Canada Energy Regulator | Régie de l'énergie du Canada

Canada

A LOOK BACK AT THE

Data Visualization Initiative

PURPOSE OF THIS PRESENTATION

For your information about the Data Visualization Initiative (DVI)

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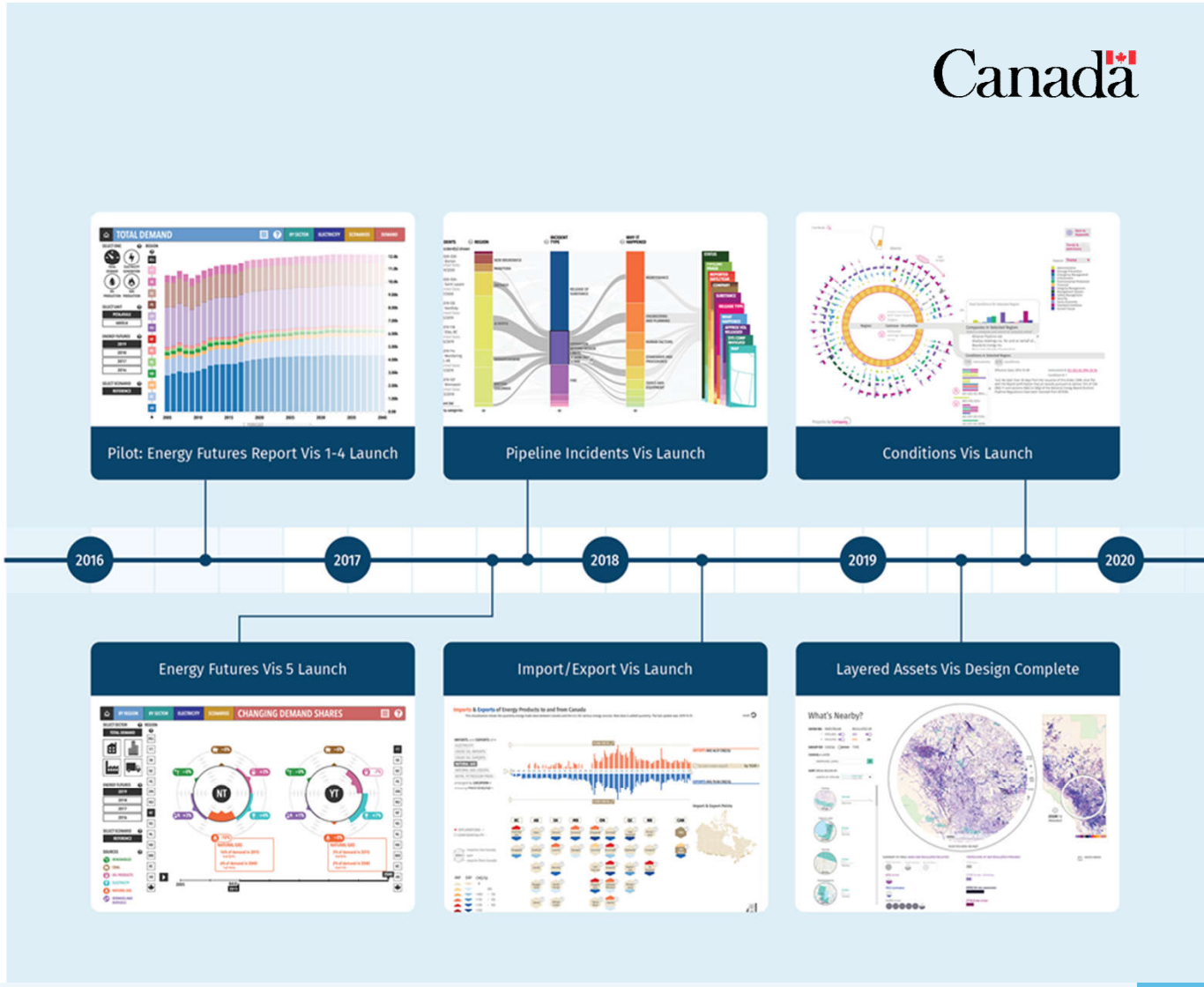
What was the DVI?

A three-year initiative using interactive data visualizations to facilitate transparency and understanding of CER data.



Objectives

BUILD CAPACITY

Build internal capacity to extract data to provide meaningful information to Canadians.

DEVELOP METHODOLOGY

Develop and document methodology to make data suitable for communication and decision making.

SHOWCASE CER DATA

Produce interactive visualizations that showcase CER-collected, compiled, and/or generated quantitative and qualitative data.

ENSURE CER RECOGNITION

Ensure CER is recognized as Canada's premier source for Pipeline and Energy Futures information.

Before DVI

- Long-term planning had not acknowledged that a different way to harness data was necessary to produce meaningful information needed to be relevant in the 21st century and for the people we serve.
- CER management wanted to apply the power of data and analytics to inform decisions.
- CER needed the right expertise, better quality data, a data analytics culture, and human-centered design approaches in order to facilitate data-supported decision making.

Who was Involved?

3 MAJOR CONTRACTS

THE HESTER VIEW
INNOVATION + DATA

PROJECT LEAD

UNIVERSITY OF CALGARY

DESIGN + RESEARCH

VIZWORX
VISIBLY BETTER SOLUTIONS

SOFTWARE DEVELOPMENT

COLLABORATIONS WITH...

Canada

Ingenium
Canada's Museums of Science and Innovation
Musées des sciences et de l'innovation du Canada

Canadian Geographic

tétro

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Internal Collaborations

Reported to EVP Transparency and Strategic Engagement

PROJECT MANAGERS

Amanda Harwood
DATA, DESIGN & ANALYTICS | DATA&IM

Katherine L. Murphy
EXECUTIVE OFFICE

SUPPORT

Faiza Hussain
ADMINISTRATOR | DVI

Shane Mahar
ADMINISTRATOR | DATA&IM

ENERGY FUTURES

Bryce VanSluys
ENERGY MARKETS | ENERGY INFORMATION

Matt Hansen
ENERGY MARKETS | ENERGY INFORMATION

Abha Bhargava
ENERGY OUTLOOKS | ENERGY INFORMATION

Michael Nadew
ENERGY OUTLOOKS | ENERGY INFORMATION

Andrea Oslanski
ENERGY OUTLOOKS | ENERGY INFORMATION

Stephen Chow
DATA MANAGEMENT | DATA&IM

PIPELINE INCIDENTS

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AUDIT, ENFORCEMENT & INVESTIGATION | SYSTEM OPERATIONS

Karen Duckworth
PROGRAMS & EVALUATIONS | SYSTEM OPERATIONS

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RESEARCH & INNOVATION | SYSTEM OPERATIONS

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DATA MANAGEMENT | DATA&IM

IMPORTS/EXPORTS

Janna Rodioukova
ENERGY SUPPLY & DATA | ENERGY INFORMATION

Paul Mortensen
ENERGY SUPPLY & DATA | ENERGY INFORMATION

Sara Tsang
ENERGY SUPPLY & DATA | ENERGY INFORMATION

Kinsey Nickerson
TOLLS & TARIFFS COMPLIANCE | ENERGY APPLICATION

CONDITIONS PWG

Heather Dodds
CONSTRUCTION OVERSIGHT | FIELD OPERATIONS

Kevin Hill
PROGRAMS & EVALUATIONS | SYSTEM OPERATIONS

Marcus Eyre
ADJUDICATION SYSTEM EXCELLENCE | ENERGY ADJUDICATION

Grant Moss
ENERGY MARKETS | ENERGY INFORMATION

Lori-Ann Sharp
OPEN GOVERNEMENT | DATA&IM

INFORMATION TECHNOLOGY, INFORMATION MANAGEMENT & ARCHITECTURE, PROCUREMENT, HUMAN RESOURCES

Did the Project Deliver on Objectives?

BUILD CAPACITY

- New BU (Data and Information Management) led by a data scientist.
- New hires.
- Worked with internal collaborators.

DEVELOP METHODOLOGY

- Documented process of visualization projects
- Documented the origins and evolution of datasets.
- Data visualization 101 primer for GoC open data portal.

SHOWCASE CER DATA

- Produced four public-facing interactive visualizations of quantitative and qualitative CER data.
- Produced design of one additional visualization.
- Produced various learning materials.

ENSURE CER RECOGNITION

- Community of Federal Regulators Excellence Award
- Report to Clerk of Privy Council, 2018
- Best Paper Award, IEEE VIS 2019
- External collaborations, presentations, engagement events, articles.

Supporting Core Responsibilities

ENERGY INFORMATION

R6 Canadians access and use energy information for knowledge, research or decision-making.

R7. Canadians have access to community-specific National Energy Board-regulated infrastructure information.

ENGAGEMENT

Creating tools that can be used to support engaging and building meaningful relationships with Stakeholders and Indigenous Peoples

SAFETY & ENVIRONMENTAL OVERSIGHT

Visualizations provide supporting evidence to the public re: setting and enforcing regulatory expectations for Canada Energy Regulator-regulated companies over the full lifecycle—construction, operation and abandonment— of energy-related activities.

I5. Number of serious injuries and fatalities related to Canada Energy Regulator-regulated infrastructure.

I6. Number of incidents related to Canada Energy Regulator-regulated infrastructure that harm the environment.

Challenges

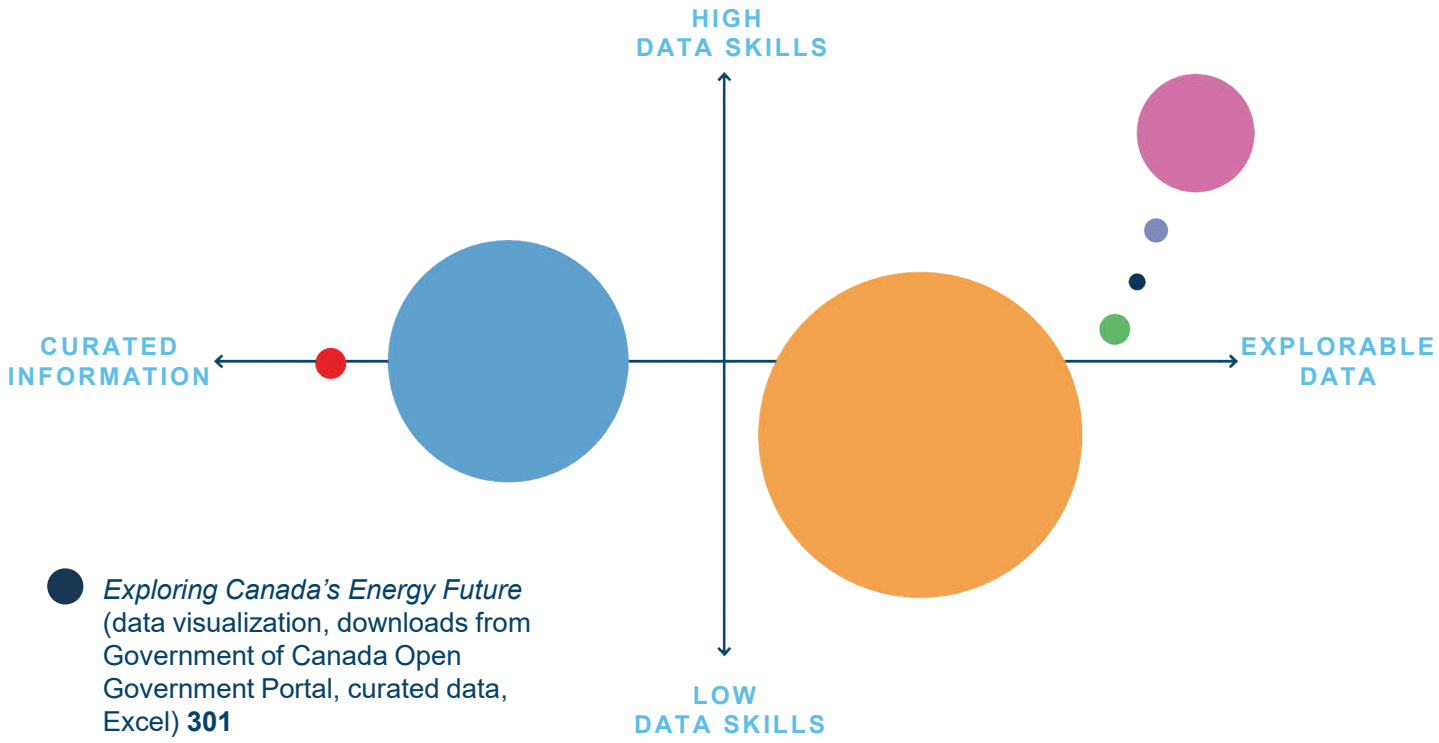
WHAT WERE/ARE THEY?	WHY?
Capacity building from the Design and Coding team fell short.	Lack of teams and/or individuals at the NEB/CER to transfer knowledge to.
Production of visualization of Asset Data (pipelines and facilities) not delivered.	Lack of data.
Risks to sustainability (ongoing).	Organizational changes, human resource allocation, and choice of priorities did not align with original DVI sustainability schedule. Ongoing risk mitigation needed.
In spite of evidence of its engagement value, organization-wide adoption of the visualization tools is low.	Lack of training in usage and weakness in internal communication? Need for maturation of data culture?

Unexpected Achievements

- Overall signal from management to support this initiative opened up space for data innovation across the organization.
- In addition to producing datasets that supported business lines, BUs collaborated to produce parallel datasets for communication or others' use.
- Data warehouse created for DVI Pipeline Incidents is now used enterprise-wide.
- Creating educational outreach materials provided a significant new audience for CER data.

We Engaged New Audiences…

- *Canada's Energy Future* (report, pageviews, HTML) **80,980**
- *Canada's Energy Future* (report, downloads, PDF) **1,156**
- *Canada's Energy Future* (downloads of Excel data for *figures*) **513**
- *Canada's Energy Future 2016* (macro indicators database, pageviews, HTML) **20,447**
- *Exploring Canada's Energy Future* (data visualization, pageviews, HTML) **130,563**
- *Exploring Canada's Energy Future* (data visualization, downloads from Government of Canada Open Government Portal, curated data, Excel) **301**
- *Exploring Canada's Energy Future* (data visualization, downloads of Methodology, Download Image and Download Data tabs) **1,089**



SOURCE
https://policyoptions.irpp.org/magazines/february-2019/data-visualization-government-can-empower-dialogue/

What's Next?

HOW DO WE CONTINUE ON OUR UPWARD TREND?

The D&IM unit has created a Visual/Design team to provide the necessary in-house expertise. The team is expected to become fully operational in 2020-21. Full complement of data designers and scientists is still required.

Establish a phased plan to upgrade/update/maintain visualization assets between D&IM and the BU/data generator/owner.

Data Transformation Focus Area will address gaps on an enterprise-wide level

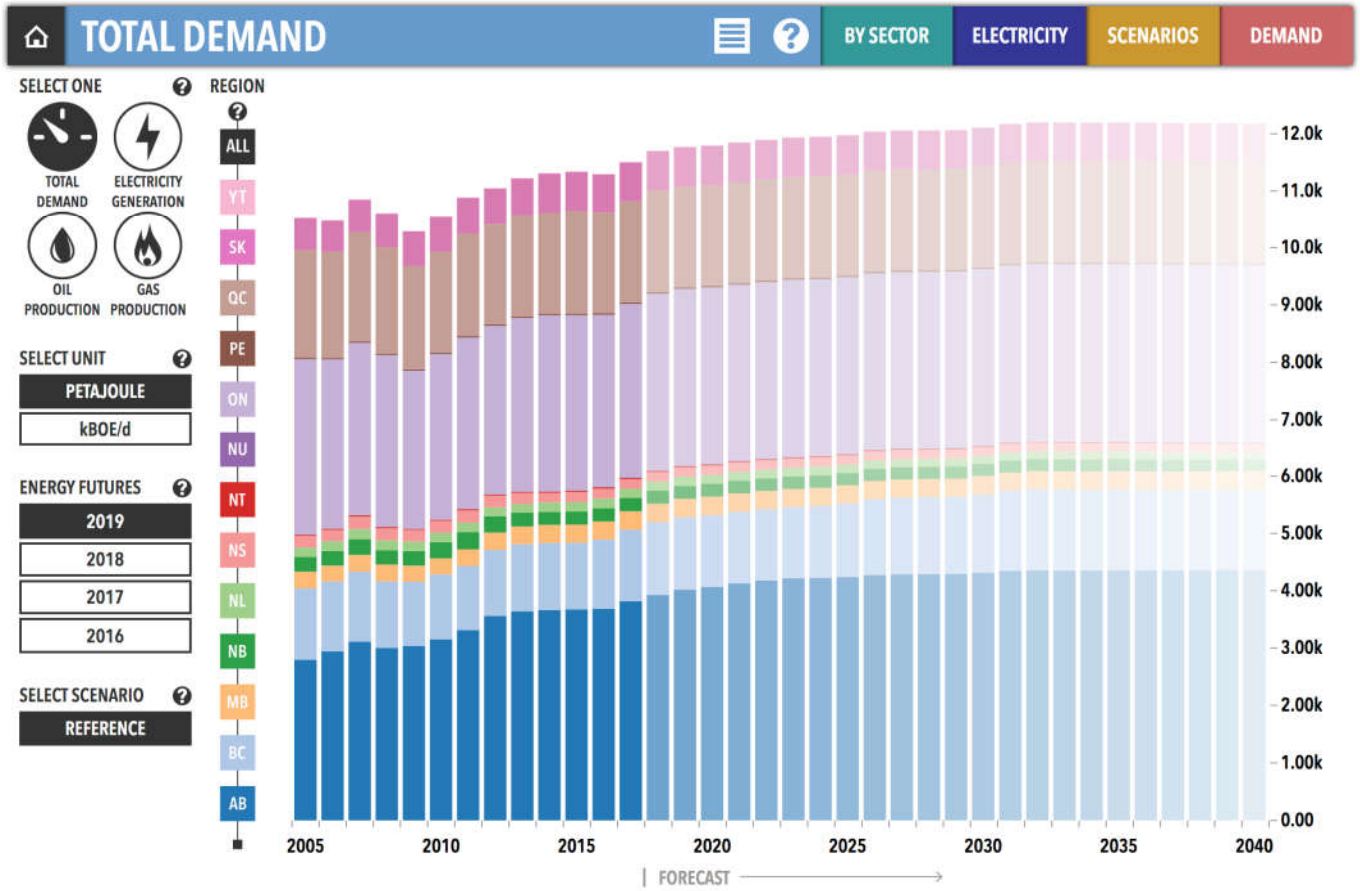
Continued collaboration with internal services (including IT and HR)

Questions/Comments

The Visualizations

Energy Futures (Pilot + Vis 5)

First interactive, visual interface for Canadians to explore Energy Futures Report data. Started conversations with other government departments, used as basis for courses and lesson plans.

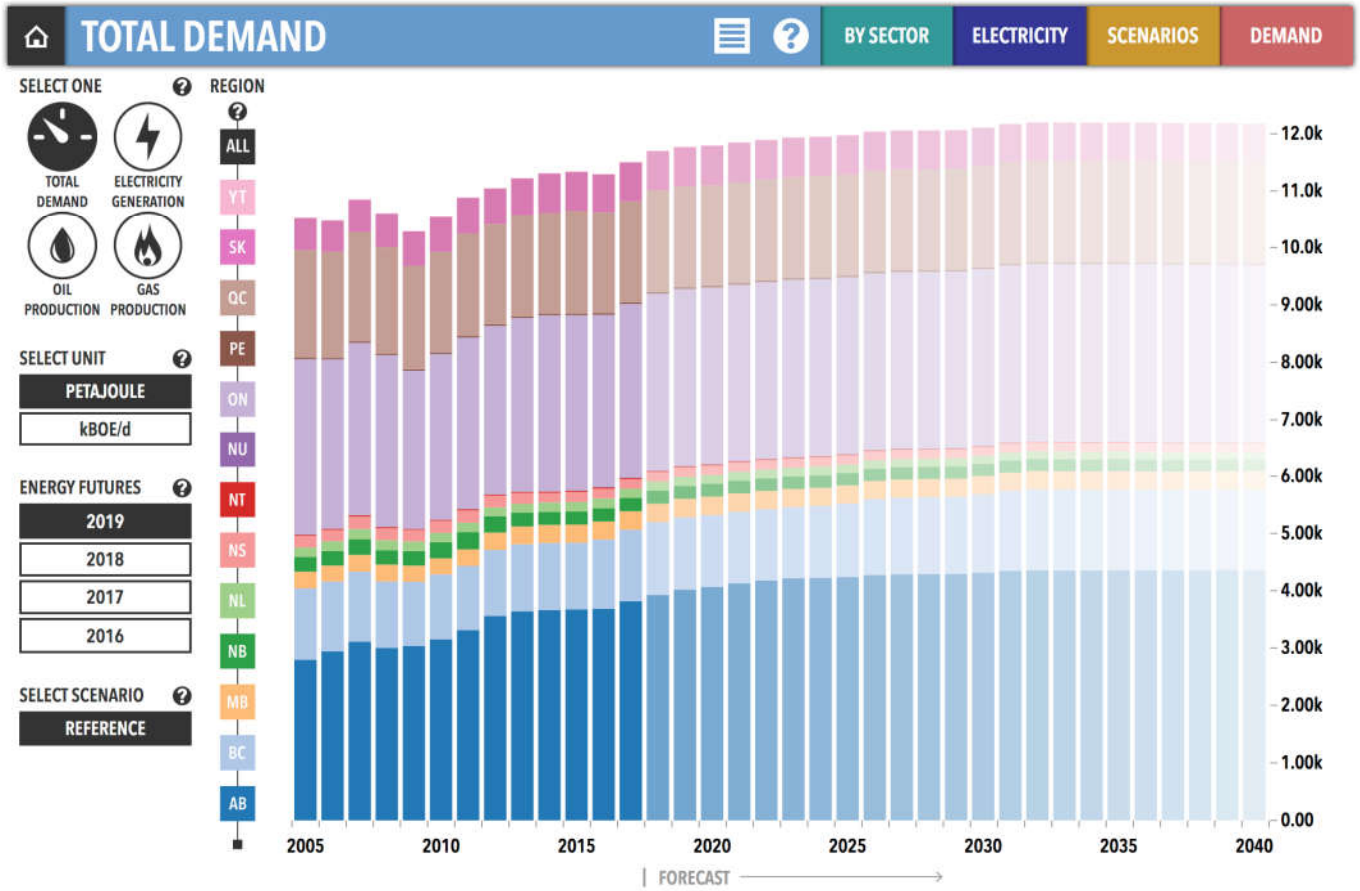


Energy Futures (Pilot + Vis 5)

HIGHLIGHTS (1/2)

Successful proof of concept to attract new public audience; conversation starter with others in data & digital innovation.

Learned importance of preliminary data discovery stage (collection, cleaning, connecting with data experts). Data needs work even when well-structured.



Energy Futures (Pilot + Vis 5)

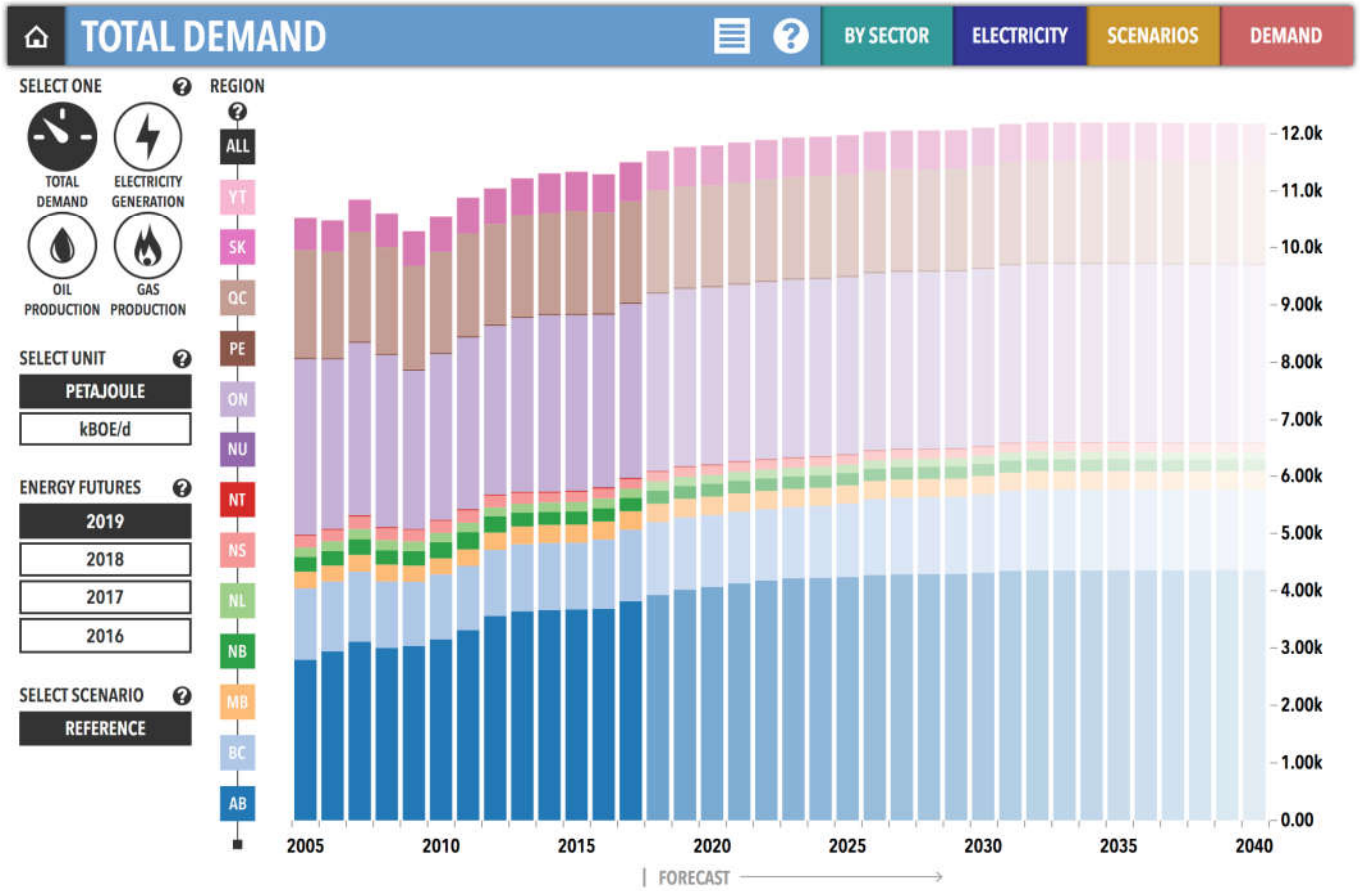
HIGHLIGHTS (2/2)

Part of an ecosystem of products. Releasing educational products increases data usage

Community of Federal Regulators Award for innovation.

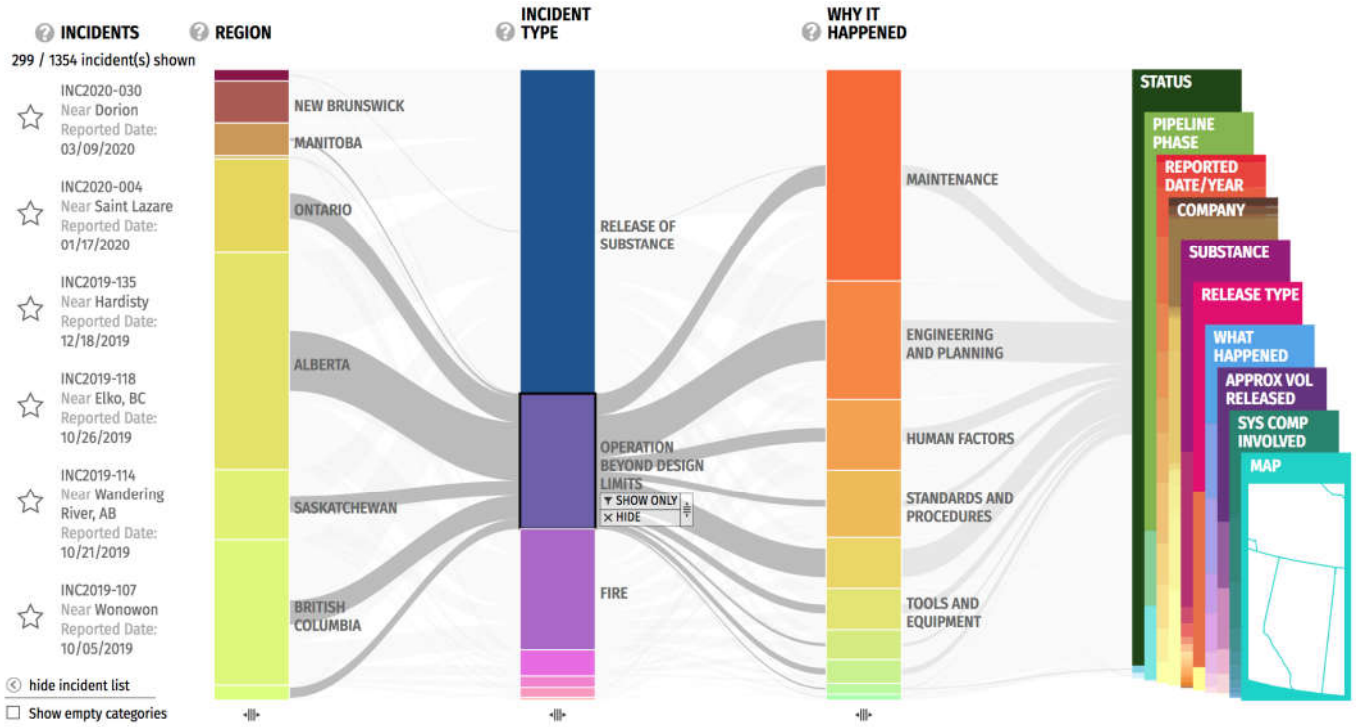
Asset that requires ongoing maintenance, yearly updates.

Used by EF data experts as additional tool to check for data errors.



Pipeline Incidents

Provided public audiences with a customizable, flexible way to view essential information about pipeline incidents. Used by regional offices in public communication.

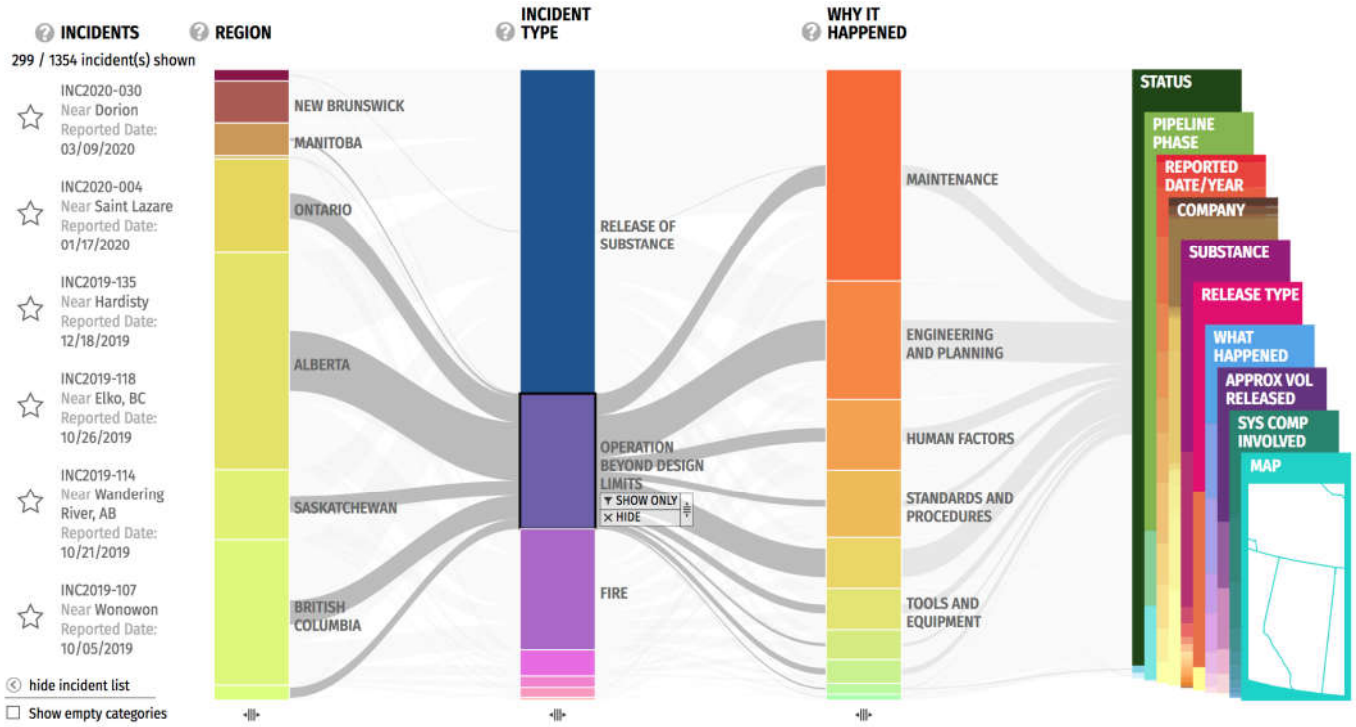


Pipeline Incidents

HIGHLIGHTS (1/2)

First visualization using externally submitted information. Required a data clean-up effort in the source database (ORCA).

Triggered creation of data warehouse to allow public-facing changes without changing source data and added a new addition in ORCA for "pipeline phase".

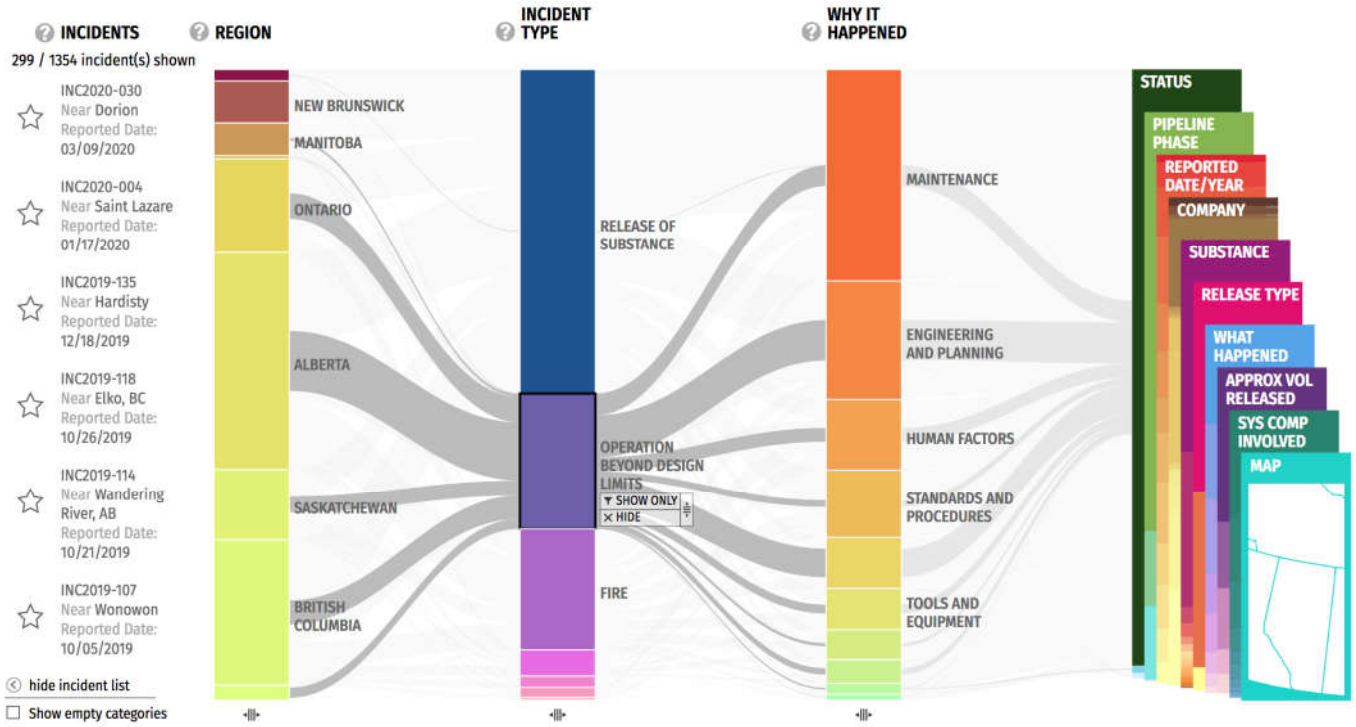


Pipeline Incidents

HIGHLIGHTS (2/2)

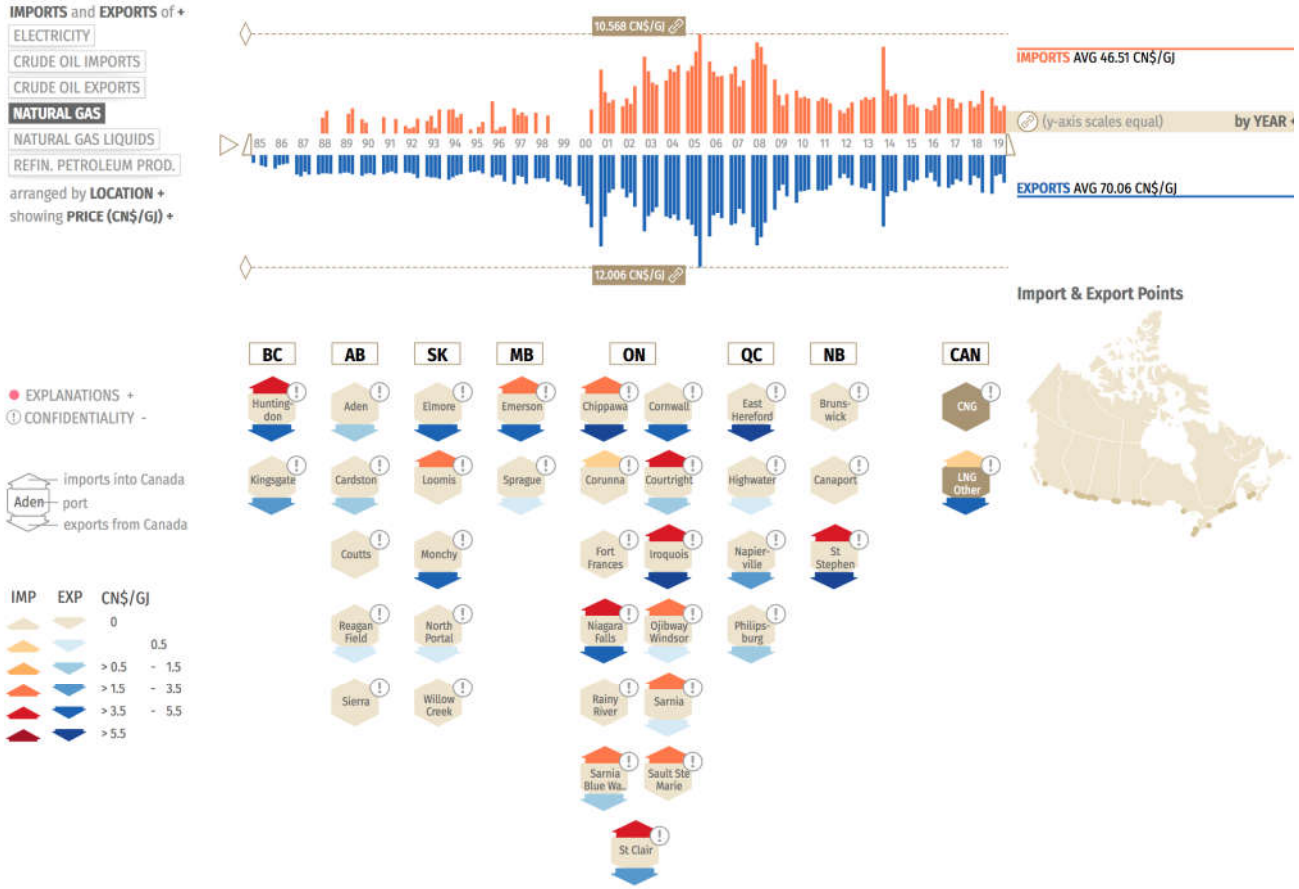
Built capacity for semi-automatic updates through ETL (Extract, Transfer, Load) process on top of data warehouse.

Quarterly updates chosen for consistency with other public-facing products showing incidents data (e.g. safety dashboards), but ETL makes more frequent updates possible.



Imports/Exports

First time Canadians could access a comprehensive dataset of Canadian energy imports and exports in a single place.



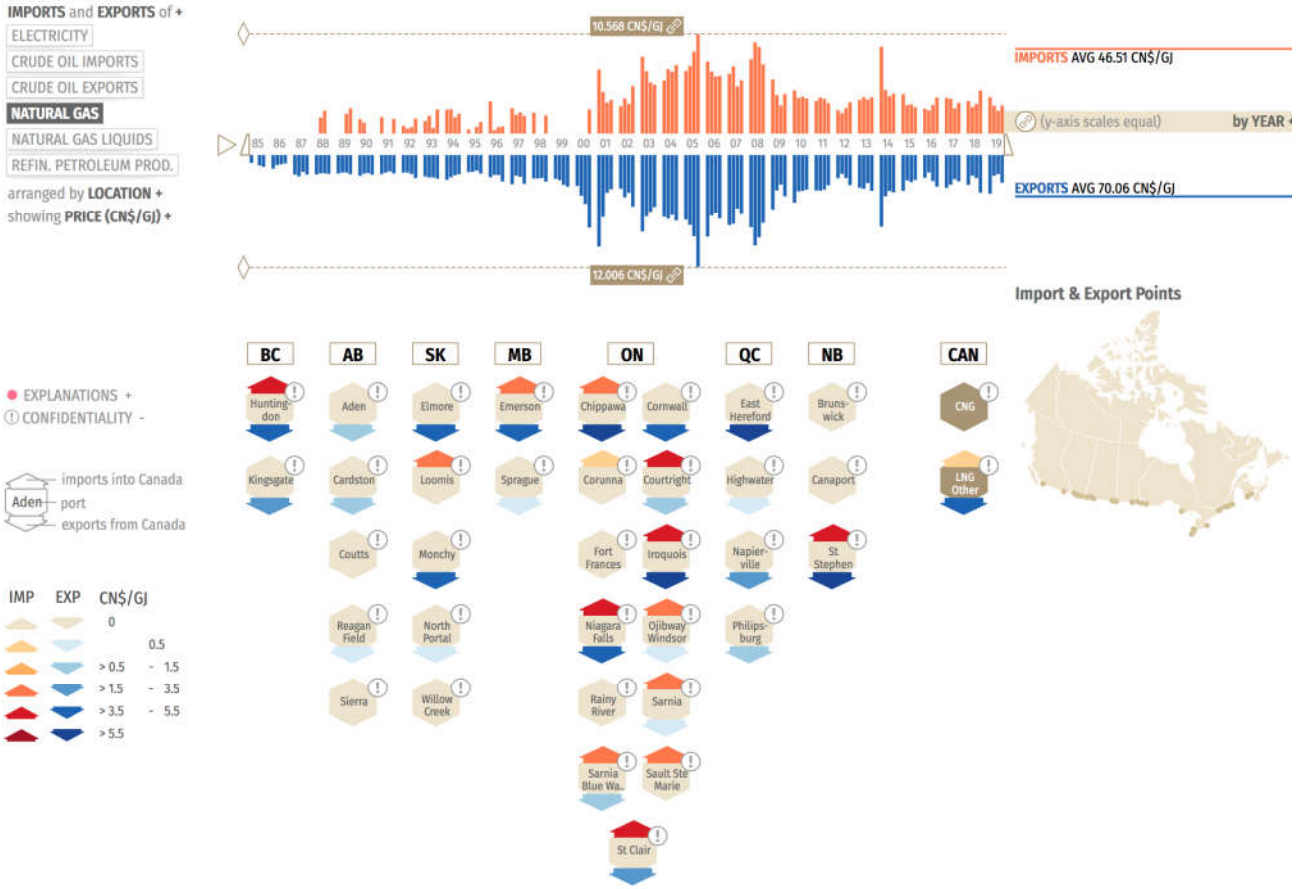
Imports/Exports

HIGHLIGHTS (1/2)

Amalgamated data from several sources, internal and external.

Disconnect / lack of alignment between internal teams had considerable impact on costs. E.g. late-stage data changes led to increased costs.

Review & learns led to strategies for more efficient and accurate communication between data experts, designers, and developers.



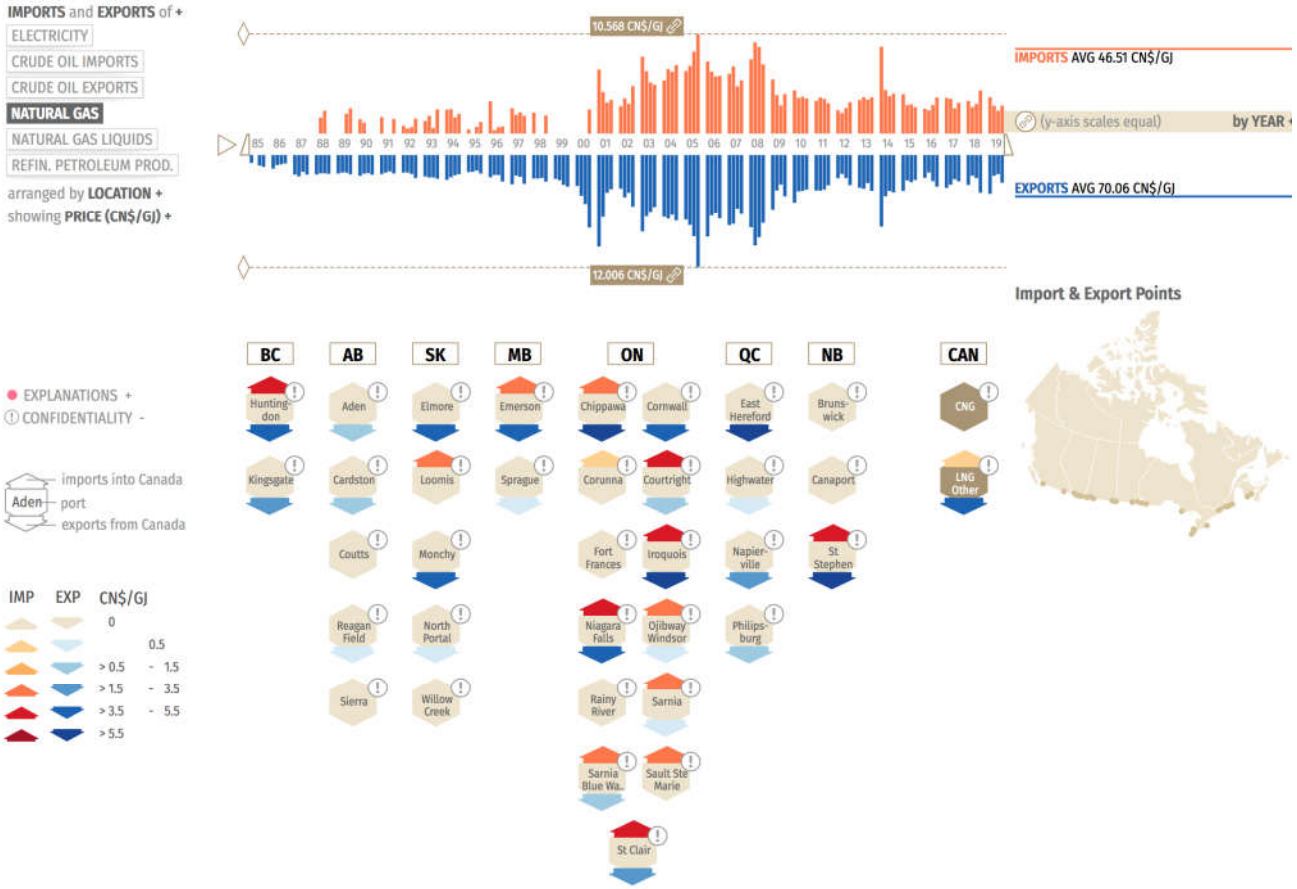
Imports/Exports

HIGHLIGHTS (2/2)

Forced conversation about confidentiality rules/norms.

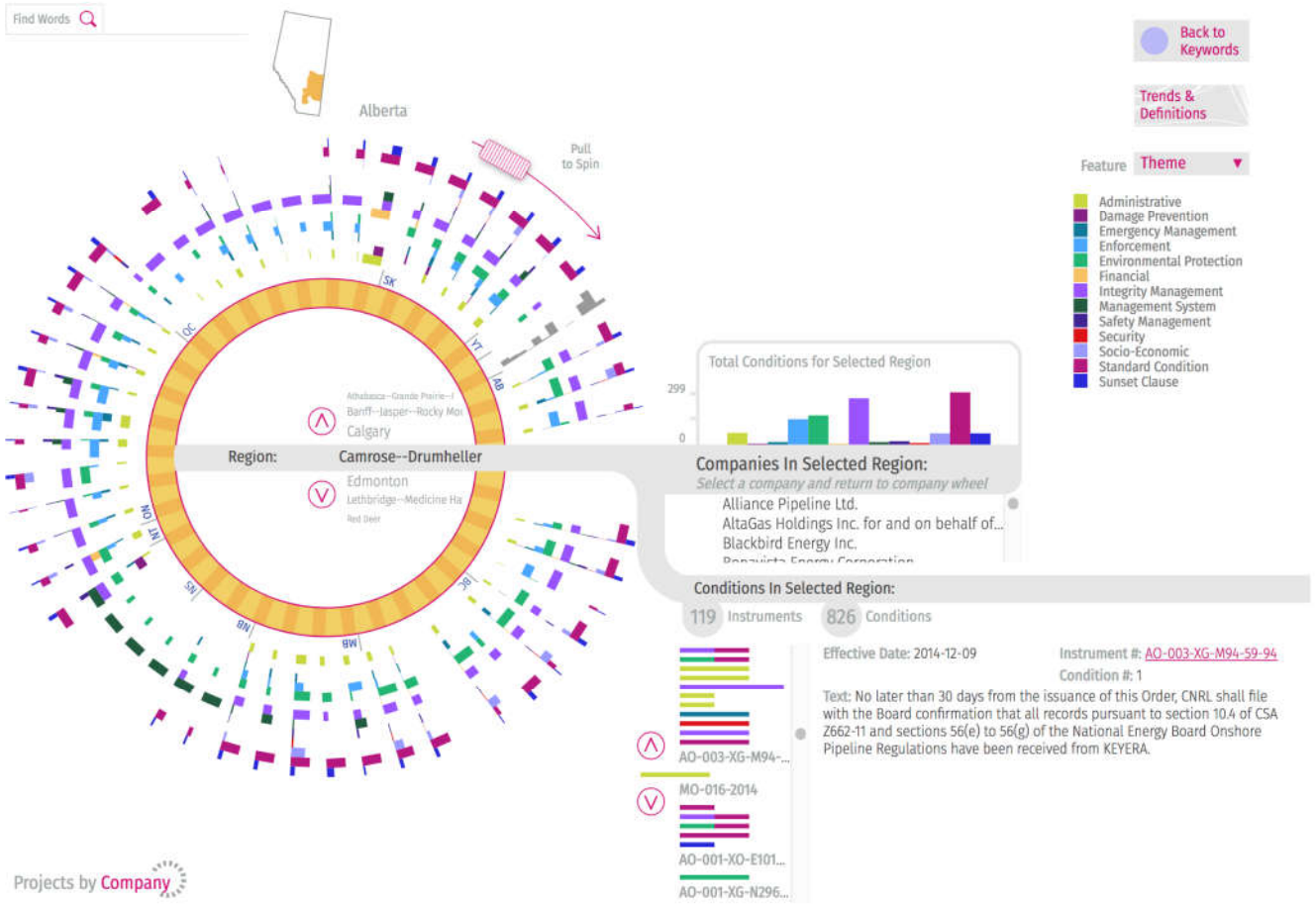
Learned importance of data expert involvement.

Merging external datasets requires external updates in similar timeframe; some external datasets are no longer maintained.



Conditions

Made it possible to see and analyze conditions' trends over time by feature (theme, status, etc.), across regulated companies, and in affected regions.



Conditions

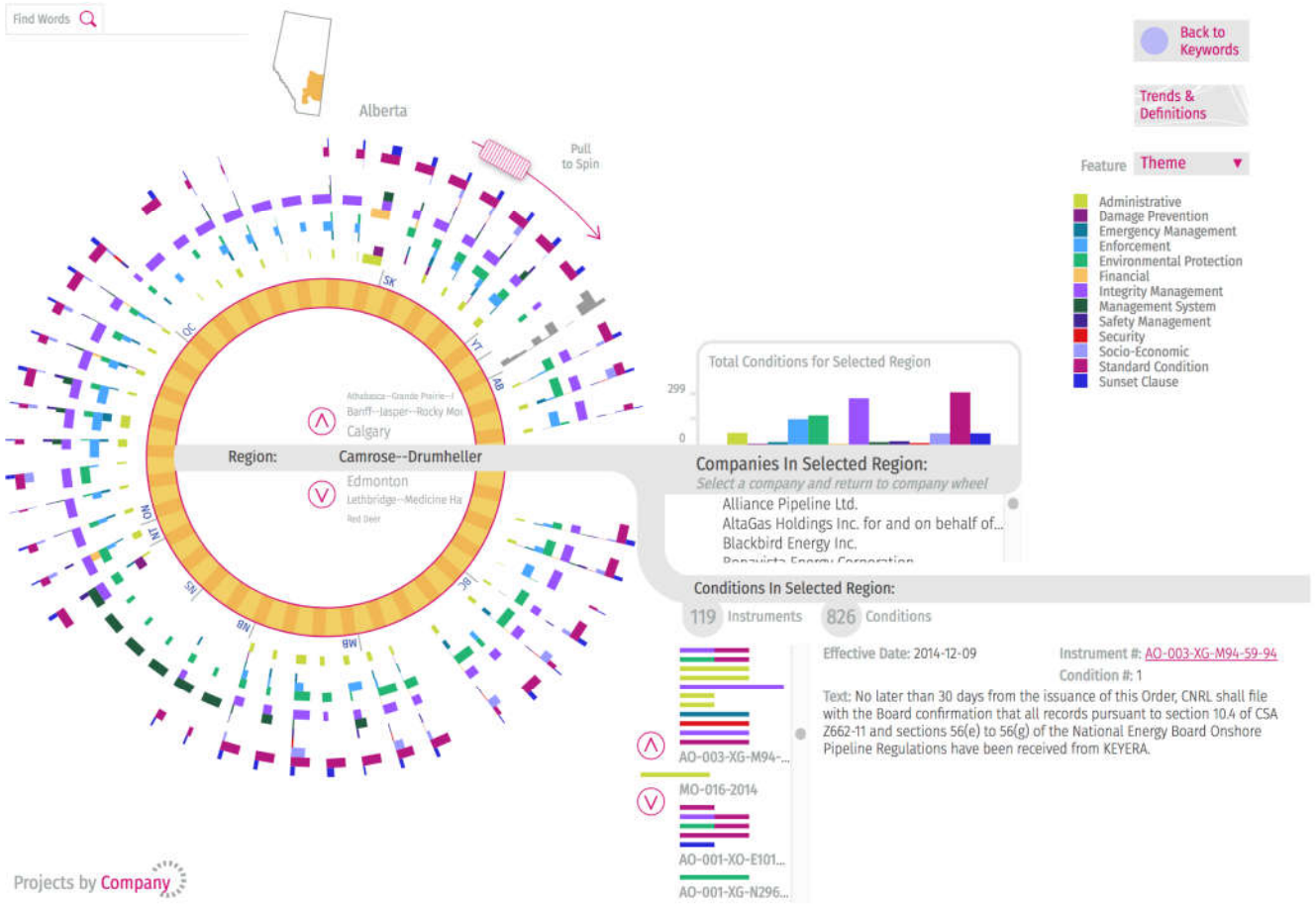
HIGHLIGHTS (1/2)

First vis showing text-based data and linked back to REGDOCS. Most complex dataset to date.

Successful application of project working group + steering committee structure with project charter, status reports.

Built capacity to add public-facing location data to text data.

Cost overruns forced us to identify non-essential features based on analytics from other visualizations.



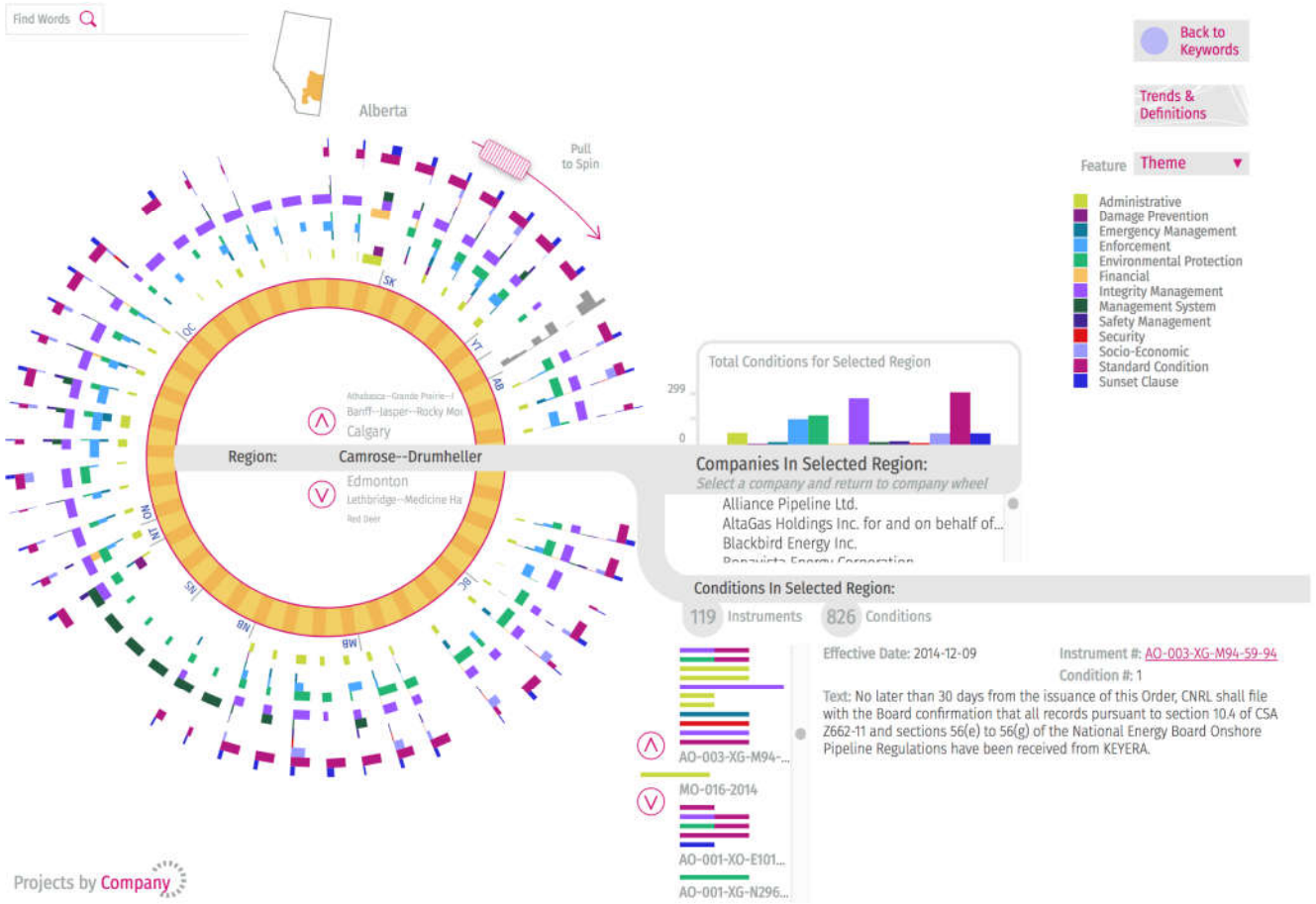
Conditions

HIGHLIGHTS (2/2)

Accessibility still not fully supported due to cost. (E.g. mobile interface missing). Interface is visually complex.

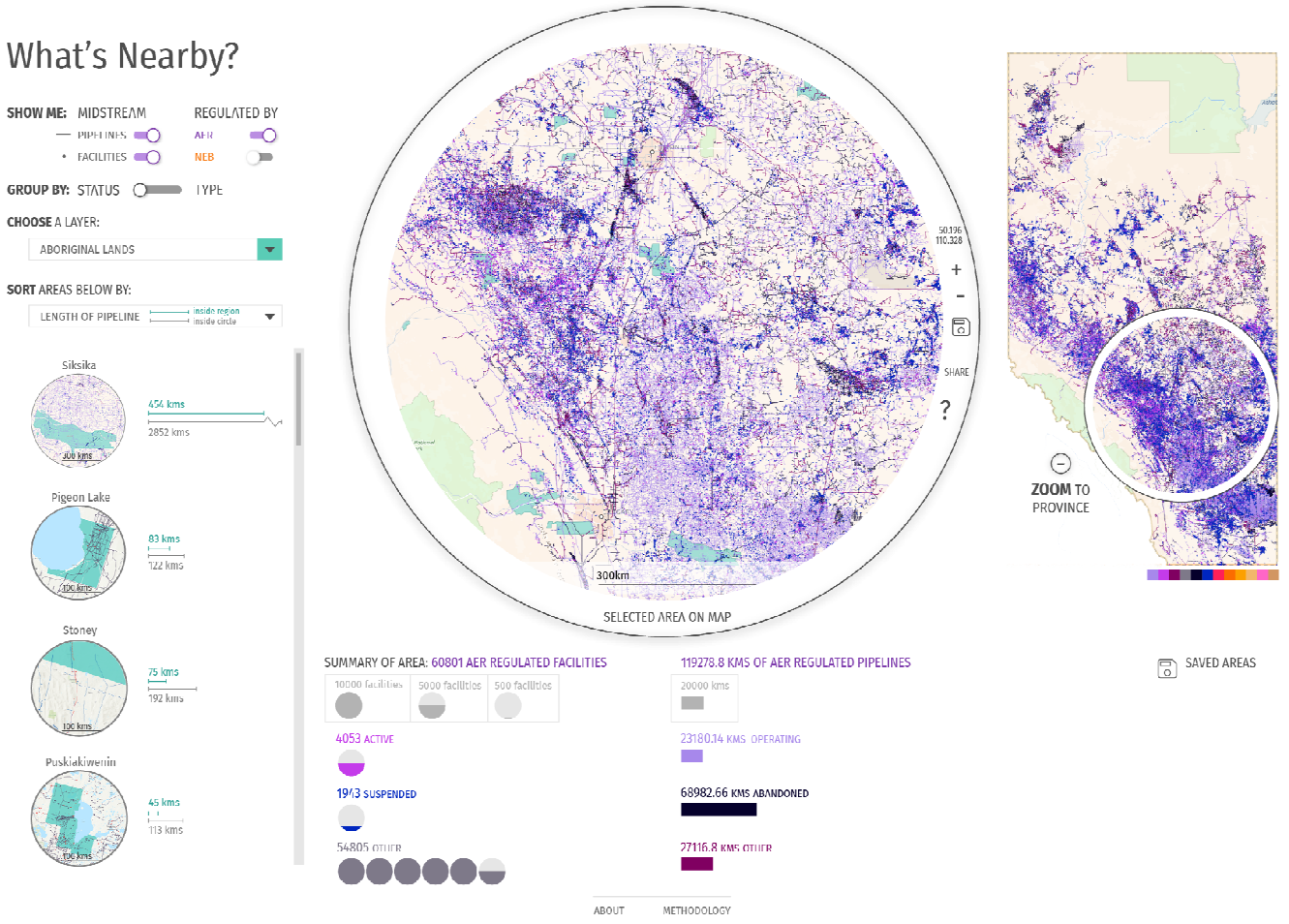
Visualization updates daily, pulling securely directly from ORCA. Built on ETL lessons from incidents vis.

Built internal capacity to create web service to securely send data to the visualization.



Layered Assets
(in progress)

A visual interface design that will allow Canadians to see where pipelines and facilities are in Canada, regardless of who regulates them.



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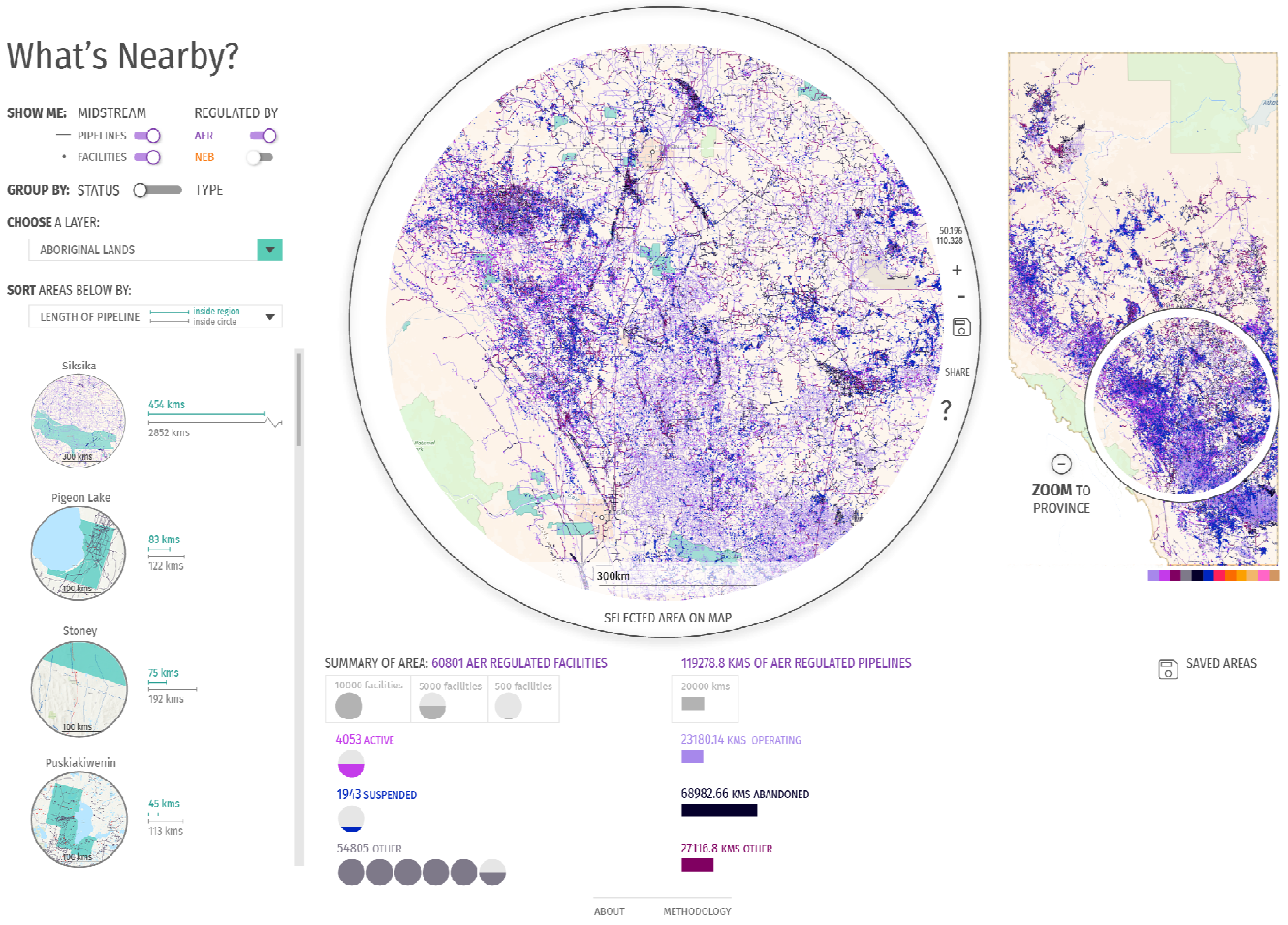
Layered Assets
(in progress)

HIGHLIGHTS

Design supports displaying combined geospatial data from CER and provincial regulators in one view without merging databases (through layering).

Ability to implement depends on CER's ownership/acquisition of asset data (ADAP project).



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