



SUMMARY OF COMMENTS & RESPONSES DRAFT SOLAR PHOTOVOLTAIC FORECAST METHODOLOGY VERSION 1.0

Four sets of comments were received during the public comment period for the Climate Forward draft Solar Photovoltaic (PV) Forecast Methodology version 1.0. Staff provides responses to the comments below. The public comment period for the draft methodology took place from June 6, 2019 to July 12, 2019.

The comment letters can be viewed on Climate Forward's website at <https://climateforward.org/program/methodologies/solar-photovoltaic/>.

COMMENTS RECEIVED BY:

1. Center for Resource Solutions (CRS)
2. Grid Alternatives Greater Los Angeles (Grid Alternatives)
3. Latham & Watkins LLP (Latham)
4. Ramboll USA, Inc. (Ramboll)

General Comments

1. We have reviewed the Climate Forward Program Manual and the Solar PV Methodology and we participated in the public webinar held on June 24, 2019 and believe that the Program and the Solar PV Methodology are well-designed. The Solar PV Methodology provides an environmentally sound framework to spur private investment to combat climate change. We fully expect the implementation of hundreds more solar photovoltaic installations as a direct result of the launch of the Program and finalization of the Solar PV Methodology. We agree with the Reserve's statements that the projects to be undertaken in accordance with the Solar PV Methodology will be truly additional – meeting both a rigorous performance standard and legal requirement test. Furthermore, the Solar PV Methodology seeks to confirm environmental and social safeguarding and ensure no double-counting or “green-washing.” Finally, projects under the Solar PV Methodology must attest to being in regulatory compliance and implement significant and substantial measures to promote project resiliency thereby bolstering the permanence of resultant emissions reductions. We believe that an ex-ante approach to quantifying emissions reductions is well-justified and supported by the requirements of the Solar PV Methodology. Because the Solar PV Methodology contains fundamental pillars of environmental integrity common to other emission reduction programs, we support the Reserve's Program and the Solar PV Methodology currently up for public comment. **(Latham)**

RESPONSE: The Reserve would like to thank Latham & Watkins for its support for the development of this methodology and for providing feedback on this methodology.

2. We agree with the Reserve that the Program addresses a need in the market and will spur much-needed immediate action to combat climate change. Advising clients in California on navigating and complying with CEQA, for example, has provided Latham with unique insight as to the necessity of a program like Climate Forward. There previously existed a gap in the market for corporate citizens to proactively take voluntary measures to reduce, mitigate, or eliminate a future stream of emissions. This Program fills this void, and under this Program, to the extent that a project developer wants to mitigate its greenhouse gas impacts, such project developer can directly invest in projects now that are tangible, impactful, and credible in order to avoid potential negative climate impacts. Furthermore, given the Reserve's credibility and meticulous development of the Program's robust framework, agencies and other governmental authorities, such as lead agencies under CEQA, should feel confident relying on actions taken by companies in accordance with the Program. **(Latham)**

RESPONSE: The Reserve would like to thank Latham & Watkins for its support for the Climate Forward program.

3. CRS commends the Reserve for striving to accelerate action on climate change through the Climate Forward program. We have reviewed this Draft Methodology using principles and best practices for carbon offsets, though we understand that Forecasted Mitigation Units (FMUs) are a different instrument. We recommend that the Reserve acknowledge and then explicitly and prominently explain divergences from carbon offset best practices related to accounting and quality criteria. We further recommend that the Reserve help to prevent consumer confusion related to this new FMU's uses and claims that may otherwise result in greenwashing and inaccurate statements. Specifically, the Draft Methodology should clarify

how FMUs can and cannot be used by purchasers and how they should or should not be accounted for in different GHG inventories, programs and reporting systems. **(CRS)**

RESPONSE: The Reserve would like to thank Center for Resource Solutions for its support for the development of this methodology and for providing feedback on this methodology. We heartily agree that clear communication and guidance is needed to prevent consumer confusion. As it will be applicable across all methodologies, guidance regarding the nature and use of FMUs will be handled by Version 1.1 of the Climate Forward Program Manual. Thus, such guidance will not be incorporated into the Solar PV methodology.

4. California's cap on emissions from the power sector affects the "realness," ownership, and additionality of emissions reductions from PV installations in California. The Draft Methodology should require that California carbon allowances be retired with the issuance of FMUs for this project type in California. **(CRS)**

RESPONSE: The issuance of FMUs to emission reductions in capped sectors is one area where Climate Forward has advantages over offsets because mitigation activities in capped sectors by non-capped entities is perfectly reasonable. Unlike actions that a capped entity might take, mitigation actions in a capped sector by a non-capped entity does not change the supply/demand curve for the capped entities. This is because the FMUs mitigate the impact of future emissions from a new investment, which simply means that the new investment will not increase the need for additional mitigation actions by the capped entity. Think of it as the non-capped entity taking action to mitigate its future emissions now, with the additional emissions in the future that it cannot mitigate onsite still needing to be addressed by the capped entity (e.g., if 100 FMUs are created now by mitigating within a capped sector, in the future an additional 100 tons of emissions will still need to be mitigated by the capped entity, i.e., the capped entity's overall mitigation obligations have not changed, they just have not increased). Additional guidance and discussion on this topic is included in the Climate Forward Program Manual Version 1.1. The Solar PV methodology is intended to incentivize small-scale PV installations that would not otherwise occur, even if the emissions in the short term are reduced from a capped sector. The emissions will rise in the future once the new investment starts emitting emissions; the overall net change in mitigation obligations for the capped entity from the use of FMUs is zero. The user of the FMUs can still lay claim to having made an investment that resulted in the installation of a solar PV system. The FMU provides a tool to quantify the benefit of that action.

5. We fully support the Methodology and Climate Forward more generally, as it provides a framework that will incentivize action now to reduce greenhouse gas emissions in the future. We are particularly supportive of the fact that this Methodology can be applied in disadvantage communities that are most vulnerable to the impacts of climate change and pollution. **(GRID)**

RESPONSE: The Reserve would like to thank GRID Alternatives for its support for the development of this methodology and for providing feedback on this methodology.

6. In general, Ramboll believes the pilot version of the solar PV forecast methodology established a well-designed, conservative, and credible approach to estimate emission reductions into the future. We believe that Climate Forward can help with GHG emission reduction projects. We appreciate the challenge of creating this new GHG mitigation registry

and we understand that the Climate Action Reserve (Reserve) continues to seek approaches to optimize the approach. **(Ramboll)**

RESPONSE: The Reserve would like to thank Ramboll USA, Inc. for its support for the development of this methodology and for providing feedback on this methodology.

Section 3.3.1 The Performance Standard Test

7. The proposed performance threshold for California—the installation of solar PV on existing buildings that do not currently have a solar PV system—may not be sufficient to exclude nonadditional projects. **(CRS)**

RESPONSE: The Reserve thanks CRS for their comments, but maintains the research completed and summarized in Section 3.8 Market Expansion Objective and Appendix A on industry practice and drivers and barriers to adoption has sufficiently demonstrated that existing incentives have been insufficient in scaling the uptake of solar PV to meet demand and potential opportunity in California, where at the time of this writing, the majority of solar installations in the United States occur.¹ High upfront costs continue to be the major barrier to installation, and the number of existing incentive programs are insufficient to significantly scale up installations. Additional incentives, such as revenue streams from the sale of FMUs, could help close the gap between demand and affordability, leading to installations that otherwise may not have occurred. Furthermore, per the language in Section 3.3.1, the performance standard test is applied at the time of the project's start date. If at any time in the future the Reserve reasons the installation of solar PV at existing buildings in a given region has become "common practice", such installations will no longer be considered additional, and therefore eligible, for that region.

Section 3.3.2 The Legal Requirement Test

8. Section 3.3.2, states "In addition to the attestation, the Project Implementation Report must include procedures that the Project Proponent will follow to ascertain and demonstrate that the project at all times passes the Legal Requirement Test." [emphasis added] We understand that the Climate Forward program is intended to take an *ex-ante* approach toward issuing Forecasted Mitigation Units (FMUs). In an *ex-ante* approach, the FMUs would be issued up-front based on projections of future emissions reductions. This is the foundation of this novel approach and we believe the protocol better fits this concept by holding true to that concept of providing a means where FMUs can be used "up-front". The third paragraph in Section 3.3.2 (page 7) states that the "legal requirement test is applied at the time of a project's start date." [emphasis added] We believe that the approach to apply the test at the time of a project's start date is appropriate in regard to providing a basis for project proponents to use this new approach. It is otherwise unknown and potentially impossible for a project to continually evaluate and assess the Legal Requirement Test "at all times". We suggest that the Reserve edit this text to be internally consistent and in alignment with the central concept of the program to allow the issuing of FMU's "up-front". **(Ramboll)**

¹ Solar Energy Industry Association® (SEIA) "Top 10 Solar States 2018" Available at: <https://www.seia.org/research-resources/top-10-solar-states-0>

RESPONSE: The language in Section 3.3.2 has been modified to remove any reference to "at all times" and reinforce that the Legal Requirement Test is assessed at the project start date and the determination is held for the duration of the crediting period upon successful confirmation. Language has also been added in Section 3.3.2 for "batch" considerations, noting that each solar PV installation site in a batch must pass the Legal Requirement Test at the time of their respective start dates to be eligible.

Section 3.5 Regulatory Compliance

9. We recommend that you remove the eligibility requirement for regulatory compliance or change the verbiage to state that "no laws that could impact the GHG reductions from such project have been broken" (or similar). Any extraneous "issues/violations" will result in fines for the installer but will not affect the project or its anticipated GHG reductions. **(GRID)**

RESPONSE: The Reserve thanks GRID for their comments, however, we decline to make changes to the language in this section. Regulatory Compliance is a program-wide requirement all projects under Climate Forward must follow. All projects are required to attest that no laws have been broken in their respective implementation, and provide an assessment of any aspects which may present a risk of future regulatory violations. Where such risks are identified, appropriate and confirmable measures must be implemented to avoid potential future noncompliance during the project crediting period.

Section 3.6 Ownership and Double Counting

10. We recommend that language in the Draft Methodology regarding treatment of renewable energy certificates (RECs) from PV projects be strengthened, and that the Reserve specify activities to verify REC retention and retirement for these projects. RECs are an accounting instrument to verify delivery of renewable energy (with a specified emissions factor) to customers (either for compliance with a state Renewable Portfolio Standard (RPS) or a voluntary program), and they can be used to verify a company's or organization's carbon footprint, specifically scope 2 indirect emissions. They are a different tool than carbon offsets and FMUs. But they are not problematic for that which they are intended to be used and are necessary for all renewable energy purchases and claims. RECs are de facto generated and generation attributes are de facto owned by the project, even if the project is not formally registered in a REC tracking system, e.g. Western Renewable Energy Generation Information System (WREGIS). As a result, how a facility would "not generate" RECs is unclear. "Holding" RECs may actually be necessary if this is equivalent to permanently "retaining" them so they cannot be sold or otherwise used. Both RECs and offsets, as well as potentially FMUs, are useful tools. We encourage Reserve Staff not to publicly disparage RECs or discourage renewable energy purchasing. **(CRS)**

RESPONSE: It is certainly not the intent of the Climate Action Reserve to "publicly disparage RECs or discourage renewable energy purchasing." Quite the opposite, this methodology is intended to encourage the installation of solar PV (and thus, the purchasing of renewable energy). The treatment of RECs in the methodology has been modified in accord with the above feedback. Specifically, Section 3.6 has been revised from excluding RECs to stating, "The Project Proponent must also attest and provide clear documentation demonstrating that the project is permanently retaining, contractually retiring, or retiring in an electronic tracking system, the Renewable Energy Certificates (RECs) or environmental

attributes associated with production for which FMUs are issued. Confirmation bodies must review contracts, purchase agreements, or tracking system reports as necessary.”

Section 3.7 Project Resilience Measures

11. The performance guarantee is not defined in the methodology and its vagueness undercuts its intended purpose. To completely guarantee production, would mean a costly comprehensive maintenance program, including panel washing, tree trimming, etc. would be required to ensure that the system is performing optimally. Additional costs would be incurred to provide a production guarantee and cover any lost production below the guaranteed amount. We feel that providing the system production and guaranteeing that the system is functional through existing warranties and monitoring suffices to ensure the PV solar project’s resiliency. Moreover, California’s Single-family Affordable Solar Housing (SASH) already provides safeguards ensuring that PV solar system operate as designed. Under SASH, we are required to design and install systems that “meet a minimum performance requirement, which is 85% of the Design Factor (DF) based on a modified Estimated Performance Based Buydown (EPBB) calculation.” We respectfully ask that you remove this requirement from the methodology. To our knowledge, this is not a requirement for any state-funded solar program and is infeasible with which to comply without incurring additional considerable costs. We feel that other best practices and system monitoring is more than enough to ensure that the systems are and will remain properly functioning.

(GRID)

RESPONSE: After careful review and consideration, the Reserve has decided to remove the requirement for energy service contracts with performance or production guarantee from the methodology. In its place, the Reserve has modified the requirements on System Losses in Section 5.3 of the methodology to require the categories of soiling, shading, and snow in the PVWatts® Calculator be revised based on project-specific information. It is the Reserve’s understanding that this information should be readily-available per project as it’s par for the course of any solar PV installation site assessment, and will add improved accuracy to the level of underperformance estimated by PVWatts®.

12. “[T]o address the risks of project abandonment, underperformance, and/or failure”, this section requires “energy services contracts with solar PV performance guarantees” and “long-term service contracts for continued monitoring and maintenance and periodic inspections”. Given the various factors which are already included in the protocol, we believe that a performance guarantee is a duplicative requirement and thus it may be an unnecessary cost burden for future projects:

- A performance guarantee is inconsistent with the conceptual *ex-ante* approach of the Climate Forward program;
- Potential underperformance is addressed through the “system losses” parameters of PVWatts®, which, in addition to aging (which reflects degradation over time), include reduced performance due to soiling, shading, mismatch, wiring, nameplate rating, light-induced degradation, and availability (system shutdowns);
- The methodology currently incorporates a warranty aspect that helps ensure continued operation of the solar panels, which is itself a highly conservative assumption, as the panels may well continue to produce electricity past the end of their warranty period; and
- A performance guarantee will add costs to each project which serve to disincentivize project implementation **(Ramboll)**

RESPONSE: The Reserve has decided to remove the requirement for energy service contracts with performance or production guarantee from the methodology. Please see our complete response to comment 11 above.

Section 3.8 Market Expansion Objective

13. The text “Furthermore, with an emission cap in place for the power sector in the State of California, it is not possible to issue offset credits for renewable energy projects that affect emissions at capped power plants because doing so would result in the double counting of emission reductions” does not make sense in terms of assessing if the installation of solar panels on a residential home is additional. We do not believe that this consideration is relevant as written. We understand the need to assess for Additionality and believe the other discussions in the protocol (e.g., Sections 3.3.1 and 3.3.2) adequately address this.

(Ramboll)

RESPONSE: The Reserve thanks Ramboll for their comments, however, no changes will be made to the language in this section. This text is in reference to Market Expansion Objective criteria of Climate Forward, and not Additionality. The highlighted text helps demonstrate that the methodology encourages actions leading to GHG reductions that are generally not feasible under existing GHG crediting or incentive programs. Forecast methodologies may provide a general overview of project characteristics that would make projects under the proposed forecast methodology meet this concept, as well as guidance for how projects can demonstrate that they have those characteristics.

Section 5.1 Estimating Baseline Emissions

14. The Draft Methodology’s description of baseline emissions is incorrect; section 5.1 of the Draft Methodology (pg. 14) describes the baseline scenario for the building, rather than for the grid, which is where the emissions and reductions occur. The baseline emissions for this project type are emissions from marginal emitting generation facilities on the grid without installation or operation of the project. **(CRS)**

RESPONSE: The description of the baseline emissions in this section has been modified to clarify baseline emissions are equivalent to the emissions associated with the amount of electricity that would have been generated by and supplied from the installation site’s local utility, likely from marginal emitting generation facilities on the grid, that is now being produced on-site by the solar PV system in the project. Similar language to this extent had previously been, and remains, included in Section 5.1.1. Please also see the Reserve’s Responses to Comments 15 and 16 below in Section 5.1.1. Emission Factor Selection.

Section 5.1.1 Emission Factor Selection

15. A marginal emissions factor (MEF) should be used to quantify emissions reductions from PV projects. The Draft Methodology’s quantification of emissions reductions as the difference between the direct emissions of the project (i.e. zero) and the direct emissions of what would have operated on the grid in the absence of the PV project (baseline emissions) (specifically, equations 5.1-5.3) is generally correct, provided that the emissions factor used to calculate baseline emissions is the MEF. Although the Draft Methodology correctly requires use of MEFs where available, it allows use of utility- specific and grid average emissions factors. The Draft Methodology should explicitly disclose that utility-specific and grid emissions factors are only allowed due to data availability or conservativeness. They are in that case a permissible proxy for an MEF despite the fact that an MEF is the

appropriate number to use to estimate what is displaced on the grid by PV generation.
(CRS)

RESPONSE: Slight modifications have been made to Section 5.1.1 to reinforce the priority of using utility-specific MEFs, when available, over other emission factors, and to clarify, that when utility-specific MEFs are unavailable, the project proponent must select the most conservative emission factors available and applicable for the project location. Furthermore, all emission factors must be approved by the Reserve prior to their use, at the time of project listing, and all Reserve-approved emission factors will be contained in the external Solar Photovoltaic Forecast Methodology Parameters document. The Parameters document is fluid and additions or changes to all parameters are welcomed on an ongoing basis, provided robust evidence is submitted to demonstrate the proposed parameter values are reasonable and conservative. While at this time, the Reserve has approved of the use of utility-specific average emission factors for Southern California, the Reserve hopes utility-specific MEFs will become available in the near future, at which time, they will supersede the average emission factors. Additionally, the Reserve may also reevaluate the appropriateness of any previously-approved emission factors and update the Parameters document accordingly, should it be determined the use of any other values would be more appropriate.

16. We understand the preference to use MEFs, however, we suggest that the protocol create less of a mandate given that just because a MEF may be available, it does not necessarily make it the better or more conservative emission factor for an analysis to use. We believe that the language as written may result in inaccurate or non-conservative accounting of FMUs when less reliable MEFs may become available. We suggest that the Reserve consider revising the wording that “when available, MEFs must be used”, to continue to allow flexibility pending CAR’s review of applications. **(Ramboll)**

RESPONSE: The Reserve thanks Ramboll for their comments, but maintains MEFs are the most appropriate (whether or not the most conservative) emission factor to use to estimate displaced GHG emissions on the grid by PV generation, and must be used when available. To encourage flexibility, the Reserve maintains an external Solar Photovoltaic Forecast Methodology Parameters document containing all Reserve-approved quantification parameters, including the emission factors, for this methodology. It is intended for such values to change over time, as more recent and more robust data become available. Additionally, the Project Proponent may propose additions or changes to any parameters by demonstrating the appropriateness of such changes to the Reserve, and provide robust evidence demonstrating to the Reserve’s satisfaction that proposed parameter values are reasonable.

Section 7.3 Reporting and Confirmation Period

17. With respect to the proposed one-year delay of confirmation activities after initial operation, it is our recommendation to shorten the timeframe from one year to three months from permission to operate (PTO) from utility to confirm and issue FMUs. In our experience, if there is an issue with the system, we will know within the first month or two after interconnection, when the homeowner gets their first new bills. Rarely does an issues arise outside of this timeframe. **(GRID)**

RESPONSE: Per Section 4.4 of the Climate Forward Program Manual Version 1.0 (November 2018), “Confirmation activities may not commence prior to one year following the

project start date in order to establish an observable level of project performance, unless otherwise specified by the forecast methodology.” In light of the above feedback from GRID, the Reserve has reasoned a three-month confirmation delay is appropriate for this methodology, and Section 7.3 has been revised accordingly. Specifically, at least one solar PV system in a batch must have been operational for at least three months before confirmation can commence. As stipulated in methodology Section 3.2, to be eligible for inclusion in a project, the solar PV system at an installation site must be delivering useful electricity prior to the initiation of confirmation activities for that project. It is reasonable to expect then by the time confirmation closes, all solar PV systems included in the project will have had at least three-months’ worth of performance data.

18. The Climate Forward Program has an *ex-ante* concept approach that we believe should be maintained to make it effective, and we believe requiring a one-year confirmation period is conceptually inconsistent with the idea of the Climate Forward program. The goal of issuing FMUs in an *ex-ante* approach is that Project Proponents can mitigate expected future streams of emissions up-front; the projected reductions are based on scientific understanding and contain conservative factors and discount factors due to this approach. The initial confirmation requirements will ensure that the projects are properly installed and generating electricity. There is currently no evidence to suggest that solar panels will not function properly once they are initiated. We believe that in the concept approach of the program and with the various safeguards and calculational discounts incorporated, a one-year operational period prior to confirmation is not necessary and would increase associated costs of implementation thereby disincentivizing future investment in projects. **(Ramboll)**

RESPONSE: As discussed above in Response to Comment 17, Section 7.3 in the methodology has been revised to allow confirmation activities to commence after the Project has been submitted and approved by the Reserve and at least one PV system in the batch has been operational for at least three months, as opposed to one year.

Parameters Document

19. We understand the Reserve would like this protocol to have flexibility and potential use in as broad of situations as possible. The text and tables in the Solar Photovoltaic Forecast Methodology Parameters do not appear to express this flexibility. We suggest the Reserve include clarification in the methodology and in the Parameters document that the parameters shown in the tables are not fixed or required to be used as-is for projects. We understand that they are provided to facilitate applications and to provide some measure of consistency. However, the Reserve should highlight that applicants can propose other methods for other situations or as data changes. For example, the methodology could note that additional regions or parameters may be added based on data submitted by Project Proponents (e.g., electricity intensity factors for different utilities and years) and that input parameters set as “default” in PVWatts® may change with model updates over time.

RESPONSE: Section 2.3 in the Methodology specifies “The Project Proponent may propose additions or changes to all parameters by demonstrating the appropriateness of such changes to the Reserve ...The Project Proponent must provide the Reserve with robust evidence demonstrating to the Reserve’s satisfaction that proposed parameter values are reasonable and conservative.” The posted Parameters document for public comment was in draft form and has been updated to include similar language at the onset.