



Methane emission mitigation by municipalities

WITH SPECIAL GUEST ROBERT HOWARTH FROM CORNELL UNIVERSITY

"THE GREENHOUSE GAS FOOTPRINT OF SHALE GAS IS WORSE THAN THAT OF COAL, WHEN METHANE EMISSIONS ARE CONSIDERED..."

TODAY'S SPECIAL GUEST AND METHANE EXPERT PROFESSOR ROBERT HOWARTH AND WEBINAR HOST BRUCE (BF) NAGY WILL REVIEW IDEAS FOR MUNICIPALITIES TO REDUCE METHANE, PARTICULARLY BY ACCELERATING THE MOVE AWAY FROM GAS AND TOWARDS BENEFICIAL ELECTRIFICATION WITH HEAT PUMPS.

AND BY BETTER MANAGEMENT OF WASTE FOOD, PAPER, AND CONSTRUCTION DEBRIS. METHANE EMISSION MITIGATION IS ONE OF OUR MOST CRUCIAL CLIMATE STRATEGIES FOR THE 2030s.

TUES NOV 8 | 7:00 PM EASTERN / 4:00 PM PACIFIC



Clean Air Partnership

CLIMATE SOLUTIONS WEBINAR SERIES



TODAY

BRUCE NAGY - ABOUT 20 MINS

- ◇ GLOBAL METHANE POLICY TRENDS
- ◇ ROLE OF LOCAL GOVERNMENT, NATIONAL GOVERNMENTS
- ◇ EXAMPLES: HEAT PUMPS, AGRICULTURE AND FOOD POLICY

PROF. ROBERT HOWARTH - ABOUT 30 MINS

- ◇ GLOBAL CARBON BUDGET
- ◇ METHANE SCIENCE
- ◇ BUILDINGS, LANDFILL, FUGITIVE EMISSIONS
- ◇ CASE EXAMPLE - NEW YORK ADVISORY COUNCIL



CAP CLIMATE SOLUTIONS WEBINAR SERIES

WITH HOST BRUCE (BF) NAGY



**Clean energy technology & disinformation
with Professor Mark Jacobson, Stanford, May 11 2022**



**How new USA climate laws affect North American
municipalities & citizens, Bruce (BF) Nagy, Thurs Oct 27, 2022**



**Methane emission mitigation by municipalities
With Prof Robert Howarth, Cornell Tues Nov 8 2022**

Coming up:



**Europe & UK Update With Prof Peter Strachan, RGU Scotland
How has the war in the Ukraine affected climate policy
REGISTER NOW: Tues Nov 22, 2:00 PM Eastern | 6:00 PM GMT (Scotland)**



CLIMATE SOLUTIONS WEBINAR SERIES



TODAY'S GUEST PRESENTER
ROBERT HOWARTH PHD



CORNELL'S PROFESSOR ROBERT HOWARTH IS AN INTERNATIONALLY RENOWNED RESEARCH SCIENTIST, PROFESSOR OF ECOLOGY & ENVIRONMENTAL BIOLOGY, JOURNAL EDITOR AND ADVISOR TO GOVERNMENTS.

TIME MAGAZINE NAMED HIM IN ITS "50 PEOPLE WHO MATTER" 2011 PERSON OF THE YEAR ISSUE. HE WAS A SPEAKER AT COP26 AND IS CURRENTLY AT WORK ON NEW YORK STATE'S CLIMATE ACTION COUNCIL.

HE HAS PUBLISHED OVER 200 SCIENTIFIC PAPERS, AND HIS WORK HAS BEEN CITED IN THOUSANDS MORE.

***Thank you to ROBERT HOWARTH
and also to Gaby Kalapos & webinar manager Desislava Stefanova from the Clean Air Partnership.***

BRUCE (BF) NAGY

CLIMATE SOLUTIONS

- ◇ COLUMNIST, SPEAKER, CONSULTANT
- ◇ AUTHOR 250+ ARTICLES ON CLIMATE SOLUTIONS
- ◇ AUTHOR OF *THE CLEAN ENERGY AGE*, ROWMAN & LITTLEFIELD



PLEASE LOOK FOR MY FEATURE IN AN UPCOMING EDITION OF *CORPORATE KNIGHTS* MAGAZINE ON NORTH AMERICAN GREEN BUILDINGS AT SCALE.

SOLUTIONS, PRIORITIES, CASE EXAMPLES



BUILDINGS
NEW & RETROFIT TECHNOLOGY & PROGRAMS



TRANSPORTATION
ELECTRIC FLEETS, INFRASTRUCTURE & TRANSIT VEHICLES

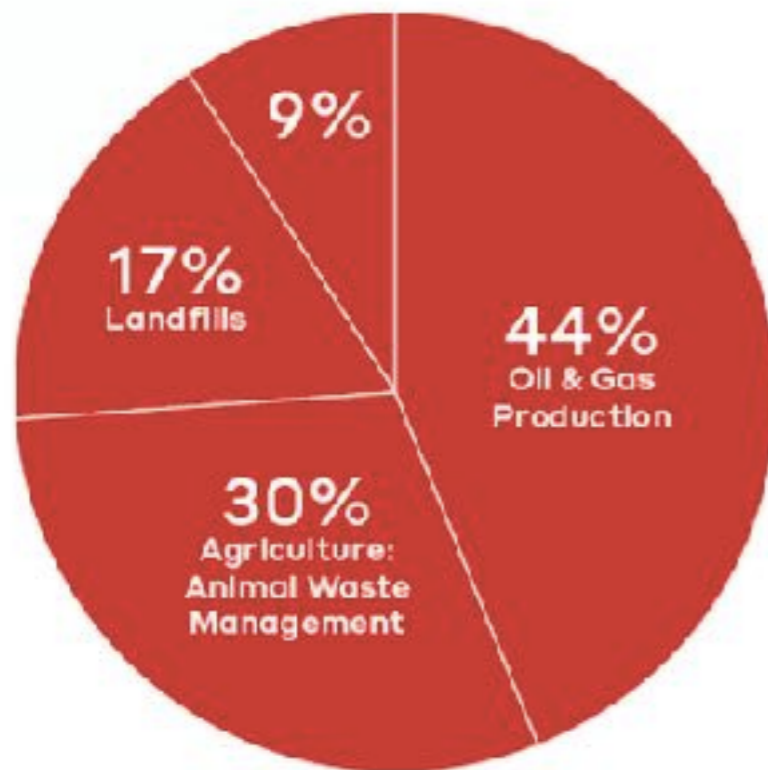


POWER & STORAGE
TECHNOLOGY, PLANNING & ECONOMICS



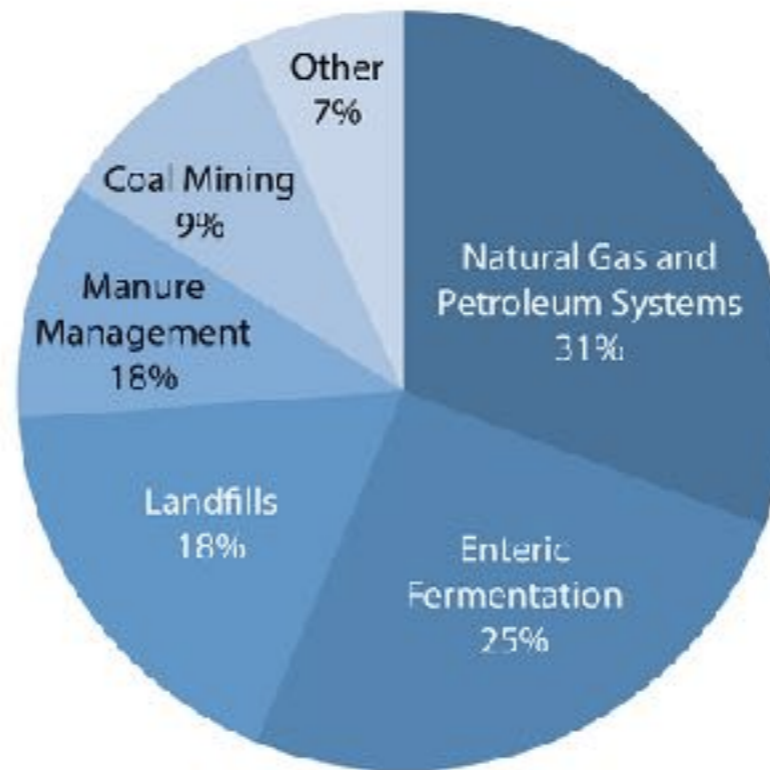
METHANE EMISSIONS

METHANE EMISSIONS CANADA



<https://www.wco.com/en/COinsights/cb-high-impact/low-profile-reducing-methane-emissions>

METHANE EMISSIONS USA



<https://www.americangeo.com/geo-science-careers/methane-emissions-of-hard-gas-industry/>

FOSSIL FUEL EXTRACTION

OIL & GAS HIGHER IN CANADA

COAL BIGGER FACTOR IN USA

FOOD & AGRICULTURE

AGRICULTURE HIGHER IN USA

LANDFILLS ABOUT THE SAME IN BOTH COUNTRIES

METHANE EMISSIONS

1 AGRICULTURE

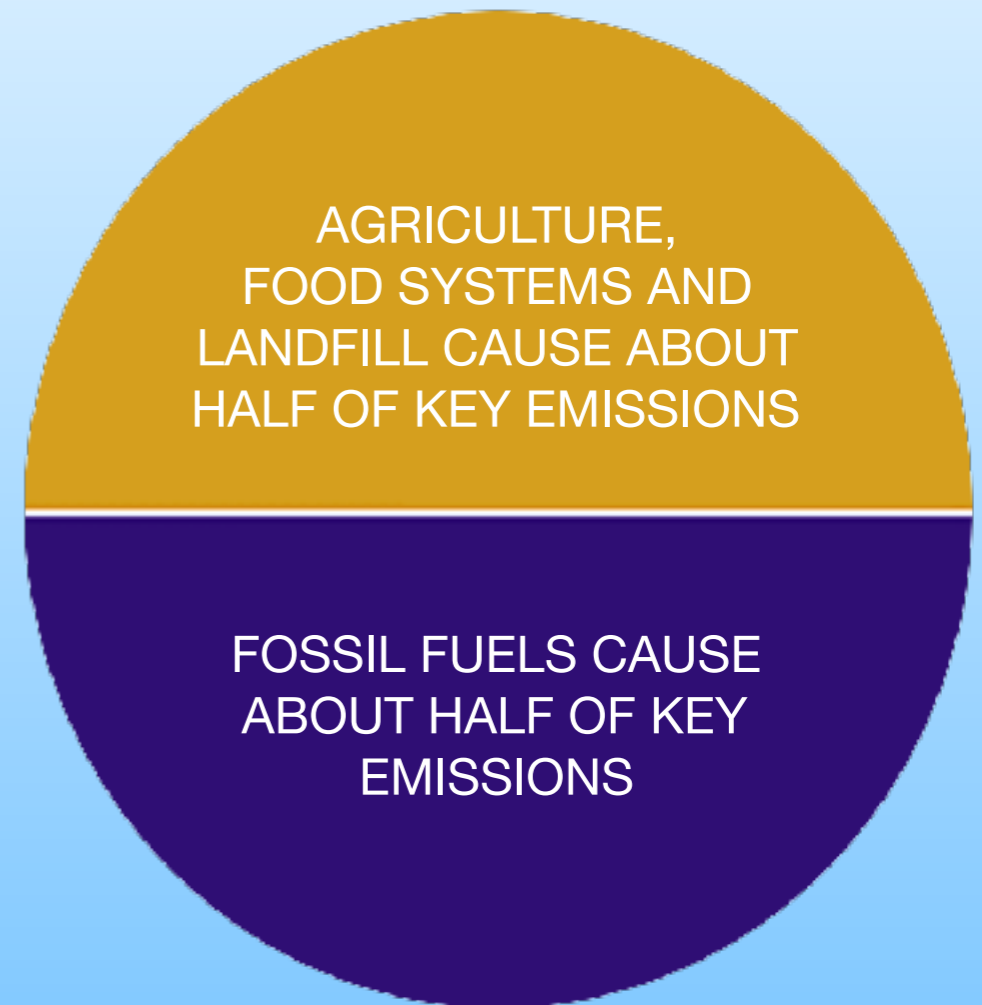
- ◇ BETTER REGULATION
- ◇ EDUCATION
- ◇ MORE SUPPORT FOR CHANGES
- ◇ R&D

2 FOOD & LANDFILLS - **CITY GOVERNMENTS**

3 FOSSIL FUELS:

- ◇ BETTER REGULATION
- ◇ EDUCATION
- ◇ MORE SUPPORT FOR CHANGES
- ◇ R&D

◇ REDUCE FOSSIL FUEL USE - **CITY GOVERNMENTS**



LANDFILL & FOOD SYSTEMS

1. ABOUT 1/3 OF FOOD PRODUCED GLOBALLY IS EITHER LOST OR WASTED, GENERATING METHANE AND DRIVING UP WASTE MANAGEMENT COSTS.
2. MOST CITIES ARE HOME TO PEOPLE WHO SUFFER FROM FOOD INSECURITY, HUNGER AND MALNUTRITION

MAKE A 2030 TARGET FOR REDUCTION IN CITY METHANE EMISSIONS & TACKLE BOTH PROBLEMS

MANAGE FOOD WASTE

SEE SCREENS TO FOLLOW.

RECYCLE: CITY-WIDE SEGREGATED FOOD WASTE COLLECTION ENABLES COMPOSTING AND OTHER ORGANIC WASTE TREATMENTS, WHICH MINIMIZE METHANE EMISSIONS.

SAFE DISPOSAL OF MUNICIPAL SOLID WASTE, ESPECIALLY FOR FOOD AND ORGANIC WASTE.

DISPOSAL OF FOOD AND ORGANIC WASTE IN LANDFILL PRODUCES METHANE. INSTEAD, CITIES CAN TREAT THIS WASTE TO PRODUCE COMPOST, RENEWABLE FUEL AND OTHER PRODUCTS.

ENCOURAGE A SHIFT TOWARD PLANT-BASED DIETS. CONSUMPTION OF ANIMAL-BASED FOOD IS A MAJOR DRIVER OF GLOBAL METHANE EMISSIONS. READ *HOW CITIES CAN SHIFT TOWARD A PLANETARY HEALTH DIET FOR ALL*.

C40
CITIES



CITIES MANAGING FOOD WASTE

DECENT RESIDENTIAL & BUSINESS RECYCLING RATES HAVE BEEN ACHIEVED BY VANCOUVER, CANADA; SINGAPORE CITY, COPENHAGEN, DENMARK; HELSINKI, FINLAND, SAN FRANCISCO, AND OTHERS.



EDIBLE SURPLUS FOOD – FOOD THAT HAS BEEN PRODUCED BUT CANNOT BE SOLD OR USED BY THE PRODUCER AND WOULD OTHERWISE BECOME WASTE:

CITIES SUPPORT FOOD REDISTRIBUTION THROUGH FOOD BANKS AND CHARITIES.

CITIES EASE RESTRICTIONS AND REGULATIONS TO ALLOW EASIER SURPLUS FOOD DONATIONS.

CITIES ESTABLISH TAX INCENTIVES TO DISCOURAGE FOOD WASTE AND INCREASE EFFICIENCY ACROSS THE CITY FOOD SYSTEM.



MILAN OFFERS A TAX REDUCTION TO RESTAURANTS, SUPERMARKETS AND BARS THAT DONATE THEIR SURPLUS FOOD.

NEW YORK CITY HAS A PUBLIC FOOD DONATION PORTAL TO REDISTRIBUTE WASTE THAT WOULD OTHERWISE BE SENT TO LANDFILL.

AUSTIN HAS ADOPTED AN ORDINANCE PREVENTING RESTAURANTS FROM DISPOSING OF FOOD WASTE IN LANDFILL. RESTAURANTS MUST DONATE UNCONSUMED FOOD, SEND SCRAPS TO FARMS OR COMPOST IT. THE MEASURE ALSO STIPULATES THAT EMPLOYEES RECEIVE TRAINING ON HANDLING THE WASTE.

CITIES MANAGING FOOD WASTE



NEW MEXICO
PROGRAM

[https://
www.nmrestaurant
s.org/food-waste-
management-
restaurant/](https://www.nmrestaurants.org/food-waste-management-restaurant/)

REDUCE FOOD LOSS IN SUPPLY CHAINS

IN MANY CITIES FOOD LOSS HAPPENS BEFORE IT REACHES CONSUMERS DUE TO TRANSPORT DELAYS OR POOR STORAGE CONDITIONS.

WHILE CITIES TYPICALLY HAVE LIMITED CONTROL OVER SUPPLY CHAINS, THEY CAN HELP STRENGTHEN URBAN-RURAL LINKAGES AND IMPROVE INFRASTRUCTURE.

IMPROVE SANITATION AND ELECTRICITY FOR COLD STORAGE. AT MARKETS AND DISTRIBUTION HUBS

SUPPORT COLLECTIVES THAT PROVIDE VALUE-ADDED ACTIVITIES, SUCH AS INDUSTRIAL KITCHENS PRESERVING EXCESS FRUIT AND VEGETABLES.

CREATIVITY IN KENYA

NEW DRIED MANGO PRODUCT HAS SIGNIFICANTLY REDUCED RATES OF FOOD LOSS IN MANGO PRODUCTION.

ENCOURAGE FOOD-WASTE REDUCTION

BY BUSINESSES FOR 14:1 ROI

FOOD WASTE AND RECOVERY CAN HAVE POSITIVE ECONOMIC BENEFITS FOR BUSINESSES AND THE LOCAL ECONOMY, AND CAN CREATE JOBS.

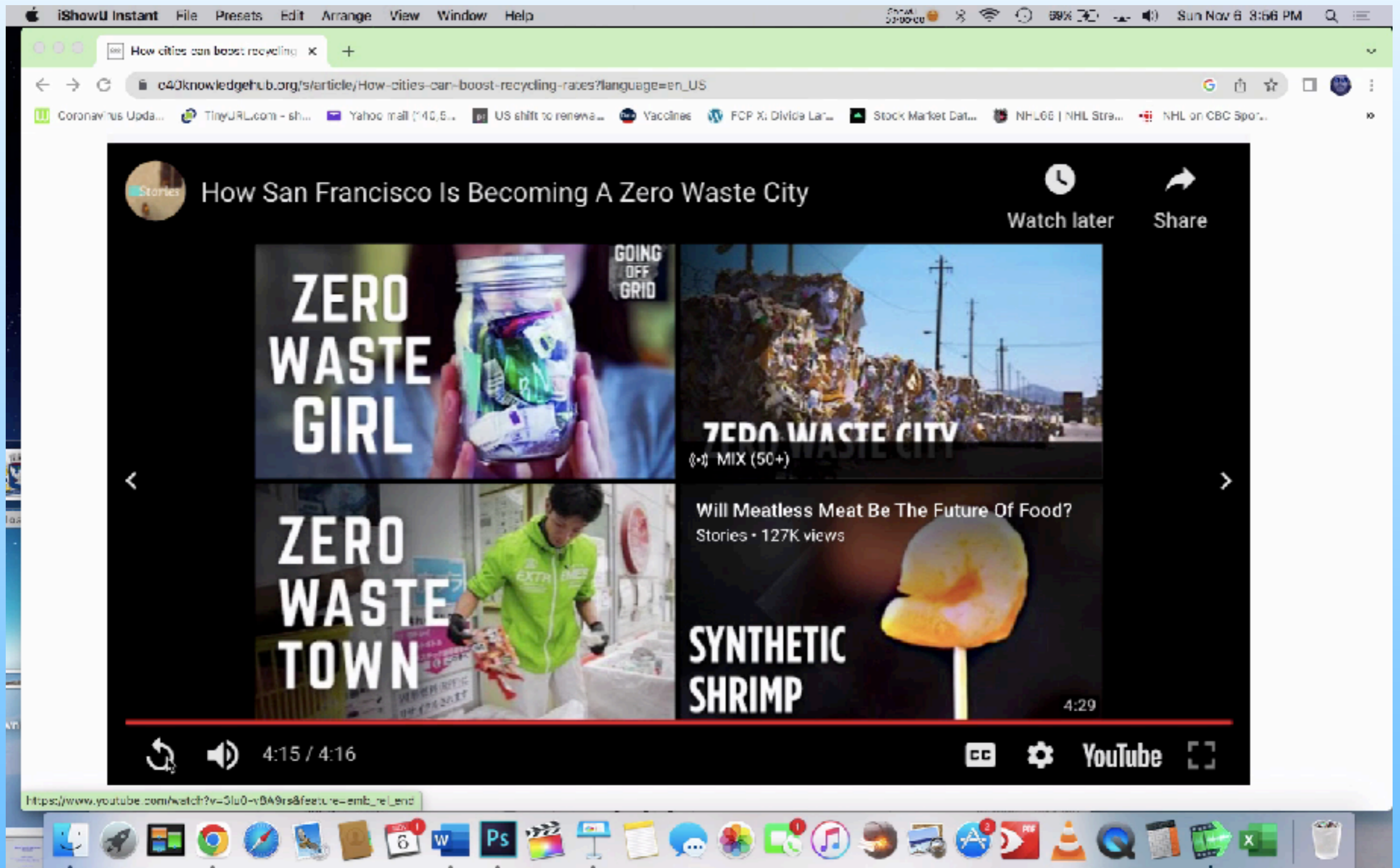
THE AVERAGE BUSINESS IS ESTIMATED TO BE ABLE TO ACHIEVE A 14:1 POSITIVE RETURN ON INVESTMENT IN REDUCING FOOD LOSS AND WASTE.

PROVIDE ONGOING TECHNICAL ASSISTANCE TO BUSINESSES TO MEASURE AND MONITOR FOOD WASTE.

GUIDANCE AND FINANCIAL SUPPORT FOR BUSINESSES & ENTREPRENEURS TO PILOT NEW FOOD-WASTE EFFORTS

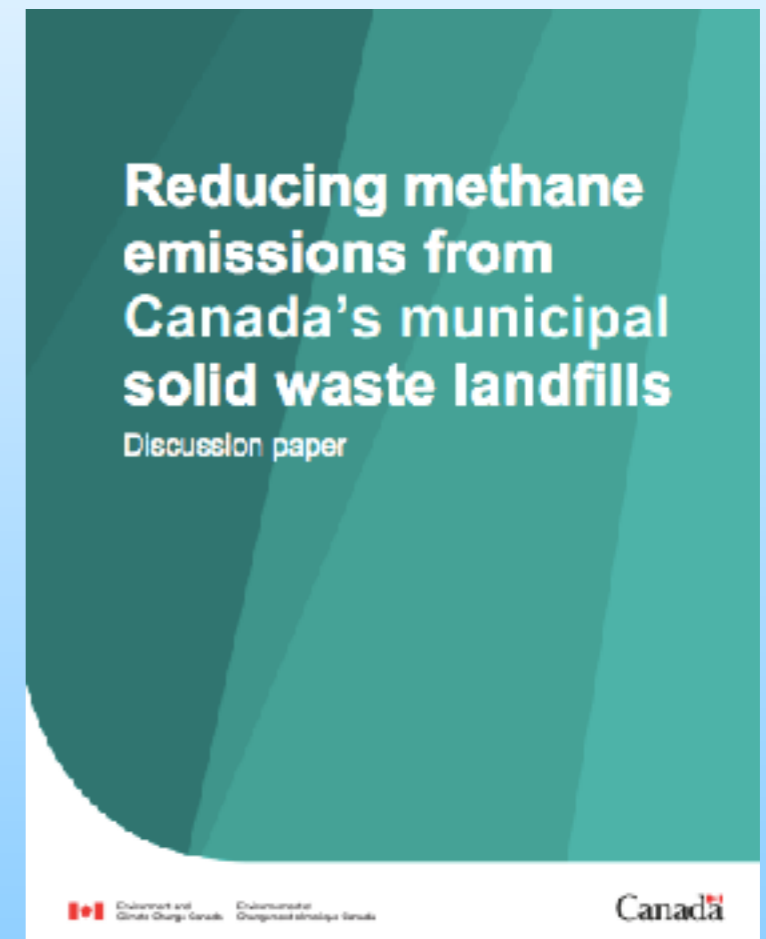
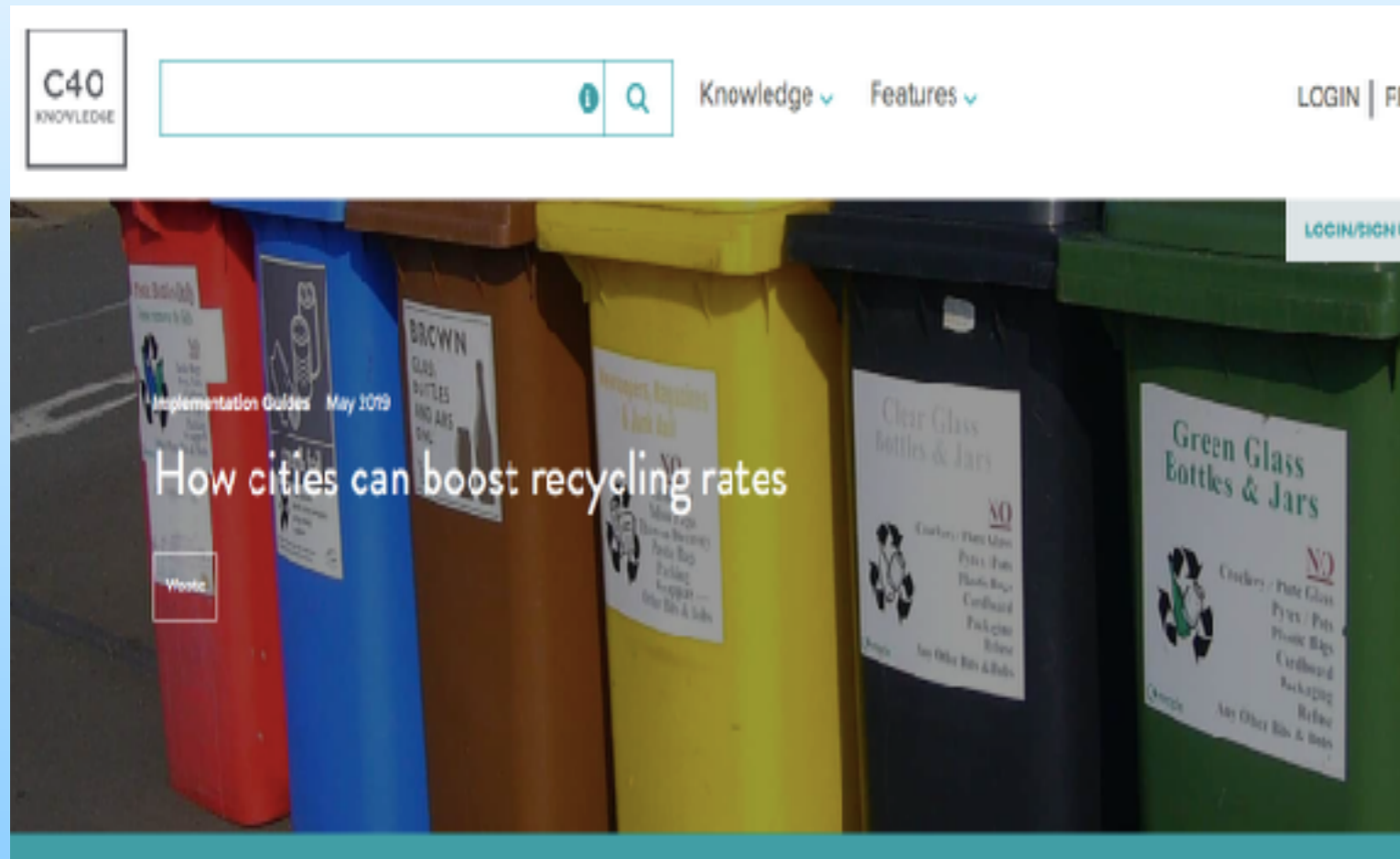
ENGAGE BUSINESSES THROUGH FOOD-WASTE CAMPAIGNS AND 'CHALLENGES'

SAN FRANCISCO RECYCLING



https://www.c40knowledgehub.org/s/article/How-cities-can-boost-recycling-rates?language=en_US

C40 & CANADA - LANDFILL RESOURCES



https://www.c40knowledgehub.org/s/article/How-cities-can-boost-recycling-rates?language=en_US

<https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/reducing-methane-emissions-canada-municipal-solid-waste-landfills-discussion.html>

BRITISH COLUMBIA AGRICULTURE SOLUTIONS

LIVESTOCK AND MANURE MANAGEMENT

LIVESTOCK AND MANURE MANAGEMENT ARE SIGNIFICANT CONTRIBUTORS TO AGRICULTURAL GHG EMISSIONS. THE FOLLOWING PRACTICES CAN SEQUESTER CARBON AND / OR MITIGATE GHG EMISSIONS FROM LIVESTOCK AND MANURE:

- USE LIVESTOCK FEED ADDITIVES
- PRACTICE ROTATIONAL GRAZING TO SEQUESTER CARBON IN THE SOIL
- SELECT HIGH QUALITY FEED THAT WILL REDUCE METHANE RELEASED FROM ENTERIC FERMENTATION
- MANAGE MANURE TO REDUCE METHANE AND NITROUS OXIDE
 - COVER MANURE STORAGE FACILITIES
 - OPTIMIZE MANURE USE WITH NUTRIENT MANAGEMENT PLAN
 - CAPTURE AND COMBUST METHANE FROM MANURE STORAGE

SOIL CONSERVATION AND CARBON SEQUESTRATION

AGRICULTURAL ECOSYSTEMS HOLD SUBSTANTIAL CARBON RESERVES. THE FOLLOWING FARM PRACTICES PROMOTE CARBON SEQUESTRATION BY EITHER INCREASING STORAGE OF CARBON OR REDUCING THE LOSS OF STORED CARBON:

- ENHANCE NITROGEN MANAGEMENT THROUGH NUTRIENT MANAGEMENT PLANNING
- REDUCE TILLAGE
- DECREASE BARE FALLOW
- RETURN CROP RESIDUES TO THE SOIL
- ESTABLISH AGROFORESTRY SYSTEMS
- INCREASE COVER CROPPING
- IMPLEMENT ROTATIONAL GRAZING

ENERGY CONSERVATION AND FUEL SWITCHING

EACH FARM OPERATION HAS DIFFERENT OPPORTUNITIES FOR ENERGY CONSERVATION AND FUEL SWITCHING. SOME EXAMPLES INCLUDE:

- CONDUCT AN ON-FARM, ALL-FUEL ENERGY ASSESSMENT TO IDENTIFY ENERGY SAVING OPPORTUNITIES
- ENSURE THAT ALL HEATING AND COOLING SYSTEMS ARE IN GOOD WORKING ORDER
- USE TIMERS, SENSORS OR VARIABLE SPEED DRIVES ON VENTILATION, HEATING, COOLING AND LIGHTING SYSTEMS
- REPLACE FOSSIL-FUEL POWERED EQUIPMENT WITH ELECTRICAL PUMPS AND MOTORS

<https://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/agricultural-land-and-environment/climate-action/reducing-agricultural-ghgs>



ON-FARM ENERGY PRODUCTION

RENEWABLE ENERGY SOURCES CAN DISPLACE FOSSIL FUEL USE, REDUCING GHG EMISSIONS ON AND OFF-FARM. THEY CAN ALSO HELP DECREASE RELIANCE ON ENERGY SOURCES WITH VOLATILE PRICES, • [ANAEROBIC DIGESTION \(PDF, 2.2 MB\)](#)

- GEOTHERMAL
- SOLAR PHOTOVOLTAIC
- SOLAR THERMAL
- WIND TURBINES
- RECHARGEABLE BATTERIES



UN - AGRICULTURE SOLUTIONS

◇ **MANURE** - MANAGE MANURE MORE EFFICIENTLY BY COVERING IT AND COMPOSTING IT.

◇ **GASTROENTERIC RELEASES** - FARMERS AND SCIENTISTS ARE EXPERIMENTING WITH ALTERNATIVE TYPES OF FEED TO REDUCE METHANE PRODUCED BY ANIMALS

◇ **DIET** - WESTERN COUNTRIES ARE SHIFTING TOWARDS PLANT-RICH DIETS AND EMBRACING ALTERNATIVE SOURCES OF PROTEIN.

◇ **RICE** - EASTERN STATES ARE STUDYING PADDY RICE - EXPERTS RECOMMEND ALTERNATE WETTING AND DRYING APPROACHES THAT COULD HALVE EMISSIONS.

<https://www.unep.org/news-and-stories/story/methane-emissions-are-driving-climate-change-heres-how-reduce-them>



URBAN PLANNING FOR CLEAN ENERGY



GREEN TRANSPORTATION & SPACE FOR WALKING



GOOD CYCLING LANES



PEDESTRIAN MALLS



RECREATIONAL TRAILS



ELECTRIC VEHICLE CHARGING

MORE TRANSIT INVESTMENT

BUS RAPID TRANSIT (BRT)



ELECTRIC BUSES, ELECTRIC LRT, ELECTRIC SUBWAY TRAINS

BATTERIES, SOLAR, EVs, URBAN AGRICULTURE



GREEN BUILDINGS & COMMUNITIES



LARGE GREEN BUILDINGS



TORONTO CONDOS



BOSTON OFFICE TOWER



AFFORDABLE HOUSING IN HARLEM NY

INFLATION REDUCTION ACT USA



DEMAND SIDE INTERVENTIONS

HEAT PUMPS, BUILDING ENVELOPES, SOLAR, BATTERIES, ELECTRIC VEHICLES

- ◇ HOMEOWNER CASH REBATES AND TAX CREDITS FOR INCREASING EFFICIENCY AND DECARBONIZING HOMES
- ◇ HOMEOWNER TAX CREDITS FOR INSTALLATION OF SOLAR AND BATTERIES
- ◇ CLEAN ENERGY LOAN GUARANTEES TO UNDERWRITE BANK FINANCING OF CLEAN ENERGY INITIATIVES
- ◇ INCREASED EFFICIENT HOME CREDITS FOR HOUSING DEVELOPERS FOR NEW CONSTRUCTION AND DEEP RETROITS
- ◇ TAX CREDITS FOR NEW ELECTRIC VEHICLES, USED ELECTRIC VEHICLES, AND HOME CHARGERS.
- ◇ FUNDING FOR BUILDING CODE UPGRADES FOR ZERO-EMISSION BUILDINGS
- ◇ GRANTS FOR TRIBAL COMMUNITIES THAT TRANSITION TO CLEAN, ZERO-EMISSION, ELECTRIC ENERGY SYSTEMS
- ◇ FUNDING FOR DISADVANTAGED COMMUNITIES TO REDUCE GREENHOUSE GAS EMISSIONS, MITIGATE RISKS FROM EXTREME HEAT, IMPROVE CLIMATE RESILIENCY AND REDUCE INDOOR AIR POLLUTION
- ◇ BUSINESS BUILDING TAX CREDITS FOR ENERGY USE REDUCTIONS
- ◇ GRANTS AND LOANS FOR NEW OR RETROIT AFFORDABLE HOUSING PROJECTS THAT ADVANCE BUILDING ELECTRIFICATION, IMPROVE ENERGY AND WATER EFFICIENCY
- ◇ FINANCING FOR DOMESTIC MANUFACTURING OF HEAT PUMPS AND THE PROCESSING OF CRITICAL MINERALS
- ◇ TAX CREDITS TO ACCELERATE DOMESTIC MANUFACTURING OF SOLAR PANELS, WIND TURBINES, AND BATTERIES
- ◇ AN AGGRESSIVE NEW FEE FOR METHANE EMISSIONS

HOMEOWNER ELECTRIFICATION

Key points: 1. 30% cash rebate for heat pumps, electric water heaters, and electric ranges. 2. 30% tax credit for electric vehicle charging stations. 3. 30% tax credit for electric vehicle purchases. 4. 30% tax credit for electric vehicle charging stations. 5. 30% tax credit for electric vehicle charging stations.

RESIDENTIAL SOLAR & BATTERIES

Key points: 1. 30% tax credit for solar panels and batteries. 2. 30% tax credit for solar panels and batteries. 3. 30% tax credit for solar panels and batteries. 4. 30% tax credit for solar panels and batteries. 5. 30% tax credit for solar panels and batteries.

COMMERCIAL BUILDINGS

Key points: 1. 30% tax credit for solar panels and batteries. 2. 30% tax credit for solar panels and batteries. 3. 30% tax credit for solar panels and batteries. 4. 30% tax credit for solar panels and batteries. 5. 30% tax credit for solar panels and batteries.

NON-RESIDENTIAL SOLAR & BATTERIES

Key points: 1. 30% tax credit for solar panels and batteries. 2. 30% tax credit for solar panels and batteries. 3. 30% tax credit for solar panels and batteries. 4. 30% tax credit for solar panels and batteries. 5. 30% tax credit for solar panels and batteries.

PURCHASES OF ELECTRIC VEHICLES

Key points: 1. 30% tax credit for electric vehicle purchases. 2. 30% tax credit for electric vehicle purchases. 3. 30% tax credit for electric vehicle purchases. 4. 30% tax credit for electric vehicle purchases. 5. 30% tax credit for electric vehicle purchases.

AMERICAN MADE SOLAR, WIND & BATTERIES

Key points: 1. 30% tax credit for American made solar panels, wind turbines, and batteries. 2. 30% tax credit for American made solar panels, wind turbines, and batteries. 3. 30% tax credit for American made solar panels, wind turbines, and batteries. 4. 30% tax credit for American made solar panels, wind turbines, and batteries. 5. 30% tax credit for American made solar panels, wind turbines, and batteries.

INFRASTRUCTURE INVESTMENT AND JOBS ACT



The Infrastructure Investment and Jobs Act

THE IIJA WAS PASSED IN NOV 2021,
A BIPARTISAN ACT OF THE US SENATE.
\$1.2 TRILLION OVER 8 YEARS, OF WHICH
\$550 BILLION IS NEW SPENDING.

FUNDING TO IMPROVE ROADS AND BRIDGES,
CREATE ELECTRIC VEHICLE CHARGING
NETWORKS, ELECTRIC BUS FLEETS, EXPAND AND
MODERNIZE POWER GRIDS AND SMART GRIDS,
SUPPORT ADVANCED BATTERIES AND ENERGY-
EFFICIENCY PROGRAMS, AND FUND
ENVIRONMENTAL REMEDIATION AND
RESILIENCE.

\$110 BILLION TOWARD ROADS, BRIDGES AND OTHER PHYSICAL
INFRASTRUCTURE (\$40B FOR BRIDGE REPAIR, \$17.5B FOR MAJOR PROJECTS).
\$73 BILLION FOR THE COUNTRY'S ELECTRIC GRID, SMART GRID AND POWER
STRUCTURES
\$66 BILLION FOR RAIL SERVICES
\$65 BILLION FOR BROADBAND
\$55 BILLION FOR WATER INFRASTRUCTURE
\$21 BILLION IN ENVIRONMENTAL REMEDIATION
\$47 BILLION FOR FLOODING AND CLIMATE RESILIENCY
\$39 BILLION TO MODERNIZE TRANSIT
\$25 BILLION FOR AIRPORTS
\$17 BILLION IN PORT INFRASTRUCTURE
\$11 BILLION IN TRANSPORTATION SAFETY PROGRAMS
\$7.5 BILLION FOR ELECTRIC VEHICLES AND EV CHARGING
\$5 BILLION IN LOW & ZERO-EMISSION BUSES
\$2.5 BILLION FOR FERRIES
\$27 BILLION FOR OBSOLETE AND UNPROVEN TECHNOLOGY INCLUDING
NUCLEAR, HYDROGEN AND CARBON CAPTURE (SATISFIES LARGE POLITICAL
DONORS).

INFRASTRUCTURE INVESTMENT AND JOBS ACT



The Infrastructure Investment and Jobs Act

ELECTRIC VEHICLES & CHARGING STATIONS



\$5 BILLION IN GRANTS TO SUPPORT STATE EXPANSION OF THE ELECTRIC VEHICLE CHARGING NETWORK AND \$2.5 BILLION IN DIRECT SUPPORT TO STATION OWNERS.

THE WHITE HOUSE SAYS ITS GOAL IS 500,000 CHARGERS. OBSERVERS SUGGEST THIS IS A GOOD FIRST STEP, BUT NOT ENOUGH MONEY.

THERE ARE ABOUT 50,000 GAS STATIONS IN THE USA, MEANING A CONTRIBUTION OF ABOUT \$25,000 EACH ON AVERAGE.



PHOTO COURTESY OF EVARCO. EVARCO IS A LEADER IN EV CHARGING INFRASTRUCTURE. EVARCO'S CHARGING STATIONS ARE DESIGNED TO BE EASY TO USE, ENERGY EFFICIENT AND COST EFFECTIVE. EVARCO'S CHARGING STATIONS ARE DESIGNED TO BE EASY TO USE, ENERGY EFFICIENT AND COST EFFECTIVE.



GRID & BATTERIES



GRID

↳ \$66 BILLION INVESTMENT INCLUDES THE LARGEST INVESTMENT IN CLEAN ENERGY TRANSMISSION AND GRID BY AMERICAN HISTORY.

↳ \$30 BILLION INCREASE IN BORROWING AUTHORITY FOR BOWENVILLE POWER ADMIN, PACIFIC NORTHWEST.

↳ \$2.5 BILLION REVOLVING LOAN FUND TO ALLOW THE DOE TO SERVE AS AN "ANCHOR TENANT" FOR UP TO HALF OF THE CAPACITY OF A NEW OR UPGRADED TRANSMISSION LINE. HELPS SECURE FINANCING.

SMART GRID & BATTERIES

↳ \$3 BILLION TO DOE 2027 SMART GRID INVESTMENT GRANT PROGRAM.

↳ \$5 BILLION GRANTS FOR GRID OUTAGES CAUSED BY EXTREME WEATHER, WILDFIRES AND NATURAL DISASTERS.

↳ \$1 BILLION IN FUNDING IS EMARKED FOR GRID IMPROVEMENT IN BUREAU OF ENERGY EFFICIENCY.

↳ \$500 MILLION TO SUPPORT STATE ENERGY PROGRAM.



ELECTRIC BUSES & ELECTRIC FERRIES



\$4 BILLION MORE FOR ELECTRIC BUSES AND ZERO CARBON BUSES.

\$2.5 BILLION FOR ELECTRIC FERRIES. THERE ARE VERY FEW ELECTRIC FERRIES OPERATING SO FAR IN NORTH AMERICA.

IN CANADA, A COUPLE HAVE RECENTLY BEEN ESTABLISHED IN THE KENNEDY, ONTARIO AREA.



ELECTRIC FERRY AT PORT CHARLOTTE, FLORIDA. PHOTO COURTESY OF THE STATE OF FLORIDA.



URBAN TRANSIT



AMERICAN PUBLIC TRANSIT INFRASTRUCTURE IS IN A QUARANTINE - WITH A MULTIBILLION DOLLAR REPAIR BACKLOG, REPRESENTING MORE THAN 24,000 BUSES, 5,000 RAIL CARS, 200 STATIONS, AND THOUSANDS OF MILES OF TRACK, SIGNALS, AND POWER SYSTEMS IN NEED OF MAINTENANCE.

↳ \$20 BILLION OF NEW INVESTMENT TO MODERNIZE TRANSIT, IN ADDITION TO CONTINUING THE EXISTING TRANSIT PROGRAMS FOR FIVE YEARS AS PART OF FEDERAL TRANSIT INVESTMENT REAUTHORIZATION.

↳ NEW INVESTMENTS AND RIA REAUTHORIZATIONS PROVIDE \$8.5 BILLION IN GUARANTEED FUNDING FOR PUBLIC TRANSIT OVER THE NEXT FIVE YEARS.



REGIONAL TRAINS: THE IIA ALSO ALLOCATES \$55 BILLION IN ADDITIONAL RAIL FUNDING TO HELP STATES AND LOCALITIES WITH RAIL BACKLOG.

USA METHANE LEAKS - STANFORD STUDY

STANFORD STUDY SHOWS OIL & GAS INDUSTRY METHANE LEAKS MUCH HIGHER THAN REPORTED BY THE INDUSTRY AND THE EPA

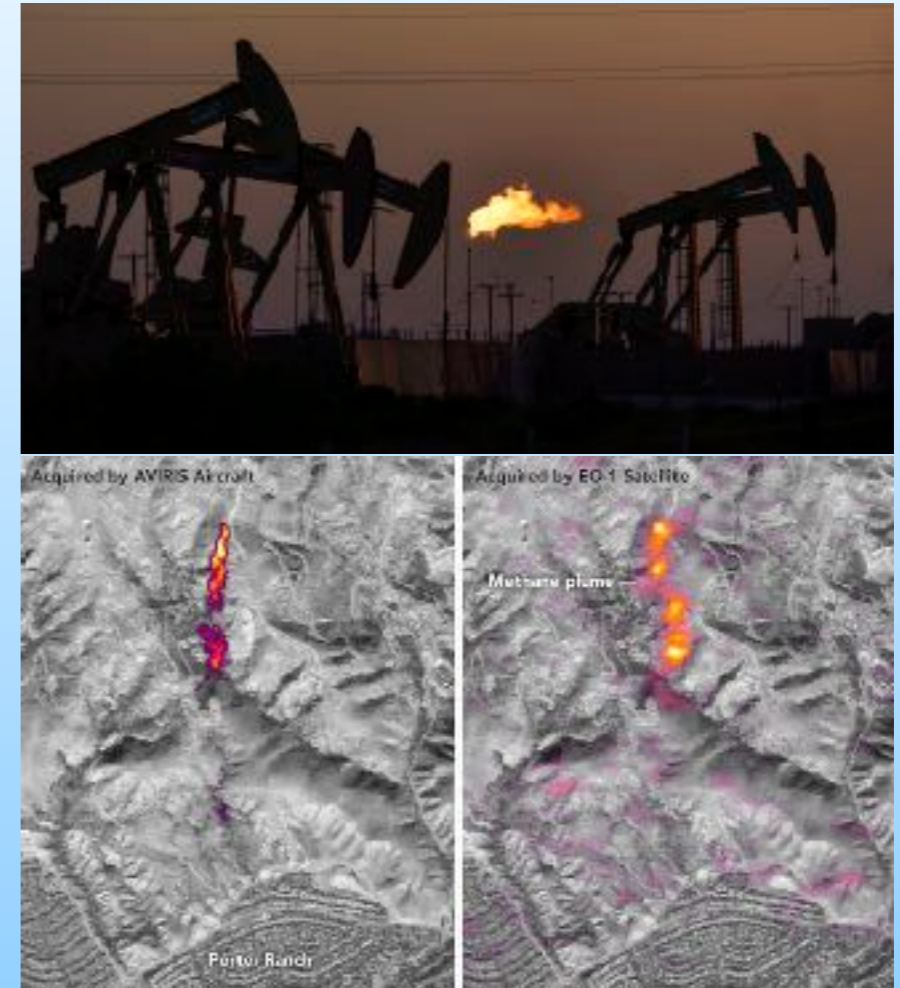
USING AIRBORNE SENSORS RESEARCHERS STUDIED PERMIAN BASIN IN NEW MEXICO, ONE OF THE MOST EXPANSIVE AND HIGHEST-PRODUCING OIL AND GAS REGIONS IN THE WORLD.

THEY ESTIMATE THAT MORE THAN 9% OF ALL METHANE PRODUCED IN THE REGION IS BEING LEAKED, SEVERAL-FOLD HIGHER THAN EPA ESTIMATES, WELL ABOVE THOSE IN THE PUBLISHED LITERATURE.

NEW MONITORING EQUIPMENT CAN CREATE MORE ACCURATE AND IMMEDIATE LEAK DETECTION AND HELP COMPANIES IDENTIFY AND FIX THE WORST LEAKS AS A PRIORITY.

SEVERAL STUDIES HAVE SHOWN THAT HAVING A GOOD LEAK REPAIR STRATEGY ACTUALLY PAYS FOR ITSELF FROM THE GAS INDUSTRY POINT OF VIEW, DECREASING LOST REVENUE.

STILL THE INDUSTRY USUALLY ASKS FOR A HANDOUT FROM TAXPAYERS, AND THE POLITICIANS USUALLY PROVIDE IT, BECAUSE THEY ARE THE BIGGEST DONORS TO POLITICAL CAMPAIGNS IN CANADA AND THE USA.



IN THE PERMIAN BASIN 9% OF ALL METHANE PRODUCED IN THE REGION IS BEING LEAKED INTO THE SKY.

<https://news.stanford.edu/2022/03/24/methane-leaks-much-worse-estimates-fix-available/>

MCGILL UNIVERSITY STUDY

JOURNAL ENVIRONMENTAL SCIENCE AND TECHNOLOGY

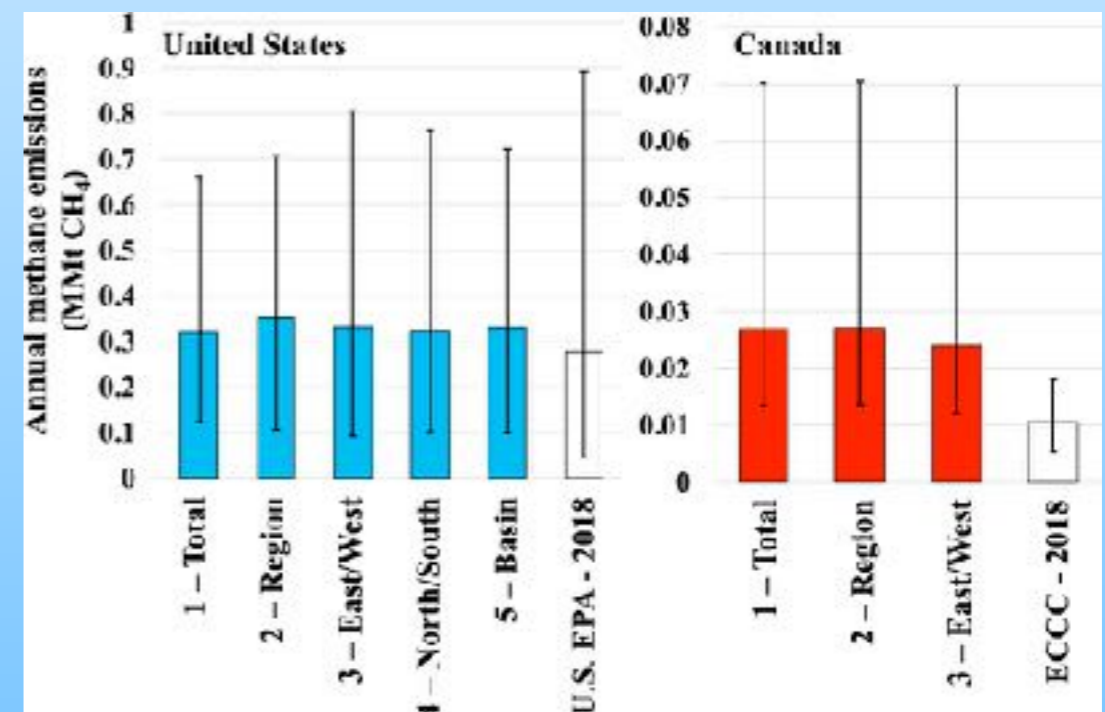
KEY FINDING: METHANE EMISSIONS FROM ABANDONED WELLS ARE UNDERESTIMATED BY 150% IN CANADA AND BY 20% IN THE USA.

ABANDONED OIL AND GAS WELLS ARE ONE OF THE MOST UNCERTAIN SOURCES OF METHANE EMISSIONS INTO THE ATMOSPHERE. THESE UNCERTAINTIES AND IMPROVE EMISSION ESTIMATES,

GEOSPATIAL AND STATISTICAL ANALYSIS OF 598 DIRECT METHANE EMISSION MEASUREMENTS FROM ABANDONED OIL AND GAS WELLS A

ESTIMATE THE NUMBER 4 MILLION ABANDONED WELLS IN THE USA, 370,000 IN CANADA. METHANE EMISSIONS RANGE FROM 1.8×10^{-3} G/H TO 48 G/H PER WELL DEPENDING ON THE PLUGGING STATUS, WELL TYPE, AND REGION, WITH THE OVERALL AVERAGE AT 6.0 G/H.

THERE ARE ABOUT 500,000 WELLS IN THE USA AND 60,000 IN CANADA THAT ARE UNDOCUMENTED.



[HTTPS://PUBS.ACS.ORG/DOI/PDF/10.1021/ACS.EST.0C04265](https://pubs.acs.org/doi/pdf/10.1021/acs.est.0c04265)

WHITE HOUSE POLICY ACTION ON METHANE

LANDFILLS (17% USA METHANE EMISSIONS)

IN 2016, EPA ISSUED REVISED GUIDELINES TO REDUCE EMISSIONS - LOWERED EMISSIONS THRESHOLD REQUIRING LARGE LANDFILLS TO COLLECT AND CONTROL EMISSIONS EARLIER. BIDEN-HARRIS ADMIN FINALIZED A NEW FEDERAL **PLAN IN 2021, ESTABLISHING REVISED STANDARDS FOR LANDFILLS** IN AREAS WITHOUT A STATE OR TRIBAL IMPLEMENTATION PLAN - 1,500 LANDFILLS COVERED.

LANDFILL METHANE OUTREACH PROGRAM (LMOP) SUPPORTS DEVELOPMENT OF LANDFILL GAS ENERGY PROJECTS BY PROVIDING TECH SUPPORT AT REGULATED LANDFILLS AND HELPING SMALLER, UNREGULATED LANDFILLS COLLECT AND DIRECT METHANE GAS TO THE RENEWABLE GAS ENERGY MARKETPLACE. BIDEN-HARRIS ADMIN IS PUTTING A NEW EMPHASIS ON LMOP AS A KEY PART OF STRATEGY TO **CAPTURE GAS AND CUT FLARE RATE FOR ALL LANDFILLS TO 70% NATIONALLY, A 12% INCREASE FROM THE CURRENT RATE.**



REDUCING FOOD WASTE IN LANDFILLS

30%-40% OF THE FOOD PRODUCED IN THE UNITED STATES IS LOST OR WASTED. FOOD IS THE MOST COMMON MATERIAL FOUND IN LANDFILLS, ABOUT 24% OF THE MATERIAL IN OUR LANDFILLS. AS IT DECOMPOSES, FOOD WASTE GENERATES LARGE QUANTITIES OF UNCONTROLLED METHANE EMISSIONS

IN 2015 EPA AND USDA SET A NATIONAL GOAL TO REDUCE FOOD LOSS AND WASTE BY 50% BY 2030 BIDEN-HARRIS ADMIN PUSHING HARDER TO 50% GOAL AGENCIES FORMED JOINT PROGRAMS AND PURSUED FOOD LOSS AND WASTE ACTIONS:

EDUCATION AND OUTREACH, RESEARCH, COMMUNITY INVESTMENTS, VOLUNTARY PROGRAMS, AND PUBLIC-PRIVATE PARTNERSHIPS. WILL IMPROVE FOOD SECURITY AND NUTRITION, INCREASE FARMER INCOME AND RURAL PROSPERITY, REDUCE PRESSURE ON NATURAL RESOURCES, AND HELP MEET GREENHOUSE GAS EMISSIONS REDUCTION TARGETS.

METHANE FEE - POLLUTERS PAY



THE IRA INCLUDES A VARIETY OF INCENTIVES, INCLUDING TAX CREDITS AND GRANTS, FOR USA INDUSTRIES TO REDUCE GREENHOUSE GAS EMISSIONS.

IT ALSO INCLUDES A SIGNIFICANT “DISINCENTIVE” FOR EMITTING METHANE FROM CERTAIN OIL AND GAS FACILITIES.

THE METHANE EMISSIONS REDUCTION PROGRAM, WHICH INCLUDES A METHANE WASTE EMISSIONS CHARGE THAT WILL BECOME EFFECTIVE JANUARY 1, 2024.



“AGGRESSIVELY CUTTING METHANE EMISSIONS IS THE FASTEST AND MOST EFFECTIVE WAY TO REDUCE THE RATE OF WARMING AND KEEP THE GLOBAL AVERAGE TEMPERATURE FROM BREACHING THE 1.5°C BARRIER ABOVE PREINDUSTRIAL LEVELS.”

METHANE FEE - POLLUTERS PAY



IT IS ESTIMATED THAT 2,172 FACILITIES WILL BE SUBJECT TO THE METHANE FEE.

THE IRA ALSO AUTHORIZES THE EPA TO APPROPRIATE \$850 MILLION IN GRANTS TO FACILITIES SUBJECT TO THE FEE TO MEET A RANGE OF OBJECTIVES, INCLUDING “IMPROVING AND DEPLOYING INDUSTRIAL EQUIPMENT AND PROCESSES” THAT REDUCE METHANE EMISSIONS, WHICH MAY REDUCE EMISSIONS FROM A FACILITY BELOW THE THRESHOLD.

IF EPA’S REGULATIONS AND THE APPLICABLE STATE IMPLEMENTATION PLANS ARE NOT IN EFFECT BY JANUARY 1, 2024, THE SOURCE CATEGORY FACILITIES IN THOSE STATES WILL BE SUBJECT TO THE METHANE FEE.



THE METHANE FEE ULTIMATELY MAY BE WAIVED FOR A FACILITY IF (1) EPA ADOPTS ITS PROPOSED RULE FOR STANDARDS OF PERFORMANCE FOR NEW, RECONSTRUCTED, AND MODIFIED SOURCES AND EMISSIONS GUIDELINES FOR EXISTING SOURCES: OIL AND NATURAL GAS SECTOR CLIMATE REVIEW, 86 FED. REG. 63110 (NOV. 15, 2021), OR OTHER REGULATIONS THAT WILL RESULT IN EQUIVALENT OR GREATER EMISSIONS REDUCTIONS, AND (2) SUCH REGULATIONS ARE THEN ADOPTED IN THE IMPLEMENTATION PLANS OF THE STATES WHERE THOSE FACILITIES SIT.

CANADA.CA SAYS METHANE REDUCTION MATTERS

FROM CANADA.CA PAGES:

“REDUCING METHANE EMISSIONS FROM THE OIL AND GAS SECTOR IS ONE OF THE FASTEST, MOST COST-EFFECTIVE THINGS WE CAN DO...

...OIL AND GAS SECTOR IS CANADA’S LARGEST INDUSTRIAL EMITTER OF METHANE. IT CURRENTLY ACCOUNTS FOR ABOUT 21% OF THE OIL AND GAS SECTOR’S EMISSIONS AND 13% OF CANADA’S TOTAL GREENHOUSE GAS EMISSIONS...

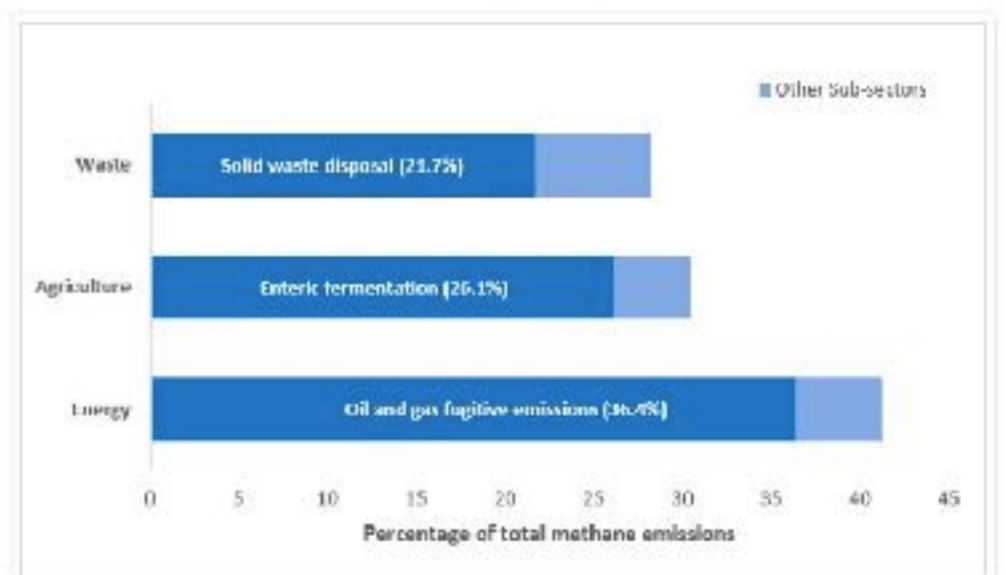
...FIRST COUNTRY IN THE WORLD TO COMMIT TO AT LEAST A 75% METHANE REDUCTION FROM THE SECTOR BY 2030...

IN DECEMBER 2021, ENVIRONMENT AND CLIMATE CHANGE CANADA PROVIDED AN UPDATE THAT CANADA IS ON TRACK TO MEET ITS 2025 METHANE REDUCTION TARGET OF 40% TO 45% BELOW 2012 LEVELS...

PREVIOUS METHANE REGULATIONS PUBLISHED BY CANADA IN 2018 WERE ESTIMATED TO REDUCE METHANE EMISSIONS AT AN AVERAGE COST OF \$17 PER TONNE.

- EMISSION REDUCTION TECHNOLOGIES, WHICH CONTINUE TO EVOLVE AND PROVIDE OPPORTUNITIES FOR GREATER GHG REDUCTIONS;
- DESIGN APPROACHES FOR FUTURE REGULATIONS;
- OPTIONS FOR METHANE MEASUREMENT, MONITORING, AND REPORTING.”

Figure 1 – Major Sources of Canada’s Methane Emissions in 2020, by Sector



SOURCE: FIGURE PREPARED BY THE LIBRARY OF PARLIAMENT USING DATA OBTAINED FROM UNITED NATIONS CLIMATE CHANGE, *NATIONAL INVENTORY REPORT 1990–2020: GREENHOUSE GAS SOURCES AND SINKS IN CANADA*, PART 3, P. 7.

“HEALTH: REDUCING METHANE EMISSIONS WILL DECREASE OZONE FORMATION AND CAN PREVENT OVER 200,000 PREMATURE DEATHS EACH YEAR, HUNDREDS OF THOUSANDS OF ASTHMA-RELATED EMERGENCY ROOM VISITS, AND OVER 20 MILLION TONNES OF CROP LOSSES A YEAR BY 2030.”

SOME ACTION IN ALBERTA

ALBERTA SAYS:

170,000 ABANDONED WELLS EXIST IN IN THE PROVINCE, REPRESENTING 37% OF ALL WELLS IN THE PROVINCE.

WELL CAPPING PLAN:

IDENTIFY ANY ISSUES WITHIN THE WELL THAT COULD LEAD TO POTENTIAL LEAKS (E.G., CRACKS)

CLEAN THE INSIDE OF THE WELL BORE TO REMOVE ANY OIL OR GAS THAT COULD CAUSE IT TO CORRODE OR COULD CAUSE THE CEMENT PLUGS THAT WILL BE INSERTED INTO THE WELL TO LEAK

CUT THE WELL CASING TO A MINIMUM OF ONE METRE BELOW THE SURFACE (WITH SOME EXCEPTIONS, WHICH ARE LISTED IN *DIRECTIVE 020*), AND PLACE A VENTED CAP ATOP THE WELL CASING.

LAND AROUND IT MUST BE RETURNED TO ITS ORIGINAL STATE

INDUSTRY SAYS THEY'VE CAPPED 130,000 OF 170,000 ABANDONED WELLS OR 76% - BUT MOSTLY WITH CONCRETE

“IN THE PAST, WE’VE USED CEMENT PRODUCTS. AND CEMENT PRODUCTS HAVE THEIR ISSUES. THEY CAN CRACK AND BECOME POROUS OVER TIME AND THEY CAN LEAK,” SAID FRED WASSMUTH, A RESEARCHER WITH INNOTECH ALBERTA.

IF SUCCESSFUL, CEMENT ALTERNATIVES COULD BE USED FOR THOUSANDS OF REMEDIATIONS IN ALBERTA EVERY YEAR – WITH THE POTENTIAL TO SAVE THE PROVINCE BILLIONS OF DOLLARS IN INTERVENTIONS FOR LEAKING WELLS.



METHANE MONITORING

ALBERTA INTRODUCED A REQUIREMENT FOR LDAR??LEAK?DETECTION AND REPAIR PROGRAMS

“RESEARCH IS BEING DONE ON OTHER TECHNOLOGIES DESIGNED TO ENHANCE METHANE DETECTION, QUANTIFICATION AND MITIGATION”

INITIATIVES DISCUSSED BUT FEW IMPLEMENTED

“MULTIPLE INNOVATIONS ARE BEING DEVELOPED BY INDUSTRY SUCH AS THE USE OF SOLAR PANELS TO POWER PUMPS AND SYSTEMS DESIGNED TO CAPTURE VENTED GAS FROM COMPRESSORS—USING THIS GAS AS FUEL FOR COMPRESSOR ENGINES.”

<https://globalnews.ca/news/9214286/researchers-explore-materials-cap-inactive-oil-gas-wells/#:~:text=According%20to%20the%20Alberta%20Energy%20Regulator%2C%20over%20170%2C000%20wells%20across,already%20been%20decommissioned%20and%20reclaimed.>

<https://www.aer.ca/regulating-development/rules-and-directives/directives/directive-020>

DESI PLEASE SWITCH TO

**PROF ROBERT HOWARTH,
CORNELL UNIVERSITY**



**Clean Air
Partnership**

CLIMATE SOLUTIONS WEBINAR SERIES



QUESTIONS?



CAP CLIMATE SOLUTIONS WEBINAR SERIES

WITH HOST BRUCE (BF) NAGY



**Clean energy technology & disinformation
with Professor Mark Jacobson, Stanford, May 11 2022**



**How new USA climate laws affect North American
municipalities & citizens, Bruce (BF) Nagy, Thurs Oct 27, 2022**



**Methane emission mitigation by municipalities
With Prof Robert Howarth, Cornell Tues Nov 8 2022**

Coming up:



**Europe & UK Update With Prof Peter Strachan, RGU Scotland
How has the war in the Ukraine affected climate policy
REGISTER NOW: Tues Nov 22, 2:00 PM Eastern | 6:00 PM GMT (Scotland)**



CLIMATE SOLUTIONS WEBINAR SERIES



THANK YOU

Webinar dates & registration - Desi (Desislava) Stefanova
DStefanova@cleanairpartnership.org

Webinar content - Bruce (BF) Nagy
bruce.nagy@rogers.com bfnagy1@gmail.com
bfnagy.com Twitter: @BFNagy



**Clean Air
Partnership**

CLIMATE SOLUTIONS WEBINAR SERIES

