CLEARINGHOUSE

Hawaiian Electric

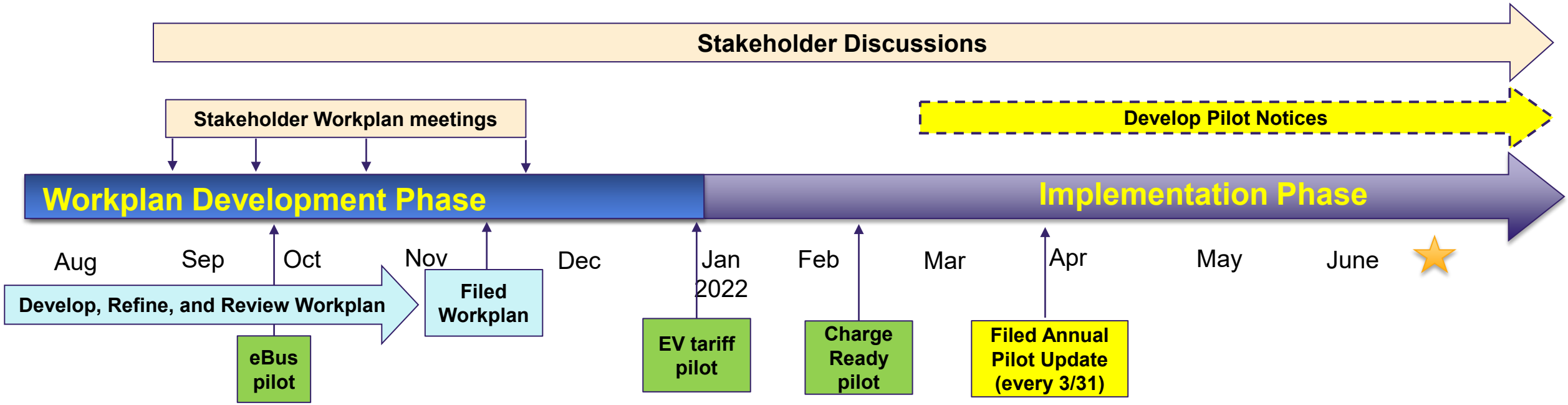
Data Analytics Clearinghouse (DACh)

Potential project for Innovation Pilot process

June 2022

Welcome back!

A "Workplan" is required by the PUC's PBR D&O to *"…identify an initial set of 5-10 areas of collaboration"* that will *"…lead to the development of a portfolio of pilot concepts that may be refined and introduced as specific pilot proposals as part of the Implementation phase."*



Implementation phase

- Pilots are intended to be flexible and have a goal of reducing uncertainty by trialing solutions and measuring outcomes.
- We will continue to reach out to stakeholder groups for specific pilot concepts
- We also plan to have these types of ad hoc meetings when a pilot concept is coming into focus and we think we are nearing an NOI.
- We are all still learning together, so please give us feedback

Agenda for today:

- Discussion of Data Analytics Clearinghouse pilot concept – feedback welcome!

Problem Statement & Pilot Concept

Data Analytics Clearinghouse (DACh)

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Current Situation

- HECO customers and partners need **seamless access to large volumes of Big Data** to generate meter-level insight including detailed usage patterns, load patterns, EV modeling, PV modeling, time of day use, and energy intensity.
- This detailed data is available in HECO's EDAP (Enterprise Data Analytics Platform) environment today, but the **volumes are too high and can't be analyzed** seamlessly by core partners
  - *Hawaii State Energy Office (HSEO)*
  - *Division of Consumer Advocacy (DCA)*
  - *Public Utility Commission (PUC)*
  - *University of Hawaii*
  - *County resiliency & sustainability offices (Hawai'i, Maui, Honolulu)*
- Enabling data-driven integrated grid planning, grid modernization, and electrification of transportation (EoT) initiatives **requires high-fidelity data** instead of statistical inference and heuristic methods used today

Self-Service Clearinghouse Pilot

Pilot Concept

- Meet **active interest** in smart-meter data by partners and close gaps in their analytical capabilities
- **Information sharing and collaboration** with our partners and customers for energy consumption decision making
- Enable **evidenced-based policy making** that consider a holistic view of energy needs balanced with Hawaii's climate, clean energy and energy independence goals
- **Provide on-demand fulfillment** of external data requests (C&C/State Benchmarking)
- Provide an environment where our partners **can consume** and **collaborate** with data and insights

Clearinghouse address key Areas of Collaboration (AOC)

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"Data acquisition and analytics, and the safe sharing of this data, is a cross-cutting area of need that will impact a multitude of projects, programs, and pilots."

Directly Addresses AOC 4

- ✓ 4. **Data Sharing, Access, and Analytics**
  - Forecasting & modeling
  - Grid reliability & DER tariff and interconnection needs
  - Sharing data across multiple separate and distinct stakeholders
- ✓ Directly addresses **key Strategic Areas** in PBR:
  - Grid Planning/Modernization
  - Customer Energy Resources
  - Electrification of Transportation

Foundational support for all AOCs

- ✓ 1. **Decarbonization**; rate/billing mechanisms; Energy Efficiency; holistic cost-effective options; demand/availability measures
- ✓ 2. **Customer Resources** and Services; DER program improvements & value measures
- ✓ 3. Beneficial **Electrification**; M&V Ebus & Charge Ready Pilots; EV customer behavior
- ✓ 5. **Technology** Innovation and Cyber Security: Digitization-digital twin, ML/AI
- ✓ 6. **Resilience** and Innovative **Reliability** Approaches; Microgrid support and renewable penetration
- ✓ 7. **Equity**, Access, Affordability, Sustainability; technology adoption for LMI programs;

Direct **stakeholder impact** for data access, transparency and useability
Indirect **customer impact** through rate design and data informed decision making

Partner Survey and discussion conducted in March

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- **Strong support for multiple services** being offered with priority on Packaged Data Sets & API Gateway.
- Key uses include **monthly** & **annual** access to
  - Customer targeting & analysis of customer characteristics
  - Load profile analysis
    - Impact towards decarbonization
    - Weather & operations optimization
    - Forecasting & optimization modelling
  - Program & Policy impact evaluation
    - Pricing Tariffs
- **Prioritize broader access to data**, see what makes sense based on usage
- Challenges include: storage capacity, resources-staffing availability, accessing Big Data outside and also specific to Hawaii
- Specific data sets desired include:
  - Generation Data
  - Installed Capacity
  - PV Data (Net Generation)
  - EV Load Profiles
  - Customer energy usage
    - Billing Data
    - Tariff Type
  - Weather
  - Demographics Data (Census, American Communities Survey, DBEDT Economic Data)
  - Health related datasets (e.g. social vulnerability index)

Solution Summary

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Self-Services Data and Analytics

A **cloud-based clearinghouse** of published HECO data and analytical insights

Built upon **existing HECO investments** in a modern, secure Enterprise Data Analytic Platform (EDAP)

Usable in a **self-service and collaborative manner** by public agencies, external customers, and consumer interest partners

Support **benchmarking, compliance, energy utilization decision-making,** and other data analysis & reporting needs

Support Multiple Use Cases

- **Meter data sharing and analysis for all stakeholders**
  - Partners can access high value time-series data that is tagged with census tract location, load shapes, DER, EV, etc.
- **Electrification of Transportation (EoT)**
  - EV adoption, load studies, Public charging infrastructure expansion simulation
  - Monitor adoption of EV and identify opportunities emerge to invest in expansion (i.e., parking lots, MDUs, public transportation)
- **Customer renewable (PV and DER)** program operations and evaluation
  - Use smart meter data to ensure compliance to the program
  - Use meter data to generate load profiles to simulate grid reliability

What Needs to be Done: Clearinghouse Components

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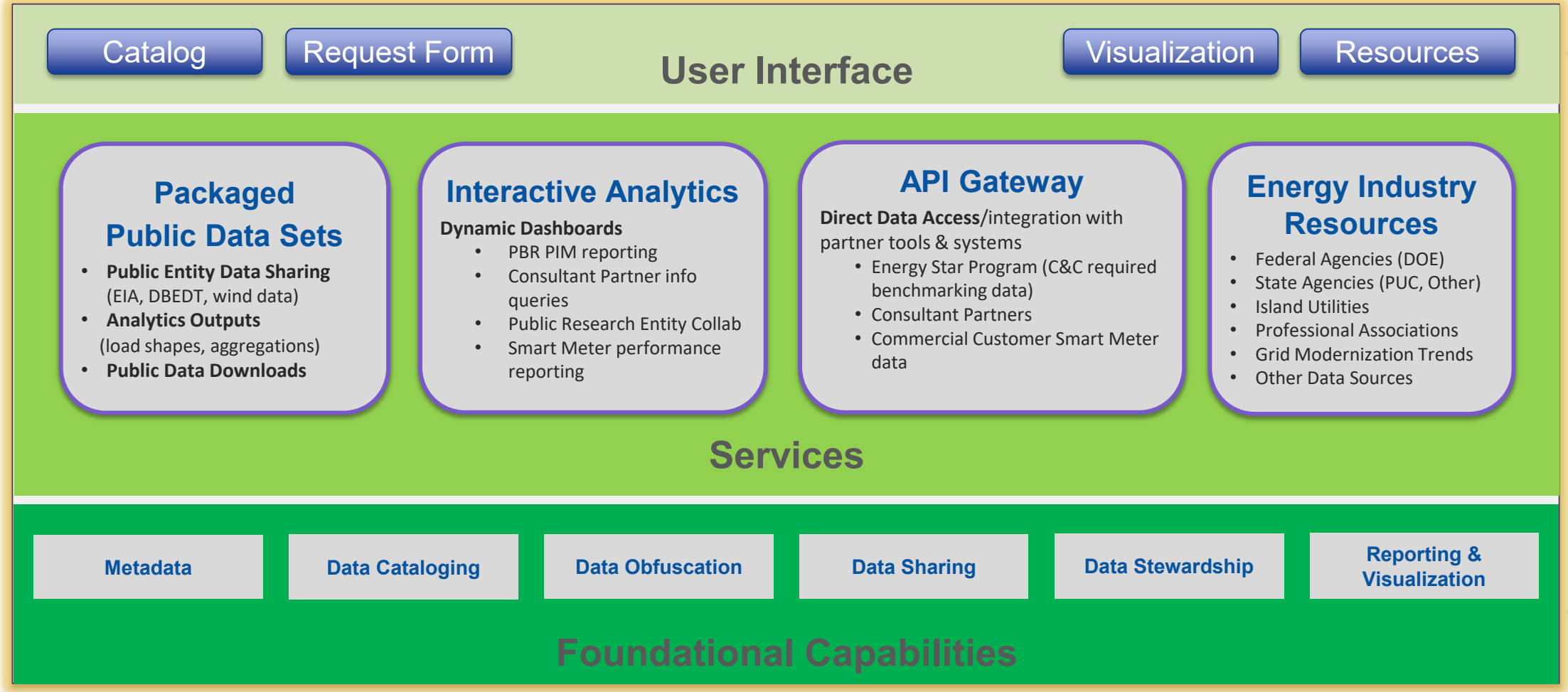

Examples of a Clearinghouse User Experience

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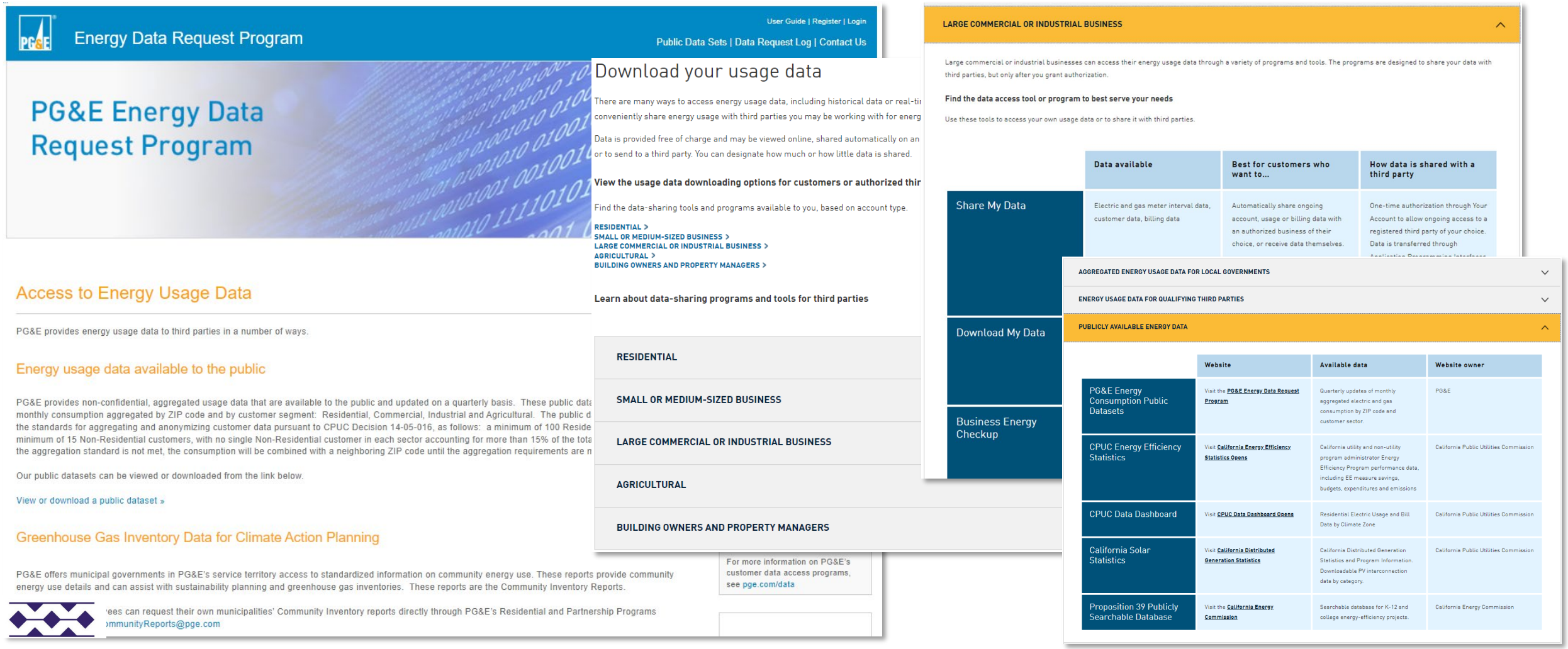
Catalog | Request Form | **User Interface** | Visualization | Resources



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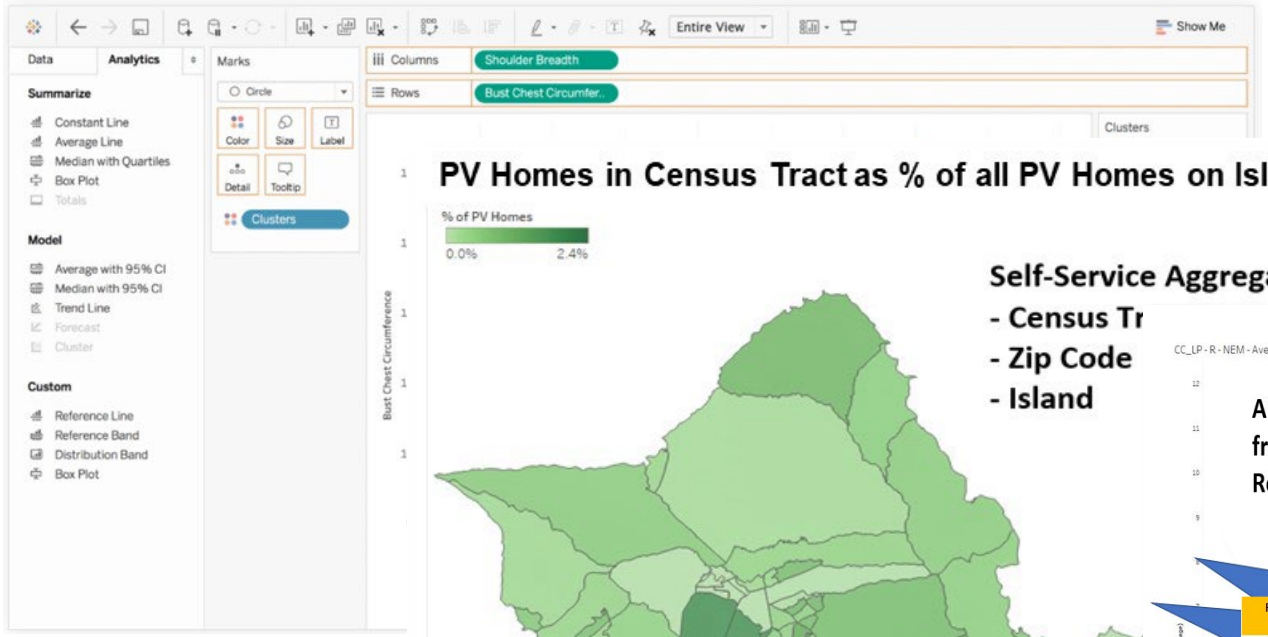

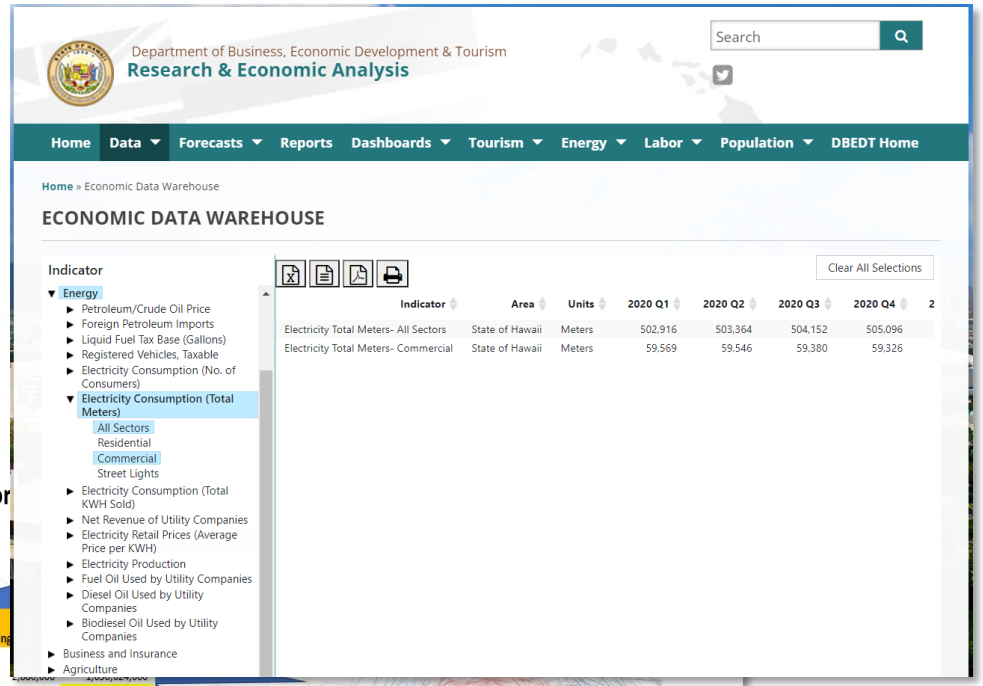

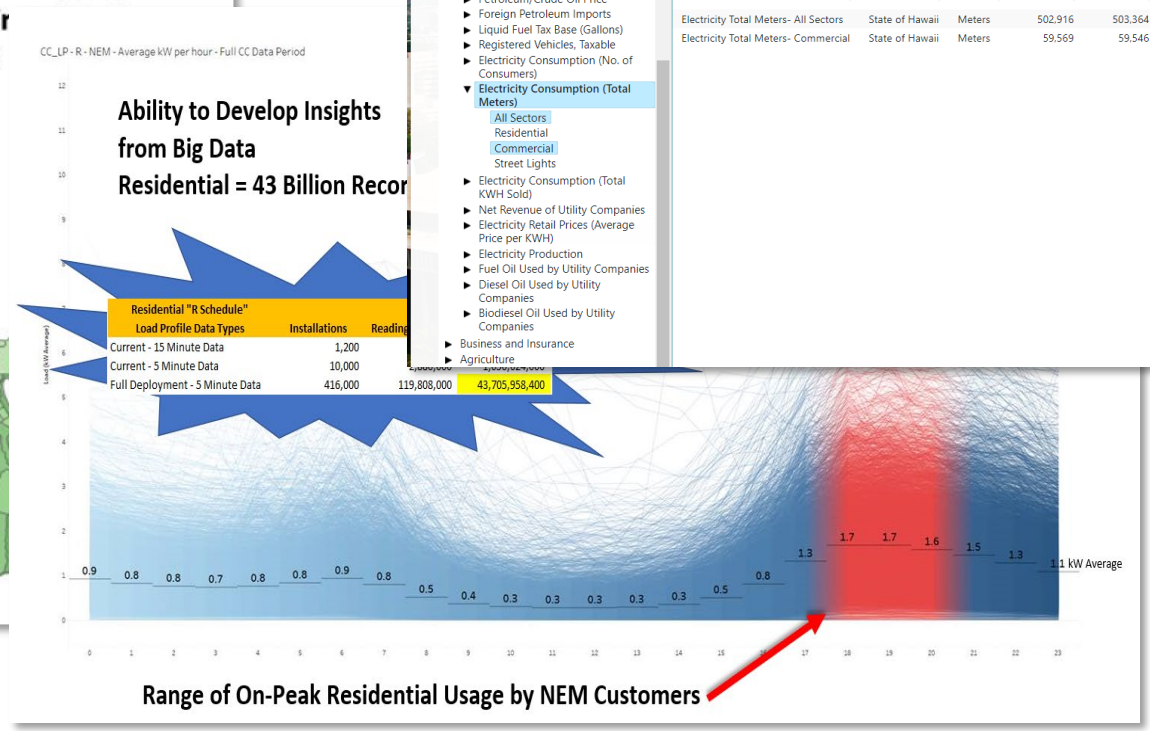

Clearinghouse Benefits & Outcomes

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Benefits

- ✓ **Seamless use of growing data assets** to deliver reliable, safe and affordable energy to HECO customers AND enable HECO to transition to 100% Renewable Energy by 2045
- ✓ **Evidence-based policies and funding decision support** for integrated grid planning, grid modernization, and electrification of vehicles strategies and roadmaps

Pilot Deliverables

- ✓ Prove the **demand for smart-meter data by key partners** in support of key initiatives towards a clean energy future
- ✓ **Learn the required collaboration**, critical data sets, visualizations and analytics needs
- ✓ **Learn the organization and support** model required to support the data and insights needs
- ✓ **Identify potential market interest** for data
- ✓ Refine the Clearinghouse Solution content and capabilities for self-service, collaboration, and data sharing, maximizing its value impact
- ✓ Develop an iterative approach to feature releases and data sharing in a cloud native environment

Pilot Timeline is estimated at 30 months

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Clearinghouse Pilot with three releases over 24-30 months starting ~July 2022 and Early Life Support phase ending 2024

2022										2024			
July	Aug	Sep	Oct	Nov	Dec	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
FOUNDATION & MVP 1						MVP 2		MVP 3		ELS			

Duration	Release	Description
6- 8 Months	Foundational Capabilities & MVP 1	First release of Minimal Viable Product which includes foundational capabilities and user interface with a minimal data set of AMI smart meter data
3 - 6 Months	MVP 2	Controlled release to a stakeholder of minimal viable product
6 Months	MVP 3	Full release to all stakeholders of minimal viable product
12 Months	Early Life Support	Early life support and maintenance of DACh capabilities and continued stakeholder feedback
Continuous feedback will be used to assess value throughout the pilot and during early life support		

Summary of Pilot Costs

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Estimated costs is **$2.76M**

Project: Data Analytics Clearinghouse

			2022 Total	2023 Total	2024 Total	Grand Total
Outside Services	Non-Labor	O&M				
	Foundational & MVP 1		$ 917,873			
	MVP 2			$ 568,030		
	MVP 3			$ 568,030		
	ELS - Maintenance				$ 381,302	$ 2,435,234
Software Maintenance	Non-Labor	O&M	$ 45,881	$ 121,891	$ 155,439	$ 323,211
TOTAL PILOT COST			**$ 963,754**	**$ 1,257,951**	**$ 536,741**	**$ 2,758,446**
Estimated Internal Labor	Labor	O&M	$ 142,829	$ 263,341	$ 142,829	**$ 548,998**

- Fair balance in value of pilot vs cost is to split across three service territories in a 70/15/15% split
- Operational Support costs estimated through 2024 - Pilot will be used to estimate future O&M requirements
- HECO will absorb Internal labor costs and estimates are not included in the Pilot budget
- Total costs of the portfolio will be managed to stay below the $10M cap
- In accordance with the pilot process costs will be treated as deferred

Key Partner Benefit

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Key Partner / Stakeholder	Objectives	Clearinghouse Objectives - efficient and secure transfer of the "Big Data" files and compute environment to enable
Hawaii State Energy Office (HSEO)	Evidence based policies and guidelines to achieve 100 percent clean energy by the year 2045 reducing dependency on fossil fuels	Clearinghouse data analysis to provide evidence on **policy effectiveness**. "Assessing and planning for an integrated energy ecosystem involves rigorous analysis and modeling on both sides of the energy supply and demand equation and across sectors to provide clarity around embedded issues that will move important metrics such as costs, energy security, and environmental impact that can be used in assessing and comparing the key decision points on the clean energy roadmap." - https://energy.hawaii.gov/energy-ecosystem
Division of Consumer Advocacy (DCA)	The DCA emphasizes keeping rates low while ensuring that the utility provides safe, reliable, and adequate service to consumers. Beyond this, DCA also plays an active role in promoting and advancing the state's energy policies	Evidence based policies and **time-of-use based rates that are in the interest of consumers** based on load profiles and the ability respond to consumer preference incent customer preference towards clean energy use "...aggregated, anonymized customer usage data available to interested third parties...would present...exceptionally valuable opportunities for data mining and associated analyses and research which would aid in distribution planning, non-wires alternative assessments, distributed energy resource interconnection analyses, and demand side management research, among other benefits." - https://dms.puc.hawaii.gov/dms/DocumentViewer?pid=A1001001A20E21B44345C00621
Public Utility Commission (PUC)	Oversee regulatory and ensure safe, reliable, and economical electric utility energy	Ensuring the **effective rate design** for EV and DER using data analytics from the clearinghouse and align to grid modernization aligned to **integrated grid planning**. "Focus on delivering immediate value and benefits to customers with installation of smart grid infrastructure. Examples would include offering web portals for customers to access and view energy consumption data; improving outage response and power quality; and supporting rapid adoption of innovative rate structures." "Development of an Enterprise Data Warehouse ("EDW") to serve as the central repository of the large amounts of data gathered over the AMI network and other Company data" - https://dms.puc.hawaii.gov/dms/DocumentViewer?pid=A1001001A17A05B01613H26476
University of Hawaii (UH) coordinated through Hawaii Natural Energy Institute (HNEI)	Support research and decision support in advising PUC on energy policies and integrated grid planning	Data and analysis capabilities to support a broad set of studies that evaluate and test the impacts of incorporation of PV, potential of storage options, and EV and the effect of **stability and reliability on the grid**. "A core part of HNEI's mission is to support Hawai'i in its clean energy transformation by focusing on cost effective and practical solutions to help deliver commercially viable renewable energy for the state and its citizens. HNEI robustly supports analysis to inform energy policy and decision making in Hawai'i" - https://www.hnei.hawaii.edu/wp-content/uploads/2022-HNEI-Annual-Report.pdf
Hawaii, Maui, Honolulu County energy, resiliency & sustainability offices	Substantially reduce greenhouse gas (GHG) emissions from ground transportation, electricity, and waste sectors	Data analysis and transparency on **electric energy load patterns** for benchmarking, policy considerations and **energy equity** metrics.
Hawaii Energy (HE)	Our mission is to empower island families and businesses to make smarter energy choices to reduce energy consumption, save money, and pursue a 100% clean energy future	**Efficient and secure transfer of the "Big Data"** files and compute environment to enable Hawaii Energy to develop **energy efficiency programs** that promote ratepayer savings, advance the **State's environmental** and greenhouse gas policies, and help support **economic recovery**.

Mahalo for your time!