



Rooftop Solar Potential Study First Stakeholder Meeting

May 27, 2021

Webinar Logistics & Guidelines



All parties except presenter muted to avoid unnecessary noise distraction

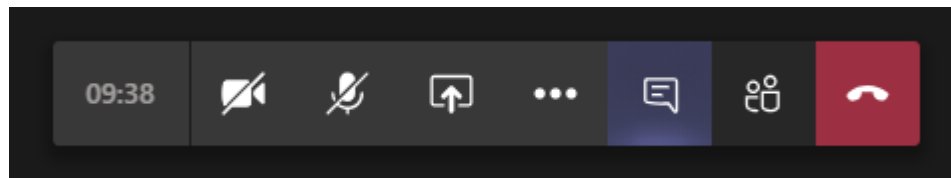


If you have an immediate question, or audio or video is poor please send an instant message to the moderator



We will stop today's presentation several times to take questions

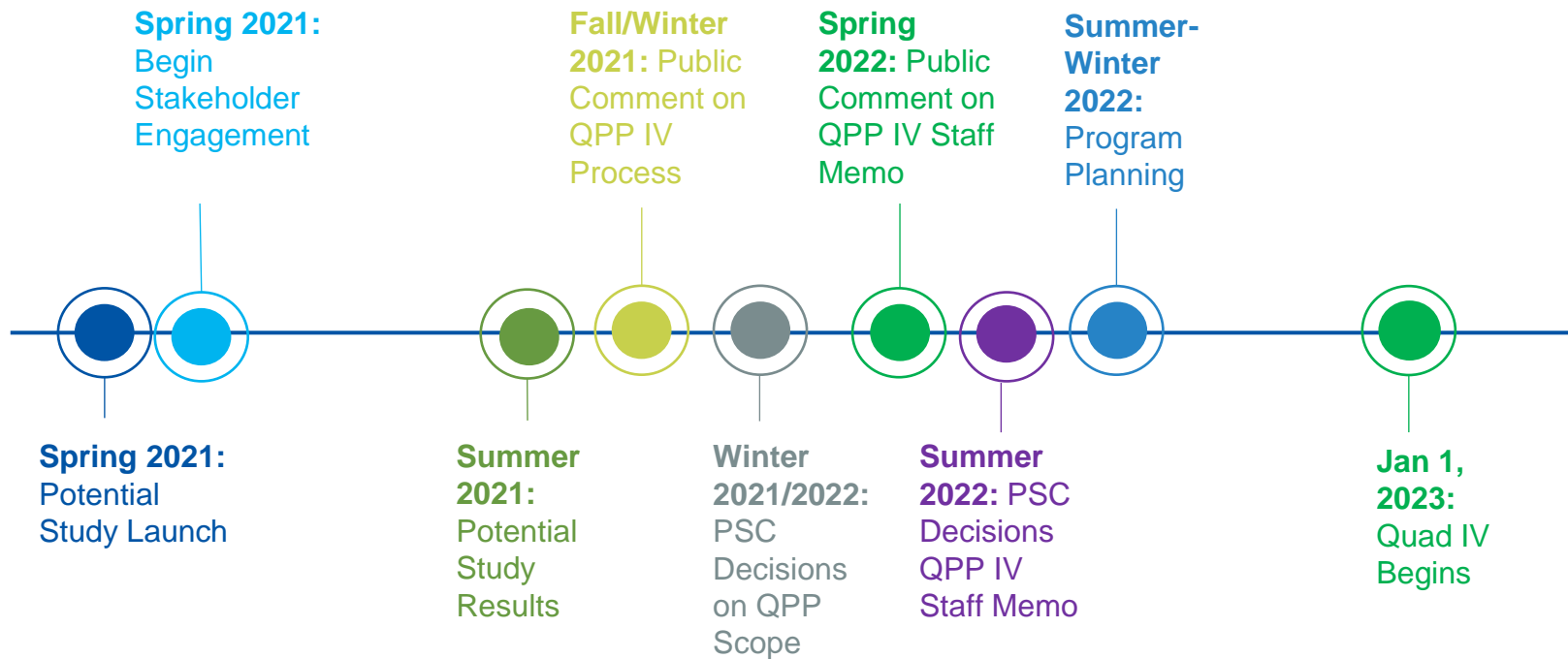
Your Settings



Solar Study Integration With Program Planning



Solar Potential Study and Stakeholder Engagement will inform Quadrennial IV Planning Process (QPP IV)



Cadmus Potential Study Management Team



Amalia Hicks
Principal
Investigator



Aquila Velonis
Technical
Potential Lead



Lakin Garth
Market
Potential Lead



Jeana Swedenburg
Income Qualified
Research Lead



Jeremy Eckstein
Project Manager

Agenda



Stakeholder Engagement

- Objectives
 - Future meetings
-



Solar Potential Study Scope

- Types of solar potential estimated
 - Segmentation
 - Cost effectiveness comparison
 - Income-qualified research
-



Study Methodology

- Modeling approach
 - Technical potential
 - Market potential
 - Economic scenarios
 - Income-qualified research
-



Q & A



1. Stakeholder Engagement

Stakeholder Engagement Objectives



Solicit Feedback

- Three stakeholder meetings planned
- Opportunity to comment on results and draft report



Capture Stakeholder Perspectives

- Provide insight to enhance the potential study



Create a Foundation for Broader Conversation

- Opportunity for mutual learning
- Shared framework of collaboration

Cadmus will:

- Share key information (data assumptions, draft reports)
- Post all presentations and any relevant documents on the stakeholder website

Stakeholder Meetings



Proposed meetings timed to present key data and discuss next steps

Kick-off (Today)

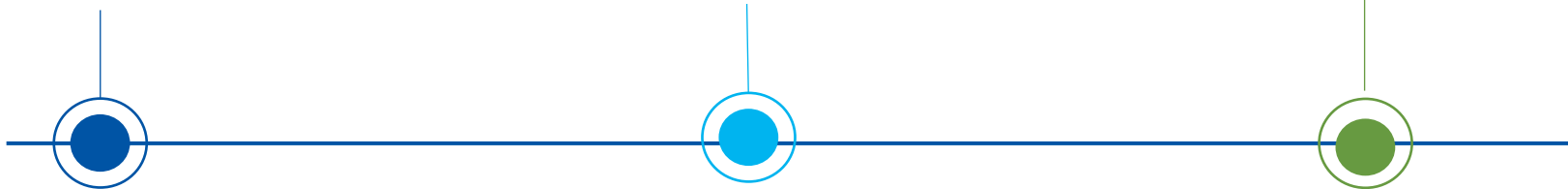
Overview of
Potential Study and
Approach

Model Inputs and Scenarios (June 2021)

Review model inputs and
discuss economic scenarios

Draft Results (July 2021)

Present draft results of
study





2. Study Scope

Study Scope

Estimate Rooftop solar Potential

- Technical and market potential through 2034
- Results by county and utility service area
- Results by building segment (commercial and residential)
- Results for income-qualified customers

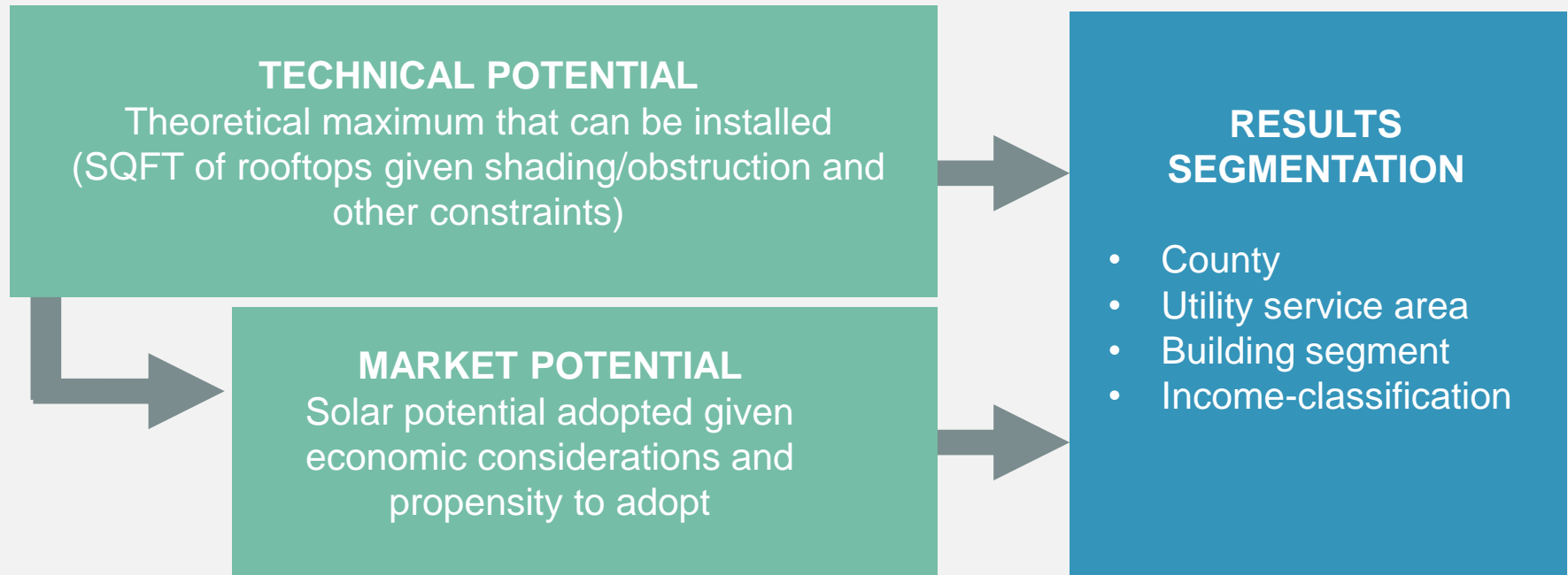
Cost-effectiveness

- Calculate mTRC for residential and commercial solar systems
- Compare solar mTRC to 10 selected EE measures (selected w/ stakeholder input)

Income-Qualified Research

- Barriers and opportunities research
- Equity framework
- Policy analysis

Types of Potential Estimated



Due to rapidly changing economics of distributed solar systems the methodologies for estimating adoption potential differ from the energy efficiency study

Solar Potential Study does not provide program targets

Program targets are developed based in part on study results through comprehensive planning process

Income-Qualified Research

Qualitative Research

Information for effective program design

Interviews and Literature Review

Benchmarking of program designs

Identification of barriers and opportunities

Policy Research

Review of WI and Focus on Energy policies

Equity Framework

Infographic

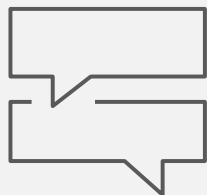
Guiding principles and questions for policy at state, local, and utility-level

The Floor is Open – Feedback Welcome!



Questions/Comments?

- Stakeholder meetings & objectives
- Scope
- Other questions?



Please add your questions to the meeting chat: we will address questions in the order that they are received & provide opportunity for clarification.

Please remain muted until your question is announced.

Modeling Approach – NREL dGen



Overview

- Open-source, bottom-up, agent-based market penetration model
- WI-specific data provided and adjustable
- County-level resolution
- Simulates market adoption

dGen Applications

- *2020 Standard Scenarios Report: A U.S. Electricity Sector Outlook*
- *Envisioning a low-cost solar future: Exploring the potential impact of Achieving the SunShot 2030 targets for photovoltaics*
- Many others

The screenshot displays a database interface with a table list on the left and a code editor on the right. The table list includes:

Table Name	Size
ATB19_Mid_Case_retail	21M
ATB19_Mid_Case_wholesale	3M
aeo_energy_price_projections	4.7M
aeo_load_growth_projections	4.5M
aeo_rate_escalations	4.4M
batt_prices_FY17_mid	56K
batt_prices_FY20_mid	48K
batt_tech_performance_FY19	48K
batt_tech_performance_SunLamp17	48K
battery_cost_projections	216K
carbon_intensities_FY19	80K
cntys_ranked_rates_lkup_20200721	13M
county_geoms	216K
county_nerc_join	216K
default_res_rate_lkup_2020	56K
deprec_sch_FY19	80K
financing_atb_FY19	16K
input_main_dsire_incentive_options_raw	16K
input_main_incentives_cap_raw	16K
input_main_itc_solar	16K
input_main_market_inflation	16K
input_main_nem_selected_scenario	16K
input_main_nem_user_defined_com	8K
input_main_nem_user_defined_ind	8K
input_main_nem_user_defined_res	8K
input_solar_bass_com	16K
input_solar_bass_ind	16K
input_solar_bass_res	16K
max_market_share	792K
nem_scenario_bau_2019	40K
nem_scenario_bau_by_utility_2019	48K
nem_state_limits_2019	8K
pv_plus_batt_prices_FY20_mid	48K
pv_price_atb19_mid	48K
pv_price_projections	64K

The code editor window shows the following Python code:

```
# make output directory
os.makedirs(model_settings.out_dir)
# create the logger
logger = utilfunc.get_logger(os.path.join(model_settings.out_dir, 'dg_model.Log'))

# connect to Postgres and configure connection
con, cur = utilfunc.make_con(model_settings.pg_conn_string, model_settings.role)
engine = utilfunc.make_engine(model_settings.pg_engine_string)

# register access to hstore in postgres
pgx.register_hstore(con)

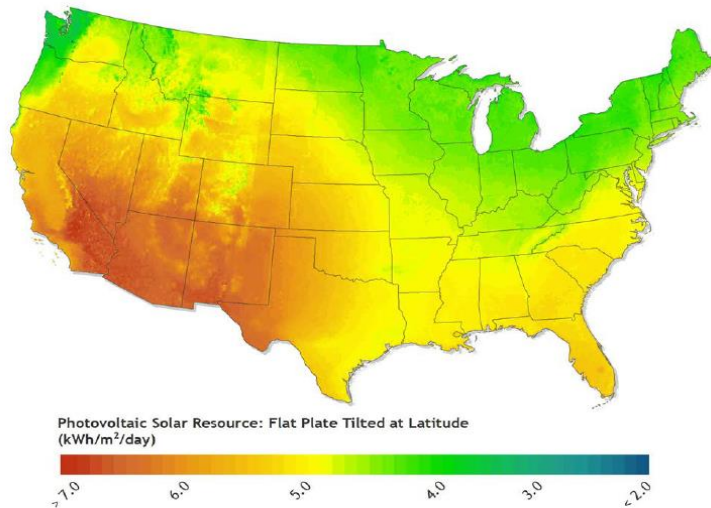
logger.info("Connected to Postgres with the following params:\n{}".format(model_set
owner = model_settings.role

# =====
# LOOP OVER SCENARIOS
```

Modeling Approach – Technical Potential



Lidar, weather, and population data to estimate developable roof area



Source: dGen Model Documentation 2016

CADMUS

Review & adjust data inputs as needed

- Population estimates and distributions
- System efficiency

Some post-processing of results as needed (solar production for technical potential)

Modeling Approach – Market Potential



Overview of Approach

- Model for residential and commercial sectors
- Performs economic calculations incorporating costs, retail rates and incentives
- Calculates adoption through Bass-style diffusion
- Bass coefficients calculated by NREL

CADMUS

Review data inputs & adjust as needed (Electric rates, policy parameters)

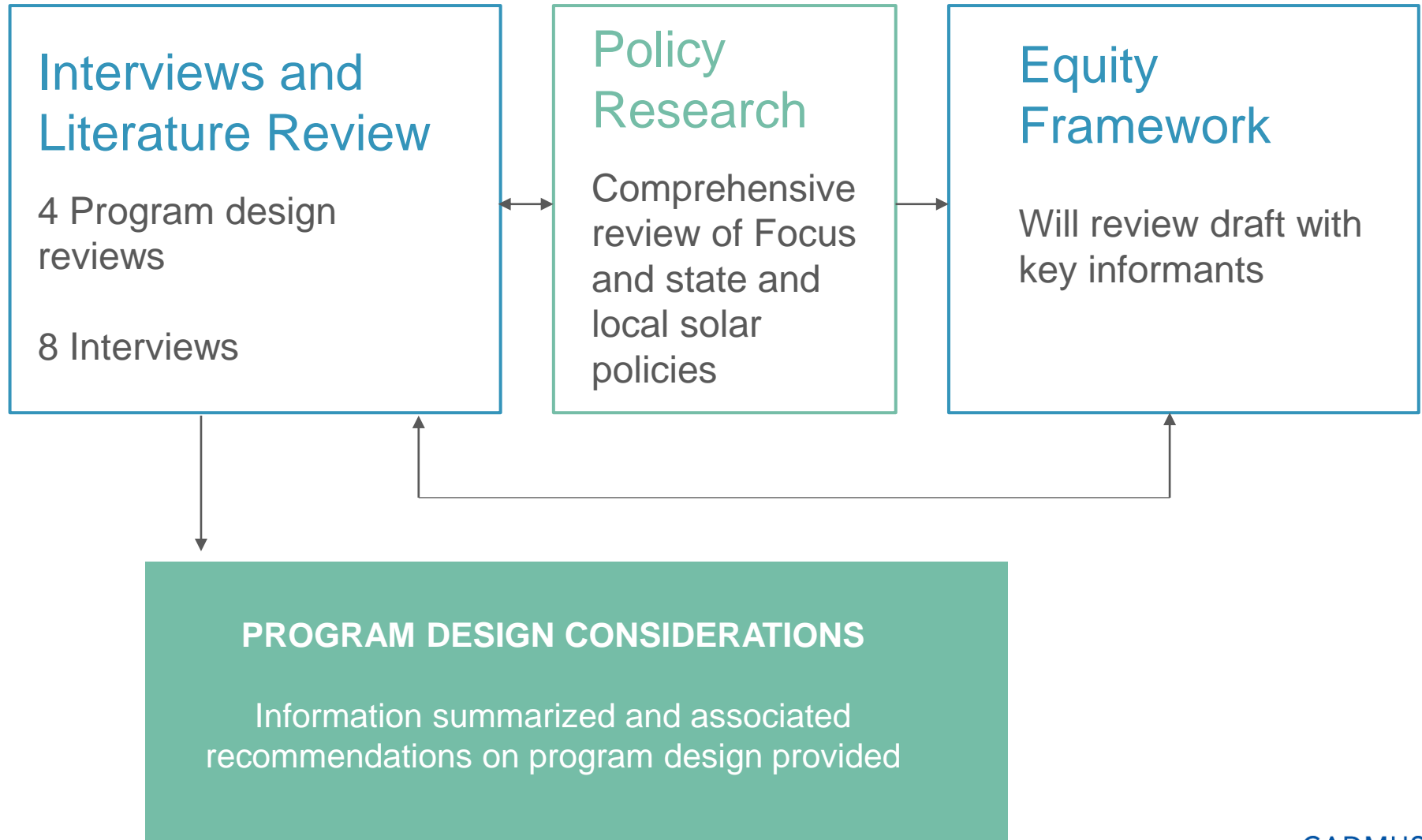
Adjust adoption parameters as required (low-income populations)

Economic Scenarios

Four scenarios (to be discussed with stakeholders)

- ITC / incentives / net-metering rates, electric costs could be scenarios

Income-Qualified Research

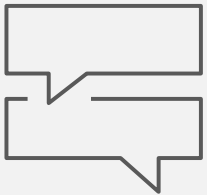


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Questions/Comments?



- Modeling?
- Approach?
- Other Questions?



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5. Next Steps

Thank You

Next Stakeholder Meeting:

Modeling (June/July)

Cadmus will present modeling inputs and solicit feedback on types of economic scenarios to run

Your feedback and input is important, please send us feedback

Other feedback opportunities

Email **Amalia Hicks** at Cadmus
(amalia.hicks@cadmusgroup.com)

or contact **Mitch Horrie** at PSC
(Mitch.Horrie@wisconsin.gov)