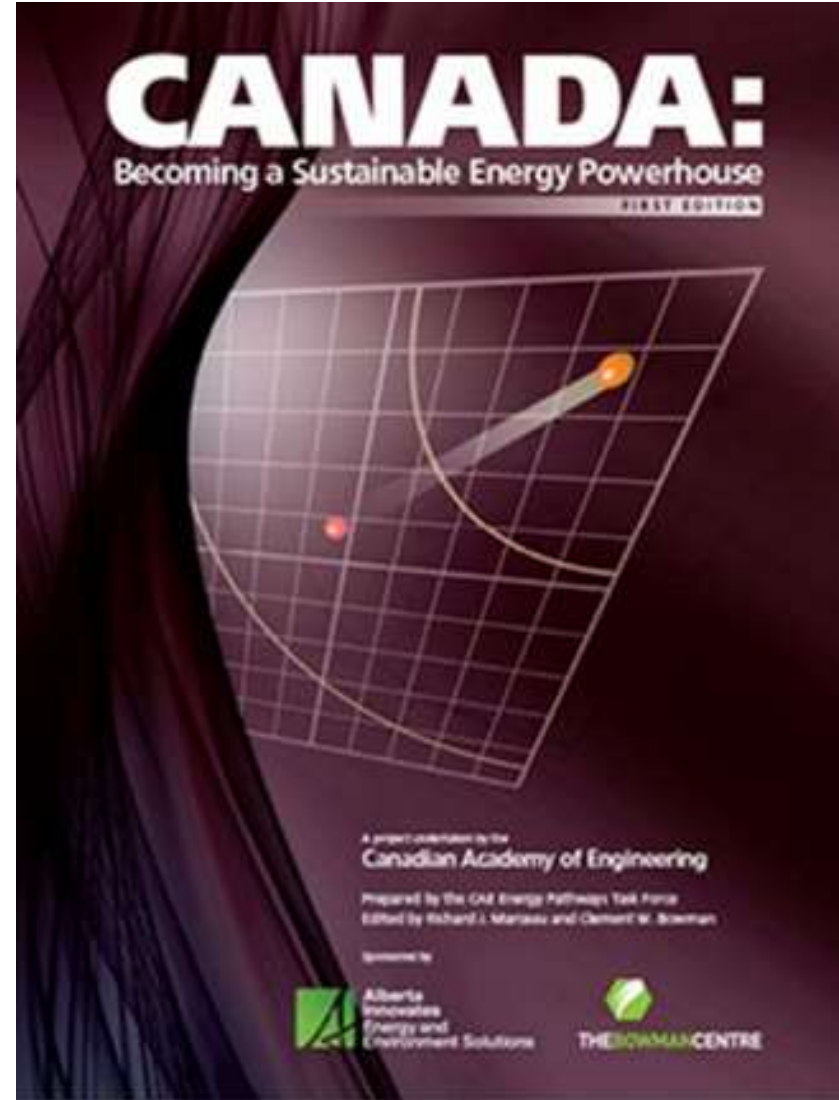
Total: 17,000 km

All km values approximate

And the scenario is still valid...

- Maritime Transmission Link: Newfoundland to Cape Breton (2018)
 - Canada Infrastructure Bank support for Northern Ontario transmission line
 - Federal support for study of line between Manitoba and Saskatchewan
- 

“Twinning Canada’s electricity trade strategy with climate change goals – through high value electricity production and transmission – has the potential to deliver economic prosperity with a much lower national carbon footprint.”



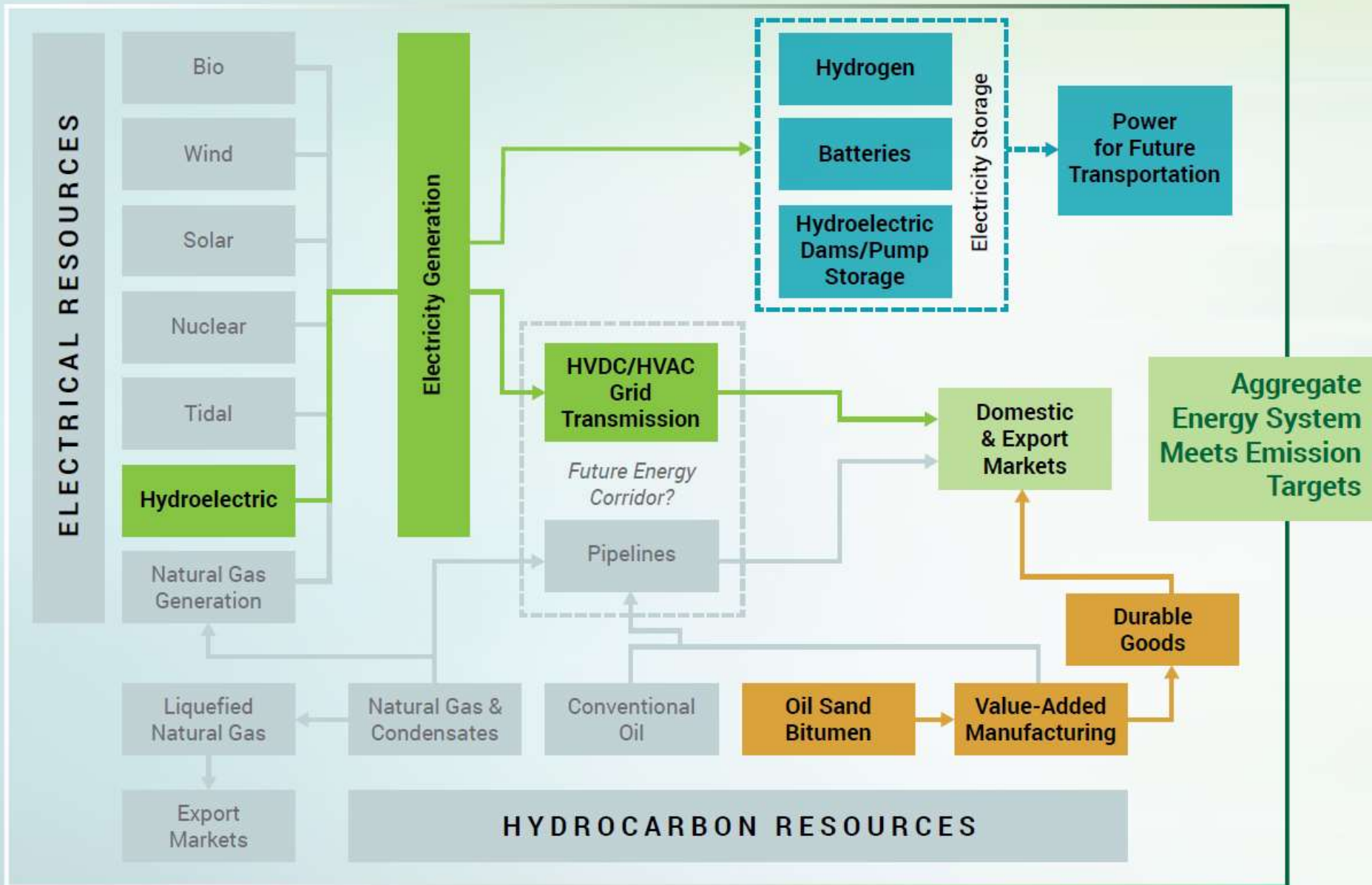
2014

ISBN: 978-1-928194-00-2



Source: "Canada: Becoming a Sustainable Energy Superpower"

Energy Linkages: Three Important "System Chains"

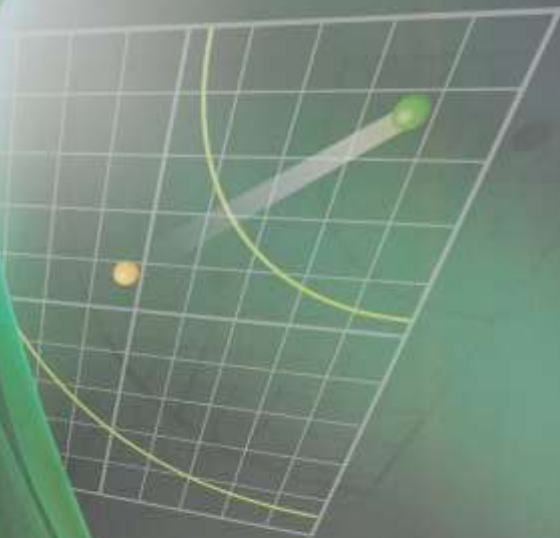


We proposed 3 'value-chains':

- 1) A hydro-electric chain with HVDC/HVAC transmission for domestic and export markets
- 2) Electricity storage with hydrogen, batteries, pumped storage and hydropower to provide energy for transportation, and
- 3) Non-fuel uses of Oil Sands bitumen

CANADA:

Making the Case for Nation-Building Projects



A project undertaken by:




The Bowman Centre
For Sustainable Energy

“Canada’s energy system should be envisioned as an integrated system.”


2019

ISBN: 978-0-9739339-6-3

Benefits:

- Productivity improvements as each link of a national electrical grid is built
 - Avoid stranded assets
 - Continue with nation-building
- 

New Research

- Assessments underway for each energy value chain
 - Reaching out to other think-tanks to share expertise and build a solid case
 - Contribute to new Impact Assessment Agency of Canada
- 

Where are we now?

- Canada needs a visionary leader
- Adjoining provinces need to cooperate to connect their respective grids
- Technical and governance solutions are needed for grid interfaces
- Overcome long lead times for infrastructure projects
- There are competing and conflicting scenarios



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Thank you for attending

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Dr. Yves Beauchamp

Ed Brost

Dean Jacobs

Peter Smith

Marshall Kern

Dr. Clem Bowman



- Founder of The Bowman Centre for Sustainable Energy
- Fellow of the Canadian Academy of Engineering
- Former President of AOSTRA

Dr. Richard Marceau (1953 – 2016)



- Associate of The Bowman Centre for Sustainable Energy
- Past-President of the Canadian Academy of Engineering
- VP of Research; Memorial University Newfoundland
- Past Provost and VP Academic at UOIT

EPEC2020



Website: <https://epec2020.ieee.ca/>

Conference Co-Chairs: Alexandre Nassif, and Dr. Pertr Musilek

Canadian Academy of Engineering

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