

# **Online Energy information System: A survey of Web-based resources**

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## **Abstract**

In introducing cohesion to the various sustainable energy and climate change tasks and initiatives that had been being undertaken within provincial government level, within industry and trade and within civil society, authorities has now not been a hit. The primary reason in the back of this failure is that there's no consolidated platform to file sustainable energy and climate alternate initiatives. This gives a false impression that no longer a lot is being completed inside the sustainable energy quarter. Moreover, the stakeholders in the energy area inside the province are every now and then unable to get entry to strength records because there is no vital records centre. Presently, there may be no tool to reveal the progress of those initiatives and their effect at the strength and weather exchange landscape. The overarching objective of the undertaking is to have a system of tracking municipal RE and EE projects within the province. The underlying goals of the paper focused on thoroughly evaluating available technologies and database. An extensive survey two of the world's best resources readily available on the interment was conducted. Most important points and conclusions are noted.

## **Keywords**

Sustainability, ENERGY, Database

## **Introduction**

### **1. INTRODUCTION**

#### **1.1. Background**

The White Paper on Renewable energy (2003) has set a target of 10 000GWh of power to be constructed from renewable power sources (especially from biomass, wind, solar and small-scale hydro) by 2013. The White Paper's goal of 10 000GWh renewable energy contribution to very last energy intake with the aid of 2013 became confirmed to be economically feasible with subsidies and carbon financing. accomplishing the target will: add about 1.667MW new renewable power capacity, with a net effect on GDP as high as R1.071-billion a yr. it is also predicted to create extra government sales of R299-million, Stimulate dditional earnings on the way to go with the flow to low-profits families through as plenty as R128-million, growing just over 20 000 new jobs; and make a contribution to water savings of 16.5-million kilolitres, which translates right into a R26.6-million saving.

Renewable energy resources, aside from biomass (the power from plants and plant-derived substances), have not yet been exploited optimally in South Africa. The DoE has bolstered worldwide relationships in this vicinity via partnerships hooked up at some point of the world Summit on Sustainable development (WSSD) in 2002. Such partnerships will conquer marketplace barriers and sell big use of sustainable

energy answers. these consist of the worldwide Village energy Partnership and the Renewable energy and energy efficiency Partnership.

The 2003 study additionally highlighted the technologies to be applied first, based totally on the extent of commercialisation of the technology and natural resource availability. The department has added nominal, as soon as-off capital subsidies to assist undertaking builders in imposing economically sound initiatives which might be effectively financed by way of financial institutions. ([http://www.electricity.gov.za/files/renewables\\_frame.html](http://www.electricity.gov.za/files/renewables_frame.html))

round the sector, national and subnational (e.g., country, provincial, and municipal) governments are enacting regulations and providing financial incentives associated with smooth power. as the quantity of regulations and incentives grows, it turns into more difficult for consumers, corporations, researchers, and policymakers to decide how they may effect clean electricity tasks.

The Database of country Incentives for Renewables and efficiency (DSIRE) become installed within America to offer summaries of power performance and renewable electricity regulations offered through federal and state governments. Because the launch of DSIRE in 1995, the quantity of regulations and incentives blanketed within the database has grown from only some hundred to extra than 2,700. DSIRE, that's funded via the U.S. department of energy (DOE), is considered the foremost public aid for statistics on easy power rules and incentives within the u.s.a. In 2012, DSIRE averaged greater than 574,000 visits in step with month and greater than a hundred and 70,000 unique visitors. Many different international locations have expressed interest in creating a comparable database to provide online, easy public get right of entry to to countrywide and subnational smooth power policy statistics.

## **1.2. PROBLEM STATEMENT**

One goal of the Gauteng integrated energy strategy (GIES) that became developed in 2010, was to bring cohesion to the numerous sustainable energy and climate alternate initiatives and tasks that have been being undertaken inside provincial government level, inside industry and commerce and within civil society. in the course of the past 5 years that the strategy has been applied, this cohesion has not been achieved. the main reason at the back of this failure is that there is no consolidated platform to file sustainable energy and climate trade projects. This offers a false impression that no longer an awful lot is being performed within the sustainable energy sector. moreover, the stakeholders in the energy quarter in the province are once in a while not able to access energy facts due to the fact there's no vital statistics centre. currently, there may be no tool to display the progress of these projects and their effect at the energy and climate change panorama.

## **1.3. PROJECT OBJECTIVES AND METHODOLOGY**

The overarching objective of the project is to have a system of tracking municipal RE and EE initiatives in the province. In order to do so the underlying objectives of the paper was to thoroughly review available technologies and database. A comparative and analytical comparison of two working databases was done and related to the Gauteng provincial case. The direct beneficiaries of the proposed project will be sector departments, municipalities, national government, Eskom, Energy Civic Organizations, Higher learning Institutions, Energy companies

### **Databases**

Table1.

<b>Database</b>	<b>country</b>	<b>audiences</b>
DSIRE	USA	<ul style="list-style-type: none"> <li>Consumers •</li> <li>Businesses •</li> <li>Policymakers and other government officials •</li> <li>Researchers • Media</li> </ul>
IREEED	INDIA	<ul style="list-style-type: none"> <li>Consumers •</li> <li>Businesses •</li> <li>Policymakers and other government officials •</li> <li>Researchers • Media</li> </ul>

it could be the case that there are a couple of target audiences. as an example, the number one audiences for both DSIRE and IREEED are consumers, corporations, and policymakers. customers from each form of audience will be searching for exclusive facts and it could be essential to recollect developing particular portals for every sort of target audience with targeted facts. occasionally a easy power coverage database may even attract users from other nations. The making plans group may want to recall creating factsheets and other substances to help the worldwide network apprehend the way to use the database and how the country's energy region is dependent and operates

it is important to determine the initial scope of the coverage content early inside the technique. Efficiencies can be gained through adhering to a steady, transparent method for choosing applicable content. Sharing the scope and methodology can help customers recognize what's and what is not blanketed. for example, DSIRE offers a precis of the scope of internet site at <http://dsireusa.org/faq/> in which it surely states the method for determining which policies and incentives are included within the database.

while defining the scope, the assignment team might also discover it useful to start by using determining what will and could not be covered in 4 number one classes, defined in greater element beneath: 1) eligible technologies, 2) financial incentive type, 3) government policy or application kind, and 4) additional power data

### **Eligible Technologies**

Policies and incentives are typically designed to apply to specific types of technologies (e.g., photovoltaics and/or wind). Early in the process of developing a database, it is useful to clearly define the types of technologies that the database will cover. For example, is the database being created to provide information only on solar policies or will it include all renewable technologies? In broad terms, possible options include:

- Renewable energy
  - o Electric applications
  - o Thermal applications
  - o Transportation (vehicles, fuels, and equipment)
- Energy efficiency
  - o Buildings
  - o Industry

- o Transportation
- Other technologies and systems
- o Energy storage
- o Smart grid equipment and infrastructure.

It will likely be helpful for the project team to be as specific as possible regarding included technologies (e.g., will policies targeting photovoltaics and concentrating solar be included?). As an example, the list of specific technologies included in DSIRE can be found by scrolling through the “Select a Technology” dropdown list on the DSIRE search page at <http://dsireusa.org/searchby/index.cfm?ee=1&re=1>.

### **Financial Incentive Type**

There are many different types of financial incentives, some of which will be unique to particular countries. Potential incentive categories include:

- Tax incentives • Rebates • Performance-based incentives • Long-term purchasing contracts and offers
- Grants • Loans and loan guarantees.

In addition to considering the kind of incentives to encompass, it may additionally be useful to do not forget the longevity of application funding. For instance, DSIRE normally only includes monetary

Incentives which can be to be had on an ongoing foundation and does no longer normally consist of one-time funding possibilities. Each monetary incentive may be administered via a particular entity, such as a state or provincial government, software, or a non-profit. Depending on the target audience(s), it is able to make sense to limit the scope to include incentives furnished most effective by way of unique entities, such as:

- State government agencies
- Local government agencies
- Quasi-government agencies
- Electric utilities
- Gas utilities
- Businesses (including banks and other lenders)
- Non-governmental organizations (domestic and/or international).

The project team may additionally choose to commit special attention to whether or not incentives provided via the personal zone (e.g., corporations) will be blanketed. as an example, the DSIRE project body of workers has found that it is difficult to evaluate the perceived merits of financial incentives which can be supplied by using agencies (which include banks however except for utilities) and therefore does no longer consist of such monetary incentives inside the database.

### **Government Policies or Program Type**

similarly to presenting economic incentives, government agencies can also set up other regulations to encourage or require the use of renewable power and/or strength performance technologies. As an example, those are non-financial rules which can be currently carried out by way of federal, nation, or local governments all through the usa:

- Appliance/equipment efficiency standards
- Building energy codes
- Contractor licensing requirements

- Energy efficiency resource standards
- Energy standards for government buildings
- Government green power purchasing commitments
- Interconnection standards
- Net metering
- Public benefits funds
- Renewables portfolio standards
- Renewable energy permitting policies
- Solar and/or wind access policies.

it's far probable that different applicable government policy sorts exist in specific countries that the project team may additionally find vital to encompass. relying on the target audience, the project group might also desire to keep in mind inclusive of summaries of accredited authorities power plans, projects, roadmaps, or different comparable documents. while DSIRE does not consist of such content material, these files can provide beneficial records about the coverage environment on the precise degree of authorities.

### **Additional Energy Data**

Along with this sort of data, but, can considerably expand the scope of the database, that can make the database more tough to navigate and keep. Layout and conduct initial studies The target market and the content scope will guide how the initial research is designed and conducted. The challenge group will likely need to appoint multiple techniques of soliciting and gathering data to populate the new useful resource. viable strategies encompass:

- engaging in research on the national, nation, and neighborhood levels using applicable felony tools, databases, and other available assets
- Surveying comparable internet-based sources and related reports
- Designing and sending a survey to authorities officers, utilities representatives, nongovernmental corporations, and organizations that perform inside the electricity arena to gather statistics about applicable financial incentives and government policies; follow-up telephone calls can make sure a better reaction
- accomplishing media studies for information articles addressing relevant financial incentives or government policies using appropriate media archives, databases, and different available tools.

Database projects can be a bit tricky to complete if initial making plans efforts address how the content of the database can be reviewed and updated for accuracy and timeliness. If the content material is up to date regularly, the database may want to prove greater useful as a decision making tool. preferably, database content can be reviewed and updated at least as soon as a year, and new incentives and rules can be delivered without delay after going into effect. methods utilized by DSIRE body of workers for staying abreast of easy electricity policy and incentives developments include:

- Subscribing to relevant information feeds, newsletters, and different media resources
- Periodically conducting felony studies, specifically on pending and proposed policy adjustments despite the fact that they'll now not be delivered to the challenge internet site until they may be enacted
- Periodically reviewing utility and government web sites
- Periodically communicating immediately with stakeholders
- Attending webinars, workshops, conferences, and different occasions
- Inviting the general public to suggest, regulate, or offer content thru an online form or an open supply platform.

If viable, it can be beneficial to periodically touch the program administrator immediately to affirm that an incentive or policy remains in effect and affirm the accuracy of the database file. In accumulating policy information, the IREEED group has relied extra heavily on direct interactions with policy and application administrators due to the fact information of the specific kingdom guidelines aren't as effectively to be had on-line as they are inside the u.s.. As this manner can be greater time eating, it's miles critical for the assignment team to apprehend the type of techniques so as to be used to collect and

update data while determining the sources needed to finish this undertaking. when to start with planning a smooth electricity coverage database and website, there can be only a few incentives and policies to encompass. however, it could be useful to contain expectancies for boom into the initial plan and renovation and operations protocols to make sure future flexibility. Database users might also want to know how frequently and the way currently the facts is updated. DSIRE accomplishes this through imparting a description on the often requested Questions (FAQ) web page explaining that all records is up to date at least as soon as annually. both DSIRE and IREEED offer a date on the top of every precis page that suggests while it was ultimate reviewed (determine 2 has an example from DSIRE). providing the customers with a specific date of the last assessment permits them to quick determine if the facts is recent or in the event that they need to touch the program administrator to look if any updates have come about.

additional considerations all through the budgeting and improvement level it may be useful to don't forget several extra issues that could effect the path of the database, and therefore the workforce and budget needed to function it. these issues may encompass:

- additional assignment assets in addition to summaries of financial incentives and authorities regulations, the DSIRE internet site offers a multi-standards seek device, summary maps , summary tables, a library of venture guides and presentations, a glossary, an FAQ page, a listing of related external hyperlinks, an online contact form, files of the records for download, and a solar-precise sub-website online. at the same time as IREEED turned into simply released in September 2013 and has now not included many extra sources, the website does provide files of the records for download and coverage information updates. The mission crew may additionally bear in mind imparting similar assets primarily based at the task scope and objective

Outreach and Communications Designing and imposing a proactive and coordinated outreach plan early in the process ought to assist to maximize focus and use of the database. it could be beneficial to allocate assets to permit group of workers to journey to meetings, workshops, conferences, and other activities to generate cognizance of the website among government officers, groups, and most people.

- Language The language of the internet site will likely be determined via the language of the targeted target audience(s). If target audiences speak more than one languages, it is able to be vital to offer the facts in multiple language. IREEED is presently available most effective in English, even though adding a Hindi model may be considered within the future.
- Requests for Technical help and data users may additionally want or need technical help and records beyond what's furnished at the internet site. for example, DSIRE personnel provides technical help to policymakers, businesses, and the general public upon request. This assistance can take the form of a telephone call to talk about the specifics of an incentive, conducting in addition studies on a positive policy, or imparting statistics at a convention of regulators. To limit the amount of team of workers time absorbed via character requests, DSIRE has predefined responses for regularly asked questions.
- Coordinate activities with similar resources Early inside the strategy planning stage, the venture crew might also find it beneficial to contact program directors for similar resources (e.g., DSIRE, IREEED) to talk about lessons found out. it can also be worthwhile to establish a partnership with other similar tasks to percentage classes learned and change facts that might improve the effectiveness of such assets. This form of coordinate and partnership can allow software directors to leverage existing sources

## **Major Technical Considerations**

The second one foremost thing of creating a smooth energy policy database is growing the database shape and the online person interface (website). Collaboration among the records era (IT) and policy groups can help make certain that the database meets the desires of the group of workers inputting and reviewing rules and the person interface meets the needs of the cusup updated.

Generation Audi: it's miles useful up to date behavior a technology audit early within the making plans system up-to-date discover server and application environment variables, assets, and desires, up to date set the muse improvement and ongoing maintenance necessities. thru the audit method, the undertaking

team will file specifications for the server surroundings, database platform, utility server, and hosting environment, a devoted internet server and database server – will probably be vital up-to-date residence the software framework. A hardware virtualization array will also be up-to-date. minimal hardware specs are dependent on the undertaking scope however may want updated consist of: • CPU Xeon Quad center or better • eight GB of RAM • 80 GB SCSI HDD area RAID 1. similarly, if the database software will be living on present servers, the challenge team will probably wish up-to-date database necessities up-to-date: • The specifications of the server (e.g., processor, RAM, or SCSI RAID) • The version of the server utilized (e.g., Linux, windows, or Mac OSX) • The version of the working device that the server is strolling.

**Database Platform** The database platform will want up to date offer a strong surroundings for utility requests, concurrent connections, and scalability. the choice of database platform is frequently up-to-date on the distinctive server OS surroundings. for example, the DSIRE database is built the use of Microsoft's sq. Server 2008. additional cloud-up to datetallyupdated frameworks, up-to-date Microsoft's sq. Azure, are other capacity options. three.1.3 **application Server** The software server is usually chosen up to datetallyupdated on server environment and the database platform. in addition, existing application surroundings fees and improvement alternatives may also affect this choice. The project crew may additionally need up to date additionally up to date what functions may be brought, which include cell viewing functionality hosting surroundings There are three principal updated up to date do not forget when deciding on a web hosting surroundings for the utility: • Reliability is a up to dateupdated precedence in thinking about a records middle up to date host the database application. Maximizing and retaining up-time is essential up-to-date and hold a long-time period consumer base. As up-to-date up-to-date dependent on up-to-date updated facts, the software should updated be ready and up-to-date on demand. • recurring lower back-Up provider website hosting candidates often provide numerous database and report lower back-up services updated help disaster resupupdated plans. hardware screw ups and human mistakes occur; ensuring that redundancies are in place can assist enhance task fulfillment. • Bandwidth The DSIRE application uses an average of a hundred and twenty GB in bandwidth up-to-date month. Bandwidth is measured with the aid of the quantity of facts that can be transferred from the server up to date the consumer. A large person base requires extra bandwidth. net hosts often base up to date-monthupdated hosting charges on bandwidth allocation. making plans for bandwidth utilization can assist prevent expensive overages if an external host is chosen. similarly, cloud-up-to-date resources may be an alternative for document management up to date be able updated lessen the quantity of bandwidth used as report information is served with the aid of the cloud host. however, heavy dependence on external cloud-up to datetallyupdated services can affect utility load times, which can negatively impact up to date.

**software planning** The software planning method includes targets, resource usability, upkeep, scalability, and extensibility. decide the utility objective one of the first choices up to date be made is up-to-date decide the software's principal goal. The objective of DSIRE and IREEED is updated disseminate 3177227fc5dac36e3e5ae6cd5820dcaa policy statistics efficiently and on a mass scale. To gain this goal, the software allows the challenge group of workers updated replace records and provides a medium up to date ensure powerful verbal exchange. set up quick- and long-time period desires application dreams are regularly set and carried out through attaining quantitative benchmarks, up to date quantity of unique up to date, quantity of page perspectives, or usage relative updated a benchmark web site. In 2011, the DSIRE software up-to-date used by a median of 560,000 up-to-date up to date month.<sup>2</sup> every up to date averages 4 web page views. This records suggest that the DSIRE utility is reaching a large target market. lengthy-term desires may be hooked up up-to-date deal with software evolution and penetration inup-to-date new markets. <sup>2</sup> it's miles updatedo early updated decide the annual average up-to-date for IREEED as the internet site become launched on the supupdated of September 2013.

keep the Database Over the existence of the database, mission personnel will want updated regulate, add, and delete content material on a normal foundation. setting up a password-protected administrative thing will make certain best undertaking workforce are updated make adjustments, protective the content of the

internet site. for example, the DSIRE utility is up to date dateupdated by means of project team of workers through a web-up to date interface (“update console”) up-to-date the database.<sup>3</sup> while designing and programming an “replace console,” it’ll beupdated crucial up-to-date up to date account the number and credentials of people who will regulate the content material, and the technique and velocity with the aid of which modified content is promoted updated the public website. as an alternative, the mission crew might also updated installation the database up to date encourage substantial public enter. The kind of version selected will effect how the task group will outline the overview and approval system. as an example, if massive user input is expected, the challenge crew might also select updated an approval manner in which group participants shouldupdated entire a review of the public enter within a set timeframe (e.g., 7 days). supplying a clear definition of the public enter assessment method at the internet site will set practical expectancies for up-to-date who make contributions records. 3 DSIRE workforce also gets constrained revisions thru person input inup to date OpenEI

Plan for Scalability due upupdated coverage information and technical sources once in a while evolve unexpectedly, it’s far essential up-to-date for modifications up-to-date the database and application structure. Scalability making plans is especially vital for the core database. The database architecture impacts the scope of the utility interface

budget and Timing

it’s far difficult up-to-date generalize approximately the costs and timing for growing a coverage database. labor expenses vary greatly from usa updated u . s . and the hard work requirements are relatively dependent on project scope. as an example, whilst DSIRE started out in 1995, only some hundred rules were included inside the database. over time, as the number of state electricity performance and renewable strength guidelines has accelerated, DSIRE has grown up to date cover approximately 2,seven hundred rules. The personnel time up to dateupdated overview and update regulations has consequently accelerated significantly. The accessibility of policy statistics can also substantially impact the staff time and fees. If most subnational governments make their rules availableupdated up-to-date the general public, it will be less difficult up to date gather the necessary records updated encompass within the database.

## **Conclusion**

developing a clean energy policy database is a complicated challenge requiring close coordination between coverage and IT specialists. an excellent first step in growing this kind of database is to truly define the challenge goal and target market as those will manual the making plans, design, and implementation. careful making plans early within the technique can assist ensure that the database meets the needs of the customers. further to considering the preliminary scope and target audience, it could be useful to begin brainstorming approximately how the database and internet site may grow or change over time. planning for possible destiny needs may want to assist the team layout the database with the necessary flexibility to conform as needed.

As countrywide and subnational governments enact new guidelines and incentives to promote renewable power and strength efficiency, it could end up more difficult for clients, corporations, or policymakers to determine which guidelines and incentives will observe to a smooth energy initiatives. on-line databases like DSIRE and IREEED, which provide a single vicinity for the public to get admission to this information, can provide insight on a country’s smooth energy coverage. <https://www.nrel.gov/studies/courses.html>

The purpose of strength records is to fuel marketers with newly available and previously untapped facts—both government and non-government statistics—to spur new services and products that assist households and corporations store cash on application payments and at the pump, guard the surroundings, and ensure a secure and dependable energy future.

In addition, existing databases of the energy overall performance of TVs, washing machines, and other energy star family merchandise can fuel net sites and cell apps that could help purchasers pick the most efficient merchandise, supporting them keep electricity and money over the product lifetime. Open information from the non-public quarter, made available to consumers, also can spur innovation. as an example, enabling energy customers to safely access their personal household or building electricity facts in a wellknown purchaser-friendly and laptop-pleasant layout—via a inexperienced Button on their very own electric powered utility website also can fuel the subsequent era of energy efficiency and power control services and products.

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