CRUX ENERGY CONSULTING

INFORMATIONAL BRIEF

What Is a Regional Integrated Resource Plan?

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1. What Is an Integrated Resource Plan?

An Integrated Resource Plan (IRP) is a long-range planning framework used to determine how a specific region can reliably meet future energy and capacity needs over 20-plus year time horizon, at the lowest cost.

Rather than starting with a predetermined solution (build a new power plant, extend a transmission line), an IRP uses least-cost optimization modelling to evaluate a broad range of supply and demand options including new generation, utility scale and distributed storage, efficiency, demand response programs, and transmission infrastructure. The analysis also incorporates a detailed assessment of existing assets, including capacity ratings, heat rates, forced and planned outage rates, replacement timelines, scheduled maintenance, required refurbishments, and planned retirements to accurately model how each resource can be utilized under different operating conditions.

These inputs feed into a probabilistic scenario analysis that stress-tests the system across a wide range of future scenarios. These scenarios attempt to account for changing load growth trajectories driven by electrification, changing industrial profiles and populations; fuel price volatility; technology cost curves for existing and emerging resources; potential policy or regulatory shifts, and more. The goal is to identify resource plans that are robust across scenarios, not just optimized for a single set of assumptions.

IRPs model 20+ year planning horizons and are updated every 3–5 years to reflect new data, revised forecasts, and changing conditions.

In addition to the rigorous technical modelling, IRPs typically undergo structured stakeholder engagement to ensure that outside perspectives are incorporated. Indigenous communities, municipal governments, industrial customers and the public are often invited to multiple sessions to provide feedback and expertise.

The result is an evidence-based roadmap that gives governments, regulators, utilities, and investors a foundation to make informed decisions about future energy infrastructure and system operations.

Relationship to NERC Reliability Standards

Electricity reliability in Canada operates within a mandatory framework established by the North American Electric Reliability Corporation (NERC), which sets minimum planning and operating reliability standards for the bulk power system across North America, including most Canadian provinces. Standards include, but are not limited to, *Transmission Planning* and *Facilities Design*, which define the contingency criteria and reserve margin requirements that utilities must meet as a baseline. An IRP goes further, addressing the strategic investment decisions above that baseline: what infrastructure to build, when to build it, where investments should occur, and how costs can be managed over time.

2. What Makes an IRP "Regional"?

Most IRPs are developed by a single utility for its own service area. A regional IRP applies the same planning approach across a larger geography, spanning multiple utilities, provinces, or both, within a single integrated modelling environment.

A regional IRP provides a shared view of how energy supply and demand interact across jurisdictions and identifies opportunities where coordination could produce better outcomes than each utility planning in isolation. This may include shared use of generation assets, transmission infrastructure, storage resources or fuel systems that can serve multiple jurisdictions more efficiently than duplicative investments within provincial or utility boundaries.

3. Beyond Electricity

Traditional IRPs focus on electricity. Our recommended approach is broader. A meaningful regional IRP should consider the full energy system. This includes centralized electricity generation, distributed energy resources, energy efficiency, storage, natural gas, heating oil, propane, hydrogen, and other emerging technologies. Equally important is understanding how people and industries use energy today, and how those patterns are likely to shift over time as electrification, efficiency and new technologies reshape demand.

Incorporating the full energy system matters, because energy infrastructure decisions often involve fuel switching. When electricity planning and fuel planning occur in separate silos, the result can be mismatched infrastructure, stranded assets, and missed cost-reduction opportunities. A plan that examines only the electricity system cannot see the full picture of what is achievable or how overall system costs might be contained.

For example, optimizing the use of the existing natural gas grid may reduce the amount of new electric infrastructure required. These trade-offs only become apparent when both systems are considered together.

4. Why Plan Regionally?

Canada's systems are already interconnected. Generation resources, transmission corridors, pipeline networks, and demand patterns all operate according to physics and geography not administrative boundaries. When planning happens entirely within jurisdictional boundaries, several challenges can emerge:

- **Missed opportunities.** The most cost effective or reliable solution for one jurisdiction may exist just across its border, such as access to hydro storage, complementary renewable generation profiles that reduce curtailment events, shared storage facilities or existing fuel infrastructure.
- **Incompatible assumptions.** Utilities and provinces often use different assumptions regarding load growth, carbon pricing, technology costs, and asset retirement schedules. Without coordination, these inconsistencies can create planning gaps, redundancies, or conflicting infrastructure investments.
- **Uncoordinated infrastructure.** Transmission lines, generation facilities, and pipelines are long-lead, capital-intensive assets with planning horizons that span multiple years. Without a regional view of available resources and transfer capability, utilities may over-build redundant infrastructure or under-invest in interconnections that could otherwise reduce total system cost.
- **Hidden interdependencies.** Electricity reliability depends, in part, on the reliability of the fuel systems that serve it, including natural gas pipelines and firm supply arrangements, propane supply chains, and fuel delivery logistics. Planning processes that examine only the electricity system may not fully capture these interdependencies and associated risks.

This wider geographic perspective is important because energy systems are interconnected. Decisions made in one area or jurisdiction of the system can significantly impact another, ultimately impacting the ratepayers that reside in each jurisdiction.

Further Reading

Crux Energy Consulting supports the development of integrated, regionally informed energy planning frameworks that reflect the realities of interconnected energy systems. Many of the themes discussed here are explored in greater detail in the report, *An Atlantic Canadian Energy Future*.