Paul Hawken is an environmentalist, entrepreneur, author and activist who has dedicated his life to environmental sustainability and changing the relationship between business and the environment. He is the author of **Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming**. The book is based on the work of researchers from around the world who identified, researched and modeled the 100 most substantive, existing solutions to address climate change. What was uncovered is a path forward that can roll back global warming within thirty years. It shows that humanity has the means at hand. Nothing new needs to be invented.

**August Actions**

1) **ACTION #1**: Pick **one** of these two actions to **focus** on this month

   i) **Ask local businesses and environmental groups to sign Canada's open letter**. This action is especially important for you to build local political will in your riding.

   ii) **Write Letters to the Editor**. Getting our local, regional, provincial and national newspapers on board for carbon pricing is another important lever of political will.

2) **ACTION #2**: Get ready for the CCL Canada Conference PART 2: Personally invite people to attend Canada's national conference AND give your MP a head's up that you will be lobbying her/him in October.

   In October we have an incredible opportunity to change the course of history in Canada by empowering our MPs and Senators with the political will we have generated for them. The more people that attend the more powerful we will be.

**For Online Warriors:**
For members who like to leave comments online please generate and uptick good carbon pricing ideas here. http://www.generationenergy.ca/ideas - especially our two submissions here and here.

Please don't forget to record your submissions in a field reports under “Personal letters to members of congress” https://community.citizensclimatelobby.org/field-reports/

**Deadlines for Canada’s National Conference**: October 21-24, 2017

1. Labour Day – Early bird registration closes. Register [here](#).
2. Friday, October 13, 2017: MP Bios due. Use this [MP bio outline sent to canada@citizensclimatelobby.org](mailto:canada@citizensclimatelobby.org)
3. Monday, October 16, 2017: All photocopying will be sent to the printers, thus MP bios must be in.
5. Starting in September, book an appointment to lobby with your MP by Tuesday, October 18, 2017. Send a note now though to give them a head's up.
6. Wednesday, October 18 – Friday, October 20 – days of travel and rest for the conference team. Thus, we will have limited contact via the internet and our workflow will be only what is absolutely necessary.
1) ACTION #1: Pick one of these two actions to focus on this month

i) Ask local businesses and environmental groups to sign Canada's open letter. This action was specifically asked of us by one our MPs. Thank you to the volunteers for your amazing and important work so far on gathering an impressive list of signatories. Your persistence, personal touch and social capital are changing the world. Marlo in Vancouver is tracking the data for us. Here is what he wrote in July:

On the week of July 16-22, we had 21 new signatories on our open letter. On July 24, we had more than 50 signatories in total. We could easily double or triple that amount if 50 of us get 1 or 2 signatories.

Successful approaches used by CCLers to get environmental groups, businesses or business associations to sign on are:
1. Speaking with a family member, friend, or neighbor.
2. Speaking with the following types of businesses: clean technology, farms at farmer’s markets, golf courses.
3. In BC, speaking with businesses that in 2016, signed on to an open letter supporting an increase in the BC carbon tax. Following up with the businesses was key.

We will present the open letter 10 weeks from now during our Parliament Hill lobbying. We will probably stop gathering signatures in early October, about 7 full weeks from now.

Here is a short and sweet email that we suggest you after you have spoke with someone:

Dear _______________________

Would you/your organization consider signing our Open Letter for Canada’s national carbon pricing to continue to rise past 2022, be economy-wide and include border carbon adjustments? It is agnostic on revenue recycling and types of carbon pricing.

Here is the letter: https://canada.citizensclimatelobby.org/open-letter-lettre-ouverte/
Here is the online form: https://canada.citizensclimatelobby.org/registration-form-formulaire-denregistrement/

ii) Write Letters to the Editor. Since July 1, our LTE writers across Canada published a record smashing 117 letters to the editors. If you like writing letters to the editor, please help us keep the momentum going for one more month. Getting our local, regional, provincial and national newspapers on board for the key elements in our carbon fee and dividend policy is an important lever of political will. With all political parties determining their policies in the lead-up to election 2019, this is the year to change the narrative on carbon pricing.

See the July 2017 Action Sheets and the All Things Media Tab on the Resources page on our website for hints on how to get lots of letters published.

2) ACTION #2: Get ready for the CCL Canada Conference PART 2

Personally invite people to attend Canada’s national conference AND give your MP a head’s up that you are coming to see them. This is the most important year for changing the narrative on carbon pricing in the lead-up to election 2019. There is strength in numbers. We need YOU! Plus, it is important to connect with each other. CCL volunteers are some of the best volunteers on the planet. Note on Labour Day, Monday, September 4, 2017 – early bird registration closes. Register here. If registration fees are a barrier to getting someone to the conference, please contact canada@citizensclimatelobby.org and we will send codes for reduced or free admissions. People must register online to attend.

Look for a special CCL Canada conference newsletter in the next couple weeks to help you invite your friend to our conference and to send to your MP. Most importantly though, phone and then email people your invitations.

Please note July we gave you a checklist of things to do to start getting ready for the conference. In September, we will all formally make appointments for lobbying our MPs and Senators in October.
SUMMARY OF THE CCS LASER TALKS

Carbon Capture and Storage (CCS) is a general term for a range of different industrial processes that can separate carbon dioxide (CO₂) emissions from smokestacks and store it underground indefinitely as toxic waste. CCL does not oppose or support any specific technologies. The science is clear, we will need to deploy CCS in order to avoid the 2C limit. When combined with biofuels, CCS can permanently reduce CO₂ levels in the atmosphere. Canada is a world leader in CCS. Without policy support such as adequate carbon pricing, CCS deployed at scales required to meet climate targets is unlikely. https://www.nature.com/articles/nenergy2017141

LASER TALK: Carbon Capture and Storage Technology

Carbon Capture and Storage (CCS) is a general term for a range of different industrial processes that can separate carbon dioxide (CO₂) emissions from smokestacks and store it underground indefinitely as toxic waste. CCS can reduce and even eliminate carbon emissions from power plants, refineries, cement kilns, steel furnaces, and other industrial facilities. When combined with biofuels, it can permanently reduce CO₂ levels in the atmosphere.¹ Canada is a world leader in CCS technology.²

CO₂ emissions are usually mixed with nitrogen, water vapour, and other flue gases which must be separated out. This accounts for three-quarters of the cost of CCS.³ Research is still ongoing to find the “best” ways to do this.⁴ Some industrial processes (e.g., calcination) have very pure CO₂ exhaust that is easier to capture with less expensive equipment. But in most cases, chemicals must be separated either before (e.g., oxyfuel combustion) or after (e.g., amine gas treatment) combustion. The biochar process reduces the carbon to a solid instead of CO₂ gas, but it comes with a heavy energy penalty. Some small- scale experimental systems feed the exhaust to algae and let photosynthesis extract the CO₂.

Solid carbon can be buried at shallow depths, but CO₂ gas must be stored deep underground. Most of the CO₂ captured today is injected into oil wells for Enhanced Oil Recovery, (EOR) which should properly be called Carbon Capture and Utilization (CCU).⁵ Several truly permanent storage options are being tested to evaluate their costs, availability, capacity and longevity. These include saline aquifers, depleted gas wells, basaltic rock, and biochar. There is not yet any guarantee that widely feasible solutions exists, but there have been some notably successful demonstrations. Norway’s Sleipner project has been pumping 1 MtCO₂ per year into the Utlsira saline aquifer since 1996 for $17 per ton, and seismometry, gravimetry, and seabed surveys show that the CO₂ is not leaking.⁶

The fossil industry has historically pursued CCU to increase fossil fuel production, because it was profitable to do so. But the right economic incentives can promote the development of true CCS variants that reduce emissions.⁷ The Pembina Institute cautiously supports CCS as part of a portfolio of solutions if it works as planned, and governments share ownership.⁸⁹ CCL is technology neutral, but wants carbon pricing to distinguish between the different kinds of CCS based on their actual carbon impact.

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¹ CCL Laser Talk on Carbon Capture, Storage, Utilization and Removal
² CCL Laser Talk on Carbon Capture and Storage in Canada
⁷ CCL Laser Talk on Carbon Capture and Storage Subsidies
⁸ “The Pembina Institute’s Perspective on Carbon Capture and Storage (CCS)”, Pembina Institute, Feb 19, 2009 http://www.pembina.org/pub/1787
LASER TALK: Carbon Capture, Storage, Utilization and Removal

Carbon capture can be used to increase, decrease, or even reverse carbon emissions, depending on how the technology is applied.\(^1\) It can be used to bury carbon dioxide (\(\text{CO}_2\)) permanently underground, instead of releasing it into the atmosphere. But it was first developed and is primarily used to assist fossil fuel production, while increasing emissions. In the future, it may be used not just to prevent emissions, but to actually remove \(\text{CO}_2\) from the atmosphere. Large-scale Carbon Dioxide Removal (CDR) of some kind is necessary to keep the Earth within 2°C of pre-industrial temperatures.\(^2\)

The main difference between good or bad CCS is where the carbon goes after capture. Most captured \(\text{CO}_2\) is used for Enhanced Oil Recovery (EOR) rather than being stored. This generally brings more carbon to the surface than is injected into the ground.\(^3\) Acid gas disposal and biogenic coalbed methane are similarly polluting. These projects are properly called Carbon Capture and Utilization (CCU), while true Carbon Capture and Storage (CCS) does not draw any new fossil fuels in exchange for the injection.\(^4\) True CCS locks the carbon in saline aquifers, depleted gas wells, basaltic rock, or biochar.

It also matters where the captured carbon came from. CCS is often used to justify new fossil fuel infrastructure, even though it will only capture a fraction of the new emissions. But if it is retrofitted onto existing facilities, it can act as a bridge technology.\(^5\) It can even produce negative emissions if installed on a biofuel plant. Without CCS, bioenergy is carbon neutral because biomass absorb as much carbon while growing as it emits when burned. But if bioenergy emissions are captured and stored, (BECCS) the overall cycle permanently removes \(\text{CO}_2\) from the atmosphere. The Illinois Decatur plant is the first in the world to test this idea. Unfortunately, the corn grown for Decatur competes for land with food production and forests. Land use can be minimized with second-generation biofuels made from agricultural waste or grown on marginal land, but land will always limit the deployment of BECCS.\(^6\) It can assist, but not replace, global reductions in fossil fuel emissions.

Reforestation is a more natural way to achieve CDR, but its potential is even more limited by productive land area.\(^7\) Other CDR options such as ocean fertilization are less reliable and carry risks of unintended consequences.\(^8\) BECCS has great potential with low risks, but it needs subsidies to gain a financial advantage over fossil fuel CCS and over freely emitting biofuels.\(^9\)

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1. See CCL Laser Talk on Carbon Capture and Storage Technology for more details on how it works.
2. “Large-scale deployment of CDR technologies is relied upon in many 2°C scenarios in the second-half of the century.” IPCC 5\(^{th}\) Assessment Report, Working Group III, Chapter 6, p. 419
3. For example, Canada’s Weyburn oilfield production is increased by 18000 barrels/day by injecting 6500 ton/day of \(\text{CO}_2\). The extra production turns into 7700 ton/day of \(\text{CO}_2\) when it is eventually burned. A third of the injected \(\text{CO}_2\) returns to the surface, but is then captured and reinjected. [http://ccs101.ca/ccs_pro/ccs_projects/commercial_projects](http://ccs101.ca/ccs_pro/ccs_projects/commercial_projects)
5. “The CCS can also act as bridge technology that is compatible with existing fossil-fuel dominated supply structures.” IPCC 5\(^{th}\) Assessment Report, Working Group III, Chapter 6, p. 453
6. “Both BECCS and afforestation may play a key role in reaching low-GHG concentrations, but at a large scale have substantial land-use demands that may conflict with other mitigation strategies and societal needs such as food production.” IPCC 5\(^{th}\) Assessment Report, Working Group III, Chapter 6, p. 489
7. “An order of magnitude of the upper potential of afforestation/reforestation would be the restoration of all the carbon released by historical land use (180 ± 80 PgC). [...] the atmospheric CO2 concentration by 2100 would be lowered by only about 40 to 70 ppm in that scenario.” IPCC 5\(^{th}\) Assessment Report, Working Group I, Chapter 6, p. 547.
8. “Most assessments agree that geoengineering technologies should not be treated as a replacement for conventional mitigation and adaptation due to the high costs [...] and the potential risks, or pervasive uncertainties involved with nearly all techniques” IPCC 5\(^{th}\) Assessment Report, Working Group III, Chapter 6, p. 484.
9. CCL Laser Talk on Carbon Capture and Storage Subsidies
LASER TALK: Carbon Capture and Storage in Canada

The global Carbon Capture and Storage (CCS) industry already captures 40 MtCO₂ per year, about 0.1% of global emissions.¹ Canadian projects already make up 12% of that figure, and even larger projects are coming. The Fort Nelson Gas Plant will capture 2 MtCO₂ per year, and the Alberta Carbon Trunk Line (ACTL) will add up to another 15 MtCO₂ per year. Canada is a world leader in CCS technology and has already broken three world records:

- The world’s first full-scale CCS electric plant (Boundary Dam)
- The most cumulative carbon stored to date (Weyburn-Midale)
- The largest annual flow rate into a saline aquifer (Quest / Scotford)

SaskPower made global headlines in 2014 when Boundary Dam unit 3 (BD3, of six) became the first commercial electricity plant with CCS. This was a retrofit onto a preexisting coal plant, demonstrating that emissions can be drastically reduced without stranding expensive assets and laying off workers. As of summer 2017, its CCS system continues to face reliability problems. In spite of this, BD3 output averaged 108 MW at 0.3 kgCO₂ per kWh in 2016.² This is as much power as a typical gas turbine but with much lower CO₂ emissions and a competitive levelized cost of electricity of 8¢/kWh.³ Emissions are expected to fall to 0.1 kgCO₂ per kWh of electricity if the system can be refit to work as designed.⁴

Federal and provincial subsidies to the project amount to $57/ton of CO₂ captured over the 30-year life of the project.⁵ (However, the 2016 cost was closer to $92/ton due to reliability problems.⁶) No private company would have taken on such costs without subsidies.⁷

Some of Boundary Dam’s CO₂ has been injected into the Aquistore saline aquifer, but most of it is sent to the Weyburn field.⁸ The Weyburn-Midale oilfield collects CO₂ from several CCS projects since 2000 and uses it for Enhanced Oil Recovery. EOR brings more carbon to the surface than is sent down.⁹ This field held the world record for most cumulative carbon injected until recently.

There are half a dozen other CCS projects ongoing in Canada, of which we can only detail the most noteworthy. The Quest project built in 2015 takes 1 MtCO₂ per year from the Scotford oil sands upgrader and stores it permanently in a saline aquifer for $45/ton. Quest narrowly beats out Norway’s Sleipner-Utsira for the highest flow rate into a saline aquifer in the world, but that record will soon be upset again by B.C.’s Fort Nelson Gas Plant. A startup called Pond Biofuels developed a novel algae capture system in 2016 for St. Marys Cement plant, capturing 0.04 MtCO₂ per year for $30/ton.

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1 “The Global Status of CCS 2016”, Global CCS Institute
(1.1 MtCO₂ (spec.) – 0.793 MtCO₂ (reported)) / (108 MW X 366 days X 24 hr/day) = 0.3 kg/kWh
6 Author’s calculations, based on actual capture and cost overruns. ( $57/t X 1 MtCO₂ (spec.) + $20M - $5M + $1.2m ) / 0.793 MtCO₂ (reported) = $92/ton “SaskPower spending more to capture carbon than expected”, Stefani Langenegger, CBC News, Dec 14, 2016, http://www.cbc.ca/news/canada/saskatchewan/saskpower-carbon-capture-1.3896487
7 CCL Laser Talk on CCS Subsidies
8 CCL Laser Talk on Carbon Capture, Storage, Utilization and Removal
LASER TALK: Carbon Capture and Storage Subsidies

CCL does not oppose or support any specific technologies. We want to put economic incentives in place and leverage the power of the free market to find the cheapest way to bring carbon dioxide (CO₂) levels back down to 350 ppm from current level that are already above 400 ppm. But we also respect scientists, and they say that Carbon Capture and Storage (CCS) is essential to meeting that goal and staying within 2°C of pre-industrial temperatures.¹ One test of a scientifically sound technology-neutral policy would then be to check if the policy would encourage CCS deployment.

CCS is needed because even if we could shut off all fossil fuel and other human-caused emissions today, CO₂ levels would take hundreds of thousands of years to return to normal by themselves.² This is not nearly fast enough. We still have to shut down fossil emissions, but we also need active carbon dioxide removal from the atmosphere.³ We can potentially remove about 50 ppm with better farming practices and reforestation.⁴ Beyond that, biofuels with CCS are our best hope to do the rest. This is a scientific conclusion repeated in the IPCC reports, James Hansen's papers, and the Stern review.

CCS systems will always be much more expensive than a simple smokestack that just dumps its exhaust into the atmosphere, and will always need financial incentives to compete.⁵ Before Saskatchewan’s Boundary Dam, Alberta cancelled a similar CCS retrofit in 2012, citing uncertainty about the price of CO₂ and the value of emissions credits.⁶ The Canadian federal government has since given $400M to various CCS developments, and provinces have given much more.⁷ The IISD calls these grants direct subsidies to the fossil fuel industry.⁸ The Ecofiscal Commission warns that a singular focus on CCS is problematic.⁹ CCL Canada suggests it would be more efficient to give a subsidy for each ton of CO₂ sequestered, comparable to the fee we want to apply to every ton extracted. The REMI study assumed such a subsidy, and their conclusions depend on the construction of CCS.¹⁰

¹ “For concentration goals on the order of 430-530 ppm CO₂eq by 2100, BECCS forms an essential component of the response strategy for climate change in the majority of scenarios in the literature, particularly in the context of concentration overshoot.” (Note the units: 2016 levels were 403 ppm CO₂ but already 489 ppm CO₂eq) IPCC AR5 WG III Chapter 6 Section 6.9.1.2, https://www.ipcc.ch/report/ar5/wg3/
² “The removal of human-emitted CO2 from the atmosphere by natural processes will take a few hundred thousand years” IPCC AR5 WG I Ch. 6 Executive Summary, Box 6.1, and FAQ 6.2. https://www.ipcc.ch/report/ar5/wg1/
³ CCL Laser Talk on Carbon Capture, Storage, Utilization, and Removal
⁵ “CCS technologies applied in the power sector will only become competitive with their freely emitting (i.e., unabated) counterparts if the additional investment and operational costs associated with the CCS technology are compensated for by sufficiently high carbon prices or direct financial support.” IPCC AR5 WG III Ch. 7 Section 7.12.1 https://www.ipcc.ch/report/ar5/wg3/
⁷ CCL Laser Talk on Carbon Capture and Storage in Canada
¹⁰ “Toward the end of the study period, the demands placed on the system by increasingly intermittent resources—coupled with increasingly large carbon taxes—result in the reintroduction, beginning, and then the significant expansion of low- carbon base-load technologies such as nuclear plants and natural gas with carbon capture and storage (CCS) at an industrial scale.” - “The Economic, Climate, Fiscal, Power, and Demographic Impact of a National Fee-and-Dividend Carbon Tax”, REMI, June 9 2014, p. 53 https://www.dropbox.com/s/22lrkkd4af4a8fh/The-Economic-Climate-Fiscal- Power-and-Demographic-Impact-of-a-National-Fee-and-Dividend-Carbon-Tax-6.9.14.pdf?dl=0
### All CCL International Calls are on Zoom

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**NEED SUPPORT:** Zoom’s tech support line is 888.799.9666 first. CCL’s Meeting ID is 2017201717
If Zoom cannot resolve your issue, then contact it@citizensclimate.org

### CCL CANADA Monthly Busy Calls- Pick one call and get to know what is going on

- **Thursday, August 10, 2017:** 6 pm PDT/ 9 pm EDT ... note your time zones
- **Friday, August 11, 2017:** 8 am PDT/ 11 am EDT ... note time zones
- **Monday, August 14, 2017:** 6 pm PDT/ 9 pm EDT ... note your time zones* [https://www.timeanddate.com/time/zone/canada](https://www.timeanddate.com/time/zone/canada)

**You only need to attend one call.**
**Please sign the Doodler:** [https://doodle.com/poll/rstmbiapspaqg6bp](https://doodle.com/poll/rstmbiapspaqg6bp)

**Location:** Canadian Uberconference Line, 1-888-570-6238 - no pin required or log in online or call for free: [https://www.uberconference.com/citizensclimatelobbycanada](https://www.uberconference.com/citizensclimatelobbycanada)
Feel free to invite your volunteers.

### Special CCL Canada Education Call - at the end of the month - We need to pick one time to meet.

**Carbon Capture and Sequestration with Yannick Trottier**

Location: **Zoom Room 3920795005**

Note this call will be on our Zoom Line that we share with Australia - Join from PC, Mac, Linux, iOS or Android: [https://citizensclimate.zoom.us/j/3920795005](https://citizensclimate.zoom.us/j/3920795005)
Or iPhone one-tap (US Toll): +16465588656,3920795005# or +14086380968,3920795005#

**THERE ARE FOUR CHOICES – Please sign doodler by Tuesday, August 15**

- **Tuesday, August 29, 2017** at either 1 pm PT / 4 pm ET or 4 pm PT / 7 pm ET
- **or Thursday, August 31, 2017** 1 pm PT / 4 pm ET or 4 pm PT / 7 pm ET

**Please**
- **sign the Doodler** [https://doodle.com/poll/gp6vzurd77e4z732](https://doodle.com/poll/gp6vzurd77e4z732)
- **note your time zones:** [https://www.timeanddate.com/time/zone/canada](https://www.timeanddate.com/time/zone/canada)
- **feel free to invite your volunteers.**
- **note there will be only one call**