



Los Angeles 100% Renewable Energy Study

Advisory Group Meeting #3

Thursday, November 16, 2017, 8:45 a.m. to 2:00 p.m.

Meeting Summary

Location

City of Los Angeles Department of Water and Power (LADWP)
John Ferraro Building
111 Hope St., Room 1514
Los Angeles, CA 90012

Attendees

Advisory Group Members

Ackley Padilla, Council District 6
Alexandra Nagy, Food and Water Watch
Allison Smith, Southern California Gas Company (SoCalGas)
Andrea Leon-Grossman, Food and Water Watch
Andy Schrader, Council District 5
Angela Johnson Meszaros, Earth Justice
Bahram Fazeli, Communities for a Better Environment
Bonny Bentzin, University of California, Los Angeles
Camden Collins, Office of Public Accountability (Rate Payer Advocate)
Carlos Baldenegro, Port of Los Angeles
Christos Chrysiliou, Los Angeles Unified School District
Cris Liban, Los Angeles County Metropolitan Transportation Authority
Danielle Osborn Mills, American Wind Energy Association
Erica Blyther, Los Angeles World Airports
Ernesto Hidalgo, Neighborhood Council Sustainability Alliance
Evan Gillespie, Sierra Club
Fred Pickel, Rate Payer Advocate
Graciela Geyer, Sierra Club
Hilary Firestone, Natural Resource Defense Council
Irene Burga, Environmental Defense Fund
Jack Durland, Valero Wilmington Refinery
Jack Humphreville, Greater Wilshire Neighborhood Council
Jasmin Vargas, RePower LA
Jean Claude Bertet, Los Angeles City Attorney, LADWP
Jessica Duboff, Los Angeles Chamber of Commerce
Jim Caldwell, Center for Energy Efficiency and Renewable Technology
Kendal Asuncion, Los Angeles Chamber of Commerce



Loraine Lundquist, California State University, Northridge
Matt Gregori, SoCal Gas
Matt Hale, Council District 2
Michelle Kinman, Environment California Research & Policy Center
Molly Deringer Croll, California Energy Storage Alliance
Priscila Kasha, Los Angeles City Attorney, LADWP
Rebecca Andreassen, Office of the Mayor
Shane Phillips, Central City Association
Shaouki Aboulhosn, Port of Los Angeles
Stewart Waldman, Valley Industry and Commerce Association
Ted Bardacke, Office of the Mayor
Ted Beatty, Southern California Public Power Authority
Tony Wilkinson, Neighborhood Council
Tyler Aguirre, Neighborhood Council Sustainability Alliance

LADWP Commissioners

Aura Vasquez

LADWP Staff

Anton Sy
Ashkan Nassiri
Atique Rahman
Brad Packer
Carol Tucker
Dan Scorza
Danny Blustein
Dawn Cotterell
Eric Montag
Joe Ramallo
Joseph Avila
Mukhlesur Bhuiyan
Stephanie Spicer

Consultants

Aaron Bloom, National Renewable Energy Laboratory (NREL)
Devonie McCamey, NREL
Ramin Faramarzi, NREL
Scott Haase, NREL
Ana Nolan, Kearns & West
Jenna Tourje, Kearns & West
Joan Isaacson, Kearns & West
Taylor York, Kearns & West

Welcome and Introductions

Joan Isaacson, Lead Facilitator from Kearns & West, welcomed Advisory Group members, gave an overview of the agenda (see Appendix A), and explained that this meeting would be focused more on discussion, rather than on presentations by LADWP and NREL staff. She noted that all

input will be recorded in writing, and that a summary will be prepared and distributed after the meeting. She also noted that there would be two different breakout discussions during the meeting, giving Advisory Group members the opportunity to provide more focused input. Another meeting goal noted by Joan was expanding the knowledge base of the Advisory Group.

In his welcoming remarks, Eric Montag, Senior Manager of Planning & Strategic Initiatives for LADWP, explained that during NREL's Partner Week in September 2017, he and LADWP Commissioner Aura Vasquez participated in a panel about accelerating transitions to 100 percent renewable energy. Eric also noted that David Wright, LADWP General Manager, gave a short presentation about the 100% Renewable Energy Study (Study) at the October LADWP Board meeting, and encouraged Advisory Group members to watch the clip. The video clip can be found on the LADWP 100% Renewable Energy website, at <http://bit.ly/2B1woNc>.

Scott Haase, Partnership Development Manager, NREL, also welcomed the Advisory Group and noted that NREL has recognized three "megatrends" that are helping to facilitate the possibility of a transition to 100 percent renewable energy:

1. Leadership in renewable energy is becoming stronger at the state and local levels. This is evident across California as well as the rest of the country, notably with California Senate Bill 100 and other efforts in large cities such as Chicago, Orlando, and Los Angeles.
2. Costs for technologies are trending down. Over the last 10 years, costs have fallen for land-based wind projects by 40 percent, for distributed photovoltaic (PV) by 50 percent, for utility-scale PV by 65 percent, and for LED lightbulbs by 94 percent. Scott also noted that battery technology is on a similar trend.
3. Real-time data is becoming more accessible, and is being refined to an almost individual building scale.

Anton Sy, LADWP 100% Renewable Energy Study Project Manager, also welcomed the Advisory Group, and emphasized the importance of stakeholder input in the Study process.

Note that slides from all presentations are available on the LADWP 100% Renewable Energy Study website, at <http://bit.ly/2B1woNc>.

Updates

Joan Isaacson introduced a new standing agenda item, during which the team and Advisory Group members can exchange updates of interest. Members are encouraged to submit updates for this item to Anton Sy (Anton.Sy@ladwp.com) for inclusion on future agendas. Updates from the LADWP and NREL team are noted below, and no updates were given by Advisory Group members at this meeting.

August 2017 City Council Motion (File No. 16-0243)

On August 1, 2017, the City Council passed a motion directing LADWP to include the following in the LADWP 100% Renewable Energy Study (see Appendix C):

1. Analysis by Rate Payer Advocate on how each scenario fits within the current rate structure, including impact on low-income customers.
2. Incorporation of CalEnviroScreen into the process.

3. Prioritization of Environmental Justice Neighborhoods as early recipients of air quality improvements and greenhouse gas emissions reductions.

Utility Variable Generation Integration Group and NREL Challenges White Paper

Aaron Bloom, NREL, noted that NREL is working with the Utility Variable Generation Integration Group (UVIG), which brings together engineers to talk about challenges of integrating 100% renewables into the power system, on the development of a white paper that presents these challenges. Aaron encouraged Advisory Group members to reach out to him for more information on attending the next UVIG meeting in Tucson, Arizona. A draft of the Fact Sheet developed at the UVIG Fall Technical Workshop is available upon request. NREL anticipates publishing the fact sheet in January. To learn more, visit www.variablegen.org.

Advisory Group Process

Advisory Group Check-in Calls

Over the last few months, Joan Isaacson conducted check-in telephone calls with Advisory Group members. These conversations lasted between 20 and 30 minutes, and about 60-65 percent of Advisory Group members participated. A description of the calls and major themes are provided in Appendix D.

Meeting Materials and Advisory Group Roster

Joan explained that moving forward, the project team is committed to distributing meeting materials to Advisory Group members at least one week in advance of each meeting. The project team has also compiled an updated roster, which can be found in Appendix E. She also reported on the team's plan to create a detailed process map in early December. It will identify the timing of Advisory Group meetings in relationship to steps in the Study, including the focus and discussion questions for each meeting. The process map will be shared at the first meeting in 2018.

Questions and Comments from Advisory Group Members

The following comments were received from Advisory Group members in response to presentations given during the "Advisory Group Process" portion of the meeting.

Comment: There was concern that the Advisory Group is composed of a disproportionate ratio of environmental/community groups and businesses. It was suggested that the project team consider adding more business interests such as manufacturing, apartment owners, building owners, studios, hospitals, etc. Stuart Waldman, Valley Industry and Commerce Association, offered to provide a more detailed list. It was also noted that renewable energy industry stakeholders should be included.

It was also suggested that, rather than add more members to the Advisory Group, the project team should consider hosting public meetings. This would give an opportunity for a broader group of stakeholders to comment, while helping to maintain balance and manageability of the Advisory Group.

Setting the Stage for Renewables

Aaron Bloom noted that there are many different considerations when thinking about how to achieve 100 percent renewable energy, and about what LADWP and NREL should include in the Study. Establishing the inputs and definitions for the Study is an important first step. For the Study, it is LADWP and NREL's role to define the questions, present them to the Advisory Group for discussion, and facilitate meaningful feedback.

City Council motions provide basic direction for the Study, and these have been included in the project scope to assess how the transition to renewable energy can affect the broader economy and environment in Los Angeles.

There have been many different approaches taken by policy makers, whether at the state, local, or federal level, to promote different policies, technologies, language, etc. NREL has prepared a memo to help explore terms commonly used to describe clean energy policies and programs (see Appendix F). Aaron noted that among states or organizations that define renewable energy, there is a high level of agreement on solar, wind, hydropower, geothermal, and bioenergy as renewable sources, and that California considers the widest variety of sources and methods of generation.

One of the key definitions of renewable energy adopted in the NREL memo is from the U.S. Energy Information Administration. It defines renewable energy as energy resources that are naturally replenishing but flow limited. This means that these resources are virtually inexhaustible in duration, but are limited in the amount of energy that can be harvested at one point in time.

There are also emerging definitions and terms that focus on carbon policy versus renewable policy. Instead of focusing on a specific technology, these terms focus on carbon emissions, and are generally grouped into a few different types:

- Low-carbon policies – Address a desired decrease in carbon emission, possibly measured against a certain baseline level.
- Carbon-neutral policies – Address resources that may emit carbon, but over their life cycle are considered to be carbon neutral.
- Zero carbon and carbon-free policies – Address any generating technology that does not result in addition of carbon to the atmosphere. This could include nuclear and large hydropower, despite the fact that these may not be considered renewable.

There are a variety of renewable energy project scales, some deployed at a larger, gigawatt scale, and others deployed at a much smaller scale. Smaller-scale technologies may become a part of the renewable energy future, but may not make a significant contribution in the near term, due to their size or stage of development. These might include hydrogen fuel, small hydropower technologies, hydrokinetic, and tidal.

Technologies for Discussion and Small Group Discussion #1

In considering renewable energy sources and technologies, Aaron explained that several need further discussion in relationship to the LA 100% Renewable Energy Study, as there may be

mixed options about whether they are defined as renewable, and/or subsequently used to reach LA's goals. Aaron then reviewed the following:

- Large hydropower – This technology presents a challenge when talking about renewable energy standards, as it has environmental and ecological impacts.
- Bioenergy – There is some general consensus that this technology could be considered carbon neutral, but does produce particulate emissions.
- Nuclear – Divesting from nuclear energy may create more costs and increase the time it takes to reach renewable energy goals, since it is already an established source.
- Renewable Energy Credits – These may provide a flexible option for attaining the last 10 to 20 percent of renewable goals.
- Low-carbon emissions – As mentioned previously, these methods shift focus from technologies to emissions that are undesirable – the goal then becomes reduction of emissions rather than production or conservation of power.

During the meeting, Advisory Group members were given the opportunity to break up into four facilitated breakout groups and discuss these technologies more in-depth, identifying and discussing advantages and disadvantages of each. Each group facilitator then asked for a volunteer to report back to the larger Advisory Group, focusing on discussion around the zero carbon emissions objective.

All notes from the small group discussions are consolidated in Appendix B.

Questions and Comments from Advisory Group Members

The following comments were received from Advisory Group members in response to presentations given during the “Setting the Stage for Renewables” portion of the meeting.

Comment: In the case of large hydropower, it could become a policy choice – do not allow new development, but keep and utilize existing development.

Comment: We have seen challenges with maintaining large infrastructure, such as the Oroville Dam, and we should consider what happens if large investments are needed for maintaining infrastructure like the Palo Verde Nuclear Generating Station – have a backup plan in case these large generation sources fail.

Comment: The Study should consider that some of the biggest energy production transformations have occurred at the time that old equipment needed to be replaced anyway. In these cases, we will not be replacing perfectly good generating sources – but we need to consider what we are replacing them with.

Question: Is there a consideration of resource interconnection – what are the other sources, and where are they located?

Answer: There is a real potential that the 100 percent goal may not be met through generation that is exclusively within California boundaries, and LADWP will need to rely on interconnections elsewhere.

Comment: The Study should consider how renewable energy affects the broader energy economy, including water.

Public Information and Outreach

Joe Ramallo, LADWP Assistant General Manager of Communications, Marketing and Community Affairs, gave a presentation on how public information and outreach for the LA 100% Renewable Energy Study fits into the broader power and clean energy communication programs.

LADWP reaches out through public forums, such as neighborhood councils and business organizations, to share progress and accomplishments in clean energy, and to remind the community that progress is being made. LADWP has a commitment and obligation to provide reliable service and competitive rates to ratepayers, and considers these factors in all studies and plans. It is also important to outline current initiatives, such as the 100% Renewable Energy Study effort and the Once-Through Cooling Study.

With respect to media coverage, few reporters cover these topics, making coverage a challenge. Joe encouraged Advisory Group members to reach out to him or to Anton Sy before responding to media inquiries, to ensure accurate information is relayed.

LADWP plans to conduct presentations to local councils and community groups on the 100% Renewable Energy Study, as part of the Clean Energy program, in the near future. Advisory Group members whose organizations are interested in a presentation should contact Joe. The recent clean energy brochure is a good resource for Advisory Group members to share. Joe also noted that any Advisory Group members who blog about the Study are encouraged to reach out to LADWP so that the department is aware of information is shared.

Questions and Comments from Advisory Group Members

The following comments were received from Advisory Group members in response to presentations given during the “Public Information and Outreach” portion of the meeting.

Question: Many Advisory Group members asked if it was possible to involve a broader set of stakeholders in this effort, including the environmental justice and business communities.

Answer: LADWP can help with outreach to and talk with community groups, but it can be challenging to organize a community meeting aimed at the general public around a specific topic – it is often difficult to get community members to attend.

Eric Montag noted that there are challenges and potential conflicts of interest when inviting certain interests or vendors and not others to participate on the board. This is why there is a focus on including alliances, councils, and other representative groups, rather than specific businesses or industry representatives. Joan Isaacson also noted that Advisory Group members are encouraged to act as representatives and take discussion topics back to those they represent, such as individual businesses or stakeholders.

Once-Through Cooling Study (OTC)

Ashkan Nassiri, Manager of Strategic Initiatives B, gave a presentation on LADWP's OTC Study and its relationship to the 100% Renewable Energy Study. OTC is the process of drawing large

quantities of ocean water into generating facilities for cooling purposes, and then returning the water back to the ocean. This has been found to have potentially adverse effects on wildlife, and LA has begun the process of eliminating this method of cooling at three of its coastal power plants. LADWP has identified six generating facilities for repowering projects over the last 15 years, with the aim of updating and increasing efficiency of these facilities. Two of these projects have been completed in the last five years.

In 2017, LADWP paused repowering efforts to analyze whether these generating stations should be repowered or whether they should be retired and replaced with different sources of energy production such as renewable energy. The OTC Study employs scenarios that will be used to determine reliability issues with replacing these facilities, and examine various combinations of repowering and retirement. The data collection phase of the project began in August 2017, and is expected to be completed in late 2017.

Cost of repowering is a component of the OTC Study, as well as mitigation measures that will be utilized when generators stop and start producing. Once scenarios are completed and vetted, LADWP will UPDATE the city's Power Integrated Resource Plan accordingly.

NREL will also incorporate data from the OTC Study in the 100% Renewable Energy Study.

Questions and Comments from Advisory Group Members

The following comments were received from Advisory Group members in response to presentations given during the "Once-Through Cooling" portion of the meeting.

Question: What occurred to initially trigger this study?

Discussion: There was some discussion that events occurring at the Aliso Canyon storage facility played a role in triggering the study, as well as a desire to reduce dependence on natural gas.

Comment: Interconnected systems, such as California Independent System Operator (CAISO) should be considered. It was noted that it is important to work with other operators to avoid duplication of effort and/or inconsistent approaches.

Small Group Discussion #2

As part of an effort to ensure that the 100% Renewable Energy Study is as thorough as possible, Advisory Group members were randomly separated into four small groups and asked to brainstorm ideas, questions, variables, and issues for NREL to consider as part of the Study. The goal was to generate as many responses in a set amount of time as possible, and results were recorded by each group facilitator on a flip chart.

Facilitators then asked Advisory Group members to identify relative priorities by placing one sticky dot on each of seven topics that they believed were most important, and a volunteer was chosen to report back to the larger Advisory Committee.

Results of this brainstorming activity and prioritization results can be found in Appendix B.



Conclusions and Next Steps

As always, Advisory Group members are encouraged to send comments or questions on any topics to Anton Sy, Project Manager: anton.sy@ladwp.com, or (213) 367-2332.

The next quarterly meeting is planned for February 2018.



Appendix A

Agenda

City of Los Angeles 100% Renewable Energy Study
Thursday, November 16, 2017
8:45 a.m. – 2:00 p.m.

Los Angeles Department of Water and Power, Room 1514

- 8:45 – 9:00 a.m. **Arrive at LADWP / Networking / Continental Breakfast**
- 9:00 – 9:05 a.m. **Call to Order and Agenda Overview**
Joan Isaacson, Facilitator
- 9:05 – 9:15 a.m. **Welcome and Introductions**
Eric Montag, Anton Sy, Scott Haase, Advisory Group
- 9:15 – 9:25 a.m. **Updates**
Joan Isaacson, Facilitator
- August 2017 City Council Motion (File No. 16-0243)
 - David Wright Board Presentation (Link)
 - Utility Variable Generation Integration Group
 - Other
- 9:25 – 9:40 a.m. **Advisory Group Process**
- Summary of Telephone Call Input
 - Detailed Process and Meeting Timelines
- 9:40 – 11:30 a.m. **Setting the Stage for Renewable Energy Analysis**
- NREL Memo
 - Scenario Development Process
- Break
- Discussion Activity: Definitions of Renewable Energy
Joan Isaacson and Aaron Bloom
- 11:30 – 11:45 a.m. **Lunch Served**
- 11:45 – 12:30 p.m. **Lunch Presentations**
- Once-Through-Cooling Study
Ashkan Nassiri, Manager of Strategic Initiatives B
 - Broader Public Information & Outreach
*Joe Ramallo, Assistant General Manager
Communications, Media and Community Affairs*
- 12:30 – 1:45 p.m. **Discussion Activity: Considerations for the Study**
Joan Isaacson and Aaron Bloom
- 1:45 – 2:00 p.m. **Wrap-up and Next Steps**
- Next meeting date: February 15, 2018 (Tentative)
 - Topics for Next Meeting
Joan Isaacson, Aaron Bloom and Anton Sy



Appendix B

Discussion Activity Format and Results

Los Angeles Department of Water and Power 100% Renewable Energy Study

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Appendix B: Discussion Activity Format and Results

Discussion 1: Energy Resource Questions

Below is a tabulation of results from Discussion 1. Advisory group members were randomly organized into four groups, each discussing the same topics. The goal of this exercise was to facilitate input from Advisory Group members on the advantages and disadvantages of incorporating each of five energy resources into LA 100% renewable energy study: 1) Large Hydro, 2) Bioenergy, 3) Nuclear, 4) Renewable Energy Credits (RECs), and 5) a Zero Carbon Emissions objective.

Group 1

Large Hydro	
Positives	Negatives
Already built (existing plants)	Controversial new development is expensive, has emissions
Cheap (existing plants)	Potential decommissioning of existing plants has risks, timing considerations
Flexible	Snowpack-dependent (affected by droughts)
Lots of storage	Currently not defined as renewable in RPS
Enables reuse of toxic water	Affects/impacts indigenous communities
Efficient (existing plants)	No local economic development benefit
Zero-carbon	
No particulate emissions	
No combustion	
No impact on EJ communities	
Helps with the duck curve	
General Comments	
None	
Bio-Energy	
Positives	Negatives
Carbon neutral	Biomass combustion emits carbon
Supports SLCP (short-lived climate pollutant) by CAR (California Air Resource Board)	Creates waste
Flexible resource	Ancillary environmental impacts
Can be used onsite	Building new facilities could impact EJ and indigenous communities
	Dis-incentivizes some sustainable farming/waste reduction practices
	Infrastructure concerns – what would be the cost?
General Comments	
None	

Nuclear	
Positives	Negatives
Existing: zero carbon; investment has already been made; currently a significant part of DWP portfolio (what would be the cost for not continuing to include it in the mix?); zero particulate emissions	Existing: nowhere to store waste product; high risks and environmental impacts; national security risk; close to fault lines
New: there is the potential for promising new technology that is smaller and safer (do we want to exclude this possibility?)	New: legality questions in CA; long permitting/lead times; high cost; technology is not mature
General Comments	
None	
Renewable Energy Credits (RECs)	
Positives	Negatives
Possibly the most cost-effective way to reduce global/regional carbon emissions	"Pay to pollute"
Creates new revenue stream for more renewables to come online generally	Does not necessarily put EJ local communities first, in terms of pollution
Gives DWP more options for meeting a carbon-neutral goal	Accounting of GHG/RPS requirements can be challenging
Possibility of even exceeding 100% renewables	Not a good model for LA in terms of local leadership
	Studies show the model doesn't work as it's supposed to in terms of pollution/carbon
General Comments	
None	
Zero Carbon Emissions Objective	
Positives	Negatives
Encourages a portfolio of diverse zero-carbon resources	Does not address other air pollutants
Most direct way of addressing climate change, as the goal	Could incentivize other less sustainable/renewable technologies
Could be less costly	Concerns about pace
Broad portfolio (doesn't just focus on renewables alone)	Need to address the storage issue
Objective is clear and simple	
Makes a statement about DWP's ultimate goal in establishing emissions as the clear priority	
General Comments	
None	

Group 2

Large Hydro	
Positives	Negatives
Large amount, cheap power	Seasonality
Infrastructure exists	Connects to local goal of water use
Castaic: we are bringing the water in anyway	Has an impact on wildlife – doesn't align with sustainability goals
Can help in making sure we have enough money to build more renewables, but should consider ultimately commissioning	Not measuring cost of ecosystem health
Shortcut	Shortcut
24/7 power supply	Aging infrastructure – cost of maintaining – too much cost to maintain – or newer technology could provide better power
Provides an opportunity to add new technology without building a new system	Challenges with drought cycles <ul style="list-style-type: none"> • Less reliable • Water may take priority over electricity
Zero emissions – no carbon	Interference with indigenous communities – Pah-Ute tribe
Existing jobs	
General Comments	
None	
Bio-Energy	
Positives	Negatives
Carbon neutral while producing energy	All of the technology used for bio energy falls under the same state regulation despite wide variation
Reduces existing waste in landfills	Combustion and associate pollution
Utilization of certain forms can reduce combustion	May not be at-scale or cost effective
Uses existing systems – compliments existing systems such as wastewater processing	Investment in dis-incentivizing waste reduction
Utilizes waste streams that cannot go elsewhere	Leakage – Methane – GHG intense
	Complex system
General Comments	
What pollutants are we talking about?	
Nuclear	
Positives	Negatives
Band-Aid in the interim <ul style="list-style-type: none"> • Existing generation • Such a small amount currently 	Current approach in U.S. is outdated
Carbon Free	Regulatory regime is not practical for new nuclear
Large energy source – has longevity	Nuclear waste
	Liability of an accident
	Uninsurable
	Regulatory system not sufficient to deal with waste
	National security concern
General Comments	
None	

Renewable Energy Credits (RECs)	
Positives	Negatives
Funding mechanism for future projects	Dis-incentivizes innovation
Financing source if LADWP can reach its 100% goal and can sell credits	Doesn't remove local polluting energy sources
Practical way (in the future) to get from 80-100% - Could cover baseload needs	<p>"The solution to pollution is dilution"</p> <ul style="list-style-type: none"> If everyone uses them, they are not effective
	If we are investing in renewable energy elsewhere, we don't experience the benefit of jobs, economics, etc.
	Shortcut
	Take credit for being at 100% without actually achieving tangible goals – intellectual wiggle room
	Masks the fossil fuel generation in LA
	Contributes to racist policy
	Can easily be taken away
General Comments	
None	
Zero Carbon Emissions Objective	
Positives	Negatives
Low-cost – existing generation	Diminished efforts such as social justice
Carbon free	Does not adequately capture other effects
Addresses climate change	Not a good health objective
Good climate objective	Has not been effective in making massive transformation
Industry leadership and jobs	Takes focus off of using less energy
	Does not make a reduction
General Comments	
May not be renewable	

Group 3

Large Hydro	
Positives	Negatives
Provides storage which is helpful with renewables	Methane emissions
Critical for Power quality	Decomposing matter anaerobic digester
100% renewables isn't achievable without it	Variable with drought
Dispatchable	Ecosystem, biologic and landscape concerns
Extensive resources outside of LA that we could access (ex: British Columbia)	Long time to expand hydro facilities
We have it already	Extensive and expensive to access outside resources
Efficient storage	Not efficient
River basins provide multi-year storage	Migrating fish impacts
Low operating cost	Expansion will be politically and legally challenging
	High capital cost
General Comments	
Some comments are related to adding new capacity and some are about existing resources and including them in study	
There are trade offs	
Can we modify existing facilities to work better with renewables?	

Bio-Energy	
Positives	Negatives
Takes advantage of existing waste stream that will always be with us	Not zero emissions
Many are commercially viable, well demonstrated and globally deployed	Emissions
Carbon zero or carbon negative	Not a reliable source of energy
Taking advantage of currently installed infrastructure and end uses would require less investment	Increase in CO2 emissions
"Back to the Future" - will selectively harvest and burn wood again. We have over one million dead trees	Carbon accounting can be very challenging
Reduces methane	Must consider trade-offs between the negatives and positives and it's hard to figure out (what is the exact processing method? The exact ecosystem...)
We have very good carbon accounting models in California	Does not fit into our long-term plan for zero emissions
California is a great model - used to account for carbon	Puts in place infrastructure that displaces other options
Captures energy from waste (although this is complex)	Some waste streams are a small slice of the pie (apples and banana peels)
Dispatchable	
Base load	
Peak following	
General Comments	
Some might be really good transitional solutions that we don't want to keep for too long	
Study should focus on different factors based on: <ul style="list-style-type: none"> • Environmental justice concerns • Availability of waste stream and how waste stream is changing over time • Overall impact of greenhouse gas emission 	
Nuclear	
Positives	Negatives
Zero emissions	Expensive to build
Base load	Uncertain U.S. future
Helps system inertia	Need more research to make it cost efficient
Marginal production costs. Costs are low.	Significant health impacts upon exposure during accidents
We have it	Waste
We can access additional resources from out of state	We don't have a viable solution for nuclear waste
	Significant environmental impacts that last for centuries
	Legally and politically problematic
General Comments	
None	

Renewable Energy Credits (RECs)	
Positives	Negatives
Cost effective solution	Proper accounting of credits can be a problem
Promotes renewable energy production	Prone to fraud
Can be a more effective way of reducing greenhouse gas emissions (Especially the last 10%-20%)	Communities in LA are not getting the same public health benefits
Can be helpful in a transition to higher goals	Subject to market forces (manipulation)
RECs is a global solution to a global problem	Exporting (negative) impacts of renewable energy generation to other places
A lot of renewable investments come in big, single projects and RECs allow for a smooth transition while retaining goals	Can be a bad investment (bad use of rate payer dollars)
As renewables come down in price, there can be a bridge with RECs	Expensive
Can still achieve goals by providing RECs	You are exporting all of the benefits too (like job generation)
Broadens price competition between renewable technologies	Missing opportunities to provide economic and technical leadership by showing how truly 100% renewable we can be
Can be technology neutral - not picking winners or losers	Does not coincide with Mayor's "Lead By Example"
Way to finance renewable energy transitions in places that cannot afford it	Politically it's opposed by Environmental Justice communities
General Comments	
How far away can we count them? Can we go internationally?	
Zero Carbon Emissions Objective	
Positives	Negatives
Reducing carbon emissions focuses on the main objective globally	A potential to blunt local objectives (like job creation)
We need to make tradeoffs with other emissions	Potential to fail to address other negative environmental impacts
Easier to define "zero carbon" than it is "renewables"	We deprive ourselves of multiple benefits of reaching zero carbon and societal benefits
Accounting for carbon is more difficult accounting and accounting for renewables is more difficult philosophically	
Run the risk of getting a scenario that grows carbon emissions in the short term	
Costs less (*but must consider society costs)	
Adds to diversity of available resources	
Climate problem is more pressing on whether our energy resources are going to run out	
General Comments	
Questions of life cycle analysis	
Should we stay faithful to Council Motion?	
Definition of "renewable" is political. The definition of emissions is scientific	

Group 4

Large Hydro	
Positives	Negatives
Cheap	Doesn't count as a Renewable Portfolio Standard
Reliable	Differentiated output over time
Flexible	Rainfall matters
Zero emissions	Environmental regulations affecting cost
Renewable	Quality of infrastructure varies
Local control (Castaic)	Build-out
	Upstream emissions
	Maintenance
General Comments	
Consider distinction between pumped hydro storage and generation	
Bio-Energy	
Positives	Negatives
Lower greenhouse gas option	Limited availability
Alternative to releasing methane into the atmosphere	Limited potential
"Renewable"	Fairly expensive
Forest management <ul style="list-style-type: none"> • Wildfire prevention 	Emissions – NOx, particulates
Dispatchable	State limits availability of some types
Increasing availability	Controversial
	Changing regulations
	Refinement needed to get fuel into gas line
General Comments	
None	
Nuclear	
Positives	Negatives
Good baseload	Not renewable
Reliable	Expensive (newly-built)
Existing	Nuclear waste
Low cost	High environmental and public health risk
Paying jobs – 2000 at San Onofre Generating Station	Security risk
Real cost is high	Political challenges
Palo Verde is mostly paid for	Not flexible
Small footprint per output	Liability risk
Zero carbon	
General Comments	
None	

Renewable Energy Credits (RECs)	
Positives	Negatives
Cheap	Doesn't shift the makeup of grid – accounting system
Balance the margins on the shortfalls	Unclear whether purchasing RECs creates new renewable energy
Helps build projects somewhere else	Should be less available infrastructure
Jobs	Gives less credibility to program
Opens potential to renewable energy	Difficult to understand
	State standard should be considered floor
General Comments	
None	
Zero Carbon Emissions Objective	
Positives	Negatives
Avoid climate change	Harder to calculate
Cleaner atmosphere	More expensive – requires conversion from one technology / usage to another
Less expensive to pursue – dams, nuclear	Politically difficult
Requires less maintenance	
Stepping stone to 100% renewable future	
Good!	
General Comments	
None	

Discussion 2: Considerations for the Study

Below is a tabulation of results from Discussion 2. Advisory group members were again randomly organized into four groups, each discussing the same topics. The goal of this exercise was to brainstorm on the following question: “What types of questions, issues, topics, and ideas should be considered as part of the study?” Facilitators asked Advisory Groups members to identify as many ideas as possible in a set amount of time, and input was recorded on a flipchart. Facilitators then asked Advisory Group members to identify relative priorities by placing one sticky dot on each of seven topics that they believed were most important. A pre-selected member of each breakout group then reported back to the larger Advisory Group on the top seven priorities identified. Because multiple ideas may have had a similar number of dots, the highlighted rows indicate ideas discussed during reporting out.

Group 1

Comment	# Dots
Consider electrifying appliances, not just transportation; what would be the impact of this to ratepayers in terms of costs and job creation/pipeline?	7
Need a clear timeline and targets for the study, both for the broader end goal and interim goals	6
Question: is rate design part of the study?	5
Measure reliability in terms of climate resiliency of the grid; the context for the study is a post-climate-change world, so extreme weather and disaster mitigation should be considered	4
Emphasis on energy efficiency (to reduce overall use)	4
Focus on energy that won't harm or kill us (consider health impacts)	3
Marry DWP goal with the LA mayor's plan for sustainability in terms of battery storage	3
Look at impacts of proposed changes at the ratepayer level (in terms of costs) compared to traditional/current practices	3
Study should be technology-neutral and focus on the broader goal	3
Study should be primarily concerned with environmental/climate impacts	3
Consider slow/medium/fast scenarios and tradeoffs for each	3
Consider lifecycle analysis for different technologies, including manufacturing and disposal	3
Question: what if we decentralize and provide power more locally (i.e., microgrids)?	2
Consider localized impacts in terms of urban pollution, EJ communities	1
Study should consider the idea of a "just transition;" a positive outcome should incorporate local workers into the new energy economy with new jobs, and consider the roles of CEOs on down in moving to this new economy and away from traditional fossil fuels	1
Consider the local impacts of new transmission/distribution lines (both overhead and underground)	1
Question: how do local investments in RECs help us get to 100% (analyze the impacts of DWP's current REC policy)?	1
Consider consumer education (energy efficiency) as part of the solution	1
Question: how can we safely decommission dirty energy?	
Consider how DWP can use this study and future actions to diversify jobs (in terms of DWP's equity metrics initiative and goals)	
Consider water footprint	
Analyze local economic impacts (vs. exporting energy)	
Consider equity when considering how and when we get to 100% – include diverse voices when collecting input	
Consider other programs DWP has (e.g., community solar, microgrids, feed-in tariffs) and how these will be impacted by or could contribute to the study	

Group 2

Comment	# Dots
Lifecycle analysis – GHG emissions <ul style="list-style-type: none"> Fair footing on health Externalities – health, environmental, etc. Cost of climate changes that come about as a result of inaction 	11
Lessons learned from other countries and/or projects	6
Equity, environmental justice, social equity, local hire, workforce development <ul style="list-style-type: none"> Environmental racism – generation and emissions in communities of color – addressing this Impacts from existing generation How does new development address this? CalEnviroscreen – Environmental justice benefits from air quality improvements first – where can air pollution benefit first? Where does mobile-source electrification go first? 	5
Leverage assets <ul style="list-style-type: none"> Transportation elements Revitalization – “Brownfields to Brightfields” Tidal turbines on Castaic Urban spaces / rooftops Potential environmental benefits (other auxiliary benefits) Urban cooling / greening 	5
Timing of when to achieve 100% <ul style="list-style-type: none"> 2023 Olympics Timing of other system replacements 	5
Smart cities technology /smart grid – microgrid	4
Cost/benefits – comprehensive and up-front – consider potential sources for financing the transition	4
Leaving door open for tech innovations and emerging technology, consider how these are integrated – foster innovation	3
Biodiversity issues	3
Aggressive efficiency / reduction	3
Transmission and distribution flows and needs	1
Holding rates to inflation – what is the impact on rates? Should resulting policy be put to a vote?	1
Lifecycle of electric vehicles <ul style="list-style-type: none"> True cost before rebates How are we subsidizing the cost of rooftop solar, etc. 	1
Reliability	1
How does LA planning relate to CA planning?	1
Environmental improvement	
Mission Creep – Are ratepayers responsible for certain aspects?	
Efficiency of different generation scales – utility vs. distributed	
Assign responsibility to sectors	
Land use	

Group 3

Comment	# Dots
How do we think about costs that are not easily quantifiable? <ul style="list-style-type: none"> Talk about impacts to public health How do we incorporate costs that are externalized? Job creation, local economy, public health, political changes, co-benefits Impacts of mining Example: waste of solar panels that only have a 15 year life 	5
Reliability	4
Resilience and building a future-looking system	3
There are other air pollutants. Consider public health benefits at a low cost.	3
Industrial, social, economic justice & environmental justice policy to help inform choices	3
Address rate payer value	3
What if we had 120% green power? <ul style="list-style-type: none"> We can help others with their objectives 80% base + 20% for others + an additional 20% 	2
Process should focus on fast short-term greenhouse gas emissions reductions and then get to 100% renewable	2
Leave an opportunity for technological advances that may shift thinking	2
Shouldn't let price drive the choice	2
Create markets to solve problems as cost effectively as possible	2
Transmission availability and options	2
Typical local impacts of policy choices	2
Educate people on the bigger picture (People are willing to make trade-offs when they understand the broader context)	2
DWP plan within other plans (such as integration with the CCA and CAISO)	2
Consider costs <ul style="list-style-type: none"> Disadvantaged communities' costs vs. other communities 	1
What are the likelihoods of getting to 100%?	1
Consider the long term - 75%-100%	1
Give context for how one might approach getting to 100%	1
Factor in behavioral changes	1
Think regionally and globally <ul style="list-style-type: none"> This is a global issue - don't think just locally 	
How do we get some technologies where they need to be?	
Not prematurely settling on one technology	
Study represents a longer-term goal <ul style="list-style-type: none"> Required load storage and shifting Cost considerations 	
Consider cost and societal changes and how fast technologies are changing	
Study should inform what we are doing now	
Intersection of study and OTC is important	
New technologies have higher hurdles than current sources	
For what it is we are doing	
Status quo isn't sustainable	
What can new technologies do that merit displacing what we are doing now?	
There is a difference between "price" (dollars) vs. cost	
Framework for environmental justice and other benefits vs. energy priorities	
Create "rules of the game"	
Price is a factor of cost	
Model needs to cover local discussions	
Reflect diversity to hedge risk and add value	

Group 4

Comment	# Dots
What is the economic impact? <ul style="list-style-type: none"> Local jobs, underrepresented groups Creating broader social impact Is LADWP the best to answer this question? What are the economics – rate impacts 	11
Distribution system resilience (grid modernization) <ul style="list-style-type: none"> Smart grid and demand-side management 	8
Near term decisions about long term assets (stranded assets)	7
Reliability	6
Timeline <ul style="list-style-type: none"> What is the commitment to implementation? 	4
Other commitments and goals and how they'll integrate	4
DWP's balancing authority	4
Resource agnostic with objectives <ul style="list-style-type: none"> How study looks at energy & ancillary resources 	3
Local emissions inside LA and outside LA	3
Evolving technology – will technology at the end of life impact?	2
Setting up criteria for determining priorities upfront (2)	2
Will DWP re-up commitment to displacement beyond 2020?	1
Future energy uses/ types – demand forecast	1
What must this achieve?	1
Global emissions	1
100% renewable energy every hour or over time?	1
Adaptability to change	1
Carbon intensity	1
Propulsion power – fleet electrification	
Storage	
Where to put it – location	
Align timeline with 2030	
Cost	
Pace of transition and cost – alignment	
How will the new system fit with existing? Will the reliability be better or worse?	
Hold to same or higher standards	
Look at resources allocated to different goals	
Is the current assumed to be the baseline?	
Is someone forecasting what's coming from the State? – current and future	
Regional context	
Cascading effects of system failure	
Build with data foundation	
Electrification of appliances in home	
To what extent DWP has storage systems for gas <ul style="list-style-type: none"> How will dependancy impact? 	
Forecast future population growth	
Current state of existing infrastructure – how much integration is in our distribution system	
How is this communicated to the public?	



Appendix C

City Council Motion

ENERGY, CLIMATE CHANGE AND ENVIRONMENTAL JUSTICE COMMITTEE REPORT relative to developing and implementing partnerships with appropriate entities to determine what investments should be made to achieve 100 percent renewable energy portfolio.

Recommendations for Council action:

1. INSTRUCT the Los Angeles Department of Water and Power (LADWP) to formally incorporate into its research efforts the following:
 - a. An analysis by the Rate Payer Advocate on how each scenario fits within the current rate structure to include the impact, if any, each scenario would have on low income customers.
 - b. Incorporation of the CalEnviro Screen into each research area, and as the context for any analysis, study, and/or recommendation.
 - c. The prioritization of environmental justice neighborhoods as the first immediate beneficiaries of localized air quality improvements and greenhouse gas reduction.
2. INSTRUCT the LADWP to report in 60 days in regard to the proposed plan and stakeholder engagement process.

Fiscal Impact Statement: None submitted by the LADWP. Neither the City Administrative Officer nor the Chief Legislative Analyst has completed a financial analysis of this report.

Community Impact Statement: Yes

For:
Greater Valley Glen Neighborhood Council
Palms Neighborhood Council

Summary:

On August 1, 2017, your Committee considered a December 1, 2016 LADWP report relative to developing and implementing partnerships with appropriate entities to determine what investments should be made to a achieve 100 percent renewable energy portfolio. According to the LADWP, over the years, it has been leading efforts to address the threat of climate change by taking steps to curb pollution and other greenhouse gases through initiatives that eliminate the use of coal as a generation resource and promote programs for greater reliance on renewable energy. In 2000, the LADWP set out to reduce load growth by 50 percent through the use of behind the meter renewables, energy efficiency, and local solar. In 2010, the LADWP achieved a milestone of delivering 20 percent renewable energy to its customers. Following that, in 2013, the LADWP's renewable portfolio grew to 23 percent of the total power supply and is currently on track to meet 25 percent by the end of 2016 and reach 50 percent on or before 2030.

A key element of the LADWP's renewable energy program is the development of local and utility-scale solar energy projects. Such projects have assisted the LADWP to meet its

utility-scale solar energy projects. Such projects have assisted the LADWP to meet its renewable energy targets and reduce its carbon footprint created by fossil fuel burning power plants while serving as vital catalysts for creating jobs and stimulating the green economy within the greater Los Angeles area. Similarly, in a landmark achievement, the LADWP significantly reduced its greenhouse gas emissions to 19 percent below its 1990 level in 2015 and is expected to achieve 40 percent reduction in greenhouse gas emissions below 1990 levels by 2017, which is 13 years earlier than the State of California's requirement of 40 percent greenhouse gas reduction below 1990 levels by 2030.

The LADWP will develop a plan to manage long-term research partnerships with the region's universities, members of the Southern California Public Power Authority, the California Independent System Operator, neighboring utilities and other stakeholders with the objective of determining what research institutions are currently conducting research and development activities related to 100 percent renewable energy and to provide a framework for partnering with the United States Department of Energy's Mission Innovation initiative. In addition to research and development efforts, the 100 percent renewable energy initiative will include a robust outreach and stakeholder engagement process. Effective engagement will assist the LADWP to anticipate and manage emerging issues, promote productive collaboration, and improve the overall decision making process. Therefore, a wide range of stakeholder interests will be represented as part of the process.

After further consideration and having provided an opportunity for public comment, the Committee moved to recommend instructing the LADWP to: incorporate into its research effort the following:

- a. An analysis by the Ratepayer Advocate on how each scenario fits within our current rate structure, including the impact, if any, each scenario would have on low-income customers.
- b. Incorporation of the CalEnviro Screen into each research area, and as the context for any analysis, study, and/or recommendation.
- c. The prioritization of environmental justice neighborhoods as the first immediate beneficiaries of localized air quality improvements and greenhouse gas reductions.

Also, the Committee recommended instructing the LADWP to report back in 60 days with updates on the proposed plan and stakeholder engagement process. This matter is now submitted to Council for its consideration.


Respectfully Submitted,

ENERGY, CLIMATE CHANGE AND ENVIRONMENTAL JUSTICE COMMITTEE

<u>MEMBER</u>	<u>VOTE</u>
MARTINEZ:	YES
KORETZ:	YES

KREKORIAN: YES
CEDILLO: YES
O'FARRELL: YES

ARL
8/1/17

-NOT OFFICIAL UNTIL COUNCIL ACTS-



Appendix D

Advisory Group - Individual Check-in Telephone Calls Summary

City of Los Angeles 100% Renewable Energy Study Advisory Group - Individual Check-in Telephone Calls SUMMARY

Prepared by Kearns & West
November 8, 2017

Introduction

The Advisory Group for the City of Los Angeles 100% Renewable Energy Study was convened in June 2017 and has met twice (in June and August, 2017). Following the first two meetings, the facilitator for the Advisory Group process conducted check-in calls with the Advisory Group members in September and October 2017. The purpose was to solicit feedback on the meeting logistics (format, schedule, lunch, etc.), and to hear perspectives, ideas, and questions about the launch of the study and considerations for the future process.

The facilitator scheduled check-in calls with Advisory Group members via email, and approximately 60% of the members responded and participated. Attachment A lists the participants.

Five questions generally guided the calls:

Question 1	Do you have any feedback on the meeting room set up, parking, meeting length and format, lunch, etc.?
Question 2	When thinking about the City Council motion and the multiple stakeholder interests, what will make the study successful?
Question 3	Can you give an example or two of similar types of studies that got it right – the analysis, modeling tools, balancing of many variables, and/or conclusions that were particularly illuminating or enlightening? What was the factor that made it successful?
Question 4	What types of discussion formats have you been part of in other groups that should be considered for this Advisory Group?
Question 5	Is there anything else that you would like to tell us?

Themes

The conversations during the calls spanned a wide range of topics and perspectives, as expected given the diversity of the stakeholder interests represented in the Advisory Group. Nonetheless, there was overlap on topics, which have been distilled into the themes noted below. Please note that order does not denote any priority or ranking.

- **Better Environmental Justice Community Representation:** The need for involvement of representatives from environmental justice communities at meetings was noted by some members, coupled with the request for LADWP to add representation as soon as possible.
- **Discussion Activities for Greater Participation by All Members:** The size of the Advisory Group seems large to many members, but also necessary in order to capture multiple stakeholder perspectives. Many suggestions were provided about using discussion and input activities designed to ensure that all members can equally participate in meetings.
- **Enthusiasm for NREL, Recognition of LADWP's Role:** High levels of confidence were expressed about NREL's lead role in the study, but a number of comments were made about incorporating LADWP knowledge, data, and staff involvement.
- **Equalizing Knowledge Base While Utilizing Special Expertise:** There was recognition that Advisory Group members have different foundational knowledge about electricity, the LADWP power system, the regional grid, etc. Providing webinars, supplemental reading materials, focused learning sessions, etc. were considered by many as important. At the same time, others talked about making use of the unique knowledge that individual members bring to the process.
- **Meeting Logistics:** Overall, members reported that the schedule, timeline, and location of the meetings are working well. Lunch and refreshments received the most comments -- requests were made for vegan and gluten-free options, less packaging for reduced waste, and hot coffee throughout the meetings. Another common request was providing a list of scheduled meetings six to 12 months out.
- **Overall Study Process -- More Information Needed:** Many expressed a need to know more comprehensive information about the study process, including how the Advisory Group and Working Teams fit into the process.
- **Pre-Meeting Distribution of Agendas and Meeting Materials:** Calls for pre-meeting materials distribution was common, so that members could review and reflect and formulate input, plus have the opportunity to consult with colleagues within their respective organizations/agencies.
- **Strategy for Results Communication:** The importance of effective communication of study results was mentioned many times, along with encouragement to start

developing the communication strategy now, including potential for video clips and well-written and concise executive summaries.

- **Substantive and Meaningful Advisory Group Input:** While most Advisory Group members expressed optimism about the commitment to stakeholder engagement, many expressed the importance of substantive Advisory Group discussion on the inputs and building blocks for the study.
- **Urgency and Comprehensiveness:** A number of Advisory Group members emphasized the need to expedite the study and launch implementation, within the context of the advance of climate change. Many members also discussed the importance of a thorough, complete, and defensible study, which will be important for successful implementation.

Attachment A Participants

The following Advisory Group members participated in the check-in calls:

- Leslie Abbott, IBEW – Local 18
- Kendal Asuncion, Los Angeles Chamber of Commerce
- Carlos Baldenegro, Port of Los Angeles (POLA)
- Erica Blyther, Los Angeles World Airports (LAWA)
- Jim Caldwell, Center for Energy Efficiency and Renewable Technology
- Christos Chrysiliou, Los Angeles Unified School District
- Jack Durland, Valero Energy Corporation
- Hilary Firestone, Natural Resource Defense Council
- Evan Gillespie, Sierra Club
- Matt Hale, Office of Councilmember Paul Krekorian - CD 2
- Ernie Hidalgo, Neighborhood Council Sustainability Alliance
- Jack Humphreville, Neighborhood Council LADWP Advocacy Committee
- Nurit Katz, University of California, Los Angeles (UCLA) with Bonnie Bentzin, Deputy CSO alternate, Cassie Rauser, Director of the Sustainable LA Grand Challenge, and Mark Gold, AVC of Environment and Sustainability
- Michelle Kinman, Environment California Research and Policy Center
- Andrea Leon-Grossman, Food and Water Watch with Alexandra Nagy, Food and Water Watch
- Cris (Emmanuel) Liban, Los Angeles County Metro
- Loraine Lundquist, California State University, Northridge
- Danielle Osborn Mills, American Wind Energy Association
- Tim O'Connor, Environmental Defense Fund
- Shane Phillips, Center City Association of Los Angeles
- Fred Pickel and Camden Collins, LA Office of Accountability
- Rafael Prieto, City of Los Angeles Chief Legislative Analyst
- Andy Shrader, Office of Paul Koretz - CD 5 (E&E)
- Allison Smith, Southern California Gas
- Mike Webster, Southern California Public Power Authority
- Tony Wilkinson, Neighborhood Council DWP MOU Oversight Committee



Appendix E

Advisory Group Roster



100% Renewable Energy Advisory Group

Organization	Primary	Alternate
American Wind Energy Association (AWEA)	Danielle Osborn Mills	
California Energy Storage Alliance (CESA)	Alex Morris	Molly Deringer Croll
California Solar Energy Industry Association (CalSEIA)	Bernadette Del Chiaro	
California State University, Los Angeles (Cal State LA)	Feimeng Zhou	
California State University, Northridge (CSUN)	Loraine Lundquist	Austin Eriksson
Center for Energy Efficiency and Renewable Technologies (CEERT)	Jim Caldwell	Liz Anthony
Center for Sustainable Energy	Ben Airth	TBD
Center for Sustainable Energy	Sachu Constantine	TBD
Central City Association	Shane Phillips	Marie Rumsey
Chief Legislative Analyst (CLA)	Rafael Prieto	
City Attorney	Priscilla Kasha	Jean Claude Bertet
Communities for a Better Environment (CBE)	Bahram Fazeli	
Council District 2	Matt Hale	
Council District 1	Arturo Chavez	
Council District 10	Ed Johnson	
Council District 11	David Graham-Caso	
Council District 13	Star Parsamyan	
Council District 3	John Popoch	
Council District 5	Andy Shrader	
Council District 6	Ackley Padilla	Jim Dantona
NC DWP Advocacy Committee	Jack Humphreville	
NC-DWP MOU Committee	Tony Wilkinson	
Earth Justice	Angela Johnson Meszaros	
Environment California Research and Policy Center	Michelle Kinman	
Environmental Defense Fund (EDF)	Tim O'Connor	Irene Burga
Food and Water Watch	Andrea Leon-Grossmann	Alexandra Nagy
IBEW – Local 18	Leslie Abbott	Gus Corona
Los Angeles Business Council (LABC)	Mary Leslie	Zarui Chaparyan
Los Angeles Chamber of Commerce (LA Chamber)	Jessica Duboff	Kendal Asuncion
Los Angeles Unified School District (LAUSD)	Christos Chrysiliou	Talal Balaa
Los Angeles World Airport (LAWA)	Cynthia Guidry	TBD

Los Angeles World Airport (LAWA)	Kendrick Okuda	TBD
Los Angeles World Airport (LAWA)	Erica Blyther	TBD
Metropolitan Transportation Agency (Metro)	Cris (Emmanuel) Liban	
Natural Resources Defense Fund (NRDC)	Hilary Firestone	
Neighborhood Council Sustainability Alliance	Ernie Hidalgo	Tyler Aguirre
Office of Public Accountability (Rate Payer Advocate)	Fred Pickel	Camden Collins
Office of the Mayor	Lauren Faber O'Connor	N/A
Office of the Mayor	Ted Bardacke	N/A
Office of the Mayor	Rebecca Andreassen	N/A
Port of Los Angeles (POLA)	Carlos Baldenegro	Shaouki Aboulhosn
RepowerLA	Jasmin Vargas	
Sierra Club	Evan Gillespie	Graciela Geyer
Skipping Stone Consulting - (EDF Consultant)	Chris Therriault	Steve Hinton
South Coast Air Quality Management District	Laki Tisopulous	
Southern California Gas	Allison Smith	Matt Gregori
Southern California Public Power Authority (SCPPA)	Mike Webster	Ted Beatty
Tesoro Refining and Marketing Company	Bobby Anderson	
University of California, Los Angeles (UCLA)	Nurit Katz	Bonnie Bentzin
University of Southern California (USC)	Carol Fern	
Valero Wilmington Refinery	Jack Durland	
Valley Industry Commerce Association (VICA)	Stuart Waldman	



Appendix F

NREL Memo: Exploring Terms Commonly Used in
Renewable Energy and Clean Energy



Los Angeles 100% Renewable Energy Study

Exploring Terms Commonly Used in Renewable Energy and Clean Energy

Many cities, companies, governments, and other organizations have set goals to reduce their environmental impact. Policies established to this end include achieving a certain proportion of energy generation from renewable resources, or achieving a specific carbon emissions target.

While the intent of these initiatives is similar across various organizations, the terms used to describe various targets and actions can be nebulous. Below is a guide to the terms commonly used to describe clean energy policies and programs. At the end, several questions for exploring the framework for the Los Angeles 100% Renewable Energy Study are listed.

1. Renewable Energy Resources:

The International Energy Agency (IEA) definition of *renewable energy* is “energy that is derived from natural processes (e.g., sunlight and wind) that are replenished at a higher rate than they are consumed.”ⁱ The U.S. Energy Information Administration defines renewable energy resources as “energy resources that are naturally replenishing but flow-limited. They are virtually inexhaustible in duration but limited in the amount of energy that is available per unit of time.”ⁱⁱ

In applying these broad definitions to state- or organization-specific renewable energy targets, different entities have different criteria for which resources qualify as renewable. For example, the California Energy Commission (CEC) outlines what it considers renewable resources to be in its Renewable Portfolio Standard (RPS) Eligibility Guidebookⁱⁱⁱ and has specific eligibility requirements for biomethane, fuel cells, and hydroelectric resources. The CEC also no longer accepts contributions from a “water supply or conveyance system” or from municipal solid waste conversion as renewable resources.^{iv}

Table 1 summarizes eligible renewable resources for several states and cities, as well as under other government and nongovernmental organization definitions. The most common restriction on renewable eligibility is for hydropower, with many entities limiting the size of projects eligible for inclusion.

Table 1. Renewable Resource Eligibility for Various States, Cities, and Organizations (*Additional requirements specified by source)

Resource	California RPS	New Jersey RPS	Colorado RPS	Austin, Texas RPS	IEA ^v	EIA ^{vi}	Renewable Energy Certificates ^{vii}	REN 21 ^{viii}	RE100 ^{ix}
Wind and Solar	√	√	√	√	√	√	√	√	√
Hydro ¹	√*	√	√	√	√	√	√	√	√
Bioenergy	√*		√ (biomass)*	√ (biomass or biomass-based waste products)	√	√ (biomass)	√ (biomass)	√ (biopower)	√ (biomass and biogas)
Landfill Gas	√	√		√					
Fuel Cell	√	√		√					
Geothermal	√	√	√	√	√	√	√	√	√
Municipal Solid Waste Conversion	√*								
Ocean Thermal	√*				√	√			√
Ocean Wave	√*	√		√	√	√			√
Tidal Current	√*	√		√	√	√			√
Other Minor Technologies	√	√	√						√
Tradable Renewable Energy Credits	√		√						

2. Low Carbon, Carbon Neutral, and Zero Carbon:

The terms *low carbon*, *carbon neutral*, and *zero carbon* apply to the accounting of carbon emissions and specific emissions reduction or net emissions targets. There are a number of accounting methods used to calculate carbon emissions. An example specific to the electricity sector is that under the Clean Power Plan, emissions can be calculated on a mass basis or on a per electricity generation basis.^x This distinction is particularly important to consider when discussing emissions reduction targets.

Low carbon implies a reduction in carbon emissions, but requires further quantification of the actual reduction, comparative metrics, and timescale. For example, the National Renewable Energy Laboratory's Low Carbon Grid Study for California evaluated the potential to cut electricity sector emissions from 2012 levels by 50% by 2030.^{xi}

Carbon neutral, as defined by Merriam-Webster, "results in no net addition of carbon dioxide to the atmosphere" or "counterbalancing the emissions of carbon dioxide with carbon offsets."^{xii} However, different entities have different interpretations of which fuels can be considered carbon neutral and which technologies or strategies can be employed to make a process carbon neutral (e.g., carbon

¹ There is significant variability in how institutions handle hydro generating resources. Some regions have exceptions for small hydro, and existing hydro resources. These constraints are often based on sustainability and ecological versus carbon considerations.



offsets). A carbon offset can include investment in renewable energy, energy efficiency, and/or reforestation—activities that "offset" the direct emissions of an organization by reducing emissions elsewhere.^{xiii} As an example, in 2013 the University of California pledged to be carbon neutral by 2025.^{xiv} Through its carbon neutrality initiative, the university plans to develop and purchase biogas to offset its natural gas consumption, develop alternative renewable energy sources, purchase power through long-term contracts, and manage a portfolio of allowances and offsets, among other strategies.^{xv}

Zero carbon is an increasingly common term to hear in policy circles. The term is most frequently used in the urban planning where it is used to define building standards. In the power sector, zero carbon or carbon free, can be used to refer to any generating technology that does not result in the emission of carbon dioxide.

3. Discussion

The literature and public policy experiences highlight a few key challenges for planning power systems with very low or zero carbon emissions. Historically, the focus has been on renewable resources, however, as targets grow from relatively modest levels of 20-50% renewable resources, several challenges present themselves.

- 1) Should biomass and bio fuels, which are generally assumed to be carbon neutral, be considered a renewable resource even though they emit carbon when burned?
- 2) Should existing hydro generation, which does not have any emissions, but has some sustainability and ecological shortcomings, be part of the transition to a 100% clean electricity sector?
- 3) Does nuclear energy, which is not renewable, but is carbon free, play a role in a decarbonized electricity system.
- 4) Should policies designed to combat climate change be focused on increasing renewables or decreasing carbon? Said another way, what are the differences between policies targeted at reducing/removing carbon versus promoting renewables.



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