

Sharing Lessons from Conservation on the Coast



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Energy Matters

FNHC Webinar

November 12 2020

We will be discussing.....

- Overview of Conservation on the Coast (COTC) energy retrofit work
- Potential benefits of energy retrofit work
- Prioritization and evaluation methods
- Lessons Learned – materials, workforce, managing expectations
- Community awareness and education opportunities
- Training strategies
- Funding options

Attawapiskat,
Kashechewan
and Fort
Albany are
remote First
Nations on the
west coast of
James Bay in
north-eastern
Ontario



A Unique Situation.....

- In the 1980's the communities of Attawapiskat, Kashechewan and Fort Albany determined that a 270 km 115kv high voltage transmission line was required to replace the limited capacity of their diesel generation
- Against all odds and with minimal government and financial support they succeeded in building the first transmission line in muskeg

A Unique Situation..... con't

- Collectively the three communities formed their own transmission company – Five Nations Energy Inc. (FNEI) and formed their own Local Distribution Companies (LDC)
- The three communities were connected to the provincial electrical grid in the early 2000's, providing unlimited power (resulting in increased energy bills for community members)

What is *Conservation on the Coast*?

- All electric utilities (LDC's) in Ontario must deliver conservation programs under the Conservation & Demand Management (CDM) Program
- Independent Electricity System Operator (IESO) provides funding and the LDC's deliver the programs
- In 2013 APC, KPC and FAPC joined together, with FNEI, to create a CDM Plan to deliver these programs and called it:



CONSERVATION ON THE COAST (COTC)

COTC's Guiding Principles



Vision Statement

“While honouring our traditional lifestyle we commit to creating a sustainable and energy efficient future for our next generations”

Mission Statement

“Our mission is to provide our communities with:

- Education and awareness on energy conservation,
- Collaborative energy efficient programs, resulting in safe, healthy, and affordable homes and buildings.”

COTC's Pillars of Success

Energy Efficiency

- Reduced energy bills
- Extended life of home
- Building capacity through trained local employment
- Employment opportunities for community members \$150,000/year/community



Occupant Health

- Increased home comfort
- Reduced stress
- Reduced amount of health problems

COTC Program Deliverables

Overall Program Deliverables 2016-2020

- **COTC Home Assistance Program (COTC HAP)**
 - Retrofit of 40 homes per community including:
 - Conduct energy audits/install B/E Measures in 521 units
- **COTC Small Business Lighting Program (COTC SBLP)**
 - Replacement of inefficient lighting in small businesses (est. 15/community)
 - Up to \$2,000/business

COTC Program Deliverables Continued...

- **COTC Home Assistance Program (COTC HAP)**

- Includes up to a maximum amount of \$15,500 in Basic/Extended/Weatherization Measures
 - Draftproofing
 - Attic, Wall, Crawlspace Insulation
- Includes both material and labour
- Includes up to \$1,500 for H&S measures
- Includes \$400 for initial Energy Audit & follow-up Quality Assurance Audit

Administrative Processes

- Policies
 - Independent Electricity System Operator (IESO)
 - Cost Effectiveness Tools
 - Achievable Potential Calculators
 - Business Case Development
 - Five Nations Energy Inc. (FNEI)
 - Admin/Financial Policies
 - Local Distribution Companies (LDC)
 - Admin/Personnel Policies

Administrative Processes

SPONSOR - *LEGISLATOR*

IESO

LDC'S - *DIRECTION*

LDCWG

PROJECT TEAM - *PROGRAM
DELIVERY*

COTC

2 PROGRAMS DELIVERED BY
Local Community Coordinators
Foreman, Crew, and Electricians

HAP

SBLP

Financial Processes

- Competitive bid process for best prices for all building supplies and tools, and electrical work
- Highly structured invoicing process with IESO
- Utilize local businesses for supplies and services AMAP
- Follow FNEI financial policy for payments, purchasing, etc.

Personnel Processes

- Follow individual LDC's employment policies for local hires
 - Full time Community Coordinator (CC)
 - 6 month contract for Crew Foreman
 - 6 month contracts for crew members
- Project Manager and 2 Technical Advisors
 - Part time contracts with FNEI

Technical Standards

- National Building Code (NBC)
- Hot 2000 and IESO Software
- Industry Best Practices
 - Preparing a Training Manual to provide written guidelines of required and expected work
- Maintenance tips for:
 - Energy conservation
 - HRV maintenance
 - Mold prevention

Retrofit Process

- 1) Review existing housing information (inspection reports, etc.)
- 2) Identify as major or minor renovation (\$25K+ - major)
- 3) For COTC, minor homes were better suited for selection
- 4) Conduct Blower Door Test (BDT) and install some basic energy saving products (higher BDT = more savings)
- 5) Complete HOT2000 file to determine potential energy savings
- 6) Select homes based on potential energy savings and minor repairs
 - *Major renos could be considered with help from First Nation/owner
- 7) Conduct Field Assessment of home to confirm work required

Retrofit Process Con't...

- 8) Prepare scope of work/material lists for each unit
- 9) Order materials in bulk for shipping on winter road
 - Competitive bid process with suppliers and shippers
 - Inventory verified by CC and Foreman
- 10) Hiring process start in March/April
 - Long process due to hunting, etc.
- 11) Training starts in May for 3 weeks (theory)
 - First Aid/CPR, Working at Heights, Worker Safety, Confined Space, House As A System/Building Science Principles
- 12) Practical training starts in late May
 - Weatherization Techniques, HRV installations, custom finish work

Retrofit Process Con't...

- 13) Retrofit work starts in June, each unit takes 5-8 days
 - 1 day for cleaning/prep work
 - 1-2 days for draftproofing
 - 1-2 days for attic insulation/HRV work
 - 2-3 days for exterior wall/crawlspace insulation
 - May take longer if we find additional Health & Safety issues (FN, owner gets involved)
 - Technical advisors conduct regular visits for support and guidance
- 14) Foreman completes daily reports and submits to Community Coordinator (CC)
 - Work performed, materials used, roll call, incidents, etc.
- 15) CC compiles reports and uploads to COTC database
 - Contains shared data, reports, templates, pictures, participant files
- 16) Project Manager verifies all reports each week, at season end for reporting purposes

Retrofit Process Con't...

- 17) Deficiency inspections follow work mid-late October
 - Retrofit work, Health & Safety, Heat Recovery Ventilators (HRVs), etc.
- 18) Season end inventory of material conducted in November
 - Required for reporting and invoicing
- 19) Data collection and reporting October-November
 - Energy consumption data, Field Assessment Tool (FAST) files, reports, Quality Assurance BDT's
- 20) Current year project debriefing & next year briefing in November
 - Discuss admin/technical/financial/personnel issues
 - Confirm selection of home retrofits, material lists for next year

Home Energy Audits and Retrofits

- Energy Audits started in 2014 and are ongoing – all homes will be audited by 2020
- Install energy efficient products – CFL/LED light bulbs, water heater blankets and pipe wrap etc., (plus some fridge replacements in 2014-2015)
- Insulation, air sealing and mechanical ventilation installed on eligible homes



Installing Energy Saving Products during Energy Audit



Basic/Extended Measures



Home Selection Process

- Ten homes per year per community are chosen for the insulation and air sealing work

Key criteria:

- High blower door test number i.e leaky house (2000+)
- Low insulation levels in attic and walls
- Foundation level and dry
- Roof not leaking, shingles in good shape
- **THESE CRITERIA ENSURE WE ACHIEVE HIGHER SAVINGS WITHOUT DANGER OF BEING DAMAGED**

Home Selection Matrix Sample



Conservation On The Coast - Kashechewan Power Corporation

Information Data Sheet

Blower Door Testing Results and Basic & Weatherization Measures

File ID	Address	Type of Unit	1st BDT Results	Total Size of Air Holes in Square Inches	Date of 1st BDT & Basic Measures	Foundation Condition	Exterior Finish Condition	Roof Condition	Health & Safety Issues
KAS00-0012	13 Atik St.	Detached	6078	607	Oct. 2013	Good	Fair	Poor	No ventilation
KAS00-0118	23 Reserve Rd.	Detached	4575	457	Oct. 2016	Fair	Fair	Fair	Mould
KAS00-0062	28 Muskeg Rd.	Detached	4404	440	Aug. 2014	Poor	No finish	Poor	Major water damage
KAS00-0055	15 Waweyaston Crescent	Detached	4389	438	Aug. 2014	Fair	Fair	Poor	No ventilation
KAS00-0126	11 Willow Creek Rd..	Detached	3988	398	Oct. 2016	good	good	Poor	No ventilation
KAS00-0070	14 Mallard St.	Detached	3972	397	Sept. 2014	Good	No finish	Good	No ventilation

COTC Home Retrofit Work

- Air seal attic floor, install HRV ductwork
- Insulate attic (blown-in insulation 19" - R50)
- Air seal window and door frames
- Install and tape weather barrier on exterior walls
- Insulate exterior and crawlspace walls with 1.5" of extruded polystyrene (adding R7.5) and crawlspace walls, sealed at all seams
- Complete finish work i.e. trim, siding, etc.

Health and Safety Work:

- Install sealed poly over dirt floor in crawlspace
- Install Heat Recovery Ventilator (HRV) for continuous fresh air in the home
- Repair minor structural problems

Exterior Wall Retrofit

Siding is removed carefully in the hope it can be reused, if not.....

FN purchases siding and COTC pays shipping





Wet and damaged wood replaced before new air barrier and exterior insulation is installed



Air barrier
installed and
taped

R7.5 foam
insulation
installed and
taped



Window and door frames are air sealed with expanding foam or caulking



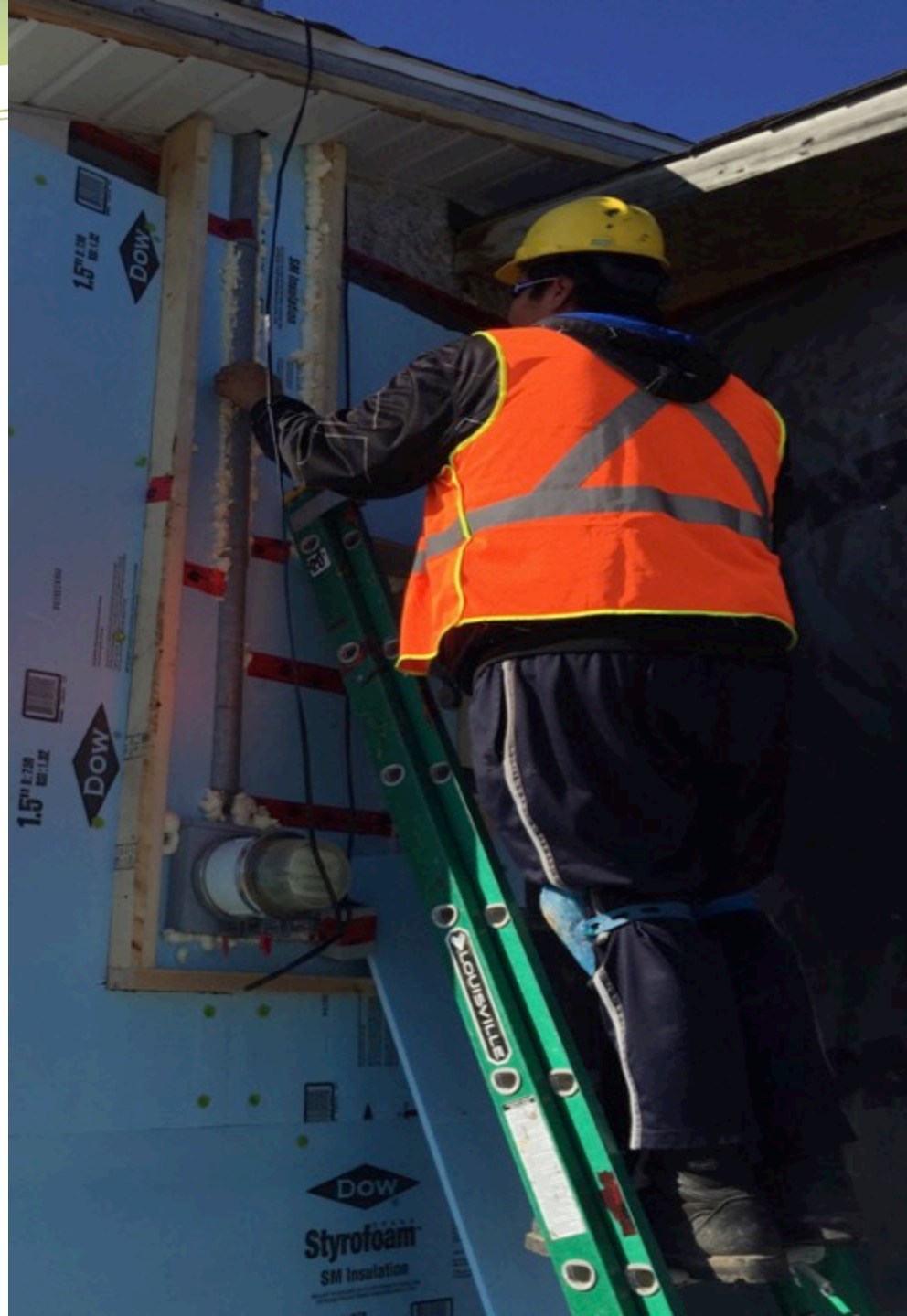
Window framed with wood and then covered with flashing and caulked



The crews make their own flashings with a metal brake



The framing work required around the mast and meter is time consuming, but worth the effort



Vinyl or wood siding is supplied by the First Nation and installed by the COTC crew



Attic retrofit work

Create an exterior attic entrance

Permanently close interior access

Remove existing insulation



Insulation batts are kept, if in good condition, for reuse in the crawlspace or offered to the occupant



With the insulation removed there is a clear working area for a thorough air sealing job



Soffit baffles installed to ensure the soffit ventilation is not blocked and to help avoid ice damming on the roof in winter



19 inches
(R50) of loose
fill insulation
blown in
AFTER all air
sealing and
HRV work
completed



Crawlspace Retrofit Work

Occupants required to clean out stored items ,
COTC crew levels the ground in preparation
of installing 6 mil poly,
sealed at all seams.



The poly stops the migration of moisture from the exposed ground into the homes



The poly is sealed to the side walls and at seams with acoustical sealant and Tuck Tape.

Wall insulation is added as required and air/vapour barrier repaired





HRV installed in the laundry room – for easy access to a drain

Easy to use wall control is installed for operation of the HRV

Foreman and Community Coordinator inform occupants on benefits of use and how to adjust controls.



COTC installed HRV units are balanced with a Magnahelix Gauge to ensure an equal amount of air is exiting and entering the home

COTC assists local Housing Department with balancing other HRV units in the community



Addressing the Challenges

- **Adapting provincial CDM programs to remote FN communities**
 - COTC staff educated and informed the government about the specific needs of remote FN communities
- **Educating Power Corporation General Managers and Board members about mandatory CDM programs and regulatory issues**
 - Working Group formed with three GMs, FNEI and COTC staff, and regular presentations made to update and inform
 - COTC staff worked with the Power Corporations' lawyer to adapt the Provincial CDM plans to suit their needs

Addressing the Challenges Con't...

- **Maintaining education and awareness of energy efficiency**
 - COTC Facebook page for each Community
 - Community posters when required
 - Yearly calendar with EE tips and artwork and photos
 - COTC Website www.conservationonthecoast.com
 - COTC Video on YouTube or COTC website
 - https://www.youtube.com/watch?v=_TcZGRYOdOY

HRV FACT SHEET

What is a Heat Recovery Ventilator (HRV)?

Think of your HRV as **LUNGS** for your home!

- When operating, your HRV exchanges stale, moist air from inside your home with fresh air from outside, this is essential for healthy living in your home

Why should I use my HRV?

- Homes require fresh air exchange
- Running an HRV continuously in the winter reduces window condensation
- If windows are dry then mold can't grow

How does an HRV work?

- An HRV is simply a fan in a box moving equal amounts of air in and out of your home
- The two streams of air are filtered before they pass by each other within the heat exchanger - the outgoing air gives off its heat to the cooler incoming air
- The stale air is exhausted from your bathroom, kitchen and laundry rooms
- The fresh air is distributed either through your furnace ductwork or through dedicated ductwork in your attic and out through a ceiling diffuser

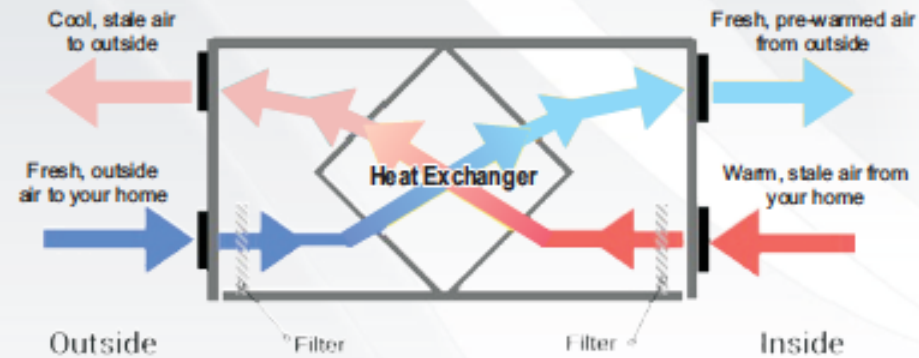
To operate my HRV



Set dial to 'Comfort Zone'

Set switch to minimum (MIN)

Heat Recovery Ventilator (HRV)



Working together to make our homes healthy, comfortable and energy efficient.

▽ ΔΓ <<NΓΓeσΔ' PPaΔ
 ΔΓ 9 Δδ Γe ALNΓeσΔ'
 eΔσJb' e°C ▽ Γeδ' Δ'δU°



MAINTENANCE OF YOUR HRV



Your HRV requires regular maintenance to operate effectively
What do I need to do?



Before opening the HRV door, set wall control switch to OFF



Clean the ceiling diffusers that supply and exhaust air with a damp cloth once per month



Undo the two latches and open your HRV door



Check and clear debris from the outside intake hood every spring and fall



Wash the two reusable filters in your sink once per month



Clean any debris inside your HRV every time you clean the filters



To restart your HRV, close and latch the door, then turn wall control switch back to Minimum (MIN)

Once per year your HRV core, drain and fan blades need to be cleaned and the air flow may need to be rebalanced. Check with your Housing Department for assistance with these tasks.

How to Avoid Mold

Keep surfaces clean, warm and dry!

1. Keep Surfaces Clean

- Regularly clean window ledges to remove dust, a food source for mold
- Regularly clean caulking around tubs and sinks



2. Keep Surfaces Warm

- Open window coverings every day to allow sun and warm air to reach the glass
- Pull furniture away from outside walls to allow an even flow of warm air to wall surfaces
- Keep furniture away from baseboard heaters and floor registers to allow an even flow of warm air to window and wall surfaces
- Keep bedroom doors open to allow even distribution of warm air to all rooms

3. Keep Surfaces Dry

Control amount of moisture in your home:

- Cover crawlspace dirt floor with plastic, sealed at all seams
 - Avoid walking and storing items on crawlspace floor plastic
- Use kitchen and bathroom exhaust fans when cooking and showering
- Use HRV continuously (if you have one)
- If no exhaust fans or HRV, open two windows to move excess moisture outside
- Repair or report plumbing leaks and other water leaks to Housing Department
- Vent dryer directly outside
- Reduce the use of humidifiers and pots of water on the woodstove



How to Clean Mold



- Use soap and water only
- **DO NOT USE BLEACH**
- Wipe mold off surfaces
- Dry surface



After cleaning follow directions for keeping that surface clean, warm and dry to avoid further mold growth.

If the moisture source is not stopped the mold will grow again!

Addressing the Challenges Con't...

- **Shipping products and tools – cost effectively and timely**
 - Order construction products in the fall for delivery on the winter road for work to be done the following summer
- **Ongoing personnel issues**
 - 3 weeks training each spring – classroom and hands on
 - Ongoing technical support, two weekly calls
 - Staff turnover, extended cultural breaks
 - Punctuality and attendance
 - Technical skills required i.e. HRV installation, custom finishes

Addressing the Challenges Con't...

- **Condition of the homes** – wet foundations, curled shingles, no siding, rotting wood, missing ceiling poly and tiles, holes in floors
 - Work collaboratively with Housing Managers to do necessary repairs prior to COTC energy retrofit work
- **Homes built on wet soil** – muskeg – “the James Bay Lowlands”
 - Work with Housing and Chief and Council to try different foundation options that are better suited to the muskeg

Addressing the Challenges Con't...

- **Balanced mechanical ventilation** is an essential element of a comprehensive energy retrofit, but too often they are turned off to “save money”
 - COTC Foreman and Community Coordinator educate the home occupant on why the HRV is important to operate and how to adjust controls for ultimate comfort
 - HRV maintenance labels and info brochure are in development
 - In discussion with Housing departments to provide more HRV maintenance help

Addressing the Challenges Con't...

- **Everyone wants insulation and air sealing work done**
 - Manage expectations with clear set of criteria of how homes are chosen
 - Work with Housing to finalize the list against other work being done to homes
- **Some hydro bills are either staying the same or rising after the retrofit is done**
 - Preliminary survey results and anecdotal evidence indicate some people are reducing how much wood they burn and using baseboards more than before – electric heat can be cheaper than buying wood
 - Changes in occupancy lifestyle increase energy consumption

Collaboration Efforts

- COTC and AFN, FAFN, KFN working collaboratively on addressing:
 - Foundation issues (gravel, drainage, structural, etc.)
 - Roof issues (shingle replacement, roof leaks, etc)
 - Exterior finishes (siding, lumber, etc.)
 - CMHC and INAC funding proposals
 - METS proposals

Collaboration with Community Members

- COTC encourages “sweat equity” from community members
 - Cleaning out crawlspaces
 - Moving wood piles and other obstacles away from the exterior walls
 - Keep worksites clear of other work hazards i.e. vehicles, pets, “short-cuts” through yards



“SHOWCASE” PROJECTS

- 3 way partnership between COTC, the FN, and the homeowner
- Each partner contributes to the project with materials and labour
- Fort Albany FN example:
 - First Nation repaired foundation and roof
 - COTC provided draftproofing, poly in crawlspace, HRV unit, insulation on crawlspace and exterior walls, and attic insulation
 - Homeowner repaired and/or installed all exterior and interior finishes at his own cost

Collaboration with Community Members

- COTC will work with community members renovating their home to match their schedule
- Replacement of windows is not part of our program, but in this situation the homeowner provided the windows and COTC installed them while doing the wall insulation



Collaboration with ACEP

- COTC and the Aboriginal Community Energy Plan (ACEP) working collaboratively on achieving vision:
 - Working in unison for quicker timeline
 - Sharing resources to complete tasks
 - ACEP further defining community vision
 - Encouragement to develop housing policies for better new builds, retrofits and maintenance schedules

Collaboration Between the Power Corporations and FNEI

- Provide historical and post electricity usage for each retrofitted home for analysis and monitoring
- Formed a Working Group of the General Managers, Power Corporation Board members and FNEI CEO to run the program
- Power Corporations responsible for local COTC staff payroll
- Local COTC staff follow their Power Corporation's Personnel Policies and Procedures

Strapping milled in Fort Albany being shipped by boat to Kashechewan

Collaboration
between the
Power
Corporations

Sharing
materials and
resources as
required



Collaboration with other Agencies

- Mennonite Central Committee provided 2 volunteer electricians to change lighting under the Small Business Lighting (SBL) program.
 - Lighting retrofits could not be done without this contribution of time
- Canadian Coalition for Green Health Care, with IESO funding, provided energy audits and energy management training for WAHA health facilities on the west James Bay coast





IESO and MoECC staff visited in August 2016 (and again in 2019) and heard our challenges and have shared with their colleagues



Collaboration with
Government

Addressing the Challenges

- **The First Nations' financial constraints to supply materials and train staff**
 - COTC sometimes shared the cost of materials and shipping with the First Nations
 - COTC invited Housing staff to our HRV training
 - COTC share expertise with HRV balancing and maintenance with Housing staff
- **Government agencies do not understand the “remote factor” and the impact of muskeg on the durability of the structure and health of the occupants**
 - Invited IESO and MoECC staff to see the challenges first hand resulting in a greater understanding
 - Negotiated additional funds from IESO for HRVs to improve indoor air quality

Collaboration is the KEY to success

Strong, committed local leadership is required to make real change

Government

- INAC, CMHC
- FNMHF
- Discretionary Capital
- Health Canada
- Province

Regional & Local Housing Strategies / Authorities

- New housing policies
- Existing housing policies
- Roles & responsibilities

Local Power Corporations

- Energy retrofits
- Energy education
- Technical skills

Community Energy Plan

- Conservation potential
- Efficiency potential
- Renewable energy potential



GOAL: Safe, Healthy, Comfortable, Durable, Efficient Homes

We all have the same goal

Learn from each other





Sharing Training Strategies

Building & Maintaining Local Skills

COTC Training Goals

- Train local person to act as a community champion
 - Works closely with FN, Band members
 - Promotes COTC
- Train local men and women to work as a retrofit crew
 - energy efficiency concepts
 - retrofit construction techniques
- Train local men and women as Energy Auditors
 - Blower Door Tests, Energy Data entry & analysis
- Provide specialty training to local men and women
 - Energy Auditors
 - HRV installations and maintenance

COTC Training Program

- Mandatory Employee Training (4 days)
 - Working at Heights
 - First Aid and CPR
- Workplace Safety course (2 days)
 - WHMIS, MOL 4-Step, Confined Space, OH&S, Toolbox talks, PPE
- House As A System and Building Science Principles (3 days)
 - Includes overview of retrofit work, Blower Door Tests, Energy Audits
- On-site hands on training (6 days)
 - Measures installation, custom trimwork, etc.
- Administrative training for local CC
 - Project management, HOT2000, FAST, reporting, etc.

COTC Training Program Cont...

- HRV Installation & Maintenance (new)
 - Theoretical training with COTC and FN
 - More hands-on training for HRV installation
 - Ductwork installation
 - Balancing
 - Supply/return placement
 - Maintenance
 - Tenant education
 - Balancing
 - cleaning

Procurement Opportunities

- Building Materials Supply
 - Local sawmill provides some lumber
 - Purchase of material for unforeseen work
- Electrical Work
 - Licensed electricians & local helpers
- Shipping & Transportation
- Technical
 - Energy Auditors
 - HRV installations (future)
- General Labourers

Sources of Training Dollars

- Partial Funding provided by IESO (provincial funder)
 - Weatherization, Workplace Safety, Mandatory Training, etc.
- Partial Funding by METS (provincial)
 - Additional training costs in excess of budget, HRV, practical training
 - Includes purchase of some materials
- Other training agencies
 - Native Women's Association of Canada (NWAC)

Other Funding Opportunities

- Provincial and utility energy conservation programs
- Federal energy retrofit programs (hopefully in the future)
- CMHC Section 95 and RRAP funds and other new programs
- Housing Policies / Maintenance policies/fees etc. that create funds for ongoing retrofit and maintenance work

COTC Community Impact

- ~ \$1M labour costs for 3 communities over 3 years
- ~ \$300K training costs for 3 communities over 3 years
- 54 people received training/certifications over 3 years
- ~25 people received HRV installation training (COTC crew and local housing contractors)
- ~7 people received Project Management training (Community Coordinators)
- ~12 people received Energy Auditor training
- 2 people earned carpenter apprenticeship hours

Making it work in your community

Use these questions as a guideline for discussion on how to make an energy retrofit program work in your community:

- What are the benefits of an energy retrofit program for your community?
- List your community's resources (*i.e. access to materials, skilled labour, political will, own source revenue etc.*)
- List your community's challenges (*i.e. access to materials, skilled labour, condition of housing stock, political will, funding, lack of supportive housing policy etc.*)
- Discuss ways to meet/overcome the identified challenges
- Identify potential funding sources for training and retrofit work
- Identify some key words / elements for a Vision and Mission Statement that would reflect your community's desire to implement a energy retrofit project

Questions?

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