Why and How to Invest in Decision Support System Tools for Clean Energy Development

By Liese Dart,* Chase Huntley,** and Pam Eaton,‡ The Wilderness Society

The blood that sustained a unified nation is in this land. This is the land that George Washington surveyed. This is the land that James Monroe walked. This is the land that Chief Justice John Marshall farmed. Throughout my 26 years in Congress, I have worked diligently to preserve these lands for future generations. Millions of federal, state, local and private dollars have gone into protecting the sanctity of the history of this region. An electric transmission corridor with a transmission line of the magnitude proposed would permanently desecrate the integrity of this landscape. We must not destroy this land.

Congressman Frank Wolf, 10th District of Virginia
Regarding the Dominion Virginia Power TrAILCo Project
September 14, 2006[1]

As the United States develops renewable sources of energy, values such as open space protection, conservation of at-risk species, and the protection of cultural and historic resources must be recognized during the planning and siting phases of a project. Multiple policy objectives and legal requirements exist to ensure their protection. Considering these values early in planning may reduce community objections to a renewable energy project and forestall litigation.[2] This paper will demonstrate the need to account for a range of values that present potential conflicts when siting clean energy projects, review existing tools to help inform siting decisions, and suggest best practices for creating useful tools to address these issues.

I. Challenges and Opportunities in Siting Clean Energy

Government agencies and non-governmental organizations have made available to the public environmental datasets at the local, state, regional, and federal levels.[3] These data are presented in a geospatial format through tools that, if applied, can be used to improve decisions at the earliest stages of planning about the appropriateness of areas for siting energy generation or transmission facilities.[4] Easily available, reliable, and accurate information about the location and significance

** Liese Dart is the special assistant to the president of The Wilderness Society ("TWS"). Ms. Dart was formerly a Wildlife and Clean Energy Policy Advisor for TWS from 2011-2013, where she served on the Non-governmental Organization ("NGO") caucus of the Eastern Interconnection Planning Collaborative. Ms. Dart covered energy transmission and conservation issues for the Piedmont Environmental Council from 2006-2008. She is a graduate of Tulane University and the University of Wisconsin's Nelson School of the Environment, where she received a master's degree in Environment and Resources and a certificate in Energy Analysis and Policy.*

*** Chase Huntley is senior director of government relations for energy at TWS. He leads the Society's Renewable Energy Initiative and oversees advocacy on energy and transmission issues. Previously, Mr. Huntley served as a lead analyst on energy and climate issues at the U.S. Government Accountability Office, the investigative branch of Congress. He has also worked at the U.S. House of Representatives and Department of Agriculture. Mr. Huntley is a graduate of Claremont McKenna College and received master's degrees in public policy and natural resource management from the University of Michigan.*

‡ Pam Eaton is a senior advisor on energy at TWS. Ms. Eaton serves on the Western Electricity Coordinating Council's ("WECC") Scenario Planning Steering Group and served as the original chair of the WECC's Environmental Data Taskforce. She also co-chaired the Western Governors Association's Environment and Lands Working Group for the Western Renewable Energy Zones project. She is a graduate of Yale University and received a master's degree in public policy from the University of Michigan's School of Natural Resources and the Environment.

1. Letter from Frank Wolf, U.S. Congressman, to Samuel Bodman, Sec'y, U.S. Dep't of Energy (Sept. 14, 2006) (on file with author), *available at* http://wolf.house.gov/press-releases/wolf-opposes-new-power-lines (regarding a request for designation of lands in Virginia as part of a National Interest Electric Transmission Corridor).
2. Liese Dart et al., *Public Policy Considerations in Transmission Planning*, Electric Light & Power (Sept./Oct. 2011), *available at* http://www.elp.com/articles/print/volume-89/issue-5/sections/public-policy-considerations-in-transmission-planning.html.
3. U.S. Gov't Accountability Office, GAO-05-02, Environmental Indicators: Better Coordination Is Needed to Develop Environmental Indicator Sets That Inform Decisions (Nov. 2004), *available at* http://www.gao.gov/new.items/d0552.pdf.
4. A list of tools available in the United States in 2013 includes, for example, Argonne National Lab—Energy Zones Mapping Tool; EDTF Preferred Data Sets (WECC); National Renewable Energy Laboratory ("NREL")—Solar Prospector; NREL Solar Energy Environmental Mapper; Western Regional Partnership; Western Governors Association—Crucial Habitat Assessment Tools; U.S. Fish & Wildlife Service IPaC System; Renewable Energy Atlas of Vermont; Great Lakes Wind Atlas; American Wind and Wildlife Institute—Landscape Assessment Tool; NEPAssist Map Layers; Ohio Coastal Atlas; Natural Resources Defense Council Renewable Energy; and Defense Database, which uses data from the U.S. Department of Defense.

of natural and cultural resources provides renewable energy and transmission developers with a full suite of information about potential risks to project permitting that can help them make a better investment, which may avoid lengthy environmental review, enormous mitigation costs, and litigation.

Past and current practices in regional energy planning have not fully valued the rich tapestry of ecological, biological, and cultural resources that are impacted by electric transmission lines and new generation facilities.[5] Instead, project proposals have stumbled upon regulatory intervention, public opposition, and late-stage litigation because these impact considerations have been ignored until the siting phase of the project. Sensitive lands, waters, species, scenic viewsheds, and their accompanying legal protections and social concerns can pose significant risks to project completion when not accounted for in grid-expansion plans from the outset.

These land uses and attributes can represent a significant risk to business investments. Energy development has the potential to degrade other important benefits derived from the landscape that support human and ecosystem health like clean water, clean air, important cultural and historic resources, maintenance of natural habitats, and aesthetic qualities that cannot be replaced.[6] These impacts, along with other concerns, can engender opposition in administrative venues and through litigation, interrupting or delaying planned project completion.

For example, in 2006, Dominion Virginia Power proposed to construct an extra high voltage transmission line in Virginia through one of the most important historic areas in the United States which contains scenic landscapes walked by our Founding Fathers and Civil War battlefields where thousands of American lives were lost,[7] significant portions of which are already conserved in open space easements.[8] The opposition to this proposal was substantial from all sides, including traditional allies of the Virginia-based utility.[9] In response to a contentious legal battle, the line was eventually moved to an existing right of way corridor, but only after years of delay, wasting the company's time, money, and reputation.[10]

In California, Sunrise Powerlink Project, a 117-mile, 500-kV transmission line proposed in 2005 from Imperial County to San Diego,[11] provides another example of how land use consequences can represent a significant risk to business investments. San Diego Gas and Electric's proposed route ran through the Cleveland National Forest and California's largest state park and largest state wilderness area.[12] During the environmental review process, a number of stakeholders, including the state's parks agency, raised concerns about the unacceptable impacts of the proposed route to sensitive resources and lands protected by law from development. The project proponents did not believe a modified route was economically feasible, so the project was halted by litigation for nearly five years.[13] In 2010, final permits were issued for the line, which followed a modified route, including more than eighty miles of underground direct current cables.[14]

II. New Approaches to Reduce Risk to Siting Clean Energy

Fortunately, new planning approaches and geospatial tools have emerged that can provide the necessary clarity of foresight needed to plan, permit, and build projects which carry reduced risks to impacting existing resources. Changing the practice and culture of energy planning to consider and account for potential conflicts in the very preliminary phase of energy project development can both save energy developers time and money and increase protection of important environmental resources.

Many developers, conservationists, and regulators believe that tools for improving planning will result in a more efficient move to a cleaner energy future.[15] Decision Support System Tools ("DSST") are web-based geospatial platforms that are used by energy planners to aggregate data and identify areas of high resource conflicts that should be avoided when siting a project. DSSTs can offer developers a method by which to compare project sites before a formal project proposal is made. Since 2009, developers, conservation-

5. In FERC Order No. 2000, the Commission lists the four requirements which must be met in order to establish an RTO. These requirements are listed as (1) independent from market participants, (2) appropriate scope and regional configuration, (3) possession of operational authority for all transmission facilities under the RTO's control, and (4) exclusive authority to maintain short-term reliability. Regional Transmission Organizations, Order No. 2000, 89 FERC ¶ 61,285, at 152 (Dec. 20, 1999).
6. *See* Ernie Niemi & Mark Buckley, ECONorthwest, Land/Water External Costs and Electricity Planning Accounting for Nature's Value When Evaluating Options for the Eastern Interconnection Electricity System 16–24 (June 2011).
7. In 2006, the Piedmont Environmental Council based in Warrenton, Virginia estimated that within Dominion Power's Study Area for the Virginia portion of the TrAILCo line, the following resources were at risk: 37 Historic Sites on State and/or National Register; 12.9 miles Appalachian Trail; 70 miles Birding and Wildlife Trails; 208 miles Scenic Byway; 62 miles Scenic Rivers—Rappahannock and Goose Creek; 21,725 acres Civil War Battlefields; and 69,190 acres Historic Districts. Christopher Miller, Piedmont Env't Council, Transmission Infrastructure and Land Conservation 33 (n.d.), *available at* http://coursecast.uwc.edu/feeds/1185/hppresentation-cmiller2.pdf (last visited Feb. 10, 2014).
8. This includes 100,200 acres of Easements and 9,744 acres Publicly Owned Open Space. Niemi & Buckley, *supra* note 6.
9. Letter from John Warner, U.S. Senator (R–Va.), to Thomas F. Pharrell II, Chief Exec. Officer, Dominion Power (Sept. 14, 2006); Letter from Homeowners and Landowners in Western Prince William County to Samuel Bodman, Sec'y, U.S. Dep't of Energy (Jan. 13, 2007); Letter from Frank Wolf, *supra* note 1; Letter from George Allen, U.S. Senator, to Samuel Bodman, Sec'y, U.S. Dep't of Energy (Sept. 27, 2006).
10. The TrAILCo project was opposed on the basis of route selection but also on need. (Testimony of Dr. Hyde Merrill on behalf of The Piedmont Environmental Council, Exhibit No. 73 at pages 3–22 in support of VA SCC - Cases PUE-2007-00031 and PUE-2007-00033). Opponents argued before the Virginia State Corporation Commission that the transmission line was unnecessary as a reliability project and that other less impactful and less expensive solutions had not been exhausted. (Testimony of Dr. Hyde Merrill on behalf of The Piedmont Environmental Council, Exhibit No. 73 at pages 31-32 in support of VA SCC - Cases PUE-2007-00031 and PUE-2007-00033).
11. *See generally San Diego Gas & Electric Company's Sunrise Powerlink Project*, Cal. Pub. Utils. Commission, http://www.cpuc.ca.gov/environment/info/aspen/sunrise/sunrise.htm (last visited Feb. 10, 2014).
12. Dart et al., *supra* note 2.
13. Util. Consumers' Action Network v. Pub. Utils. Comm., 187 Cal. App. 4th 688 (Cal. App. 4th Dist. 2010).
14. *See San Diego Gas & Electric Company's Sunrise Powerlink Project*, *supra* note 11.
15. *NEPA*, Clean Line Energy Partners, http://www.cleanlineenergy.com/blog/entry/nepa_blog (last visited Jan. 30, 2014).

ists, and regulators have participated in the development of two interconnection-wide DSSTs as part of a Department of Energy-funded transmission expansion planning process in the Western and Eastern Interconnections.[16] These interconnection-wide tools represent the most substantial investments in DSSTs for energy development in scope and scale thus far and are evidence that prescreening to avoid high conflict lands is becoming common practice for utility-scale energy development. Lessons from the development and use of the Eastern and Western Interconnection tools, and other similar decision support systems that include wildlife and lands resources, can inform future investments in building effective DSSTs.

The Wilderness Society undertook a review of 30 existing DSSTs from December 2012 to March 2013 to develop considerations for optimizing these tools.[17] Six key considerations were identified based on review of documentation and data for more than 30 local, state, regional, and federal DSSTs, as well as an informal survey of key stakeholders involved in the design of these systems. These considerations are described in detail below.

A. Involve a Broad Stakeholder Group for Establishing Scope and Gathering Data

Renewable energy and transmission developers strongly support the concept that better informed decisions about how and where to site energy projects is crucial to improving permitting and reducing siting-level conflicts. Stakeholder engagement and buy-in are critical to building an effective DSST.[18] A significant upfront investment is essential for determining credible pre-existing data sources as well as data gaps and for gathering a wide perspective on what datasets should be included in the tool. This investment should aim to ensure that the tool captures a wide perspective on the potential resource conflicts that are relevant in a specific geography, such as specific species, geological attributes, or existing uses of the land, which differ from place to place. The goal of involving a broad stakeholder group is to identify all potential resources that may present conflicts for a project proposed in the area.

Working with stakeholders to clearly define the purpose of such a DSST will inform what data sets should be included, what funding is needed, and whether the tool's purpose can be accomplished in the time allotted for a project. For the Western Interconnection, a taskforce made up of representatives from transmission developers, utilities, state wildlife agencies, federal land management agencies, wildlife groups, land trusts, public land conservation groups, and renewable energy advocates came together to create a DSST for interconnection-wide transmission planning.[19] As a group, they determined what types of environmental and cultural data should be included in the DSST and how different environmental factors should be ranked in terms of significance for transmission planning.[20] This stakeholder engagement produced a useful DSST based on best available data and generated awareness of data gaps that need to be addressed to facilitate better siting of energy infrastructure across the entire Western Interconnection.

B. Key Environmental and Other Factors in DSSTs for Energy

Stakeholders have begun to identify which factors put real constraints on siting—and where data exist to help identify those constraints early. Our review found a wide-ranging level of completeness of information within the available tools, and varying levels of inclusion of key data. For example, data delineating areas on western Bureau of Land Management ("BLM") lands identified as having wilderness character, a class of lands identified as potentially worthy of protection under the Wilderness Act of 1964, were not consistently included in DSSTs.[21] In total, we observed over 300 discrete indicators employed in the thirty DSSTs. Our analysis found that DSSTs commonly included the following natural resource and environmental factors: the built environment (including brownfields), infrastructure and jurisdictional borders, land ownership status (state, federal, and private), species (both at-risk species and crucial habitats), cultural and historic resources, defense lands and operations (lands used for testing and training, radar installations, and other), and protected areas (National Parks, National Forests, Wilderness Areas, and Wildlife Refuges). However, the specific data elements included to represent these issues in DSSTs studied varied widely. Some tools, but not all, included administrative management datasets such as identified Wilderness Study Areas, Areas of Critical Environmental Concern managed by the BLM and areas identified as critical habitat or migration corridors for birds. A standard set of key natural and cultural resource data are not in use, leaving significant "blind spots" in communicating relative risk to a project proponent of any

16. American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115, 139 (2009).
17. These DSSTs included federal, state, regional, and local DSSTs. Contact lead author for a complete list.
18. This statement is based on observation from The Wilderness Society's staff participation as a representative of the NGO Caucus for the development of the Energy Zones Mapping Tool by Argonne National Lab, under funding from the Eastern Interconnection States' Planning Collaborative, and the Environmental Data Task Force of the WECC. In addition the authors conducted 15 interviews with stakeholders engaged in these processes on best practices for DSSTs.
19. According to WECC's website on the Environmental Data Task Force,
> The Environmental Data Task Force (EDTF) was formed by the Scenario Planning Steering Group (SPSG) in June 2010 to develop recommendations on the type, quality, and sources of data on land, wildlife, cultural, historical, archaeological, and water resources. The EDTF was purposed with exploring ways to transform that data into a form usable in WECC's Transmission Expansion Planning study cases, 10-year, and long-term planning models.

Environmental Data Task Force, W. Electric Coordinating Council, http://www.wecc.biz/committees/BOD/TEPPC/Pages/EDTF_Home.aspx (last visited Nov. 21, 2013).
20. *Environmental Data Task Force—Products*, W. Electric Coordinating Council, http://www.wecc.biz/committees/BOD/TEPPC/Pages/EDTF_Products.aspx (last visited Jan. 30, 2014).
21. The BLM has authority to identify lands as having wilderness character under the Federal Land Policy and Management Act of 1976. Lands may be designated as wilderness by an act of Congress under the Wilderness Act of 1964. The Wilderness Act of 1964, 16 U.S.C. §§ 1131–1136 (2012).

particular potential site. Below are additional thoughts on three common datasets: species data, cultural data, and U.S. Department of Defense ("DOD") data.

1. Species Datasets

Important wildlife conservation laws like the Migratory Bird Treaty Act and the Endangered Species Act serve to protect the health of our natural ecosystems. As a result, DSSTs host varying levels of in-depth species data, based on the purpose and author of the tool. In general, state-based DSSTs provide more information on specific species that use state Fish and Game data, while larger, regional tools focus on species covered by U.S. Fish and Wildlife Service data. Species datasets may change dramatically over time. As climate change continues to occur, tool developers should consider including calculations for biodiversity shifts to reflect where species will likely migrate over the course of the forty to fifty year lifetime of an energy project.

2. Cultural Datasets

Laws to protect cultural and historic resources and the areas where they are found must be complied with in the process of deciding where to site a renewable energy facility, usually through the National Historic Preservation Act and other federal, state, and local laws and ordinances. These resources are very important, but there is often limited data available on their distribution across a landscape. Tools that indicate a region may have historic resource constraints can help developers begin the historic and cultural resources survey process as early as possible.

3. Defense Facilities Datasets

Constraints involving defense facilities can completely halt a project or severely alter the design of a site. Once a developer becomes aware of a potential defense-related conflict, the project proponent often consults the DOD Siting Clearinghouse, designed as a one-stop-shop for comprehensive, expedited evaluation of energy projects and their potential effect on DOD operations."[22] Similarly, the Natural Resources Defense Council's Renewable Energy and Defense Geospatial Database (READ) provides an accessible and less formal geospatial tool to determine potential project conflicts with military installations, ranges, and training locations; flight training routes and special use airspace; weather radar installations; air defense; and Homeland Security radar installations.[23]

C. Create Measures for Managing Sensitive Data

A DSST's accuracy is based on ensuring that the data truly reflect the resource constraints of an area. Often, data for important resources are not publicly available because of concerns about providing geospatially-explicit information on the location of sensitive resources. DSSTs can work with data holders to reduce these concerns. For example, in the Western Interconnection, data were preprocessed to meet the data provider's need for confidentiality and to aggregate data across jurisdictions.

The approach taken in the Western Interconnection DSST can help make information about endangered species occurrences, cultural resource distribution, and even critical infrastructure locations available in a way that informs planning without exposing those resources to additional risk. For example, cultural and historic resource constraints may greatly impact how a project is developed. Data about the presence and distribution of these resources are often kept in State Historic Preservation Offices (SHPO) that have their own databases of resources, but only some of those databases are digitized. In the Western Interconnection states, which contain a much higher percentage of public lands, there is a cultural database owned by the BLM; however, not all of the states share their data. Some states have their own archeological databases, but these are not publicly available because of the sensitivity to potential looting or vandalism. In addition, many cultural and historic resources have not been surveyed—only three percent of National Park Service lands have been surveyed for cultural and historic resources.

In the west, stakeholders are working together to overcome these constraints. As part of the Western Interconnection Regional Transmission Expansion Plan, a pilot project is underway to determine an appropriate method and scale for acquiring and using cultural resource location and inventory (*i.e.*, survey) data.[24] The goal is to develop a process and product that respects the sensitivity of cultural data and the need to protect the locations of these irreplaceable resources from public release, while providing sufficient information to allow for the consideration of cultural resources during regional transmission planning.

D. Establish a Plan to Keep Data Current From the Start

The long-term success of any tool is highly dependent upon ensuring that once an investment has been made, a tool does not languish because of outdated data. Establishing a system to keep the data current will influence how the tool is built in many important ways, including the amount of information provided, the depth of the information attained, and how the data is aggregated and presented. Of the DSSTs reviewed by The Wilderness Society, many are "snapshots" in time—cre-

22. *DoD Siting Clearinghouse*, U.S. Dep't of Defense, http://www.acq.osd.mil/dodsc/ (last visited Nov. 11, 2013).
23. *Renewable Energy and Defense Geospatial Database*. Nat'l Resource Defense Council, http://www.nrdc.org/media/2011/111108b.asp (last visited Jan. 30, 2014).
24. W. Elec. Coordinating Council, Strawman SHPO Site and Inventory Data Analysis Approach 2 (Apr. 23, 2013), *available at* http://www.wecc.biz/committees/BOD/TEPPC/130425/Lists/Minutes/1/WECC_CulturalDataApproach_20130423.pdf.

ated with no plan for maintenance and improvement. With proper upfront planning for future funding, tools can be updated regularly. Tools that receive federal funding, such as the Western and Eastern Interconnections' DSSTs, should set the bar high by institutionalizing maintenance plans. The Eastern Interconnection DSST developer Argonne National Lab plans to track the eastern data layers by the date they were last updated, stated interest of users, and an estimate of how often a layer is likely to change. Creating processes through which stakeholders can identify and provide new or updated data can improve DSSTs over time. The Western Interconnection has established a process whereby new data will be updated on a biannual basis via an open season for data.[25] The West's process is aimed at updating existing environmental and cultural data sets with the most current available information; adding new or previously undiscovered data sets that will improve the West's ability to assess environmental and cultural risks associated with transmission expansion; and most importantly, building consistent relationships with organizations that manage environmental and cultural data to facilitate ongoing collaboration in transmission planning in the Western Interconnection.

E. Decide Upon Logical and Tested Systems and Methods for Communicating Risk and Opportunity

DSSTs are only as good as the maps, reports, and products they produce. The two examples provided—the Eastern and Western Interconnection-wide planning tools—offer different approaches to communicating and presenting risk and opportunity to energy developers, based on identification of specific resources verses indication of potential conflict. The Western Interconnection stakeholders—through an open and collaborative stakeholder process comprised of government, industry and conservation representatives—compiled a list of preferred data sets to inform a complete risk profile for all lands within the Western Interconnection. Lands within the Western Interconnection are ranked 1–4 based on the level of risk an environmental or cultural resource or set of resources may pose to the development of a transmission line. A risk assessment of 1 correlates to a low-risk area to develop. A risk assessment of 4 indicates to a developer that the area is high-risk—generally precluding development—and planning for an alternative route is warranted.

In the East, stakeholders developed a web-based GIS mapping tool called EZ Mapper to identify suitable areas for clean energy development in thirty-nine eastern states.[26] This robust tool provides users with access and the ability to populate a customized map with hundreds of state-specific and regional data layers which can then be used to model optimal sites for energy projects. With this tool, a developer may also model the suitability of a site based on a number of characteristics. The EZ Mapper tool allows a user to build a map using over 200 individual data layers but also provides compressed "habitat" and "protected lands" layers which are coded as "preclude from development," "develop with extreme caution," and "develop with caution." These compressed data sets can be individually weighted as part of the tool's modeling function, which optimizes energy resource potential with resource constraints to guide developers towards low conflict development sites.

Although these two approaches are different, they are comparable in that they both provide a developer with a catalog of potential resource conflicts and a sense of the level of appropriateness of a site or route. Both tools allow developers to use the risk classifications provided in the tool and to access the underlying data sets to develop their own risk assessment.

Reporting functions can increase the usefulness of a tool's mapping function. For example, the National Renewable Energy Laboratory's Solar Prospector[27] allows a user to create a map of solar insolation layered with technological potential—including access to transmission corridors and resource constraints, such as critical habitat. Once a site is determined, the user can run a report on the annual mean solar resource variability for a specific place to determine its suitability as a productive site. The Solar Prospector also allows the user to query a defined region for average annual direct normal irradiance (DNI), habitat conflicts (though not other environmental risks), and access to transmission. Any three of these constraints could be a significant hindrance to a project. Similarly, the Western Interconnection tool allows the user to develop a report of environmental risk factors for any given area.[28]

An additional approach, exemplified through the Western Regional Partnership tool, allows users to create reports that may be downloaded and saved as a PDF. This easy-to-use function can provide a developer with a quick overview of landscape resources via the datasets available in the Western Regional Partnership GIS map.[29] The report also provides contact names and phone numbers for the federal, state, local, and defense-related land management agencies that are within the selected site.

F. Include Metadata

Metadata—or data that describes or provides additional information about one or more aspects of the data being

25. Envtl. Data Task Force, W. Elec. Coordinating Council, Environmental Data Update and Review Process (2012), *available at* http://www.wecc.biz/committees/BOD/TEPPC/External/EDTF_Environmental_Data_Update_and_Review_Process.docx.
26. The Energy Zones tool also allows for users to inform plans for electric transmission infrastructure. *EZ Mapping Tool*, EISCP, https://eispctools.anl.gov/ (last visited Apr. 8, 2014).
27. *The Solar Energy Prospector*, Nat'l Renewable Energy Laboratory, http://maps.nrel.gov/node/10 (last visited Mar. 31, 2014).
28. *Environmental/Cultural Data Viewer*, W. Electric Coordinating Council, http://184.169.179.203/flexviewers/WECC2/ (last visited Mar. 31, 2014).
29. The Western Regional Partnership ("WRP") brings together senior-policy level Federal, State, and Tribal leadership to identify common goals and emerging issues in the states of Arizona, California, Nevada, New Mexico, and Utah related to natural resources, sustainability, homeland security, and military readiness. The WRP Web Mapping Application displays spatially referenced data using a common platform and shared data. *WRP Web Mapping Application*, W. Regional Partnership, https://wrpinfo.org/GISGroup.aspx (last visited June 5, 2014).

depicted—is essential to transparency for any DSST.[30] Access to and quality of metadata can make or break the trust of a user, and can provide important insight into the currency, quality, and the origin of the data. First and foremost, metadata needs to be easy to find on the tool's website and organized in a consistent manner. For broad sets of data, such as the National Conservation Easement Database maintained by the non-profit Land Trust Alliance,[31] new easements are frequently updated or added, so it is important to annotate which version is included in a DSST. Some metadata may be important in providing an accurate picture of the resources within an area, but may not be a national dataset or created by a state or the federal government. For example, in the Eastern Interconnection's EZ Mapper, The Wilderness Society provided several important data layers for the tools that were created in-house. The Society's "Mountain Treasures" data represents some of the most ecologically intact regions of the Southern Appalachian Mountains, which were under-represented prior to the inclusion of this information in the Eastern EZ Mapper.[32] It is important to provide developers with a solid understanding of how the data was developed, who created it, and how up-to-date it has been kept in order to create data sources that are credible and useful.

III. Conclusion

By investing in the design of DSSTs that aid renewable energy and transmission developers in the smart siting of new infrastructure projects, we can reduce the risk to important landscape resources while spurring the rapid shift that is needed to a new and cleaner energy economy. Energy infrastructure siting can be intimidating, complex, and cumbersome for developers and investors. When potential siting conflicts are not uncovered upfront, the seemingly simple exercise of building new infrastructure can be fraught with risk to the project proponent in terms of timely permitting and completion. The growing awareness of the need to prescreen proposed sites for potential conflict with sensitive natural and cultural resources is promising, particularly the increased use of DSSTs. These tools, however, are only effective in communicating the relative risk of siting in one area or another if important sensitive resources are represented by accurate and reliable data. The key considerations identified in our analysis can help to ensure new tools communicate the real risk to project proponents. Changing the culture of energy-planning by making a shift towards prescreening for conflicts using DSSTs in the preliminary phase of project development will save developers years of struggle, and will protect the iconic resources that are integral to our shared American experience.

30. "A metadata record is a file of information, usually presented as an XML document, which captures the basic characteristics of a data or information resource. It represents the *who, what, when, where, why* and how of the resource." *Geospatial Metadata*, Fed. Geographic Data Committee, https://www.fgdc.gov/metadata (last visited June 5, 2014).
31. *NCED at a Glance*, Nat'l Conservation Easement Database, http://nced.conservationregistry.org/ (last visited Jan. 30, 2014).
32. *North Carolina Mountain Treasures*, Wilderness Soc'y, http://www.ncmountaintreasures.org/ (last visited Jan. 30, 2014).