



Integrated Grid Planning

Joint DPWG & GSWG Meeting

February 27, 2019

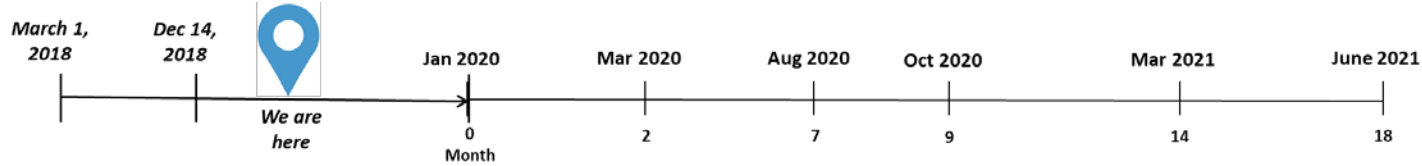
Agenda

- ◆ Welcome & Introductions
 - IGP Overview
 - Ground rules
 - Overview of Initial Joint WG Meetings
- ◆ Overview of Distribution Planning and Grid Services Working Group Charters
 - Scopes & Schedules
 - Proposed topics for DPWG
 - Proposed list of services to discuss in GSWG
- ◆ Soft Launch Introduction
 - Provide overview of Soft Launch Scope & Process
 - Provide Summary Description of Opportunity
 - Provide Description of associated Distribution Capacity Deferral Service
- ◆ Next Steps and Schedule

What is Integrated Grid Planning (IGP)?

- ◆ Integrated grid Planning
 - Integrates planning analysis for resources, transmission and distribution to ensure the net requirements for the system are transparently identified & optimized
 - Integrates market-sourced alternatives into the analysis instead of relying on theoretical price/cost assumptions
 - Integrates stakeholders' input and feedback into the overall process
- ◆ Resulting in better value for customers
- ◆ Creates greater market opportunities for developers & aggregators
- ◆ Creates opportunities to optimize resource, transmission, and distribution solutions to provide customer value

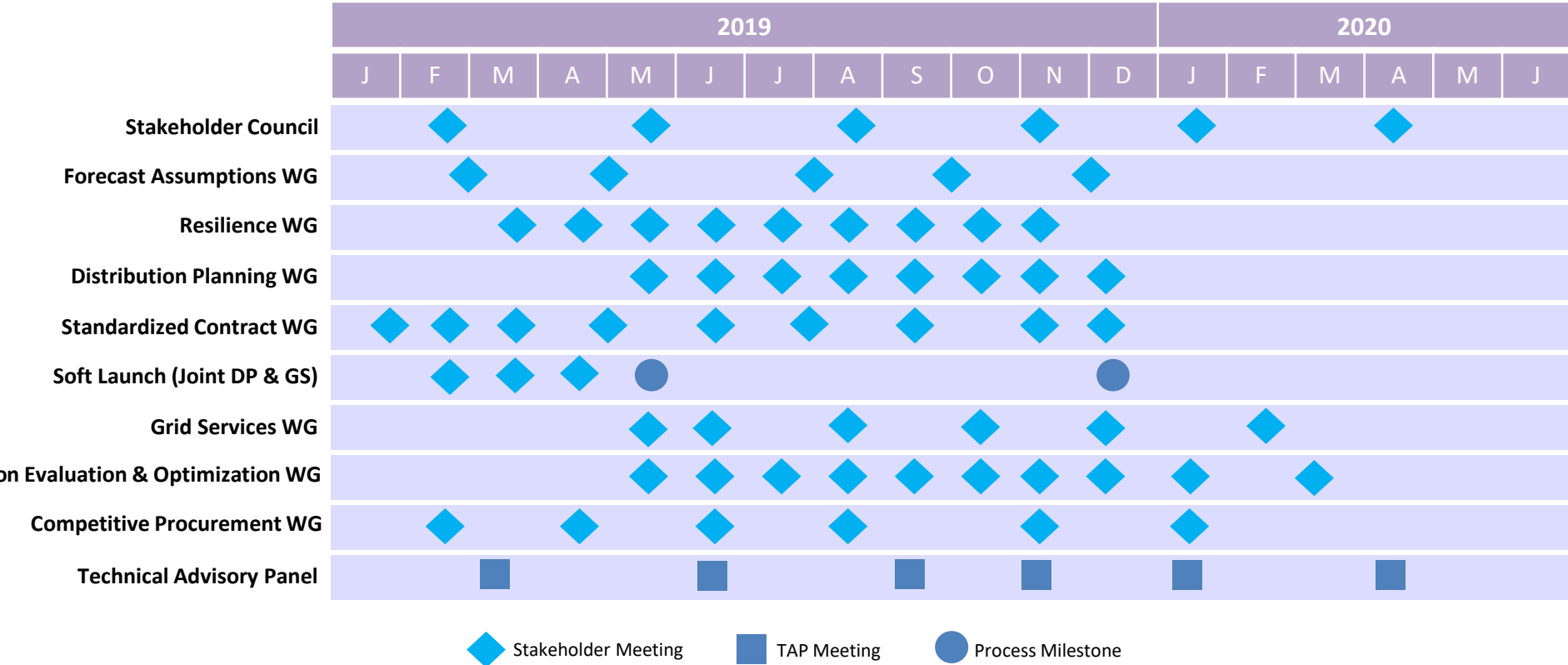
IGP – Integrated Grid Planning



Why are we having this Stakeholder Process?

- ◆ Objectives:
 - Have regular two-way dialogue
 - Stakeholders ask critical questions for the Companies to answer in the process
 - Education both ways of preferences and challenges
 - Keep stakeholders informed throughout the process (transparency)
 - Input/Feedback
 - Sharing of plans or studies by others (DBEDT, COH, HNEI)

Stakeholder Engagement Schedule 2019 - 1H 2020



Ground Rules

- ◆ Chatham House Rule will apply – no personal or organizational attribution will be made to any comments/feedback provided during the meeting by any participant nor in written documentation.
- ◆ Working group meetings, and other information exchanges are intended solely to provide an open forum or means for the expression of various points of view in compliance with antitrust laws.
- ◆ Under no circumstances shall engagement activities be used as a means for competing companies to reach any understanding, expressed or implied, which tends to restrict competition, or in any way, to impair the ability of participating organizations to exercise independent business judgment regarding matters affecting competition or regulatory positions.
- ◆ Proprietary information shall not be disclosed by any participant during any industry engagement meeting or information exchange. In addition, no information of a secret or proprietary nature shall be made available to industry engagement participants.
- ◆ All proprietary information which may nonetheless be publicly disclosed by any participant during any industry engagement meeting or information exchange shall be deemed to have been disclosed on a non-confidential basis, without any restrictions on use by anyone, except that no valid copyright or patent right shall be deemed to have been waived by such disclosure.

Joint DPWG & GSWG Meetings

- ◆ Objective is to introduce and discuss the IGP Soft Launch as a practical demonstration of the anticipated distribution planning and non-wires alternative sourcing process that will begin in 2020 as part of IGP.
- ◆ The 3 Joint meetings will discuss the distribution planning analysis behind the Soft Launch as well as the identified grid service – distribution capacity deferral.
- ◆ DER providers & utilities (ConEd, SCE & APS) with distribution NWA experience have also been invited to discuss their experience and lessons learned.

Mtg 1: Kick-off Meeting

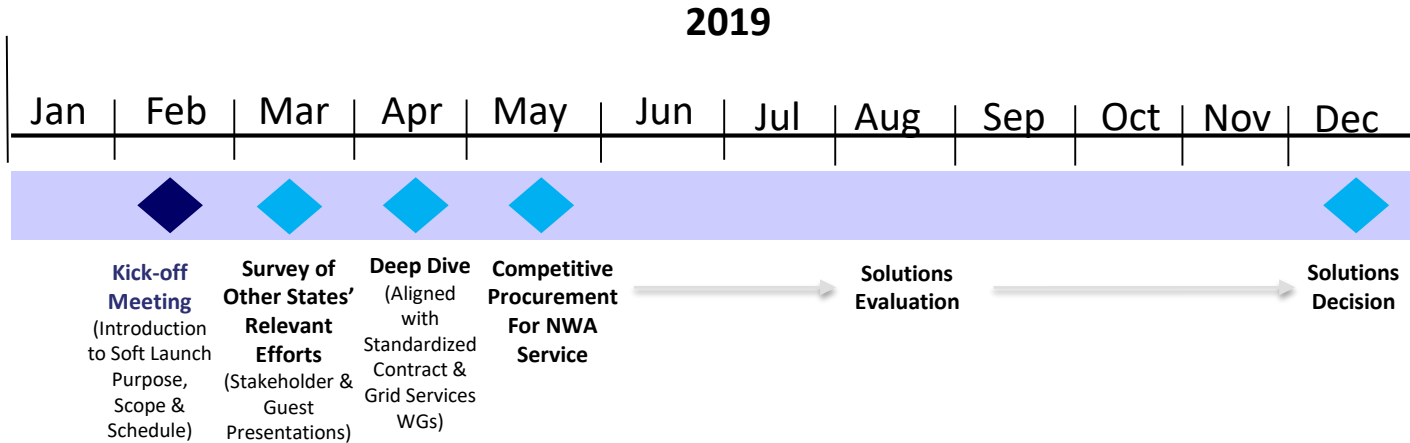
Mtg 2: Industry Lessons Learned

Mtg 3: Deep Dive on Soft Launch

- Planning Analysis
- Grid Service Parameters



Proposed Soft Launch Sourcing Schedule



DISTRIBUTION PLANNING WG



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Distribution Planning Working Group Objectives

The objectives of the Distribution Planning working group (DPWG) are to inform and educate stakeholders on various aspects of distribution planning at the Companies, and to afford stakeholders opportunities to provide feedback and input into the Companies methodologies to identify distribution grid needs.



DPWG Roles and Responsibilities

- Gain a sufficient level of understanding of the Companies distribution planning and operations,
- Bring forward best planning practices for incorporation into the Companies processes,
- Collaboratively work with all members of the working group, and to
- Advise the Companies on the distribution planning methodology to identify grid needs.

Working group participants should have technical knowledge of distribution systems, distribution planning, DER technologies and capabilities, or related knowledge.

Composition of the DPWG

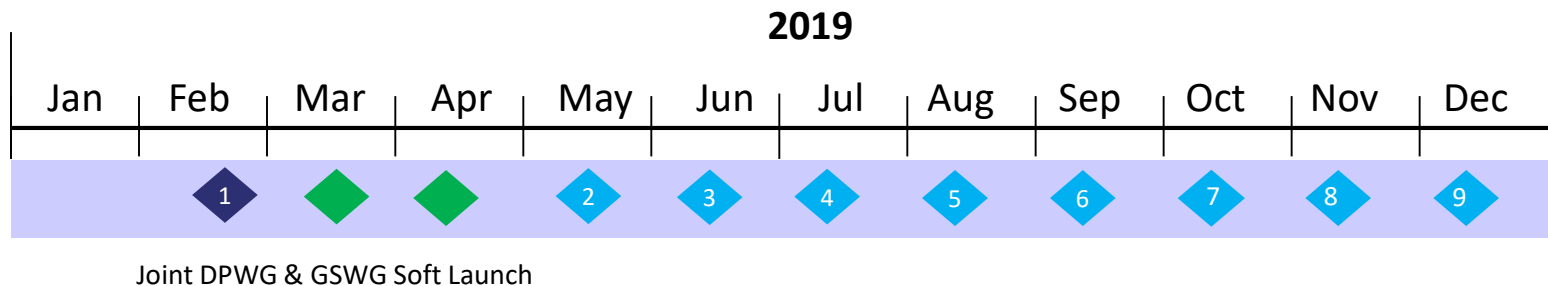
- Members of The Companies, including, but not limited to: distribution planning, system operations, engineering, customer installations, demand response, and distribution energy resources.
- Public Utilities Commission Staff
- Division of Consumer Advocacy
- Department of Business, Economic Development & Tourism
- A Representative from each of the major DER Solution Providers
 - Hawaii Energy, Inverter Manufacturer, Electric Vehicle Supply Equipment, Solar, BESS
- Representative of the IPP Developer Community
- Representative from each County (Hawaii, Honolulu, and Maui)

The Companies or working group participants should not share non-public information as part of the DPWG activities

DPWG Preliminary Statement of Issues

1. A review and exchange of information of the Companies' current state of the distribution planning process, and improvements and enhancements the Companies are making.
 - a. Describe the Companies' current process for capacity expansion of the distribution system, and improvements the Companies are making. Identify potential industry best practices to incorporate.
 - b. Describe the Companies' current circuit hosting capacity methodology and improvements the Companies are making. Identify potential industry best practices to incorporate.
2. Identify sensitivities and scenarios for DER and load capacity planning analyses to appropriately identify distribution grid needs.
3. Identify non-wires alternatives opportunities and the related information requirements to effectively and efficiently procure and evaluate potential solutions.
4. Integration of distribution with resource and transmission planning.

Proposed Timeline for DPWG



1. Kick-off, Scope and Issues
2. Distribution Forecasts, Scenarios & Sensitivities
3. Asset Management & Load Capacity Planning
4. Hosting Capacity Planning
5. Hosting Capacity Planning
6. Grid Needs & NWA
7. Grid Needs & NWA
8. Information Sharing
9. Integration of distribution with resource and transmission





Questions & Feedback



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GRID SERVICES WG



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Market Working Group: Grid Services

Objective: Define and prioritize existing and additional energy, capacity, ancillary and T&D non-wires alternative services (collectively “Grid Services”) in support of IGP Solution Sourcing.

Leverage existing HECO definitions and other states’ and ISO’s efforts that defined relevant services including:

- CA IDER working group
 - NY Joint Utilities working groups
 - CAISO
 - ERCOT
-
- Prioritize activity to address services with system needs and stakeholder value, including services for IGP Soft Launch in 2019.
 - Continue in 2020, as needed, to address services for subsequent IGP cycles.

Market Working Group: Grid Services

Role and Responsibilities

Engage in active and open dialogue to support the refinement of existing and the definition of additional energy, capacity, ancillary and T&D non-wires alternatives services to support IGP solution sourcing.

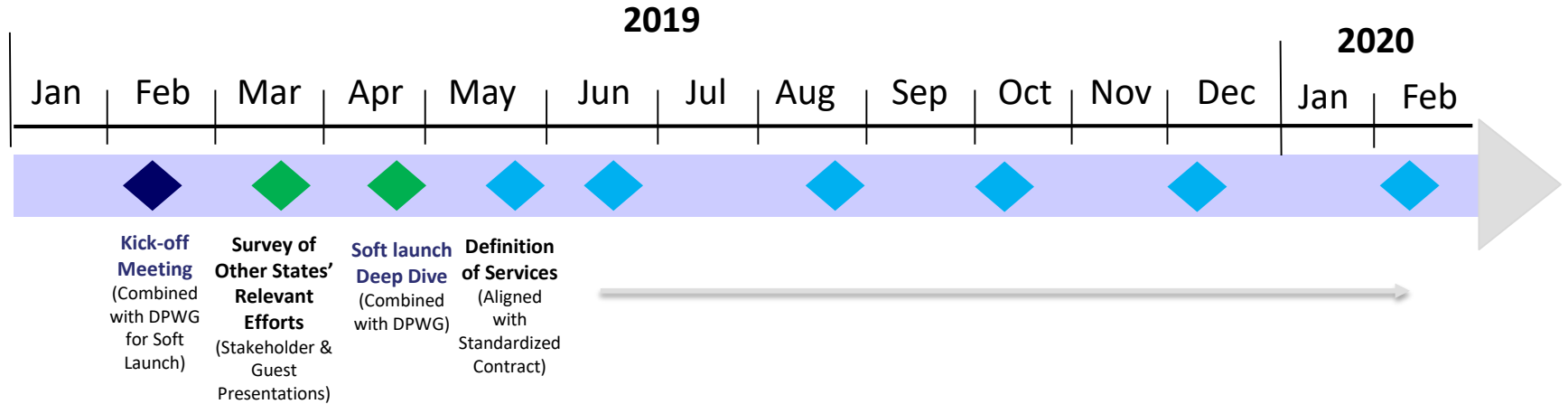
- Expect that participants will provide expertise in the discussion topics as well as potentially relevant examples for consideration and/or lessons learned from other states.
- Expect participants to provide thoughtful and respectful input and feedback with all participants by:
 - Providing insights
 - Sharing ideas
 - Offering feedback

Proposed Grid Services

- ◆ *Initial services for discussion, definition and prioritization may include*
 - *Bulk System*
 - *Energy*
 - *Capacity*
 - *Contingency Reserves (FFR)*
 - *Regulating Reserves*
 - *Replacement Reserves*
 - *NTA (Transmission Deferral)*
 - *Resilience*
 - *Black Start*
 - *Ramping*
 - *Distribution System*
 - *Capacity deferral*
 - *Resilience*
 - *Voltage Support*



Proposed Grid Services Sub-Working Group Meeting Schedule



2019 and 2020 meetings as needed to discuss the services identified. Expected that stakeholder presentations and guest presenters from other states' efforts will be invited.



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IGP SOFT LAUNCH



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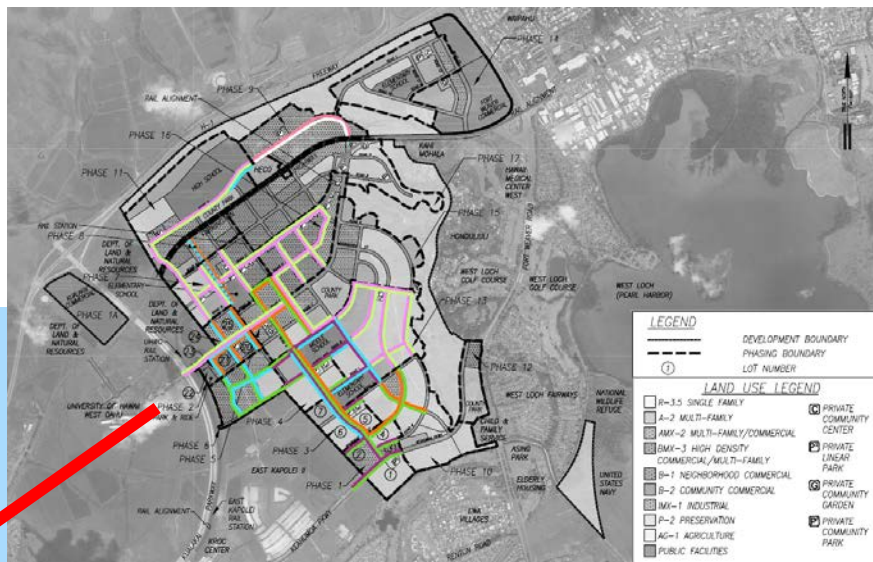
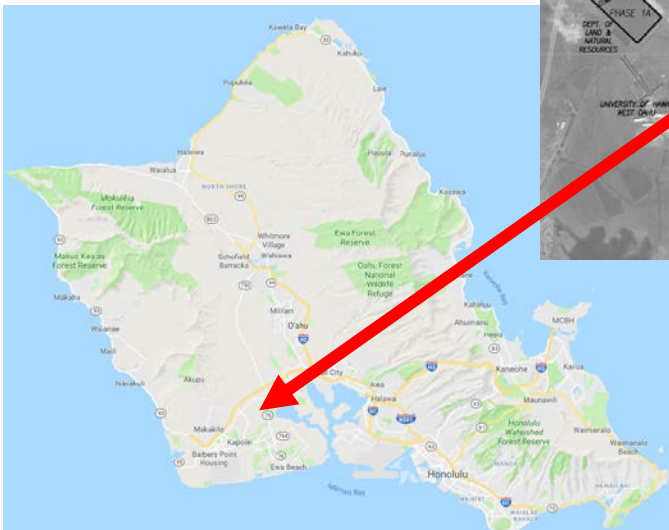
Objective & Overview

- IGP Soft Launch is intended to demonstrate the Sourcing processes and evaluation methods for distribution non-wires alternatives in 2019.
- This Soft Launch will help inform development of the full scale IGP planning and sourcing effort beginning in 2020.
- Soft Launch is focused on distribution capacity deferral need required to meet near-term new housing/commercial development (2022-2025).
- Soft Launch will commence with sourcing and evaluation in 2019 and continue with anticipated solution deployment in 2020-21 and operational testing by 2022.
- Soft Launch will be informed by and provide learnings to Market WG activities.



Ho'opili Sub-Division Load Descriptions

Total 19 phases development,
from 2018 to 2030



Residential – 39.4 MVA
Commercial – 14.9 MVA
Industrial – 5.2 MVA
School – 7 MVA



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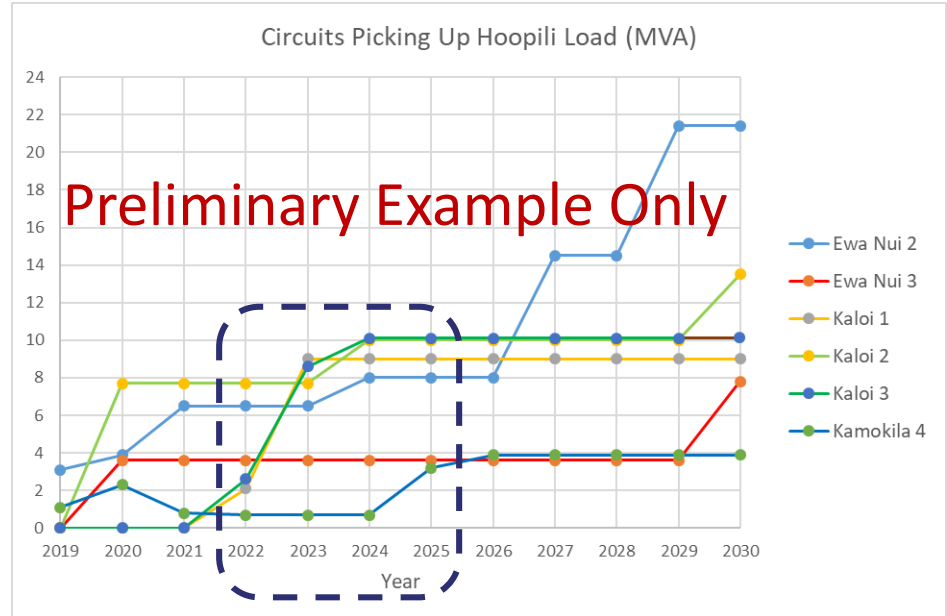
Distribution Area Under Study

Soft Launch focus:

- Near-term load growth (2022-2025)
- Normal peak load as opposed to contingencies to simplify demo
- Address smaller deferral opportunities given the early stage development

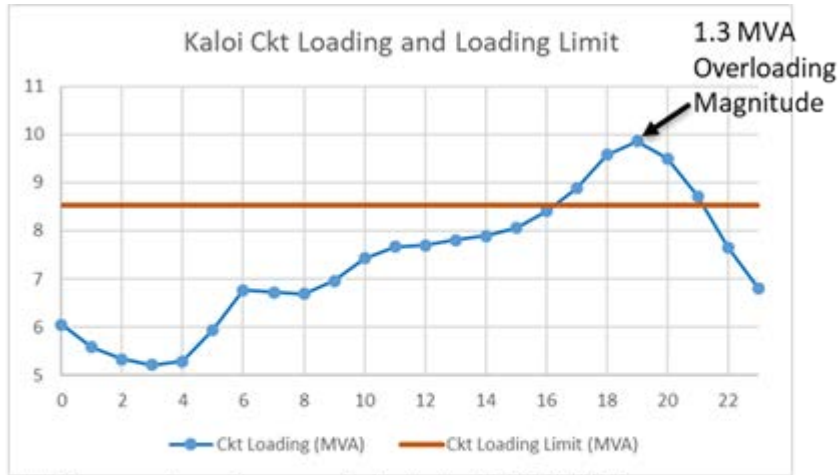
Future load growth will be addressed through IGP process

Developer's near-term significant 24x7 load growth will be addressed through substation investment

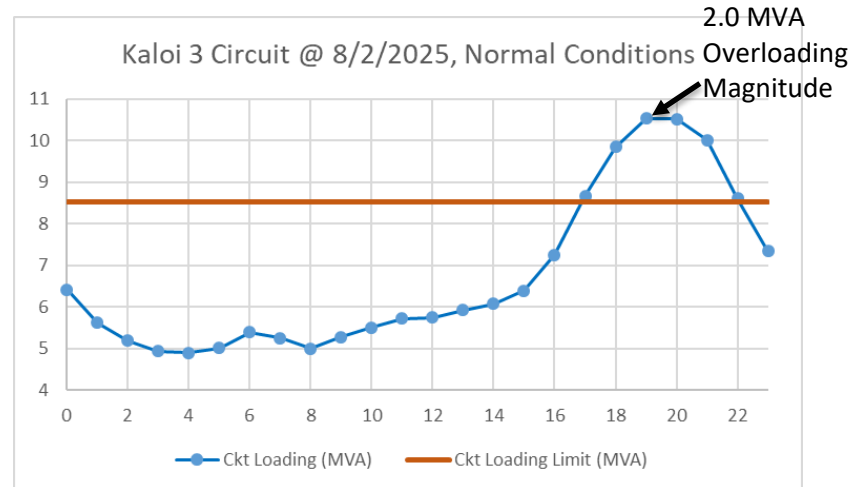


Distribution Grid Need

- Ho'opili Area Load Growth
 - Distribution system overloading starts from 2022
 - There are 6 normal scenarios, and 18 contingency scenarios that must be considered in this area
 - Worst Substation transformer overloading cases by 2025



5-Hr overloading period, total 3.9 MWH overloading energy



6-Hr overloading period, total 6.6 MWH overloading energy



Incorporating Lessons Learned

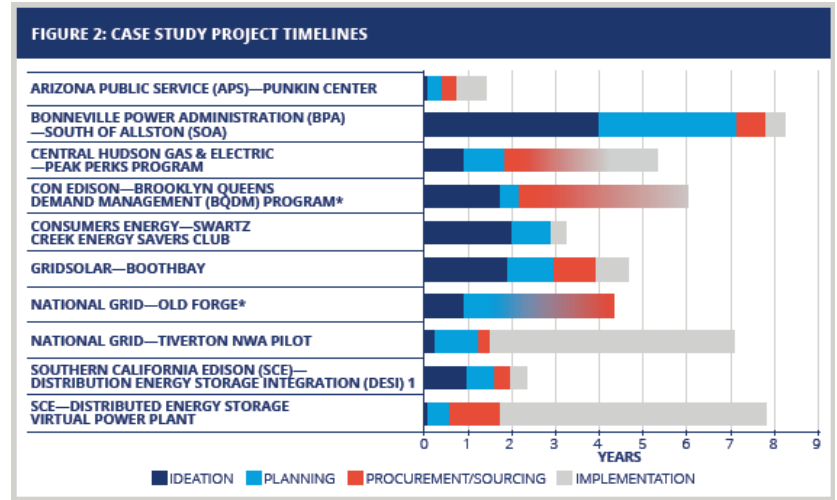
- ◆ Soft Launch NWA Sourcing will be open & technology-agnostic (solicitation and selection will focus on the services delivered rather than the technologies that deliver them).
- ◆ Cognizant that additional time may be needed for bidders to develop proposals and us to evaluate
- ◆ Will provide a deep dive on engineering analysis and parameters of the grid need to help stakeholders and bidders understand the need and related requirements
- ◆ Will provide a general framework on how the proposals will be evaluated –however, the intent is to select a NWA solution/s to implement and operate to fully learn from the demonstration

KEY INSIGHTS PLANNING AND SOURCING
Open and technology-agnostic approaches can help with project success
Procurement processes and bidding responses require more time than originally anticipated
Uncertainty of load growth is a challenge for utilities but a strength for NWAs
Know as much about your service territory as possible to inform program recruitment
Utilities often use a benefit-to-cost assessment to evaluate NWA opportunities

Source: SEPA, PLMA, and E4TheFuture, 2018.

Non-Wires Alternative Grid Services

Non-wires alternatives is defined as “an electricity grid investment or project that uses non-traditional transmission and distribution (T&D) solutions, such as distributed generation (DG), energy storage, energy efficiency (EE), demand response (DR), and grid software and controls, to defer or replace the need for specific equipment upgrades, such as T&D lines or transformers, by reducing load at a substation or circuit level.”



Source: E4TheFuture, PLMA & SEPA, Non-wires Alternatives: Case Studies from Leading US Projects



Non-Wires Alternative Grid Services

- ◆ Solicitations requesting DERs to provide distribution services will specify at a minimum the following primary types of guidance to bidders, which are further described in the following subsection:
 - **Services:** DERs will be solicited to provide some combination of distribution capacity, voltage, and reliability/resiliency services.
 - **Attributes:** DERs will need to be able to deliver specified services reliably at very precise locations, at specific times, and in predictable amounts.
 - **Performance Requirements:** DERs will be expected to integrate with system operational needs and deliver verifiable performance.

Source: CPUC Integrated DER Docket – Competitive Solicitation WG

Non-Wires Alternative Grid Services

- ◆ A common set of principles was developed in California regarding the importance of defining the details around distribution services. These four principles were:
 1. Location of where distribution service is provided
 2. Timing of when distribution service is provided
 3. Level of DER service provided
 4. DER Availability and Assurance of Ability to Provide

Source: CPUC Integrated DER Docket – Competitive Solicitation WG

Non-Wires Alternative Grid Services

- ◆ Three key distribution services identified in California & New York that DERs can provide, which may result in deferral of distribution capital costs:
 - **Distribution Capacity**
 - **Voltage Support**
 - **Resiliency and Reliability**
- ◆ Distribution Capacity Services Definition

Distribution Capacity services are defined as a load modifying or supply services that DERs provide via the dispatch of power output (megawatts, MW) for generators or reduction in load that is capable of reliably and consistently reducing net loading on desired distribution infrastructure. These Distribution Capacity services can be provided by a single DER resource and/or an aggregated set of DER resources that reduce the net loading on a specific distribution infrastructure location coincident with the identified operational need in response to a control signal from the utility.

Source: CPUC Integrated DER Docket – Competitive Solicitation WG

Distribution Capacity Service Attributes Example

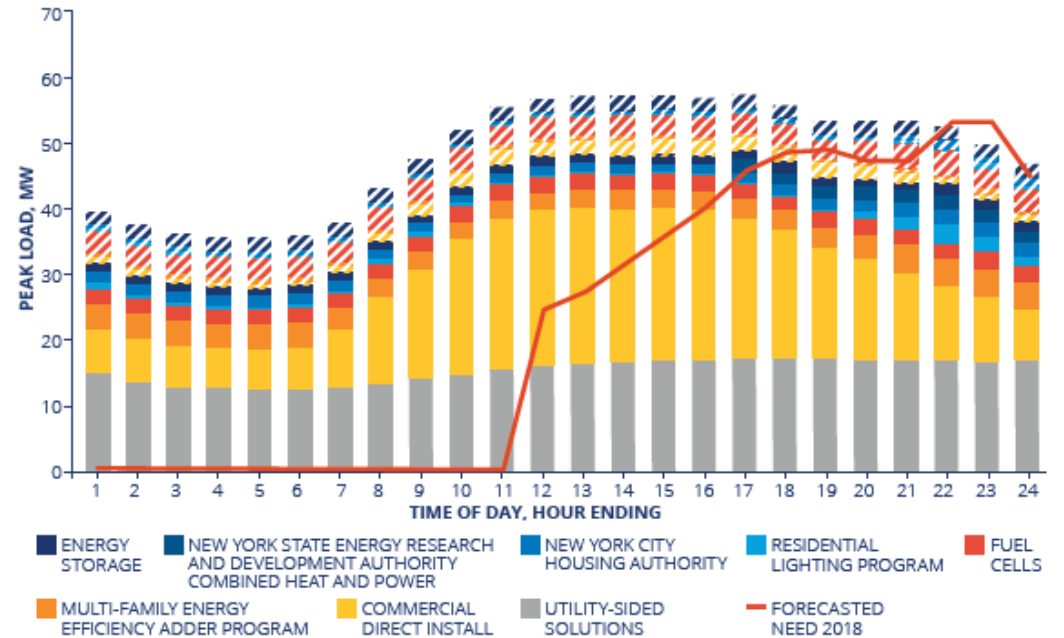
DER Attributes to Procure	YEAR				
	2017	2018	2019	2020	2021
Distribution Capacity Need (MW)	-	-	1.4	2.6	3.6
Distribution Capacity Need (MVAR)	-	-	-	-	-
Months when needed	-	-	Aug-Sept	Aug-Sept	July-Sept
Days when needed	-	-	All	All	All
Time when needed	-	-	15:00-20:00	14:00-20:00	14:00-20:30
Duration (hours/day)	-	-	5	6	6.5
Frequency of Need (days/month)			1	3	5

Source: CPUC Integrated DER Docket – Competitive Solicitation WG



Example of DER Providing NWA

FIGURE 4: EXAMPLE OF HOURLY LOAD REDUCTION PROVIDED BY DIFFERENT NWA RESOURCES



Source: Con Edison, 2018.



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NWA Performance Overview

To ensure that DERs are able to provide distribution services in a safe and reliable manner, a DER will be required to meet certain performance standards that can be measured by the utility. Depending on the location and attributes of the local distribution area where DERs are providing these distribution services and the type of DER, these performance requirements may vary. However, these DER performance requirements will include at a minimum the following:

- System Availability
- Data Availability
- Response Time Following a Utility Command Signal
- Quality of Response (e.g. measurement if DER provided required output for specified duration and frequency as defined by agreement)

Source: CPUC Integrated DER Docket – Competitive Solicitation WG

Example Distribution Capacity Service Summary

NWA Service	Definition	Attributes	Performance Measurement & Test
Distribution Capacity Deferral	Capacity to manage net normal and emergency loading on distribution infrastructure (substation, feeder, feeder component, transformer)	<ul style="list-style-type: none"> • Distribution capacity (quantity in kW) • Timing (certain hours within a day, month and/or season) • Flexibility (Ramping Up/down) • Locational Specific 	<ul style="list-style-type: none"> • Test resource ability to perform the service prior to commercial operation and prior to deadline for HECO to construct traditional alternative. • Test periodically during delivery term. • Ensure DER availability when expected to contribute to grid needs and utility reserved periods • Real-time visibility and control. • Effectiveness of coordinated dispatch/scheduling • Analysis of projected equipment loading levels against actual equipment loading levels. • Measure communication reliability between HECO dispatch operators and the DER provider to ensure availability





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