



RE-Powering America's Land
Evaluation Scoping Assessment

Final Report

April 16, 2015



Prepared for:

EPA Office of Solid Waste and Emergency Response
Center for Program Analysis

Prepared by:

Industrial Economics, Incorporated
2067 Massachusetts Avenue
Cambridge, MA 02140
617/354-0074

TABLE OF CONTENTS

I.	INTRODUCTION AND KEY FINDINGS	1
	Background	1
	Summary of Key Findings	2
	Organization of Report	3
II.	EVALUATION SCOPING METHODOLOGY	4
	Phase One	4
	Phase Two	5
III.	LOGIC MODEL	6
IV.	INITIAL LIST OF POTENTIAL EVALUATION QUESTIONS	8
V.	EVALUATION SCOPING FINDINGS	10
	Topics That Can Be Evaluated and Corresponding Methods	10
	Topics That Cannot Be Evaluated at Present	12
	High-Level Summary of Preliminary Findings by Evaluation Question	12
VI.	POTENTIAL EVALUATION METHODOLOGIES (FOR PRIORITY QUESTIONS THAT CAN BE EVALUATED WITH EXISTING OR READILY OBTAINABLE DATA)	15
	Potential Data Sources and Methods	15
	Strengths and Limitations	25
	Next Steps	27
VII.	POTENTIAL APPROACHES TO IMPROVE PROGRAM DATA COLLECTION (FOR QUESTIONS THAT ARE <u>NOT</u> CURRENTLY EVALUABLE)	28
	Data on Site-Specific Assistance	28
	Data on General Program Tools	29
	Other Data Collection Considerations	29
	APPENDIX A: CROSSWALK OF EVALUATION QUESTIONS, DATA SOURCES, AND POTENTIAL METHODS	30
	APPENDIX B: PARTIAL BIBLIOGRAPHY FOR LITERATURE REVIEW	44

I. INTRODUCTION AND KEY FINDINGS

BACKGROUND

Located within EPA's Office of Solid Waste and Emergency Response (OSWER) Center for Program Analysis (CPA), the RE-Powering America's Land Initiative aims to promote renewable energy (RE) development on current and formerly contaminated lands, landfills, and mine sites (CLs), when such development is aligned with the community's vision for the site. The Initiative achieves these ends through a combination of tailored redevelopment tools, sharing of best practices and success stories, outreach and partnerships, and site-specific technical support from EPA and the Department of Energy's National Renewable Energy Laboratory (NREL).

The objective of this evaluation scoping assessment was to assess the readiness of the RE-Powering Initiative for an outcome evaluation, focusing on the Initiative's effectiveness and overall contributions to the siting of RE systems on CLs. Specifically, this project aimed to identify existing data that could be used to conduct an outcome evaluation, and identify any new data that would be required to assess the program's outcomes. The results are intended to help inform EPA management's decision about whether and how to proceed with an outcome evaluation of the RE-Powering Initiative.

The evaluation team conducted the following activities:

- Reviewed documents and web links to become familiar with the history, goals, and status of program activities;
- Developed a new program logic model for the RE-Powering Initiative;
- Developed an evaluation scoping methodology;
- Created a list of potential evaluation questions;
- Investigated the availability of data sources and methods for each potential evaluation question, in accordance with the evaluation scoping methodology;
- Drafted a preliminary evaluation scoping findings memo;
- Identified areas in which the program could potentially enhance its data collection to support future evaluation activities;
- Narrowed down the list of potential evaluation questions based on the preliminary evaluation scoping findings and the program's evaluation priorities; and
- Developed a memo with methods and data sources for answering the narrowed-down list of evaluation questions, using existing or readily obtainable data.

EPA retained Industrial Economics, Incorporated (IEc) to provide technical support for this project. The project team includes representatives from the RE-Powering Initiative, OSWER's Center for Program Analysis, and IEc.

SUMMARY OF KEY FINDINGS

- **Using existing data – combined with new qualitative research (e.g., interviews) – EPA can:** explore factors that influenced the development of RE projects on CLs; document the program’s role and contribution to observed outcomes; and provide meaningful indications of the program’s successes, challenges, and opportunities.
- **Data limitations preclude a comprehensive assessment of the program’s effectiveness or direct causal impact on the development of RE projects on CLs.**
- **Evaluation topics and methods that can be supported with existing data include:**
 - An in-depth assessment of the effectiveness of EPA and NREL's joint feasibility studies and the program's liability comfort letters.
 - Interviews with program partners, industry experts, and other stakeholders about various dimensions of program effectiveness.
 - A survey (social network analysis) to understand how the program interacts with other EPA programs and other federal agencies.
 - A literature review to match program activities/outputs to high-, medium-, and low-priority barriers to RE development on CLs.
 - A citation analysis to identify third-party references to the program, its outputs, its partners, or broader industry issues to assess the program's role in addressing barriers.
 - Application of decision rules to approximate the avoided development on undisturbed lands and possibly the cost impacts of RE projects on CLs.
- **Evaluation topics and methods that cannot be supported with existing data include:**
 - An in-depth assessment of the effectiveness of tools and resources available on the program's website; information provided at presentations, conference sessions, and workshops; assistance from the RE-Powering Response Team; and assistance from EPA Headquarters staff.
 - Development of robust quantitative measurements for the proportion of stakeholders connecting with the program who later realized RE projects on CLs, or for the total number of RE projects developed on CLs that the program influenced.
 - Surveys of stakeholders, partners, and/or experts outside of the federal government about various dimensions of program effectiveness and their interactions with the program.
- **The highest priorities for strengthening the program’s data collection in support of future evaluation activities include:**
 - Systematically tracking users (and the extent of use) of the program’s resources, tools, and knowledge products; and
 - Systematically tracking progress toward developing RE projects on CLs.
- **Other considerations for data improvement efforts include:**
 - It appears based on an initial investigation that the program could likely make significant improvements to its current data collection approaches using technology that EPA

already has in-house and with limited additional cost.

- The program may be able to customize the assistance that it provides by collecting additional information about users of its resources, tools, and knowledge products (e.g., state and type of technology).
- Collecting longitudinal data on specific individuals' use of program resources would require each user to create a separate account, which might be accomplished through online registration or through the RE-Powering Response Team.
- Information Collection Request (ICR) requirements, data privacy issues, and security issues may affect the program's options for collecting, retaining, and using additional data.

ORGANIZATION OF REPORT

This report presents the findings of the evaluation scoping assessment. Following this introduction, Section II describes the methodology used to conduct the evaluation scoping assessment. Section III presents a new program logic model characterizing the program's efforts to encourage the development of RE projects on CLs. Section IV presents the list of evaluation questions and describes their connection to the logic model. Section V presents the main findings of the evaluation scoping assessment, including potential approaches to answering the evaluation questions, data requirements, and data limitations. Section VI describes methods and data sources for answering selected evaluation questions (questions that are evaluable at present). Section VII identifies options for strengthening data collection activities to support evaluation in the future (focusing on topics that are not evaluable at present).

Appendix A summarizes our key evaluation scoping findings in a crosswalk table. Appendix B presents a preliminary bibliography for a literature review conducted for this project.

II. EVALUATION SCOPING METHODOLOGY

The evaluation scoping assessment consisted of two phases. In the first phase, we conducted an initial scoping assessment. This process entailed reviewing program documents, developing a new program logic model, identifying potential evaluation questions, and assessing the extent to which these questions can be answered with existing data sources. In the second phase, EPA identified a set of priority evaluation questions based on the results of the initial scoping assessment. We conducted additional analysis and developed potential evaluation methodologies for these priority evaluation questions. We also developed some suggestions for improving program data collection, to facilitate future evaluation of questions that cannot be answered with existing data sources. This section provides the details of our methodology.

PHASE ONE

The first phase of the evaluation scoping assessment included:

- **Document Review:** IEC reviewed program documents and web links related to the program to become familiar with the history, goals, and status of program activities. Key documents included the program's fact sheets, quarterly newsletters, submission to Harvard University's Top 25 Innovations in American Government, and other educational materials. We also consulted a limited number of published studies on RE project siting and CL redevelopment to understand broader market trends.
- **Logic Model:** IEC worked with CPA, and headquarters and regional program staff, to develop a draft logic model. The new logic model reflected information gathered from conversations with program staff and the document review. IEC developed the logic model following an iterative process, starting with an internal draft for CPA. We integrated CPA's feedback in a revised version of the model, which we presented to a broader group of program stakeholders during a conference call. IEC finalized the logic model based on comments from the evaluation team and headquarters and regional staff. The logic model helped to ensure a common understanding of the program's activities, intended outcomes, and underlying assumptions.
- **Evaluation Questions:** IEC used the logic model to develop draft evaluation questions. The evaluation questions ensured a common understanding of evaluation goals and priorities, and served to focus the team's efforts to identify relevant data sources. Through conversations with evaluation team members, IEC further refined the list of 17 potential evaluation questions, focusing on program effectiveness and outcomes. As discussed below, EPA subsequently narrowed down the list of evaluation questions based on the evaluation scoping findings.
- **Evaluation Scoping Assessment:** IEC assessed potential evaluation methods, data requirements, and data sources for each of the 17 potential evaluation questions. To facilitate this process, we developed a crosswalk table with the potential evaluation questions, potential evaluation methodologies, necessary data sources, and current data availability. The table enabled us to

review the 17 potential evaluation questions systematically, and consider the evaluation readiness of each question given existing data sources. As part of this high-level review, we identified the evaluation questions that could be meaningfully evaluated at present, evaluation questions that could be evaluated at present in a more limited manner, and evaluation questions that could not be evaluated at present. The crosswalk table is attached in Appendix A.

- **Preliminary Findings:** IEC prepared a memo presenting the compilation, analysis, and presentation of information gathered during the evaluation scoping assessment. The main findings from this assessment are presented in Section V.

In response to these preliminary findings, EPA selected seven priority evaluation questions for further assessment in Phase Two.

PHASE TWO

The second phase of the evaluation scoping assessment included:

- **Further Information Gathering and Analysis:** IEC collected and analyzed information from a variety of sources identified in the initial screening assessment. Key sources of information included the RE-Powering Mapper, the Project Tracking Matrix, the Success Stories reports, and the feasibility studies conducted with NREL. IEC reviewed these data sources to determine how they might assist in addressing the priority evaluation questions identified by EPA, considering data availability, utility, practicality, and robustness. IEC also compiled a more extensive list of published literature on RE project siting and the redevelopment of CLs to determine the availability of sources that would be useful for an evaluation. Appendix B includes a bibliography for the literature review.
- **Potential Evaluation Methodologies:** Based on our further analysis of available data sources, IEC developed potential evaluation methodologies for the priority evaluation questions that can be addressed with existing data. Potential evaluation methodologies include expert interviews, stakeholder interviews, literature review, decision rules, case studies, program and industry timeline, and program data review. IEC prepared a memo presenting the information gathered and the analysis conducted during the second phase of the scoping project. The findings from this second-phase memo are presented in Section VI.
- **Performance Data Improvement:** IEC identified areas for improving the program's data collection, so that evaluation questions that cannot be addressed with existing data may be evaluated in the future. Section VII summarizes the data issues and identifies potential approaches for addressing these limitations.

III. LOGIC MODEL

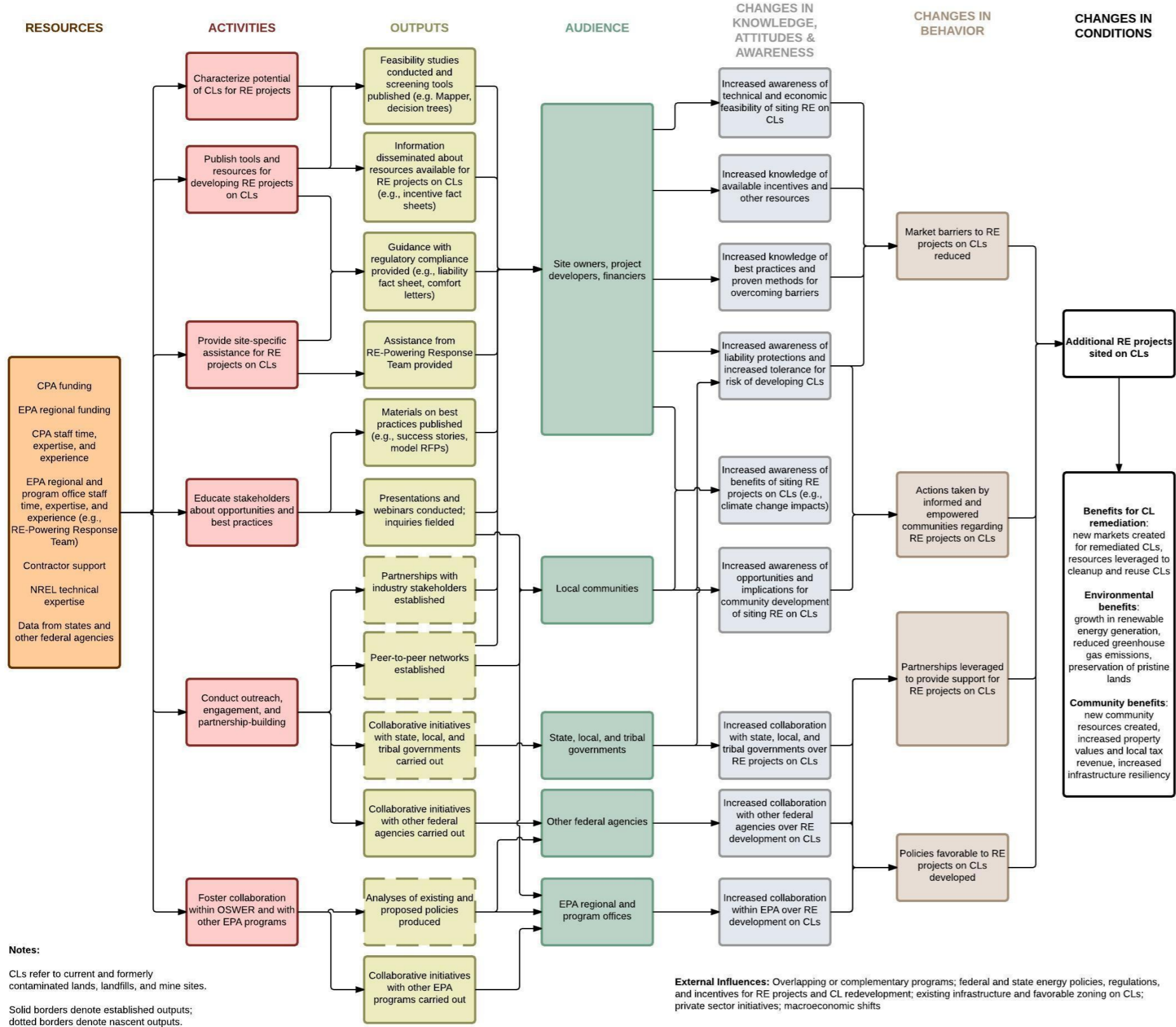
IEc worked with EPA to develop a logic model for the RE-Powering Initiative. A logic model is a graphical representation of the relationships between program resources, activities, and outputs, and intended changes in awareness, behavior, and conditions. As shown in Exhibit 1, the key components of the model include:

- **Resources** — staff and funds dedicated to the program. Resources also include the technical expertise of program partners and data from states and other federal agencies.
- **Activities** — the specific procedures or processes used to achieve program goals. For example, the RE-Powering America’s Land Initiative provides site-specific assistance to potential RE projects on CLs by conducting feasibility studies and fielding inquiries through its RE-Powering Response Team.
- **Outputs** — the immediate products that result from activities. For example, the Initiative’s outputs include guidance with regulatory compliance provided and collaborative efforts with other EPA programs and other federal agencies conducted. The logic model distinguishes between site-specific outputs, which assist potential RE projects on specific CLs, and general outputs, which encourage the development of RE projects on CLs more generally.
- **Audiences** — groups and individuals targeted by RE-Powering America’s Land activities and outputs. Audiences for the Initiative’s outputs include site owners, project developers, and financiers; local communities; state, local, and tribal governments; other federal agencies; and EPA regional and program offices.
- **Awareness** — changes in awareness resulting from program outputs that are causally linked to the RE-Powering America’s Land Initiative. For example, the Initiative’s outputs are intended to increase awareness about the technical and economic feasibility of siting RE projects on CLs.
- **Behavior** — changes in behavior resulting from changes in awareness. For example, the Initiative’s activities are designed to reduce market barriers to the development of RE projects on CLs by increasing awareness of the technical and economic feasibility of these projects.
- **Resulting Conditions** — the overarching goals of the program. The Initiative’s long-term objectives include the development of additional RE projects on CLs and the resulting benefits for CL remediation, environmental benefits, and community benefits.
- **External Influences** — factors outside of the program’s control that may affect the ability of the program to realize its objectives. External influences that may affect the RE-Powering Initiative include overlapping or complementary programs; federal and state energy policies, regulations, and incentives for RE projects and CL redevelopment; existing infrastructure and favorable zoning on CLs; private sector initiatives; and macroeconomic shifts.

EXHIBIT 1. LOGIC MODEL FOR THE RE-POWERING AMERICA'S LAND INITIATIVE

RE-POWERING AMERICA'S LAND INITIATIVE

Mission Statement: Encourage renewable energy development on current and formerly contaminated lands, landfills, and mine sites when such development is aligned with the community's vision for the site.



IV. INITIAL LIST OF POTENTIAL EVALUATION QUESTIONS

IEc and EPA developed the following set of 17 potential evaluation questions based on the logic model. Based on the findings of the initial scoping assessment, presented in Section V, EPA identified seven priority evaluation questions for more detailed investigation; these priority evaluation questions are indicated below with an asterisk (*).

1. Are the program's resources, tools, and knowledge products reaching the intended audiences?
2. How and to what extent are various stakeholders using the program's resources, tools, and knowledge products?
3. How effective have the program's resources, tools, and knowledge products been in raising awareness and encouraging consideration of renewable energy projects on contaminated lands? (*)
4. How effective has the program's site-specific assistance been in raising awareness and encouraging consideration of renewable energy projects on contaminated lands? (*)
5. How effective have the program's partnerships been in raising awareness and encouraging consideration of renewable energy projects on contaminated lands?
6. What proportion of sites tracked by the RE-Powering Initiative have considered renewable energy projects on contaminated lands?
7. How effective are the program's resources, tools, and knowledge products; site-specific assistance; and partnerships in addressing barriers to developing renewable energy projects on contaminated lands? (*)
8. How effectively is the program building or expanding networks?
9. What role does the program play in connecting stakeholders with existing or emergent networks?
10. What activities have networks in contact with the RE-Powering Initiative undertaken and what results have they produced?
11. How has the program used its networks to influence federal, state, and/or local policies, regulations, and incentives related to renewable energy projects on contaminated lands?
12. How successful is the program in converting leads into interim milestones and/or fully developed renewable energy projects? (*)
13. What opportunities exist for strengthening the program's lead conversion rate? (*)
14. To what extent is the program leveraging expertise, effort, in-kind assistance and other resources from other programs, other agencies, and partners?
15. To what extent have renewable energy projects influenced by the RE-Powering Initiative avoided development on undisturbed lands? (*)

16. What are the avoided or reduced development costs of renewable energy projects on contaminated lands rather than undisturbed lands? (*)
17. To what extent are communities empowered to consider and develop renewable energy projects on contaminated lands as a result of contact with the RE-Powering Initiative?

V. EVALUATION SCOPING FINDINGS

IEc conducted a preliminary screening-level evaluation scoping assessment for each of the 17 potential evaluation questions. This scoping assessment investigated available data sources and potential methods for answering each question. Based on the findings of this investigation, the team identified the evaluation questions that are most “evaluation-ready” and potential methods for answering these questions.

The IEc team compared potential evaluation methods and limitations across all proposed evaluation questions, and identified the topics that we believe are evaluable in some capacity. IEc also identified several topics that we do not consider evaluable at the present time. A key finding from the analysis is that a single evaluation method can address multiple topics; therefore, our findings are organized by topic and method.

Appendix A shows IEc’s underlying analysis for each evaluation question, including possible approaches to answer each question, data requirements, potential data sources, data limitations and confounding factors, and preliminary evaluation scoping assessment and suggestions.

TOPICS THAT CAN BE EVALUATED AND CORRESPONDING METHODS

The evaluation topics (and corresponding methods) that IEc considers to be evaluable at present include:

1. Conducting an in-depth assessment of the effectiveness of EPA and NREL’s joint feasibility studies and the program’s liability comfort letters.

Because the program has a discrete list of sites that have conducted feasibility studies or received liability comfort letters, IEc will be able to conduct an in-depth assessment of the effectiveness of these materials in several evaluation areas. IEc can consider their effectiveness in reaching the program’s intended audiences, in encouraging consideration of RE projects on CLs and other interim milestones, and in ultimately bringing about RE projects on CLs. IEc would use the collection of sites receiving these materials to explore descriptive statistics, conduct interviews with relevant stakeholders, and develop case studies to understand and illustrate the program’s operations and results.

2. Conducting interviews with partners and other stakeholders about various dimensions of program effectiveness.

Many of the program’s evaluation questions can be addressed through structured or semi-structured interviews with partners, other program stakeholders, and/or experts. For one, IEc can use interviews with stakeholders and/or industry experts to assess the effectiveness of other program outputs – albeit in a less comprehensive manner than our evaluation of feasibility studies and liability comfort letters – and to identify opportunities for increasing the effectiveness of program outputs. Other program outputs that IEc might consider include assistance from the RE-Powering Response Team and resources, tools and knowledge products (RTKPs) available on the program’s website, such as state-by-state incentive fact sheets. In addition, IEc can use interviews to assess the effectiveness of the program’s collaborations with partners at all levels of government and in the private sector, including efforts to influence policies or

leverage external resources. These interviews might yield case studies that examine the specific ways in which stakeholders are or are not connecting with the program, or the specific ways in which the program is or is not connecting with partners.

3. Expert interviews about various dimensions of program effectiveness.¹

Interviews with industry experts could help IEc to answer evaluation questions related to the effectiveness of program partnerships; the program's role within renewable energy or land remediation networks; and the program's role in influencing policies, regulations, or incentives. IEc could also use expert input as part of a mixed-methods evaluation approach for assessing the program's effectiveness in avoiding RE development on undisturbed lands or in reducing RE development or land remediation costs.

4. Conducting a social network analysis (SNA) that encompasses EPA and other federal agency personnel.

IEc can conduct an SNA to examine the program's role in renewable energy or land remediation networks within the EPA or within other federal agencies more broadly. This method will enable IEc to answer evaluation questions about the program's role in building networks, connecting stakeholders with networks, and encouraging networks to support the development of RE projects on CLs. This method should also provide some insight into the program's effectiveness in working with partners and leveraging external resources.

5. Conducting a literature review to match program activities and outputs to high-, medium-, and low-priority barriers to renewable energy development on contaminated lands.

IEc can use secondary literature, likely in conjunction with stakeholder or expert interviews, to identify salient barriers to RE development on CLs and compare those findings to the program activities and outputs identified in the logic model. This effort would enable IEc to assess how effectively the program is addressing market and regulatory barriers, as well as to identify opportunities for improving the program's lead conversion rate.

6. Conducting a citation analysis to identify third-party references to the program, its outputs, its partners, or broader industry issues to assess the program's role in addressing barriers.

A citation analysis – conducted with trade publications, news articles, policy or regulatory analyses, scholarly articles, or other materials – could allow IEc to assess the program's role in addressing barriers to RE development on CLs, the program's collaborations with external partners, and/or the program's role in influencing regulations or policies. This citation analysis could be conducted in conjunction with plotting the program's development against the development of the broader industry for RE projects on CLs, in order to identify correlations and synergies across program and market trajectories.

¹ In IEc's preliminary evaluation scoping memo, IEc proposed to convene a Delphi Panel comprised of these experts. Upon further review of the seven priority evaluation questions that EPA identified at a later stage of the evaluation scoping assessment, IEc concluded that interviews would be more efficient and informative than a Delphi Panel. The range of topics covered in the selected evaluation questions – and the relatively small number of individuals who could address multiple topics – do not lend themselves to a Delphi Panel, which aims to achieve expert consensus on a particular topic. Conducting interviews with experts on each topic in lieu of a Delphi Panel would allow for a deeper and more nuanced investigation of the specific issues that each respondent is best qualified to address, and would help ensure that responses are informative and useful.

7. Applying decision rules to approximate the avoided development on undisturbed lands and possibly the cost impacts of RE projects on CLs.

IEc identified extensive discussion in existing literature about the land use requirements of various types of RE projects, as well as some discussion of the cost impacts of developing RE projects on CLs instead of on undisturbed lands. IEc could supplement these decision rules with expert interviews to provide greater context. While this would not provide a definitive answer about the program's impact, it would provide a general indication of avoided development associated with the sites that installed RE systems.

TOPICS THAT CANNOT BE EVALUATED AT PRESENT

The evaluation topics (and corresponding methods) that IEc does not consider to be evaluable at present include:

1. **Conducting an in-depth assessment of the effectiveness of other RTKPs available on the program's website; information provided at presentations, conference sessions, and workshops; assistance from the RE-Powering Response Team; and assistance from EPA Headquarters staff.**

IEc does not consider a comprehensive assessment of the effectiveness of these program outputs to be feasible at the present time, due to the limited information available about which stakeholders have accessed these resources and under which circumstances. However, IEc believes that questions about these program outputs could become evaluable with improved data collection. Section VII of this report offers several potential approaches for improving data collection processes in order to permit a fuller evaluation in the future.

2. **Developing robust quantitative measurements for the proportion of stakeholders connecting with the program who later realized RE projects on CLs, or for the total number of RE projects developed on CLs that the program influenced.**

Because the program has limited data about the stakeholders connecting with the program in some capacity, IEc will only be able to assess in a qualitative manner how and why certain stakeholders interacted with the program and then did or did not develop RE projects on CLs. As a corollary, IEc will not be able to develop robust quantitative measures for the total greenhouse gas emissions avoided as a result of program activities, though IEc could estimate this outcome for *specific* sites.

3. **Surveying stakeholders, partners, and/or experts outside of the federal government about various dimensions of program effectiveness.**

ICR requirements prevent us from conducting surveys or interviews with more than nine non-federal employees about the same topic.

4. **Conducting a social network analysis outside of the federal government.**

ICR requirements prevent IEc from conducting surveys or interviews with more than nine non-federal employees about the same issue, which would be required for an SNA outside of the federal government.

HIGH-LEVEL SUMMARY OF PRELIMINARY FINDINGS BY EVALUATION QUESTION

Exhibit 2 below lists the potential evaluation questions and the results of IEc's screening-level evaluation scoping assessment. Each potential evaluation question is categorized as:

- Evaluable, where comprehensive evaluation methods are feasible at the present time;

- Qualitatively evaluable, where qualitative but not quantitative evaluation methods are feasible at the present time;
- Partly evaluable, where comprehensive evaluation methods are feasible at the present time for a certain subset of program activities or outputs;
- Potentially evaluable, where further assessment is needed to determine whether comprehensive evaluation methods are feasible at the present time;
- Not presently evaluable, where comprehensive or partial evaluation methods are not feasible at the present time but could become feasible in the future with improved data collection; or
- Not evaluable, where comprehensive or partial evaluation methods are not feasible at the present time and are unlikely to become feasible in the future.

Additional detail for each question is provided in Appendix A.

EXHIBIT 2. POTENTIAL EVALUATION QUESTIONS AND SCREENING-LEVEL EVALUATION SCOPING ASSESSMENT

POTENTIAL EVALUATION QUESTION	RESULTS OF SCREENING-LEVEL SCOPING ASSESSMENT
1. Are the program's resources, tools, and knowledge products reaching the intended audiences?	Not presently evaluable
2. How and to what extent are various stakeholders using the program's resources, tools, and knowledge products?	Partly evaluable/ qualitatively evaluable
3. How effective have the program's resources, tools, and knowledge products been in raising awareness and encouraging consideration of renewable energy projects on contaminated lands?	Partly evaluable/ qualitatively evaluable
4. How effective has the program's site-specific assistance been in raising awareness and encouraging consideration of renewable energy projects on contaminated lands?	Partly evaluable/ qualitatively evaluable
5. How effective have the program's partnerships been in raising awareness and encouraging consideration of renewable energy projects on contaminated lands?	Partly evaluable/ qualitatively evaluable
6. What proportion of sites tracked by the RE-Powering Initiative have considered renewable energy projects on contaminated lands?	Partly evaluable/ qualitatively evaluable
7. How effective are the program's resources, tools, and knowledge products; site-specific assistance; and partnerships in addressing barriers to developing renewable energy projects on contaminated lands?	Evaluable/ partly evaluable/ qualitatively evaluable
8. How effectively is the program building or expanding networks?	Partly evaluable
9. What role does the program play in connecting stakeholders with existing or emergent networks?	Partly evaluable/ qualitatively evaluable
10. What activities have networks in contact with the RE-Powering Initiative undertaken and what results have they produced?	Partly evaluable
11. How has the program used its networks to influence federal, state, and/or local policies, regulations, and incentives related to renewable energy projects on contaminated lands?	Evaluable/ potentially evaluable
12. How successful is the program in converting leads into interim milestones and/or fully developed renewable energy projects?	Partly evaluable/ qualitatively evaluable
13. What opportunities exist for strengthening the program's lead conversion rate?	Evaluable/ partly evaluable/ qualitatively evaluable

POTENTIAL EVALUATION QUESTION	RESULTS OF SCREENING-LEVEL SCOPING ASSESSMENT
14. To what extent is the program leveraging expertise, effort, in-kind assistance and other resources from other programs, other agencies, and partners?	Evaluable/ partly evaluable
15. To what extent have renewable energy projects influenced by the RE-Powering Initiative avoided development on undisturbed lands?	Partly evaluable/ qualitatively evaluable
16. What are the avoided or reduced development costs of renewable energy projects on contaminated lands rather than undisturbed lands?	Partly evaluable/ qualitatively evaluable
17. To what extent are communities empowered to consider and develop renewable energy projects on contaminated lands as result of contact with the RE-Powering Initiative?	Partly evaluable/ potentially evaluable

Based on the findings of this initial scoping assessment, EPA identified seven priority evaluation questions for more detailed investigation. IEC subsequently conducted a more thorough evaluation scoping assessment for these seven questions and developed potential evaluation methodologies for addressing each one. The results of this second-phase investigation are presented in Section VI below. IEC also developed potential approaches for improving program data collection, so that evaluation questions that cannot be addressed at present given existing data might be addressed in the future. The results of this effort are presented in Section VII.

VI. POTENTIAL EVALUATION METHODOLOGIES (FOR PRIORITY QUESTIONS THAT CAN BE EVALUATED WITH EXISTING OR READILY OBTAINABLE DATA)

Based on the results of the screening-level evaluation scoping assessment and the program’s priorities, EPA selected seven priority evaluation questions to investigate in greater depth (see Exhibit 3). EPA asked IEC to suggest potential approaches that EPA could use to evaluate the seven priority questions, including proposed data sources and methods, and the advantages and disadvantages of each approach. This section describes these potential evaluation approaches.

EXHIBIT 3. PRIORITY QUESTIONS TO PURSUE

FOCUS	QUESTION
Effectiveness	1. How effective have the program’s resources, tools, and knowledge products been in raising awareness and encouraging consideration of renewable energy projects on contaminated lands? 2. How effective has the program’s site-specific assistance been in raising awareness and encouraging consideration of renewable energy projects on contaminated lands?
Barriers	3. How effective are the program’s resources, tools, and knowledge products; site-specific assistance; and partnerships in addressing barriers to developing renewable energy projects on contaminated lands?
Projects	4. How successful is the program in converting leads into interim milestones and/or fully developed renewable energy projects? 5. What opportunities exist for strengthening the program’s lead conversion rate?
Benefits	6. To what extent have renewable energy projects influenced by the RE-Powering Initiative avoided development on undisturbed lands? 7. What are the avoided or reduced development costs of renewable energy projects on contaminated lands rather than undisturbed lands?

POTENTIAL DATA SOURCES AND METHODS

IEC’s scoping assessment indicates that a combination of qualitative and quantitative data sources and methods could be used to evaluate the RE-Powering Initiative.² Qualitative sources include: interviews, literature review, case studies, and a timeline that maps the development of the RE-Powering Initiative to broader market, technology, and policy trends. Quantitative sources include: program data (e.g., Tracking Matrix), and numerical decision rules for estimating avoided development on undisturbed lands, and avoided or reduced development costs of RE projects on CLs rather than undisturbed lands.

Exhibit 4 below summarizes the potential data sources for each evaluation question, and indicates whether each data source is “key” or “supplemental.” By “key,” IEC means the most important data

² Throughout this section, the phrase “evaluate the RE-Powering Initiative” refers specifically to the data sources, methods, and analysis that could be used to address the seven evaluation questions included in Exhibit 3.

source(s) to answer a particular evaluation question; by “supplemental,” IEc means other data sources of less importance (but still potentially useful) for answering that question. As shown in the exhibit, IEc suggests multiple data sources for each question. IEc describes each data source below.

Interviews

IEc suggests conducting a total of 30-40 interviews (60 minutes each) with two types of respondents – experts and stakeholders:

- **Experts** include individuals with academic credentials, specialized knowledge, and/or professional experience that qualify them to offer informed, insightful, and credible assessments of the drivers and barriers for developing RE projects on CLs. In general, IEc suggests interviewing experts outside of EPA who have not received services from the RE-Powering Initiative. This is to ensure the objectivity of responses and to capture “outsider” perspectives about the broader market, technology, and policy context in which the program operates.
- **Stakeholders** include program participants (i.e., individuals who have used one or more of the program’s resources, tools, and/or knowledge products), program staff, RE-Powering Response Team members, other EPA staff involved in RE projects on CLs, and other individuals that have interacted with the program in some manner. Stakeholder interviews can provide feedback about the various services offered by the program. For example, respondents can identify the resources, tools, and knowledge products that were most or least useful to them. In addition, they can provide rich descriptive information to support in-depth assessments of selected projects.

We anticipate that the expert and stakeholder interviews would play a central role in an evaluation of the RE-Powering Initiative. We see expert interviews as a key data source for Questions 3, 6, and 7, and a supplemental data source for Questions 1, 2, and 5. We envision stakeholder interviews as a key data source for Questions 1 - 5. Combined, the expert and stakeholder interviews would serve as a key data source for all seven evaluation questions.

In addition, data obtained through interviews would inform the development of other sources and methods. For example, expert interviews may be used to validate or refine decision rules (Questions 6 and 7), and to develop the timeline of program and industry development (Questions 1-3). Similarly, stakeholder interviews would provide information for the case studies, and could illustrate and contextualize information gleaned from program data. Below, we describe the types of individuals we suggest interviewing, and our suggested process for identifying specific interview candidates.

EXHIBIT 4. EVALUATION QUESTIONS AND DATA SOURCES

QUESTIONS	DATA SOURCES 1 = KEY DATA SOURCE, 2 = SUPPLEMENTAL DATA SOURCE						
	EXPERT INTERVIEWS	STAKEHOLDER INTERVIEWS	LITERATURE REVIEW	DECISION RULES	CASE STUDIES	TIMELINE	PROGRAM DATA*
1. How effective have the program’s resources, tools and knowledge products been in raising awareness and encouraging consideration of renewable energy projects on contaminated lands?	2	1			1	2	2
2. How effective has the program’s site-specific assistance been in raising awareness and encouraging consideration of renewable energy projects on contaminated lands?	2	1			1	2	2
3. How effective are the program’s resources, tools and knowledge products; site-specific assistance; and partnerships in addressing barriers to developing renewable energy projects on contaminated lands?	1	1	2		1	2	2
4. How successful is the program in converting leads into interim milestones and/or fully developed renewable energy projects?		1			1		1
5. What opportunities exist for strengthening the program’s lead conversion rate ?	2	1	2		2		2
6. To what extent have renewable energy projects influenced by the RE-Powering Initiative avoided development on undisturbed lands ?	1		1	1			2
7. What are the avoided or reduced development costs of renewable energy projects on contaminated lands rather than undisturbed lands?	1		1	1			2

*Note: IEC defines “program data” broadly to include: RE-Powering Tracking Matrix; feasibility studies; and other site data.

Expert Interviews

We recommend conducting 10-14 expert interviews with the following types of respondents:

- Legal experts on liability issues for CLs;
- Financing expert on redevelopment of CLs (potentially, financing providers listed in the RE-Powering Tracking Matrix);
- Financing expert on RE project development;
- Private developers involved in RE projects on CLs;
- Private developer tentatively involved in RE projects on CLs;
- NREL expert on land use requirements for RE projects
- NREL expert on RE project development models;
- Possible: NREL expert on RE project costs;
- NGO representatives involved in habitat protection and RE project siting; and
- Experts on utility interconnection issues.

Stakeholder Interviews

We suggest conducting stakeholder interviews in two phases, using a “snowball” technique to identify Phase 2 respondents. Phase 1 would include interviews with RE-Powering staff and individuals identified directly by the program. During the interviews, the first group of stakeholders (Phase 1 respondents) would be asked to identify other organizations or individuals with whom they have interacted – e.g., project developers, site owners, or state and local public officials. Based on the individuals or sites identified by Phase 1 respondents, EPA would then select Phase 2 interview subjects. For example, if multiple respondents in Phase 1 identified successes or challenges related to the same site or community, individuals connected to the specified site or community could be interviewed in Phase 2. Phase 2 interviews would probe the questions and issues identified in Phase 1, and would also provide case study information (see below). In addition to yielding useful information, the snowball technique would add rigor to the interview process by allowing individuals outside the program to identify interview subjects that might not otherwise be chosen.

Phase 1

We suggest conducting 5-8 Phase 1 interviews; these may include:

- RE-Powering Initiative staff;
- NREL analyst involved in feasibility studies;
- RE-Powering Response Team members (to be identified through discussions with RE-Powering staff);
- Possible: EPA Superfund Office staff (to be determined through discussions with program staff);
- Possible: EPA Abandoned Mine Lands Team (AML) staff (to be determined through discussions with program staff. Note: At least one project in the RE-Powering Tracking Matrix received technical assistance from the AML Team); and

- Possible: Regional EPA staff member (to be determined through discussions with program staff).

Phase 2

Phase 2 interviews would be determined based on the results of Phase 1. Based on IEc's knowledge of the program and our past evaluation experience, we estimate the need for 15-18 interviews in Phase 2; these may include: state and local public officials involved in RE projects on CLs; site owners and project developers involved in stalled or completed RE projects on CLs; and stakeholders for sites that received liability comfort letters and/or NREL feasibility studies.

We suggest selecting Phase 2 interview candidates from across the full spectrum of sites, including communities/developers that did – and those that did not – make progress in developing a RE project on CLs after receiving assistance from the program. In addition, EPA may want to consider differences in geography, technology, and project size when selecting interview subjects. Given the large number of sites and variables, tradeoffs may exist between the breadth of coverage and depth of analysis; therefore, it would be important to determine an appropriate balance before launching Phase 2 interviews.

ICR Considerations

The Paperwork Reduction Act precludes posing the same question to more than nine non-federal entities without obtaining an Information Collection Request (ICR). Although we are suggesting more than nine interview respondents, we do not anticipate the need to obtain an ICR. This conclusion is based on the fact that unique interview questions would be asked for each type of respondent, and we do not envision conducting more than three interviews in any one respondent category. Also, several proposed interviews involve federal respondents.

Literature Review

We recommend a literature review consisting of three components, aimed at addressing four of the seven evaluation questions in Exhibit 3. Specifically, we see the literature review as a key data source for Questions 6 and 7, and a supplemental source for Questions 3 and 5. In combination with other methods and data sources, the literature review would enable EPA to: obtain information in a systematic and comprehensive manner; avoid or mitigate the potential biases and subjectivity of interview respondents; and collect specific and highly technical data that may not be readily available to interview subjects.

Part One: Avoided Costs of Siting RE Projects on CLs

The first part of the literature review would help to assess the avoided costs of siting RE projects on CLs rather than on undisturbed lands. In its published materials, the program has identified four primary categories of avoided costs from siting RE projects on CLs: lower land costs; greater availability of federal and state incentives; reduced delays from permitting and zoning processes; and the ability to leverage existing infrastructure, including transmission and distribution lines and substations, ports and rail terminals, roads and water sources, and buildings for operations and maintenance and offices. The literature review would aim to assist in developing approximate estimates of each of these cost components, as well as the likelihood of reducing these cost components through development on CLs. If we find that existing literature does not support estimates of the magnitude of each of these cost components, we would instead develop a ranking system that estimates the *relative* magnitude (low, medium, or high) of costs associated with different aspects of RE projects. In this effort, it would be essential to identify the relative costs for different types and sizes of RE projects. For example, the

avoided costs from siting a RE system close to existing transmission lines are generally much more significant for utility-scale projects than for mid-size ones.

In IEC's initial screening to determine whether published literature exists on this topic, we found abundant information on various baseline cost components of solar and (to a lesser extent) wind installations. These studies are listed in the partial bibliography provided in Attachment B. If indicated by EPA, we will work with IEC's Information Resources Specialist to expand this partial bibliography with a particular focus on any studies that estimate how baseline costs change based on the characteristics of a given site. We would intend to limit this effort to studies examining the cost components of mid- and large-scale solar PV and wind installations, which constitute a majority of projects in the RE-Powering Tracking Matrix, and which the existing literature has treated most extensively.

However, despite the availability of literature that discusses various cost elements, we have not found any information about how the costs will change if projects are sited on CLs as opposed to undisturbed lands. Moreover, it is not yet clear whether the cost estimates in the literature are sufficiently comprehensive and generalizable to be extrapolated to sites in the Tracking Matrix. Therefore, we will conduct a targeted literature search to determine whether any existing studies document changes in costs due to siting RE projects on CLs, and whether the results can be extrapolated to sites beyond the original focus of the studies. In addition, we will ask expert interview respondents whether they are aware of any studies that address these topics. We would also ask expert interview respondents how they would estimate changes in project costs when RE is sited on CLs, based on their professional experience and judgment. Insights gained from these interviews would then feed into either estimates of avoided costs or a ranking of the relative magnitude of avoided costs, depending on data availability.

Part Two: Avoided Development on Undisturbed Lands

We also suggest consulting the literature to help estimate avoided development on undisturbed lands from siting RE projects on CLs. Published literature could be used to determine where RE projects of various types and sizes are currently being sited, both to determine a defensible counterfactual for projects on CLs and to provide the program with detailed recommendations for improving its project pipeline. The literature could also be used to determine the land use requirements of various RE projects, in order to determine the magnitude of avoided development on other sites.

Our initial screening suggests that literature on the average land use requirements for various type of RE projects is readily available. A list of these studies is also included in the partial bibliography in Attachment B. The expert interviews could be used to identify which of the estimates in the literature correspond most closely to the types of RE projects typically found on CLs.

The availability of published literature on what type of RE projects are currently being sited on undisturbed lands, or are likely to be sited in such areas in the future, is less clear from our initial screening. If indicated by EPA, we will work with IEC's Information Resources Specialist to perform a more thorough literature search, which could then be supplemented with insights from the expert interviews. For example, interviewing representatives from NGOs involved in habitat preservation would illuminate which types of RE projects they consider to help or hinder their efforts to protect undisturbed lands. As with the first part of the literature review, if the desired information was not forthcoming in the existing literature, LOE could be shifted to the expert interviews instead.

Part Three: Barriers to Siting RE Projects on CLs

The third part of the proposed literature review would examine barriers to developing RE projects on CLs, including: liability concerns, difficulty attracting capital, and local opposition. The goal would be to crosswalk the barriers to developing RE on CLs against the resources, tools and knowledge products, and site-specific assistance offered by the RE-Powering Initiative. In this portion of the literature review, we anticipate that the most relevant information might come from industry publications rather than peer-reviewed studies.³ If indicated by EPA, we will work with IEc's Information Resources Specialist to identify useful materials, which could be supplemented through expert interviews. As noted above, LOE could be shifted between the literature review and expert interviews as appropriate.

Decision Rules

This component of the evaluation would follow closely from the interviews and the literature review described above, and would play a key role in addressing Questions 6 and 7. To determine decision rules for avoided development on undisturbed lands resulting from siting RE projects on CLs, we recommend drawing from literature on the land use requirements of RE projects and on the types of projects that have been most frequently sited on undisturbed lands in the past and/or are now being sited on undisturbed lands. As described above, we suggest supplementing this information with insights from the expert interviews. We anticipate that the expert interviews would be particularly useful in identifying which land use requirements are most appropriate for the types of RE projects located on CLs and for determining the types of RE projects that pose the greatest potential threat to undisturbed lands.

After determining land use requirements and establishing a defensible counterfactual for project siting, we then recommend applying the resulting decision rule to the applicable projects in the RE-Powering Tracking Matrix. This exercise would provide a rough approximation of the acres of undisturbed lands that would have been developed in order to provide the same RE capacity that was installed on CLs. Note that while this exercise would provide the estimated benefits for all applicable projects in the Tracking Matrix, it would not indicate the extent to which the program can “take credit” for these benefits. To develop a better understanding of the program's contribution to the estimated benefits, we recommend using the stakeholder interviews, case studies, and the timeline of program and industry development. Although these methods would not be able to quantify the portion of benefits that can be attributed to the program, they would provide a meaningful indication of how the program may have contributed to avoided development on undisturbed lands.

For the second part of the analysis – determining decision rules for avoided development costs from siting RE projects on CLs – we recommend drawing from literature on the baseline cost components of RE projects and the extent to which site characteristics affect those cost components, by system size and type. Expert interviews could then serve to illuminate how those cost components might change, in either direction, when a project is sited on CLs instead of undisturbed lands. We recommend using this information to develop approximate metrics for the change in development costs that might result from siting a particular size and type of RE project on CLs (assuming a given level of on-site contamination and a given stage in the cleanup process). EPA could then apply these metrics to the projects in the RE-Powering Tracking Matrix and again use stakeholder interviews, case studies, and the program-industry timeline to assess attribution qualitatively, as discussed above. Alternatively, if the existing literature does

³ Drawing information from industry publications rather than peer-reviewed studies would not, in this instance, undermine the robustness of the evaluation. The significance of various barriers to RE projects on CLs as perceived by industry stakeholders is useful data in itself.

not provide clear decision criteria, cost savings for sites in the Tracking Matrix could be assessed at a high level using the “ranking” approach described above.

Case Studies

We view case studies as a key data source for Questions 1-4, and a supplemental source for Question 5. The case studies would draw heavily on the stakeholder interviews and also the literature review; in addition, IEc would draw on information available in existing case studies prepared by the RE-Powering Initiative. Case studies could be used for the following purposes:

- **Fill in gaps from existing data sources.** For example, while the Tracking Matrix indicates whether sites have fully developed RE projects, case studies could assess interim milestones that may not be reflected in the program data. Case studies would also capture changes in participant attitudes and awareness toward RE on CLs that may not be apparent from other data sources. Additionally, case studies could also be used to confirm, revise, or clarify statements made in the interviews.
- **Assess which program resources are most useful for addressing specific types of barriers.** While other data sources would shed light on the barriers to developing RE on CLs and provide indications of the usefulness of various resources, case studies would illustrate how program resources were used to address barriers in particular situations. For example, case studies could show whether communities used different resources, tools, or knowledge products depending on their site’s “status” in the project pipeline when they first encountered the RE-Powering Initiative.
- **Describe how and why certain outcomes did or did not occur.** Case studies would also provide insight into why particular program resources may have “worked” in one setting, but not others. For example, a series of case studies could help explain why some sites that received assistance from the program achieved interim milestones or developed RE projects, while other sites that received similar assistance did not. For instance, case studies could reveal differences in how the “same” service was delivered to different communities, important characteristics of the communities themselves, or extenuating circumstances that help explain the results.
- **Identify opportunities to strengthen the program.** By providing insight into program and site-specific dynamics, case studies could help identify areas warranting further attention. For example, case studies might identify gaps in the tools and assistance currently offered by the program, which, if addressed, would help convert leads into interim milestones and/or fully developed projects.
- **Assess the program’s contribution to observed outcomes.** Many factors influence a community’s and developer’s decision to develop a RE project on a CL. Understanding the program’s unique contribution to advancing the consideration or realization of RE projects on CLs is important, but challenging. Based on a detailed analysis of the facts (e.g., project chronology, community characteristics, and participant judgment), case studies would shed light on the program’s role in converting leads into interim milestones and realized projects.

We suggest selecting the cases from across a range of sites, including those that have reached interim milestones and/or realized a fully developed RE project, and those that have not. Looking across sites at different stages of the project development process would provide insights into which types of assistance are most useful or needed at different points phases of the project pipeline. While the specific selection criteria would be informed by other data sources and discussions with EPA, it may be useful to “match”

sites that share common characteristics (e.g., socioeconomic status), but have different outcomes. Matching sites in this way would help isolate the factors specific to the RE-Powering Initiative (as opposed to external variables) that explain why outcomes were or were not achieved. We will also consider the case studies that the RE-Powering Initiative has already produced on successful projects as we select additional sites for investigation.

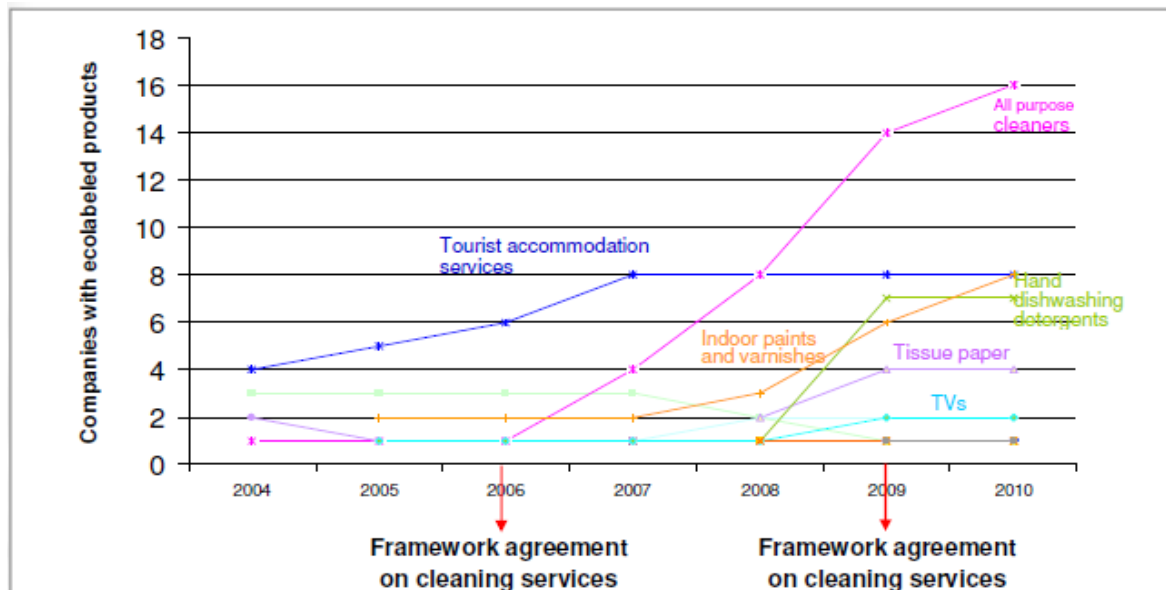
The number of case studies conducted by IEc would depend on the complexity and learning opportunities of each case. As an initial estimate, we suggest conducting up to nine case studies, assuming effort is distributed evenly across the nine cases. However, the same overall LOE could be allocated to a smaller number of cases if the sites are complex, or if the facts of the case and the interests of program staff indicate that a smaller number of more-detailed case studies would be beneficial.

Timeline of Program, Industry and Policy Development

We suggest developing a timeline as a supplemental data source for Questions 1-3, using the previously described expert interviews and discussions with program staff, the literature review, and program data. The timeline would depict: market, policy, and technology changes related to developing RE on CLs; milestones in the program's development; and trends in the number of RE projects sited on CLs. Specifically, the timeline would array the program's milestones with: i) broader trends in the market and policy arena, and ii) the number of CLs with RE installations. For illustrative purposes, Exhibit 5 provides an example of a timeline from a third-party study of government purchasing policies in Catalonia, Spain. The study investigated the connection between the government's environmentally friendly purchasing policies and the development of a market for green products and services; the example below shows an uptick in the number of companies with eco-labeled all-purpose cleaning products following the passage of a framework agreement on cleaning services in 2006. The authors of that study used the timeline both to draw inferences about the program's effects, and as a communication tool to summarize the study results.

We suggest a similar method for the RE-Powering Initiative, adapted to the specific industry and policy context in which the program operates. Showing the correlation between the number of RE projects on CLs, program milestones, and external factors would indicate whether the market is moving in the direction one would expect if the program were working as intended. For example, we would expect a steadier increase in the number of CL sites with RE installations *after* the program was established than before. If we observed a flat or decreasing rate of installations after the program was initiated, this would indicate the need to look more closely at how the program is functioning within the broader market and policy context. Similarly, the timeline could be used to assess the program's contribution to observed outcomes. For example, an uptick in RE installations in the years following the program's publication of "decision trees" for wind and solar could suggest that these tools had a positive effect on wind and solar installations on CLs. The timeline would also show alternative explanations for observed outcomes, such as a decline in the cost of solar. While this analysis would not prove or disprove the program's effectiveness, it would provide a screening-level assessment of the program's influence. Interesting or suggestive elements of the timeline could be explored and validated in stakeholder and expert interviews.

EXHIBIT 5. EXAMPLE TIMELINE OF PROGRAM, INDUSTRY AND POLICY DEVELOPMENT



Source: Maria del Mar Sans Reñé, *Green Public Procurement Policies Drive Green Market in Catalonia*, September 2012. http://www.ecoprocura.eu/fileadmin/editor_files/Maria_del_Mar_Sans_Rene.pdf

In addition, the timeline would provide market intelligence by highlighting factors that constrain or reinforce the program’s activities. As a hypothetical example, suppose the program’s decision to issue liability comfort letters was followed immediately by an external policy that increased liability concerns. The number of RE installations sited on CLs might stagnate following the new policy. An observer looking at these numbers in isolation might conclude that the program was not working; however, the timeline would show why the number of RE installations was lower than expected. It might even suggest that the effects of the unfavorable policy would have been *even worse* without the program’s comfort letters. In addition, the analysis could lead to recommendations to help the program achieve its goals – e.g., by doing more to actively engage policymakers who can influence liability policies.

Program Data

We view the program data as a key data source for Question 4, and as a supplemental source for the other six evaluation questions. We recommend conducting a review of program data in three parts. First, we recommend mapping the sites that received feasibility studies through the program’s partnership with NREL to the Tracking Matrix’s list of sites with completed RE projects. This exercise would enable EPA to assess whether the locations receiving this form of site-specific assistance later developed RE projects. Information in the Tracking Matrix could be supplemented with independent research to determine any unknown site outcomes (e.g., new or previously unknown RE projects developed, or interim milestones reached, on these sites). This could include an interview with an NREL researcher who was closely involved in many of the NREL feasibility studies, as well as publicly available information.

Second, we recommend documenting the outcomes at the sites that received liability “comfort letters” through the program. As with the NREL feasibility studies, this exercise would enable EPA to determine the proportion of sites receiving this form of assistance that later developed RE projects. The Tracking Matrix, publicly available information, and conversations with program staff could be used to determine

site outcomes, including interim milestones and fully developed RE projects. The small number of sites receiving liability comfort letters means that most of these sites could be covered through the stakeholder interviews. Depending on program staff interest, one or more case studies could be developed based on the experience of these sites.

Finally, we recommend collecting any available data about site-specific assistance requested and received from the RE-Powering Response Team, during the interviews with RE-Powering Response Team members. This data could be used to identify any patterns in sites requesting assistance, and the proportion of sites requesting assistance that later realized RE projects or interim milestones. We also recommend using interviews with RE-Powering Response Team members to identify sites that would be suitable for conducting stakeholder interviews. Again, depending on program staff interest, one or more case studies could be developed based on the experience of these sites.

This review of data related to the NREL feasibility studies, liability “comfort letters,” and perhaps the RE-Powering Response Team assistance – supplemented by interviews and publicly available documents – would provide descriptive information about the outcomes of sites influenced by the program (e.g., the percentage of sites receiving comfort letters or feasibility studies that went on to develop a RE project, and interim milestones reached at selected sites). As a result, EPA would be able to assess in an in-depth manner the program’s success at converting leads to interim milestones and fully developed projects for these particular components of the program’s activities.

STRENGTHS AND LIMITATIONS

The rest of Section VI describes the strengths and limitations of the sources and methods discussed above.

Strengths

- **Mixed-methods approach.** As discussed above, we suggest using multiple methods to address each evaluation question. Using multiple sources of information to address the same evaluation question provides the opportunity for findings from one source to validate or contradict findings from another source. Discovering consistent themes across methods bolsters the strength of the evaluation findings. Conversely, if data sources and methods generate conflicting information, this helps identify areas of uncertainty and/or areas for future investigation.
- **Market characterization.** The methods discussed in this memo aim to assess the program within its broader market, technology, and policy context. Doing so would provide a more meaningful and insightful evaluation than looking at the program in isolation. We feel this is particularly important given the diverse and diffuse nature of program activities and stakeholders, and the rapidly changing technology and market landscape. In addition to assessing the program’s effectiveness, this combination of methods would help identify drivers and barriers to success.
- **Program development opportunities.** The methods discussed above would address the usefulness of program resources, and the program’s effectiveness in addressing barriers. They would also show the program’s success in converting leads into interim milestones and realized projects. In so doing, the methods would not only assess the program’s current effectiveness, but would identify actionable ways to strengthen the program’s impact moving forward.
- **Assessment of “non-traditional” benefits.** Other previous and ongoing evaluations of RE projects have focused mostly on assessing reductions in energy use and greenhouse gas emissions, or alternatively, on community benefits. While these are worthwhile efforts, the

questions and methods presented here have a different focus. Based on the literature review and expert interviews, decision rules would be developed to assess reduced development costs and avoided development on undisturbed lands. This would advance EPA's understanding of the RE-Powering Initiative – and the benefits of RE projects on CLs overall.

Limitations

Given data limitations and ICR requirements, the methods have some limitations, which we detail below.

- **Inability to fully define the participant universe.** The program does not currently maintain a system that comprehensively tracks all stakeholders that have accessed the program's resources and in what capacity.⁴ Therefore, we do not consider a comprehensive assessment of the effectiveness of the program's resources, tools, and knowledge products to be feasible at the present time. However, because the program maintains a list of sites that have conducted feasibility studies or received liability comfort letters, it is possible to conduct an in-depth assessment of the effectiveness of these materials. The methods in this memo would provide an in-depth assessment of feasibility studies and comfort letters, while relying on a less comprehensive approach to assess other aspects of the program.
- **No comparison group.** Due to the lack of comprehensive information about who has accessed the program's resources and in what capacity, it is not possible to create a valid comparison group; doing so requires a clear definition of participants and non-participants, and the ability to assign subjects to one or the other group. It also requires the ability to select non-participants with similar (comparable) characteristics to participants. In the absence of a comparison group, the methods proposed here would instead rely on interviews (participant judgment/expert opinion) and case studies about the effectiveness of the program. Thus, it would not be possible to prove the direct causal impact of the RE-Powering Initiative on the development of RE projects on CLs. However, the interviews and case studies would explore factors that influenced the development of these projects, and the program's role and contribution.
- **Potential bias associated with purposive sampling for stakeholder interviews.** It is not possible to conduct a statistically valid sample of interviewees given the unknown size and scope of the population, the several types of interviews that need to be included to address every evaluation question, and the requirements of the Paperwork Reduction Act. Therefore, the stakeholder interviews would be selected as a purposive sample, based on the diverse and informative perspectives they can provide. However, purposive sampling has the potential to introduce bias into the evaluation results. To help mitigate potential bias, we suggest a snowball technique where earlier respondents (Phase 1) nominate later respondents (Phase 2). This takes the program and the evaluators mostly out of the selection process for Phase 2, and allows other stakeholders to help decide whose perspectives will be captured in the evaluation. Still, there may be bias in the results if Phase 1 respondents only nominate individuals who share their own attitudes and beliefs. Also, because the sample is not statistically representative, results cannot be extrapolated or generalized to the population as a whole.
- **Limited evaluation scope.** Given the limitations noted above and general resource limitations, it would not be possible to evaluate every site in the same level of detail. Instead, we suggest case studies for up to nine sites, and a higher-level review of existing program or external data for

⁴ See Section VII for discussion about this issue.

other sites. Although this would not provide a comprehensive assessment of the program, it would provide meaningful indications of the program's successes, challenges, and opportunities.

NEXT STEPS

The RE-Powering Initiative continues to believe that evaluative information will help the Agency guide its actions to better realize environmental and other benefits that RE-Powering investments have to offer.

The Initiative plans to pursue in the coming year analysis suggested by the scoping study, although the number of questions and types of information collected and analyzed will depend upon resources and availability.

VII. POTENTIAL APPROACHES TO IMPROVE PROGRAM DATA COLLECTION (FOR QUESTIONS THAT ARE NOT CURRENTLY EVALUABLE)

IEc conducted an initial investigation of potential strategies for strengthening data collection going forward. These strategies would support future evaluation activities by ensuring that the data required to answer the evaluation questions are robust, comprehensive, and accessible. IEc considers the highest priorities for future data collection efforts to be 1) systematically tracking users (and the extent of use) of the program's resources, tools, and knowledge products, and 2) systematically tracking progress toward developing RE projects on CLs. Tracking users of the program's resources, tools, and knowledge products is important for allowing a quantitative rather than a qualitative evaluation of the effectiveness of these program outputs. Tracking progress toward developing RE projects on CLs is important for supporting a more systematic understanding of how, when, and why contaminated sites progress (or do not progress) through the RE development process.

Based on an initial investigation of potential approaches to collecting this priority data, IEc concluded that the RE-Powering America's Land Initiative could likely make significant improvements to its current data collection approaches using technology that EPA already has in-house and with limited additional cost. However, the Initiative must also consider potential ICR limitations, Agency policies, and data privacy and security issues in expanding its data collection efforts.

We focus on two types of data that the program could collect in the future: 1) information on users of site-specific technical assistance, such as the inquiries fielded by the RE-Powering Response Team, and 2) information on users of general program tools, such as the RE decision trees available on the RE-Powering website.

DATA ON SITE-SPECIFIC ASSISTANCE

There may be greater opportunities to collect data for users of site-specific assistance than users of general program tools within existing ICR requirements, as the data would enable the program to offer more tailored assistance for those particular CLs and RE projects. For example, the RE-Powering Response Team might not be able to provide customized support without knowing its specific audience and the issues surrounding a specific site, so additional data collection would directly augment the user's experience. Information about the specific RE projects assisted by the RE-Powering Response Team could be recorded in a customer relationship management (CRM) database, a tool that would enable the program to track, analyze, and manage its interactions with current and potential "customers." The CRM would allow the RE-Powering Response Team to record all inquiries previously received for a given RE project and the basic characteristics of that project, allowing the program to respond to future inquiries in a more informed and thorough manner. EPA could then use this database to identify the stages of the project development process at which sites most frequently encounter barriers. The database would also allow for basic statistical analyses of project characteristics and outcomes, by associating specific sites with specific interim milestones and outcomes.

DATA ON GENERAL PROGRAM TOOLS

Collecting data for users of general tools may present a greater challenge than users of site-specific assistance, especially if customization of services is not feasible or relevant. However, it may be possible to request certain types of information about users by providing more limited customization of program resources. For example, the program website could ask users to answer simple check-box questions regarding their location (e.g., state), stakeholder group (e.g., private developer, municipality, or bank), and RE technology (e.g., wind or solar). In exchange, users could gain access to information about incentives for RE projects on CLs that are available to respondents with their profile. While this limited customization would yield information about the types of individuals using the program's tools and the frequency with which they use each one, it would not allow EPA to track the same user over time.

Collecting this longitudinal data would require each user to create a separate account, which might be accomplished through online registration. This approach would provide valuable additional information, but could present greater challenges related to information collection issues.

OTHER DATA COLLECTION CONSIDERATIONS

We recommend that EPA consider ICR requirements, relevant Agency policy, data privacy issues, and security issues in determining how to collect, retain, and use any additional data.

APPENDIX A: CROSSWALK OF EVALUATION QUESTIONS, DATA SOURCES, AND POTENTIAL METHODS

POSSIBLE APPROACHES TO ANSWERING THE QUESTION	DATA NEEDED TO ANSWER THE QUESTION	POSSIBLE DATA SOURCES	DATA LIMITATIONS AND CONFOUNDING FACTORS	PRELIMINARY EVALUATION SCOPING ASSESSMENT AND SUGGESTIONS
1. ARE THE PROGRAM'S RESOURCES, TOOLS, AND KNOWLEDGE PRODUCTS (RTKP) REACHING THE INTENDED AUDIENCES?				
<ul style="list-style-type: none"> Determine whether the individuals, companies, and/or organizations accessing the program's RTKPs are those that the program has defined <i>a priori</i> as its intended audience. Determine the proportion of the program's intended audiences who have accessed its RTKPs. 	<ul style="list-style-type: none"> Operational definition of intended audiences (must be sufficiently specific to allow comparison of the target audience with those who actually use the program's RTKPs) Catalogue of individuals, companies, and/or organizations who have accessed the program's RTKPs (i.e., attended presentations and conferences, downloaded materials from program website) 	<ul style="list-style-type: none"> List and affiliation of attendees at presentations, conferences, and workshops Data on individuals, companies, or organizations downloading RTKPs from the program's website Documentation to determine the definition of intended audiences Surveys and/or interviews with members of program's intended audiences 	<ul style="list-style-type: none"> Program does not track attendees at conferences, presentations, and workshops in a systematic manner Program does not currently collect information on individuals who are accessing RTKPs through the program's website Program's descriptions of intended audiences (e.g., in the Action Plan) are broad ICR requirements limit the number of interviewees and survey respondents 	<p>Not presently evaluable, but could be in the future if the program develops an operational definition of intended audiences and systematically tracks the users of RTKPs. A customer relations management (CRM) database would allow the program to track attendees at conferences, presentations, and workshops, and to identify other instances in which these individuals interact with the program.</p> <p>Program staff could also explore mechanisms to track who is accessing the RTKPs through the program's website. One option would be allowing registered website users to customize program tools and save their results, which would encourage (but not require) users to register.</p>
2. HOW AND TO WHAT EXTENT ARE VARIOUS STAKEHOLDERS USING THE PROGRAM'S RESOURCES, TOOLS, AND KNOWLEDGE PRODUCTS?				
<ul style="list-style-type: none"> Conduct interviews and/or surveys with program stakeholders about how and to what extent they use the program's RTKPs. Survey individuals who are known to have accessed the program's RTKPs in some capacity. 	<ul style="list-style-type: none"> List of individuals, companies, or organizations who <i>may</i> have used the program's RTKPs List of individuals who are <i>known</i> to have accessed the program's RTKPs Interview and/or survey responses from individuals who have used the program's RTKPs 	<ul style="list-style-type: none"> List of attendees at presentations, conferences, and workshops Data on individuals, companies, or organizations downloading RTKPs from program website List of stakeholders identified through consultations with program staff List of stakeholders identified through independent research 	<ul style="list-style-type: none"> Program does not currently track attendees at conferences, presentations, and workshops in a systematic manner Program does not currently collect information on individuals who are accessing RTKPs through its website Program does not maintain a centralized list of who has accessed RTKPs ICR requirements limit the number of non-federal interview/survey respondents 	<p>Partly evaluable/qualitatively evaluable. Without a comprehensive list of who has used the RTKPs, we would need to identify respondents opportunistically, and/or cast a wide net to cover everyone who <i>may</i> have used the program's RTKPs. The survey/interviews would ask respondents to self-identify RTKPs that they have used and how they used them. We can contact federal employees without an ICR. Due to ICR requirements, we would not be able to survey a representative sample of the non-federal population, but we could interview up to nine non-federal stakeholders to confirm what we learned from federal stakeholders. The measures outlined in Question 1 above, including creation of a CRM database, would help enable future evaluation activities by identifying the individuals that have accessed each RTKP.</p>

POSSIBLE APPROACHES TO ANSWERING THE QUESTION	DATA NEEDED TO ANSWER THE QUESTION	POSSIBLE DATA SOURCES	DATA LIMITATIONS AND CONFOUNDING FACTORS	PRELIMINARY EVALUATION SCOPING ASSESSMENT AND SUGGESTIONS
3. HOW EFFECTIVE HAVE THE PROGRAM'S RESOURCES, TOOLS, AND KNOWLEDGE PRODUCTS BEEN IN RAISING AWARENESS AND ENCOURAGING CONSIDERATION OF RENEWABLE ENERGY PROJECTS ON CONTAMINATED LANDS?				
<p>Option 1: Conduct interviews and/or surveys with stakeholders about their levels of awareness and their willingness to consider renewable energy (RE) projects on contaminated lands (CLs) before and after accessing the program's RTKPs.</p> <p>Option 2: Determine the proportion of stakeholders accessing the program's RTKPs who were later involved in developing RE project(s) on a contaminated site. (Could be combined with Option 1.)</p>	<p>Option 1:</p> <ul style="list-style-type: none"> See Question 2 above. Could be combined with the interview/survey questions in Question 2 <p>Option 2:</p> <ul style="list-style-type: none"> List of individuals, companies, and organizations who have accessed the program's RTKPs (e.g., attended presentations, downloaded materials from program website, etc.) List of the subset of these individuals, companies, and organizations who were later involved in developing RE projects on CLs 	<p>Option 1:</p> <ul style="list-style-type: none"> See Question 2 above. <p>Option 2:</p> <ul style="list-style-type: none"> Surveys and/or interviews with individuals who have accessed program's RTKPs Robust record of committed and/or realized RE projects on CLs List of attendees at presentations, conferences, and workshops Data on individuals, companies, or organizations downloading RTKPs from program website 	<p>Option 1:</p> <ul style="list-style-type: none"> See Question 2 above. <p>Option 2:</p> <ul style="list-style-type: none"> Program's current record of committed RE projects may not allow for a comprehensive comparison with the individuals who have accessed the program's RTKPs 	<p>Option 1: Partly evaluable/qualitatively evaluable. (See Question 2 above)</p> <p>Option 2: Not presently evaluable, but could be in the future if the program develops an operational definition of intended audiences and systematically tracks the users of RTKPs.</p> <p>Program staff would also need to systematize collection of information about realized RE projects on CLs, perhaps by establishing partnerships with any especially active project developers, or by combing state records for permitted projects.</p> <p>Due to ICR requirements, we would not be able to survey a representative population sample to assess this outcome quantitatively, but we would be able to use interviews to assess this outcome qualitatively.</p>
4. HOW EFFECTIVE HAS THE PROGRAM'S SITE-SPECIFIC ASSISTANCE BEEN IN RAISING AWARENESS AND ENCOURAGING CONSIDERATION OF RENEWABLE ENERGY PROJECTS ON CONTAMINATED LANDS?				
<p>Option 1: Conduct interviews or surveys with developers, site owners, and other partners to determine whether they have received site-specific assistance from the program, the nature of the assistance provided, and how effective they perceived the assistance to be.</p> <p>Option 2: Determine the proportion of contaminated sites receiving various forms of site-specific assistance where RE projects were later realized. <i>Program staff have indicated that they are especially</i></p>	<p>Option 1:</p> <ul style="list-style-type: none"> Likelihood of developing a RE project on a particular contaminated site before receipt of site-specific assistance from the RE-Powering Initiative (as determined by interviews) Type of site-specific assistance received Whether an RE project was eventually developed or is under development <p>Option 2:</p> <ul style="list-style-type: none"> Number of contaminated sites receiving various types of site-specific assistance from the RE-Powering Initiative Proportion of those sites 	<p>Option 1 and 2:</p> <ul style="list-style-type: none"> List of contaminated sites where NREL and EPA jointly conducted feasibility studies List of contaminated sites where EPA issued liability comfort letters List of contaminated sites about which the RE-Powering Response Team (or other OSWER staff) fielded inquiries Survey and/or interview data on whether stakeholders involved with each of these sites ever considered RE projects as a reuse option <p>Option 1 only:</p> <ul style="list-style-type: none"> List of stakeholders 	<p>Options 1 and 2:</p> <ul style="list-style-type: none"> Program does not currently track inquiries fielded by the RE-Powering Response Team ICR requirements limit the number of interviewees and preclude the use of a survey <p>Option 2 only:</p> <ul style="list-style-type: none"> Program's current record of committed RE projects is likely not sufficiently robust to compare with lists of individuals receiving site-specific assistance from the program; program-tracked sites are likely those which have had the most significant contact with program staff 	<p>Option 1: Not presently evaluable, but could be in the future if the program improves its data collection processes (see discussion under Question 1 above). Program staff could use a CRM database to track inquiries fielded by the RE-Powering Response Team.</p> <p>Due to ICR requirements, we would not be able to survey a representative population sample to assess this outcome quantitatively, but we would be able to use interviews to assess this outcome qualitatively.</p> <p>Option 2: Partly evaluable/ qualitatively evaluable. Due to ICR requirements, it is not feasible to determine the actual proportion of sites where stakeholders considered developing RE projects, though interview responses could provide insight into how and why some proportion of stakeholders made that consideration.</p>

POSSIBLE APPROACHES TO ANSWERING THE QUESTION	DATA NEEDED TO ANSWER THE QUESTION	POSSIBLE DATA SOURCES	DATA LIMITATIONS AND CONFOUNDING FACTORS	PRELIMINARY EVALUATION SCOPING ASSESSMENT AND SUGGESTIONS
<p><i>interested in conducting this analysis for the sites where the National Renewable Energy Laboratory (NREL) and EPA jointly conducted feasibility studies.</i></p>	<p>which later considered RE projects</p> <ul style="list-style-type: none"> • Proportion of those sites which later developed RE projects 	<p>identified through consultations with program staff</p> <ul style="list-style-type: none"> • List of stakeholders identified through independent research (e.g., state permitting records or records from utilities or developers that have been active in this area) • Survey and/or interview data on whether these sites realized RE projects <p>Option 2 only:</p> <ul style="list-style-type: none"> • Robust record of committed or realized RE projects on CLs 		<p>It may be possible to assess quantitatively the proportion of sites where RE projects were later developed, if program staff systematize collection of information about realized RE projects on CLs (see discussion in this section under Question 3, Option 2).</p>
5. HOW EFFECTIVE HAVE THE PROGRAM'S PARTNERSHIPS BEEN IN RAISING AWARENESS AND ENCOURAGING CONSIDERATION OF RENEWABLE ENERGY PROJECTS ON CONTAMINATED LANDS?				
<p>Option 1: As part of a social network analysis, ask stakeholders if/how the program has influenced their awareness of or willingness to consider RE projects on CLs. Ask questions specifically targeted at assessing information flows between stakeholders and across networks.</p> <p>Option 2: Conduct a Delphi panel on the program's role in the emergence of RE projects as a viable option for CL reuse and/or CLs as a viable location for RE projects. A Delphi panel is a structured technique for soliciting the opinions of a group of experts through a series of carefully designed questionnaires.</p>	<p>Option 1:</p> <ul style="list-style-type: none"> • Stakeholders' level of awareness and willingness to consider RE projects on CLs <i>before and after</i> contact with the program and/or program partners <p>Option 2:</p> <ul style="list-style-type: none"> • Expert opinions on the program's relative importance in the emergence of RE projects as a viable reuse option for CLs and in the emergence of CLs as a viable location for RE projects. • Correlation between program milestones and industry milestones 	<p>Option 1:</p> <ul style="list-style-type: none"> • See Question 8 below for further discussion of the proposed social network analysis. <p>Option 2:</p> <ul style="list-style-type: none"> • Consultations with program staff to identify names and contact information for industry experts. 	<p>Option 1:</p> <ul style="list-style-type: none"> • See Question 8 below for further discussion of the proposed social network analysis. <p>Option 2:</p> <ul style="list-style-type: none"> • ICR requirements may limit the number of expert interviews. However, Delphi panels are often formed with fewer than nine participants. 	<p>Option 1: Partly evaluable. See discussion under Question 8 below for caveats.</p> <p>Option 2: Qualitatively evaluable. The expert interviews will provide only a qualitative, rather than quantitative, assessment of the program's role in connecting stakeholders with existing or emergent networks. This would not prove causality, but would indicate whether market trends and the development of networks are aligned with program theory.</p>

POSSIBLE APPROACHES TO ANSWERING THE QUESTION	DATA NEEDED TO ANSWER THE QUESTION	POSSIBLE DATA SOURCES	DATA LIMITATIONS AND CONFOUNDING FACTORS	PRELIMINARY EVALUATION SCOPING ASSESSMENT AND SUGGESTIONS
Possibly map a timeline of industry development onto a timeline of program development (as determined through additional interviews with program staff).				
6. WHAT PROPORTION OF SITES TRACKED BY THE RE-POWERING INITIATIVE HAVE CONSIDERED RENEWABLE ENERGY PROJECTS ON CONTAMINATED LANDS?				
<p>Option 1: Survey site owners or other stakeholders associated with tracked sites</p> <p>Option 2: Map the program's list of realized or committed sites to the list of tracked sites, to identify a minimum number of sites that have considered RE projects; supplement with interviews with owners or other stakeholders associated with tracked sites to identify conditions that did or did not lead to considering and/or developing RE projects.</p>	<p>Option 1:</p> <ul style="list-style-type: none"> Names and contact information for stakeholders associated with tracked sites <p>Option 2:</p> <ul style="list-style-type: none"> Names and contact information for stakeholders associated with certain tracked sites. We may want to select stakeholders who represent a range of interim milestones achieved, site characteristics, and demographic profiles, or we may wish instead to focus on a specific issue identified in an earlier stage of our analysis. Proportion of tracked sites where RE projects were eventually committed or realized 	<p>Option 1:</p> <ul style="list-style-type: none"> RE-Powering Tracking Matrix might provide some stakeholder contact information Independent research and consultations with program staff can identify other contact information <p>Option 2:</p> <ul style="list-style-type: none"> RE-Powering Tracking Matrix, the program's list of stalled or cancelled RE projects, independent research, and additional consultations with program staff will together provide stakeholder contact information Robust record of committed and/or realized RE projects on CLs 	<p>Option 1:</p> <ul style="list-style-type: none"> Need to confirm whether RE-Powering Tracking Matrix provides stakeholder contact information ICR requirements preclude the use of a survey <p>Option 2:</p> <ul style="list-style-type: none"> RE-Powering Tracking Matrix, independent research, and consultations with program staff will provide stakeholder contact information Program's current record of committed RE projects is likely not sufficiently robust to compare with lists of contaminated sites tracked by the program; program-tracked sites are likely those which have had the most significant contact with program staff 	<p>Option 1: Not evaluable. Due to ICR limitations, it is not feasible to survey a robust sample of stakeholders associated with tracked sites to determine which proportion have considered RE projects on CLs.</p> <p>Option 2: Partly evaluable. Mapping the program's (incomplete) list of committed or realized projects will enable us to establish at least a minimum proportion of tracked sites that have considered RE projects. Interviews with select site stakeholders will enable us to assess qualitatively how and why certain stakeholders considered RE projects for their contaminated sites.</p>
7. HOW EFFECTIVE ARE THE PROGRAM'S RESOURCES, TOOLS, AND KNOWLEDGE PRODUCTS; SITE-SPECIFIC ASSISTANCE; AND PARTNERSHIPS IN ADDRESSING BARRIERS TO DEVELOPING RENEWABLE ENERGY PROJECTS ON CONTAMINATED LANDS?				
There are two stages to addressing this evaluation question. First, we need to determine whether the program's activities and outputs are targeting high-priority barriers to RE project development on CLs. Second, we need to	<p>Option 1:</p> <ul style="list-style-type: none"> References to RE projects on CLs and barriers to increased development in trade publications, news articles, policy or regulatory analyses, scholarly articles, or other materials, and trends 	<p>Option 1:</p> <ul style="list-style-type: none"> First need to identify relevant trade publications, news sources, policy or regulatory analyses, scholarly articles, and other materials Then need to comb through 	<p>Option 1:</p> <ul style="list-style-type: none"> We may need to work closely with program staff, and possibly other industry stakeholders as well, to bound the collection of literature which we review. <p>Option 2:</p>	<p>Option 1: Evaluable.</p> <p>Option 2: Partly evaluable/qualitatively evaluable. See discussion of caveats under Question 3, Option 1, and Question 4, Option 1.</p> <p>Option 3: Qualitatively evaluable. The expert interviews will provide a qualitative, rather than quantitative, assessment of the program's role in reducing barriers to RE projects on CLs.</p>

POSSIBLE APPROACHES TO ANSWERING THE QUESTION	DATA NEEDED TO ANSWER THE QUESTION	POSSIBLE DATA SOURCES	DATA LIMITATIONS AND CONFOUNDING FACTORS	PRELIMINARY EVALUATION SCOPING ASSESSMENT AND SUGGESTIONS
<p>assess whether the program's activities and outputs are effective in addressing these targeted barriers.</p> <p>Option 1: Conduct a review of published literature to create a matrix assigning high, medium, and low priority to various barriers to RE project development on CLs and then matching program activities and outputs to those barriers. Then conduct a second literature review to identify any indication that the highest priority barriers which the program is targeting have been reduced in recent years.</p> <p>Option 2: Conduct interviews and/or survey stakeholders about their perceived barriers to developing RE projects on CLs and their views on the extent to which the program successfully targets and/or reduces those barriers.</p> <p>Option 3: Conduct expert interviews to identify the most significant barriers to developing more RE projects on CLs and to assess whether program resources are successfully targeting these barriers and/or have successfully reduced these barriers.</p> <p>Option 4: Compare a list of individuals who have connected with the</p>	<p>therein.</p> <ul style="list-style-type: none"> References to the program and/or its RTKPs in trade publications, news articles, policy or regulatory analyses, scholarly articles, or other materials, and trends therein. <p>Option 2:</p> <ul style="list-style-type: none"> See discussion under Question 3, Option 1, and Question 4, Option 1 <p>Option 3:</p> <ul style="list-style-type: none"> Expert judgment on the most significant barriers to RE projects on CLs and the program's level of success in reducing those barriers <p>Option 4:</p> <ul style="list-style-type: none"> See Questions 3 and 4 above 	<p>these materials to identify references to key industry barriers, the program, its RTKPs, or other salient industry key words</p> <p>Option 2:</p> <ul style="list-style-type: none"> See discussion under Question 3, Option 1, and Question 4, Option 1 <p>Option 3:</p> <ul style="list-style-type: none"> Consultations with program staff to identify names and contact information for industry experts <p>Option 4:</p> <ul style="list-style-type: none"> See Questions 3 and 4 above 	<ul style="list-style-type: none"> See discussion under Question 3, Option 1, and Question 4, Option 1 <p>Option 3:</p> <ul style="list-style-type: none"> ICR requirements may limit the number of expert interviews these barriers. However, we do not anticipate the need to interview more than nine experts per topic. <p>Option 4:</p> <ul style="list-style-type: none"> See discussion under Question 3, Option 1, and Question 4, Option 1 	<p>Option 4: Partly evaluable. See discussion of caveats under Question 3, Option 1, and Question 4, Option 1.</p>

POSSIBLE APPROACHES TO ANSWERING THE QUESTION	DATA NEEDED TO ANSWER THE QUESTION	POSSIBLE DATA SOURCES	DATA LIMITATIONS AND CONFOUNDING FACTORS	PRELIMINARY EVALUATION SCOPING ASSESSMENT AND SUGGESTIONS
<p>program in various ways (e.g., downloading RTKPs, requesting site-specific assistance) to the program's list of committed/ realized RE projects on CLs. <i>Program staff have indicated they are especially interested in performing this analysis for the sites where NREL and EPA jointly conducted feasibility studies.</i></p>				
8. HOW EFFECTIVELY IS THE PROGRAM BUILDING OR EXPANDING NETWORKS?				
<p>Conduct social network analysis to assess the program's position and role in networks of land remediation and cleanup personnel; RE developers; local communities; and federal, state, local, and tribal government bodies.</p> <ul style="list-style-type: none"> • Option 1: Full network analysis: This method involves taking a complete census of connections within a population. • Option 2: Snowball method network analysis: This method involves beginning with a focal actor or actors, identifying the nodes to which those actors are connected, then identifying the additional nodes to which those second-stage nodes are connected, and so forth. • Option 3: Ego-centric 	<ul style="list-style-type: none"> • Identity of individuals, organizations, businesses, agencies, and other entities connected through relevant networks • Strength of those connections (reciprocity, duration, etc.) 	<p>Option 1:</p> <ul style="list-style-type: none"> • Surveys and/or interviews with all individuals and other entities within a bounded network <p>Option 2:</p> <ul style="list-style-type: none"> • Surveys and/or interviews with all individuals and other entities connected to a defined node and with their connections' respective connections, and so forth <p>Option 3:</p> <ul style="list-style-type: none"> • Surveys and/or interviews with a population sample or other defined group regarding their connections to the program 	<p>Options 1, 2, and 3:</p> <ul style="list-style-type: none"> • ICR requirements limit the number of interviewees and preclude the use of a survey for stakeholders other than federal employees <p>Option 1:</p> <ul style="list-style-type: none"> • It would be difficult to determine an appropriate yet feasible boundary for the population, given that such a wide variety of stakeholders could potentially consider RE projects on various types of CLs. <p>Option 2:</p> <ul style="list-style-type: none"> • This method might overstate the program's importance in broader renewable energy and/or land remediation networks: we would only consider RE and CL professionals who have contact with the program, which might result in misrepresenting the scale of these broader industry networks. <p>Option 3:</p> <ul style="list-style-type: none"> • This approach would not provide much information 	<p>Options 1, 2, and 3: Partly evaluable. Because of information collection constraints, we would need to limit any network analysis almost exclusively to federal employees (program staff, other headquarters and regional OSWER staff, other headquarters and regional EPA staff, other federal agency staff).</p> <p>We also recommend that program staff consider using a CRM database, which could be populated with the names of industry partners with whom they have connected.</p>

POSSIBLE APPROACHES TO ANSWERING THE QUESTION	DATA NEEDED TO ANSWER THE QUESTION	POSSIBLE DATA SOURCES	DATA LIMITATIONS AND CONFOUNDING FACTORS	PRELIMINARY EVALUATION SCOPING ASSESSMENT AND SUGGESTIONS
<p>network analysis: This method involves selecting a focal node (ego) and identifying the nodes to which it is connected (with or without also determining which of those nodes are connected to each other).</p>			<p>about the strength or the other characteristics of these connections (e.g., would not measure reciprocity of connections).</p>	
9. WHAT ROLE DOES THE PROGRAM PLAY IN CONNECTING STAKEHOLDERS WITH EXISTING OR EMERGENT NETWORKS?				
<p>Option 1: As part of social network analysis, ask stakeholders how the program has or has not connected them with existing or emergent networks.</p> <p>Option 2: Conduct a Delphi panel to identify the most seminal networks related to land remediation or cleanup, RE development, and community development and capacity building. Use these interviews to assess how the networks in which the program is embedded compare to the overall universe of relevant networks. Also interview experts about the program's role in connecting other stakeholders to its networks, or address this question by combining expert interviews with the social network analysis described above.</p>	<p>Options 1 and 2:</p> <ul style="list-style-type: none"> Stakeholders' self-reported experience in connecting with existing or emergent networks as a result of their contact with the program, including the strength and other characteristics of connections 	<p>Option 1:</p> <ul style="list-style-type: none"> See Question 8 above <p>Option 2:</p> <ul style="list-style-type: none"> Consultations with program staff to identify names and contact information for industry experts 	<p>Option 1:</p> <ul style="list-style-type: none"> See Question 8 above. <p>Option 2:</p> <ul style="list-style-type: none"> ICR requirements may limit the number of expert interviews. However, Delphi panels are often formed with fewer than nine participants. 	<p>Option 1: Partly evaluable. See Question 8 above for discussion of additional caveats.</p> <p>Option 2: Qualitatively evaluable. The expert interviews will provide a qualitative, rather than quantitative, assessment of the program's role in connecting stakeholders with existing or emergent networks.</p>
10. WHAT ACTIVITIES HAVE NETWORKS IN CONTACT WITH THE RE-POWERING INITIATIVE UNDERTAKEN AND WHAT RESULTS HAVE THEY PRODUCED?				
<p>As part of social network analysis, ask network</p>	<p>Activities of network actors and the nature of their</p>	<p>See Question 8 above</p>	<p>See Question 8 above. Note that addressing this evaluation</p>	<p>Partly evaluable. See discussion under Question 8 above for additional caveats.</p>

POSSIBLE APPROACHES TO ANSWERING THE QUESTION	DATA NEEDED TO ANSWER THE QUESTION	POSSIBLE DATA SOURCES	DATA LIMITATIONS AND CONFOUNDING FACTORS	PRELIMINARY EVALUATION SCOPING ASSESSMENT AND SUGGESTIONS
actors about activities undertaken that relate to siting RE projects on CLs.	connections with the program		question would require a full social network analysis or a snowball method social network analysis, rather than the ego-centric approach.	
11. HOW HAS THE PROGRAM USED ITS NETWORKS TO INFLUENCE FEDERAL, STATE, AND/OR LOCAL POLICIES, REGULATIONS, AND INCENTIVES RELATED TO RENEWABLE ENERGY PROJECTS ON CONTAMINATED LANDS?				
<p>Option 1: Conduct a citation analysis of references to the program and/or its RTKPs, as well as any references to partners or activities which the program may have influenced.</p> <p>Option 2: Use a mixed-methods approach to identify changes in federal, state, local, or tribal policies, regulations, or incentives related to siting RE projects on CLs and interview relevant stakeholders to assess the role played by the program, if any.</p>	<p>Option 1:</p> <ul style="list-style-type: none"> References to the program and/or its RTKPs in trade publications, news articles, policy or regulatory analyses, scholarly articles, or other materials, and trends therein. References to RE projects on CLs in trade publications, news articles, policy or regulatory analyses, scholarly articles, or other materials, and trends therein. Trends in Google searches for program and industry key words. <p>Option 2:</p> <ul style="list-style-type: none"> Recent changes in federal state, local or tribal policies, regulations, or incentives related to siting RE projects on CLs Names and contact information for stakeholders involved in those changes 	<p>Option 1:</p> <ul style="list-style-type: none"> First need to identify relevant trade publications, news sources, policy or regulatory analyses, scholarly articles, and other materials Then need to comb through these materials to identify references to the program, its RTKPs, or other salient industry key words Also conduct analysis of trends in Google searches relevant to the program and related activities (this tool is publicly available) <p>Option 2:</p> <ul style="list-style-type: none"> Combine citation analysis with search for changes in policies, regulations, and incentives Consultations with program staff to identify names and contact information for relevant stakeholders Surveys and/or interviews with EPA and other federal agency personnel, possibly conducted in conjunction with a social network analysis, and with key state, local, and tribal partners 	<p>Options 1 and 2:</p> <ul style="list-style-type: none"> Given the program’s relatively recent focus on influencing policies, the results of these efforts may not have come to fruition before we conduct the evaluation. <p>Option 1:</p> <ul style="list-style-type: none"> Discussions with program staff have revealed that there is no immediately apparent bounded collection of materials with which to conduct a citation analysis The tool for analyzing trends in Google searches is publicly available only for more common search terms (e.g., “solar landfill” but not “RE-Powering America’s Land”) <p>Option 2:</p> <ul style="list-style-type: none"> Deciding on key words that will enable us to identify changes in policies, regulations, and incentives will likely be a challenge. Program staff likely will not have access to names and contact information for all relevant stakeholders, especially where the program has not worked directly on the proposed policy, regulation, or incentive change. We may need to ask other industry stakeholders for their assistance in identifying names and contact information for 	<p>Option 1: Evaluable, though it is not guaranteed that a citation analysis will uncover any changes in policies, regulations, and incentives which the program has influenced. We will need to work closely with program staff, and possibly with other industry stakeholders as well, to identify relevant materials with which to conduct a citation analysis.</p> <p>Option 2: Potentially evaluable, though we will need to work closely with program staff and potentially other industry experts to identify relevant key words and names and contact information for relevant stakeholders. We would be able to assess the program’s causal role in these policy, regulation, or incentive changes in a qualitative rather than quantitative manner. We may also have to limit our review to federal and state policies, or complement a more expansive review of federal and state policies with a handful of case studies about local or tribal policies, identified with program staff.</p>

POSSIBLE APPROACHES TO ANSWERING THE QUESTION	DATA NEEDED TO ANSWER THE QUESTION	POSSIBLE DATA SOURCES	DATA LIMITATIONS AND CONFOUNDING FACTORS	PRELIMINARY EVALUATION SCOPING ASSESSMENT AND SUGGESTIONS
			<p>the particular stakeholders relevant to this evaluation question.</p> <ul style="list-style-type: none"> Information about changes in policies, regulations, and incentives is likely to be more readily available on the federal and state levels than on the local or tribal levels ICR requirements limit the number of interviews that we can conduct with non-federal employees. 	
12. HOW SUCCESSFUL IS THE PROGRAM IN CONVERTING LEADS INTO INTERIM MILESTONES AND/OR FULLY DEVELOPED RENEWABLE ENERGY PROJECTS?				
<p>Option 1: Develop model of the program's lead conversion process and success rate, by mapping individuals connecting with the program in various ways (e.g., downloading RTKPs, requesting site-specific assistance) against projects that have reached certain desired milestones (e.g., awareness of RE projects as a potential reuse option, consideration of RE projects as a reuse option).</p> <ul style="list-style-type: none"> Determine changes in awareness of the potential for RE projects on CLs for stakeholders who connected with the program. Determine proportion of stakeholders who connected with the program who later 	<p>Option 1:</p> <ul style="list-style-type: none"> List of stakeholders attending conferences, presentations, and workshops; downloading or otherwise accessing program RTKPs; and receiving site-specific assistance of various kinds. Stakeholders' level of awareness of opportunities for and feasibility of RE project development on CLs, prior to and after contact with the program Whether these stakeholders considered RE projects on specific contaminated sites after contact with the program Whether these stakeholders realized any RE projects on CLs after contact with the program Whether these stakeholders in contact with the program raised awareness of other industry stakeholders and/or encouraged them 	<p>Options 1 and 2:</p> <ul style="list-style-type: none"> List of attendees at presentations, conferences, and workshops List of individuals, companies, or organizations downloading RTKPs from program website List of contaminated sites where NREL and EPA conducted joint feasibility studies List of contaminated sites where EPA issued liability comfort letters List of contaminated sites about which the RE-Powering Response Team (or other OSWER staff) fielded inquiries <p>Option 1:</p> <ul style="list-style-type: none"> Survey and/or interview data on changes in awareness after contact with the program (e.g., changes in awareness of available incentives, liability protections, etc.) Survey and/or interview data on whether stakeholders involved with each of these 	<p>Options 1 and 2:</p> <ul style="list-style-type: none"> See discussion under Question 1 and Question 4, Option 1 	<p>Option 1: Partly evaluable. Would be more comprehensively evaluable if program improves its data collection processes (see discussion under Question 1 above).</p> <p>Option 2: Partly evaluable/qualitatively evaluable. If the program does not improve its data collection processes, we will only be able to interview those individuals who accessed a certain subset of program resources. Therefore, the review may be indicative of the level of success achieved in converting leads to interim milestones and/or fully realized projects, but it will not be comprehensive or generalizable.</p>

POSSIBLE APPROACHES TO ANSWERING THE QUESTION	DATA NEEDED TO ANSWER THE QUESTION	POSSIBLE DATA SOURCES	DATA LIMITATIONS AND CONFOUNDING FACTORS	PRELIMINARY EVALUATION SCOPING ASSESSMENT AND SUGGESTIONS
<p>considered one or more RE projects on a contaminated site.</p> <ul style="list-style-type: none"> Determine proportion of stakeholders who connected with the program who were later involved in developing one or more RE projects on a contaminated site. <p>Option 2: Conduct interviews with stakeholders known to have connected with the program about how useful the program and its resources were during different stages of project development, and why.</p>	<p>to consider RE projects on specific contaminated sites</p> <ul style="list-style-type: none"> Comparison between the program's lead conversion rate and those of similar or related programs <p>Option 2:</p> <ul style="list-style-type: none"> Stakeholders' views about the program's usefulness during different stages of project development, including the ways in which their contact with the program did or did not shape their awareness, considerations, or decision to develop a RE project on CLs 	<p>sites ever considered RE projects as a reuse option, and if so, whether this consideration occurred before or after coming into contact with the program</p> <ul style="list-style-type: none"> Survey and/or interview data on whether these sites realized RE projects Robust record of committed and/or realized RE projects on CLs <p>Option 2:</p> <ul style="list-style-type: none"> Interview responses about the program's usefulness during different stages of project development 		
13. WHAT OPPORTUNITIES EXIST FOR STRENGTHENING THE PROGRAM'S LEAD CONVERSION RATE?				
<p>Option 1: Conduct interviews with stakeholders known to have connected with the program about how the program and its resources could be more useful during different stages of project development, and why.</p> <p>Option 2: Conduct a review of published literature to create a matrix assigning high, medium, and low priority to various barriers to RE project development on CLs and then matching program activities and outputs to those barriers. Then conduct a second literature review to identify any indication that the highest priority</p>	<p>Option 1:</p> <ul style="list-style-type: none"> Interview responses about how the program could be more useful in overcoming barriers to RE development on CLs during different stages of a project life cycle <p>Option 2:</p> <ul style="list-style-type: none"> See discussion under Question 7, Option 1 	<p>Option 1:</p> <ul style="list-style-type: none"> List of attendees at presentations, conferences, and workshops List of individuals, companies, or organizations downloading RTKPs from program website List of contaminated sites where NREL and EPA conducted joint feasibility studies List of contaminated sites where EPA issued liability comfort letters List of contaminated sites about which the RE-Powering Response Team (or other OSWER staff) fielded inquiries <p>Option 2:</p> <ul style="list-style-type: none"> List of stalled or canceled RE projects (received from program staff) 	<p>Option 1:</p> <ul style="list-style-type: none"> See discussion under Question 1 and Question 4, Options 1 and 2 <p>Option 2:</p> <ul style="list-style-type: none"> See discussion under Question 7, Option 1 	<p>Option 1: Partly evaluable/ qualitatively evaluable. If the program does not improve its data collection processes, we will only be able to interview those individuals who accessed a certain subset of program resources. Therefore, the review may be indicative of opportunities for strengthening the program's lead conversion rate, but it will not be comprehensive or generalizable.</p> <p>Option 2: Evaluable.</p>

POSSIBLE APPROACHES TO ANSWERING THE QUESTION	DATA NEEDED TO ANSWER THE QUESTION	POSSIBLE DATA SOURCES	DATA LIMITATIONS AND CONFOUNDING FACTORS	PRELIMINARY EVALUATION SCOPING ASSESSMENT AND SUGGESTIONS
barriers which the program is targeting have been reduced in recent years.		<ul style="list-style-type: none"> Interview responses about how the program could increase its usefulness during different stages of project development Option 2: <ul style="list-style-type: none"> See discussion under Question 7, Option 1 		
14. TO WHAT EXTENT IS THE PROGRAM LEVERAGING EXPERTISE, EFFORT, IN-KIND ASSISTANCE AND OTHER RESOURCES FROM OTHER PROGRAMS, OTHER AGENCIES, AND PARTNERS?				
<p>Option 1: Interview program staff about joint initiatives conducted, resources shared, and other collaborative efforts pursued with other programs, agencies, and partners.</p> <p>Option 2: Interview program partners and other programs and agencies about any collaborative efforts undertaken with the RE-Powering Initiative, partly in conjunction with a social network analysis.</p>	<p>Option 1:</p> <ul style="list-style-type: none"> Program staff's views on joint initiatives conducted, resources shared, and other collaborative efforts pursued with other programs, agencies, and partners, as well as their assessment of the successfulness and significance of these efforts. <p>Option 2:</p> <ul style="list-style-type: none"> Program partners' and other network actors' views on joint initiatives conducted, resources shared, and other collaborative efforts pursued with the program, as well as their assessment of the successfulness and significance of these efforts. 	<p>Option 1:</p> <ul style="list-style-type: none"> Interviews with program staff. <p>Option 2:</p> <ul style="list-style-type: none"> Surveys and/or interviews with EPA and other federal agency personnel, possibly conducted in conjunction with a social network analysis, and with key state, local, and tribal partners. We will need to work with program staff to identify these partners and obtain their contact information. 	<p>Option 1:</p> <ul style="list-style-type: none"> Program staff will not be able to provide any third-party perspective on the successfulness or significance of any joint initiatives or resources shared, which is a critical limitation. <p>Option 2:</p> <ul style="list-style-type: none"> ICR requirements limit the number of interviewees and preclude the use of a survey for stakeholders other than federal employees 	<p>Option 1: Evaluable.</p> <p>Option 2: Partly evaluable.</p>

POSSIBLE APPROACHES TO ANSWERING THE QUESTION	DATA NEEDED TO ANSWER THE QUESTION	POSSIBLE DATA SOURCES	DATA LIMITATIONS AND CONFOUNDING FACTORS	PRELIMINARY EVALUATION SCOPING ASSESSMENT AND SUGGESTIONS
15. TO WHAT EXTENT HAVE RENEWABLE ENERGY PROJECTS INFLUENCED BY THE RE-POWERING INITIATIVE AVOIDED DEVELOPMENT ON UNDISTURBED LANDS?				
<p>Option 1: Apply decision rules in existing secondary literature to convert known metrics (size of RE projects, avoided GHG emissions) into acres of avoided development on undisturbed lands</p> <p>Option 2: Conduct expert interviews to assess the extent to which the siting of RE projects on undisturbed lands can be avoided by making other sites available for project development (i.e., what scale RE projects are typically constructed on undisturbed lands, and does that match with the scale of CLs available for development)</p>	<p>Option 1:</p> <ul style="list-style-type: none"> Decision rules for converting avoided GHG emissions into avoided acres of development Decision rules for determining land use requirements of RE developments by project size Size of RE projects influenced by program efforts <p>Option 2:</p> <ul style="list-style-type: none"> Expert judgment on the reasons for siting RE projects on undisturbed lands and the potential for shifting development to CLs 	<p>Option 1:</p> <ul style="list-style-type: none"> Decision rules obtained through a literature review Database of realized RE projects on CLs, including project type and size, as collected by program staff Supplemental data sources on realized RE projects on CLs, such as lists of permitted projects available through state records <p>Option 2:</p> <ul style="list-style-type: none"> Consultations with program staff to identify names and contact information for industry experts 	<p>Option 1:</p> <ul style="list-style-type: none"> Decision rules would not capture differences in the importance of undisturbed lands where development was avoided (e.g., critical habitat designations) Using decision rules rests on the assumption that projects would have occurred on undisturbed lands if they had not occurred on CLs; interviews with industry stakeholders may help to assess the validity of this assumption <p>Option 2:</p> <ul style="list-style-type: none"> Cost savings may depend too heavily on site-specific conditions for experts to reach a general consensus. ICR requirements may limit the number of expert interviews. However, we do not anticipate the need to interview more than nine experts per subject. 	<p>Option 1: Partly evaluable, though with the caveat that we are assuming that projects developed on CLs would have otherwise been developed on undisturbed lands and would have been developed in the same size and type.</p> <p>Option 2: Qualitatively evaluable. However, these expert interviews will provide only a qualitative, rather than quantitative, assessment of the extent of avoided development on undisturbed lands.</p>
16. WHAT ARE THE AVOIDED OR REDUCED DEVELOPMENT COSTS OF RENEWABLE ENERGY PROJECTS ON CONTAMINATED LANDS RATHER THAN UNDISTURBED LANDS?				
<p>Option 1: Conduct expert interviews.</p> <p>Option 2: Develop decision rules for estimating various cost components of RE projects (e.g., transmission line costs in \$/mile).</p>	<p>Option 1:</p> <ul style="list-style-type: none"> Expert judgment on the type and magnitude of cost savings resulting from siting RE projects on contaminated rather than undisturbed lands. <p>Option 2:</p> <ul style="list-style-type: none"> Determinants of the cost of various components of a RE project (e.g., hardware, 	<p>Option 1:</p> <ul style="list-style-type: none"> Consultations with program staff to identify names and contact information for industry experts <p>Option 2:</p> <ul style="list-style-type: none"> Secondary literature on determinants of cost components for RE projects; if necessary, supplementary expert interviews or survey of industry stakeholders to determine how development 	<p>Options 1 and 2:</p> <ul style="list-style-type: none"> Determining cost savings relies to a certain extent on the assumption that developers would have pursued the same project on undisturbed lands that they pursued on CLs. <p>Option 1:</p> <ul style="list-style-type: none"> Cost savings may depend too heavily on site-specific conditions for experts to reach a general consensus. ICR requirements may limit 	<p>Option 1: Qualitatively evaluable.</p> <p>Option 2: Partly evaluable, though we may find a large variance in cost savings, which would in turn reduce the usefulness of average cost savings as a metric. We are also applying the caveat that we assume that projects developed on CLs would have otherwise been developed on undisturbed lands and would have been developed in the same size and type.</p>

POSSIBLE APPROACHES TO ANSWERING THE QUESTION	DATA NEEDED TO ANSWER THE QUESTION	POSSIBLE DATA SOURCES	DATA LIMITATIONS AND CONFOUNDING FACTORS	PRELIMINARY EVALUATION SCOPING ASSESSMENT AND SUGGESTIONS
	interconnection, permitting, etc.).	on CLs affects those costs (e.g., by reducing labor hours required for permitting by a certain percentage)	the number of expert interviews. However, we do not anticipate the need to interview more than nine experts per subject. Option 2: <ul style="list-style-type: none"> Decision rules may be more robust for certain types of RE projects than for others (e.g., a robust literature exists on balance-of-system costs for solar PV systems, but an equivalent literature may not exist for other types of RE projects). 	
17. TO WHAT EXTENT ARE COMMUNITIES EMPOWERED TO CONSIDER AND DEVELOP RENEWABLE ENERGY PROJECTS ON CONTAMINATED LANDS AS A RESULT OF CONTACT WITH THE RE-POWERING INITIATIVE?				
<p>Option 1: Develop case studies assessing the barriers to community empowerment surrounding the reuse of CLs and the development of RE projects. Assess the extent to which the program is successfully targeting and/or has successfully reduced those barriers. Select communities that have reached different interim milestones (or fully realized projects) in the program’s lead conversion process (e.g., some communities which considered but did not realize RE projects, some communities which realized RE projects, etc.).</p> <p>Option 2: Assess the proportion of communities connecting with the program that have later</p>	<p>Option 1:</p> <ul style="list-style-type: none"> Working definition of “community empowerment” and/or “capacity building” Names and contact information for community stakeholders who have connected with the program <p>Option 2:</p> <ul style="list-style-type: none"> See Questions 3 and 4 above. Answering this evaluation question would also involve the additional step of narrowing the group of stakeholders accessing the program’s RTKPs and receiving site-specific assistance to local community members (rather than, say, project developers or financiers). 	<p>Option 1:</p> <ul style="list-style-type: none"> Discussions with program staff to develop working definition of “community empowerment” and/or “capacity building” in the context of this program Consultations with program staff to identify community stakeholders suitable for conducting interviews and developing case studies Interviews with community stakeholders regarding the barriers to community empowerment in the context of the reuse of CLs and the development of RE projects, and regarding the extent to which the program is successfully targeting and/or has successfully reduced those barriers <p>Option 2:</p> <ul style="list-style-type: none"> See discussion under Question 3, Option 2, and Question 4, Option 2 	<p>Option 1:</p> <ul style="list-style-type: none"> Developing a working definition of “community empowerment” or “capacity building” in the context of this particular program is one of the most essential elements of this evaluation question. However, it will likely prove a delicate balancing act between consistently applying the working definition developed by program staff and leaving room for the different definitions developed by individual communities. Community empowerment and capacity building are processes that require sufficient time to unfold. It will be important to ensure that we do not attempt to evaluate prematurely the level of community empowerment or community capacity. This challenge may require conducting preliminary 	<p>Option 1: Potentially evaluable. It will certainly be feasible to develop case studies about the experiences of particular communities, but the challenges of developing working definitions of community empowerment and/or capacity building and of ensuring that sufficient time has elapsed for an evaluation to proceed must be addressed.</p> <p>Option 2: Partly evaluable. See discussion of caveats under Question 3, Option 2, and Question 4, Option 2.</p>

POSSIBLE APPROACHES TO ANSWERING THE QUESTION	DATA NEEDED TO ANSWER THE QUESTION	POSSIBLE DATA SOURCES	DATA LIMITATIONS AND CONFOUNDING FACTORS	PRELIMINARY EVALUATION SCOPING ASSESSMENT AND SUGGESTIONS
realized RE projects on CLs.			interviews with community stakeholders to assess whether we should continue with developing a full case study. Option 2: <ul style="list-style-type: none"> • See discussion under Questions 3, Option 2, and 4, Option 2. 	

APPENDIX B: PARTIAL BIBLIOGRAPHY FOR LITERATURE REVIEW

INITIAL SCOPING ASSESSMENT

- Adelaja, Soji, et al. "Potential Application of Renewable Energy on Brownfield Sites: A Case Study of Michigan." Land Policy Institute. Report #LPR-2009-Renewable Energy-003. January 27, 2009.
- Banzhaf, H. Spencer, and Eleanor McCormick. "Moving Beyond Cleanup: Identifying the Crucibles of Environmental Gentrification." National Center for Environmental Economics. Working paper #07-02. EPA. January 2007.
- Boyd, James, and Cynthia Manson. "Attributing Benefits to Voluntary Programs in EPA's Office of Resource Conservation and Recovery: Challenges and Options." Resources for the Future. RFF DP 11-09. March 2011.
- EPA. "Data Documentation for Mapping and Screening Criteria for Renewable Energy Potential on EPA and State Tracked Sites." RE-Powering America's Land Initiative. Updated July 2013.
- ". "Guidelines for Preparing Economic Analyses." Office of the Administrator. EPA 240-R-00-003. September 2000.
- ". Renewable Energy on Contaminated Lands Project Tracking Matrix. Updated March 8, 2013.
- ". "RE-Powering America's Land: Siting Renewable Energy on Potentially Contaminated Land, Landfills, and Mine Sites." Solar Energy Industries Association (SEIA) Webinar. December 12, 2013.
- ". RE-Powering News: A Quarterly News Digest from EPA's RE-Powering America's Land Initiative. Issues 6-9. June 2013-March 2014.
- EPA and NREL. "Screening Sites for Solar PV Potential: Emphasis on Redevelopment of Potentially Contaminated Sites, Underutilized Sites, or Rooftops." RE-Powering America's Land Initiative.
- ". "Screening Sites for Wind Energy Potential: Emphasis on Redevelopment of Potentially Contaminated Lands or Underutilized Sites." RE-Powering America's Land Initiative.
- Howland, Marie. "Employment Effects of Brownfield Redevelopment: What Do We Know From the Literature?" National Center for Environmental Economics. Working paper #07-01. EPA. January 2007.
- Macknick, Jordan, et al. "Solar Development on Contaminated and Disturbed Lands." NREL/TP-6A20-58485. December 2013.
- Mosey, Gail, et al. "Converting Limbo Lands to Energy-Generating Stations: Renewable Energy Technologies on Underused, Formerly Contaminated Sites. NREL/TP-640-41522. October 2007.
- Pater, J. E. "A Framework for Evaluating the Total Value Proposition of Clean Energy Technologies." NREL/TP-620-38597. February 2006.
- Levitan, Dave. "Brown to Green: A New Use for Blighted Industrial Sites." Yale Environment 360. June 23, 2011. Accessed April 25, 2014.

Smith, V. Kerry. “Methods for Estimating the Social Benefits of EPA Land Cleanup and Reuse Programs.” Summary Report of the Workshop. September 28-29, 2006. EPA. April 13, 2007.

Streater, Scott. “Green Shoots from Brown Fields.” *Scientific American*. October 8, 2009. Accessed April 25, 2014.

Whitbread-Abrutat, Peter, and Nick Coppin. “Renewables Revive Abandoned Mines.” *Renewable Energy World*. April 13, 2012. Accessed April 25, 2014.

AVOIDED COSTS OF RENEWABLE ENERGY PROJECTS ON CONTAMINATED LANDS

American Transmission Company. “A Changing Landscape: 10-Year Transmission System Assessment, Summary Report.” 2014. <http://www.atc10yearplan.com/wp-content/uploads/2014/10/TYA2014-FINAL.pdf>. Accessed January 23, 2015.

Balachander, Arvind, et al. “Transmission-Related Policy Options to Facilitate Offshore Wind in the Great Lakes.” Great Lakes Wind Collaborative. 2011. <http://deepblue.lib.umich.edu/bitstream/handle/2027.42/83515/Transmission%20Policies%20for%20Offshor?sequence=1>. Accessed January 23, 2015.

Giberson, Michael. “Assessing Wind Power Cost Estimates.” Center for Energy Commerce. Texas Tech University. October 2013. <http://instituteeforenergyresearch.org/wp-content/uploads/2013/10/Giberson-study-Final.pdf>. Accessed January 23, 2015.

Lawrence Berkeley National Laboratory. “The Cost of Transmission for Wind Energy: A Review of Transmission Planning Studies.” By Andrew Mills, Ryan Wiser, and Kevin Porter. LBNL-1471E. February 2009. <http://emp.lbl.gov/sites/all/files/REPORT%20lbl-1471e.pdf>. Accessed January 23, 2015.

----- “Tracking the Sun VII: An Historical Summary of the Installed Price of Photovoltaics in the United States from 1998 to 2013.” By Galen Barbose, Samantha Weaver, and Naim Darghouth. NUMBER. September 2014. http://eetd.lbl.gov/sites/all/files/tracking_the_sun_vii_report.pdf. Accessed January 23, 2015.

National Renewable Energy Laboratory. “2010 Cost of Wind Energy Review.” By S. Tegen, et al. NREL/TP-5000-52920. April 2012. http://eetd.lbl.gov/sites/all/files/tracking_the_sun_vii_report.pdf. Accessed January 23, 2015.

----- “2011 Cost of Wind Energy Review.” By S. Tegen, et al. NREL/TP-5000-56266. March 2013. <http://www.nrel.gov/docs/fy13osti/56266.pdf>. Accessed January 23, 2015.

----- “Benchmarking Non-Hardware Balance-of-System (Soft) Costs for U.S. Photovoltaic Systems, Using a Bottom-Up Approach and Installer Survey – Second Edition.” By Barry Friedman, et al. NREL/TP-6A20-60412. October 2013. <http://www.nrel.gov/docs/fy14osti/60412.pdf>. Accessed January 23, 2015.

----- “Federal and State Structures to Support Financing Utility-Scale Solar Projects and the Business Models Designed to Utilize Them.” By Michael Mendelsohn and Claire Kreycik. NREL/TP-6A20-48685. April 2012. <http://www.nrel.gov/docs/fy12osti/48685.pdf>. Accessed January 23, 2015.

- “Generation Interconnection Policies and Wind Power: A Discussion of Issues, Problems, and Potential Solutions.” By K. Porter, S. Fink, C. Mudd, and J. DeCesaro. January 2009. NREL/SR-550-44508. <http://www.nrel.gov/docs/fy09osti/44508.pdf>. Accessed January 23, 2015.
- “Residential, Commercial, and Utility-Scale Photovoltaic (PV) System Prices in the United States: Current Drivers and Cost-Reduction Opportunities.” By Alan Goodrich, Ted James, and Michael Woodhouse. NREL/TP-6A20-53347. <http://www.nrel.gov/docs/fy12osti/53347.pdf>. Accessed January 23, 2015.
- “Utility-Scale Concentrating Solar Power and Photovoltaics Projects: A Technology and Market Overview.” By Michael Mendelsohn, Travis Lowder, and Brendan Canavan. NREL/TP-6A20-51137. April 2012. <http://www.nrel.gov/docs/fy12osti/51137.pdf>. Accessed January 23, 2015.
- “Wind and Solar Energy Curtailment: Experience and Practices in the United States.” By Lori Bird, Jaquelin Cochran, and Xi Wang. March 2014. NREL/TP-6A20-60983. <http://www.nrel.gov/docs/fy14osti/60983.pdf>. Accessed January 23, 2015.
- U.S. Department of Energy. “2013 Distributed Wind Market Report.” Office of Energy Efficiency & Renewable Energy. Wind Program. PNNL-23484. August 2014. <http://energy.gov/eere/wind/downloads/2013-distributed-wind-market-report>. Accessed January 23, 2015.
- “2013 Wind Technologies Market Report.” Office of Energy Efficiency & Renewable Energy. Wind Program. DOE/GO-102014-4459. August 2014. <http://emp.lbl.gov/sites/all/files/lbnl-6809e.pdf>. Accessed January 23, 2015.

AVOIDED DEVELOPMENT ON UNDISTURBED LANDS

- Fthenakis, Vasilis, and Hyung Chul Kim. “Land use and electricity generation: A life-cycle analysis.” *Renewable and Sustainable Energy Reviews* 13 (2009): 1465-1474. <http://www.sciencedirect.com/science/article/pii/S1364032108001354>. Accessed January 23, 2015.
- Glicksmann, Robert L. “Solar Energy Development on Federal Public Lands: Environmental Trade-Offs on the Road to a Lower-Carbon Future.” *San Diego Journal of Climate & Energy Law* 3 (2011): 107-158. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1912840. Accessed January 23, 2015.
- McDonald, Robert I., et al. “Energy Sprawl or Energy Efficiency: Climate Policy Impacts on Natural Habitat for the United States of America.” *PLoS One* 4 (August 2009): 1-11. <http://www.plosone.org/article/fetchObject.action?uri=info:doi/10.1371/journal.pone.0006802&representation=PDF>. Accessed January 23, 2015.
- Mosey, Gail, et al. “Converting Limbo Lands to Energy-Generating Stations: Renewable Energy Technologies on Underused, Formerly Contaminated Sites.” NREL/TP-640-41522. October 2007. <http://www.nrel.gov/docs/fy08osti/41522.pdf>. Accessed January 23, 2015.
- National Renewable Energy Laboratory. “Land-Use Requirements of Modern Wind Power Plants in the United States. By Paul Denholm, Maureen Hand, Maddalena Jackson, and Sean Ong. NREL/TP-

- 6A2-45834. August 2009. <http://www.nrel.gov/docs/fy09osti/45834.pdf>. Accessed January 23, 2015.
- “Land-Use Requirements for Solar Power Plants in the United States.” By Sean Ong, Clinton Campbell, Paul Denholm, Robert Margolis, and Garvin Heath. NREL/TP-6A20-56290. June 2013. <http://www.nrel.gov/docs/fy13osti/56290.pdf>. Accessed January 23, 2015.
- “Solar Development on Contaminated and Disturbed Lands.” By Jordan Macknick, Courtney Lee, Gail Mosey, and Jenny Melius. NREL/TP-6A20-58485. December 2013. <http://www.nrel.gov/docs/fy14osti/58485.pdf>. Accessed January 23, 2015.
- Newmark, Robin L., et al. “Implications of future energy choices in the water-energy-land nexus.” WREF Forum: Energy-Water Nexus: An International Perspective. NREL/PR-6A20-54951. May 14, 2012. <http://www.nrel.gov/docs/fy12osti/54951.pdf>. Accessed January 23, 2015.
- Outka, Uma. “The Energy-Land Use Nexus.” *Journal of Land Use & Environmental Law* 27 (Spring 2012): 245-257. http://www.law.fsu.edu/journals/landuse/vol27_2/outka.pdf. Accessed January 23, 2015.
- Trabish, Herman K. “Utility-Scale PV Developers Confront Future of Solar Project Business.” *GreenTech Media*. November 1, 2012. <http://www.greentechmedia.com/articles/read/Utility-Scale-PV-Developers-Confront-Future-of-Solar-Project-Business>. Accessed January 23, 2015.
- Turney, Damon, and Vasilis Fthenakis. “Environmental impacts from the installation and operation of large-scale solar power plants.” Brookhaven National Laboratory. National Photovoltaic Environmental Research Center. *Renewable and Sustainable Energy Reviews* 15 (2011): 3261-3270.
- U.S. Department of Energy. “Developing Renewable Energy Projects Larger than 10 MWs at Federal Facilities: A Practical Guide to Getting Large-Scale Renewable Energy Projects Financed with Private Capital.” Office of Energy Efficiency & Renewable Energy. Federal Energy Management Program. DOE/GO-102013-3915. March 2013. <http://www1.eere.energy.gov/femp/pdfs/large-scalereguide.pdf>. Accessed January 23, 2015.
- “Chapter 7: Solar Power Environmental Impacts and Siting Challenges.” In *SunShot Vision Study*. Pages 157-191. Office of Energy Efficiency & Renewable Energy. DOE/GO-102012-3037. February 2012. <http://www1.eere.energy.gov/solar/pdfs/47927.pdf>. Accessed January 23, 2015.