



CLEAN TECH IMPACT



- **Why is Off Diesel a Key Challenge?** Remote communities are disproportionately impacted by the reliance on diesel fuel for heat and electricity. Investments in clean technology can improve the environmental, economic and social conditions in remote communities and support a renewed relationship between the Canadian Government and Indigenous Peoples.
- **Workshop Summary:**
 - **When?** October 23, 2017
 - **Who?** 50+ stakeholders including Indigenous Peoples, utilities, technology experts, academics, provincial and territorial governments and the U.S. Department of Energy.
 - **Goals?** Discover, define, develop, and deliver a challenge to address critical barriers and drive breakthrough solutions for reducing diesel reliance in remote communities.
- **Challenge Models proposed by Participants:**
 - Identify a community energy vision and pathway to achievement
 - Develop a regionally based approach to prepare communities to deliver innovative and sustainable clean energy projects.
 - Develop a smart grid to increase use of renewables in communities.
 - Reduce reliance on diesel by more than 20%, for both electricity and heat.
 - Reduce diesel consumption by 60% (20% renewables, 20% efficiency, 20% conservation).

Defining the challenge

Reducing reliance on diesel fuel in Canada's remote communities by transitioning to renewable energy technology represents an opportunity that sits at the intersection of multiple federal priorities. Beyond lowering greenhouse gas emissions, the challenges could lead to

breakthrough solutions that link clean energy to other issues such as food security, quality housing and economic development.

Prior to the workshop, NRCan hosted a webinar with over 35 participants to develop a common understanding of the most significant barriers to increasing the share of renewable energy in remote and northern communities.

Barriers identified by participants include:

- **Technical Barriers:** while existing technologies can mitigate dependence on diesel, there are significant challenges increasing the share of intermittent renewable energy beyond 20% in Canada's remote communities. These include:
 - Limits to conventional diesel systems: Conventional diesel generators are able to 'ramp' production up or down to smooth fluctuations in renewable output. However, ramping is limited in terms of both pace and level. Generators require time to increase or decrease production, while renewable output can change instantaneously. Further, diesel generators cannot ramp below 30-50% without experiencing higher risk of failure.
 - Regional / Seasonal Variation: in renewable energy limits 'breakthrough' potential of any single renewable energy source.
 - Expand Energy Efficiency: to provide a low-cost pathway for diesel reduction in many remote communities (e.g. waste heat, building retrofits).
 - Technology Integration: could be accelerated through 'advanced power controllers' to harness multiple sources of energy and drive breakthrough levels of clean energy for heat and power.

- **Economic Barriers:** while diesel-dependent communities are subject to very high electricity rates in Canada, clean energy solutions require actions that:
 - Reduce Technology Costs: clean energy costs in remote communities are well above global averages. Costs are driven by location (e.g. need to import equipment/smaller pool of technical workers) and economies of scale (e.g. roads)
 - Attract Project Investment: to develop multiple renewable technologies required to achieve breakthrough levels of diesel reduction.

- **Social Barriers:** must be addressed to build the human capacity required to adopt breakthrough clean energy systems. Improving capacity alone may be considered a breakthrough, including actions that:
 - Increase Local Ownership: through new ownership models to encourage local ownership of energy projects given capacity constraints.

- Accelerate Skills Development: to support community involvement beyond the construction phase (e.g. resource assessment, operation).
- Support co-benefits for the community: such as economic development, food security, and quality housing.
- Leverage Enabling Policy: such as net metering and power purchase agreements, which can facilitate more 'grass roots' projects.

Defining the Potential for Impact

NRCan hosted a workshop on October 23 in Whitehorse, alongside the Renewables in Remote Communities Conference hosted by the Pembina Institute. Participants collaborated to identify what measures could best address the barriers to increasing the share of renewable energy in remote and northern communities. High potential areas for impact include:

- **Community Leadership**: participants emphasized that a challenge should empower communities to define their own 'breakthrough', rather than strive for a target imposed from the 'top-down'. Representatives from the US Department of Energy reported this was a key learning from implementing the 'Remote Alaskan Community Energy Efficiency' competition.
- **Capacity Building**: needs to be authentic, meaningful, relevant and multi-year. In order to move towards ambitious goals in a challenge it is clear that capacity building needs to be key feature of a challenge. Youth were highlighted as a key group of stakeholders. Feedback from the workshop and Whitehorse conference confirmed that youth can play an important role in expanding the number of clean energy champions in remote communities.
- **Flexibility**: projects in remote communities are much more complex, often require more time and are more costly. The 'off-diesel' challenge could look at funding best practices in place in other depts. For example, some programs at INAC now allow multi-year funding arrangements where funding can be rolled over from one year to the next.
- **Reconciliation**: Remote communities in Canada have significant Indigenous populations. The Government has committed to advancing reconciliation and renewing a nation-to-nation, government-to-government, and Inuit-Crown relationship with Indigenous peoples, where support for socio-economic development is seen as a cornerstone of needed transformational change. Reducing reliance on diesel in Indigenous communities can strengthen energy self-reliance and thereby support the objectives of reconciliation.

Developing Ambitious and Achievable Targets

In contrast to conventional programs that support a range of objectives, challenges support breakthrough solutions by focusing innovators on a specific barrier. As a result, effective challenges must leverage stakeholder expertise to identify these barriers and develop targets that are both ambitious and achievable.

Participants worked in groups to draft and refine potential challenge statements. Draft challenge statements reflected a variety of outcomes, including improved energy planning and technological breakthroughs. Draft challenge statements are outlined below:

1. **Identify a community energy vision and pathway to achievement** given the community's current level of human and financial capacity.
2. Develop a regionally-based approach to **prepare communities to deliver innovative and sustainable clean energy projects**.
3. Develop a smart grid to increase use of renewables in communities. Could be accomplished by supporting **partnerships between communities and industry** (e.g. telecoms)
4. Reduce reliance on diesel by more than 20%, for both electricity and heat. **Focus would be on accessible, replicable solutions**.
5. Reduce diesel consumption by 60% (20% renewables, 20% efficiency, 20% conservation) and **re-invest fuel savings**, including subsidies, into community projects.
6. Reduce diesel use for energy by 60%. Submissions to be evaluated **local ownership, partnerships, revenue generation and retention**, and fuel savings.

Delivering Breakthrough Solutions

No single organization can effectively deliver a challenge. Instead, partnerships are essential to creating transformative and lasting impacts. Identifying key partners among other federal departments, provinces and territories, academia, and industry will become an important component of program delivery going forward.

Going forward, Natural Resources Canada will continue to engage stakeholders over the winter to refine and finalize the challenge statement and program structure. NRCan is also developing cross-sectoral Off-Diesel Champions to facilitate the development of a final challenge statement.