

The background image shows a series of high-voltage power transmission towers and power lines stretching across a landscape under a sunset sky with soft orange and blue tones.

Streamlined Permitting Powered by NREL

Permitting and approval processes for new energy development play a key role in ensuring grid reliability, aligning energy projects with long-term planning, and minimizing negative impacts within local communities. As our energy systems grow more complex and demand continues to rise, there is a critical need to improve these processes to help build the infrastructure needed to power America's future—and to do it faster and more efficiently.

Accelerating Speed To Build for Energy Resources

Delays in reviewing applications for building code compliance and evaluating the impacts of energy technologies have led to a backlog of applications, preventing energy stakeholders from accessing much-needed potential energy sources. Each step in the application process presents unique challenges, requiring specialized solutions to overcome delays.

By strategically targeting the most time-consuming steps and focusing on areas in which artificial intelligence and automated analysis are most applicable, NREL has developed tools to automate and streamline the application, review, and interconnection process components—reducing approval times and lowering costs and risk for new development.

NREL's expertise, tools, and capabilities in automated data gathering and analysis reduce timelines for permitting, interconnection, and environmental review and help stakeholders identify least-cost, low-conflict energy opportunities to overcome regulatory barriers. Additional benefits include:

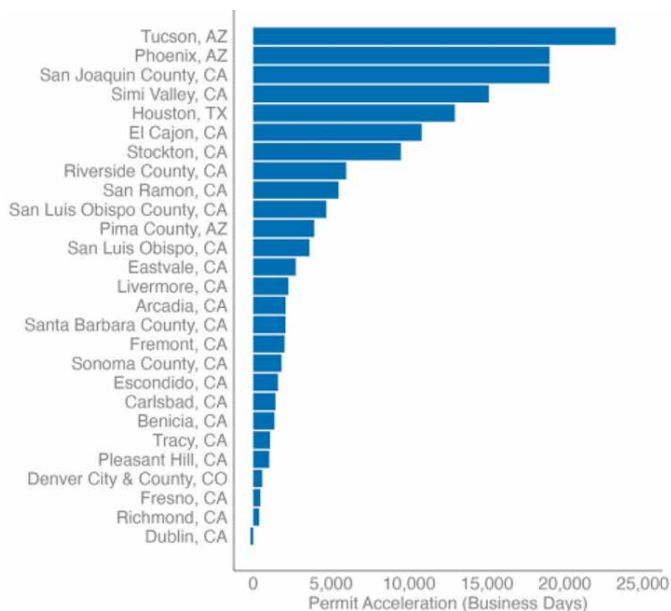
- **Better data, faster decisions.** Automating the collection and distribution of accurate and consistent permitting and regulatory data at all scales
- **Cutting-edge analysis tools.** Developing analytical methods and tools for objective, transparent assessment of all types of energy infrastructure
- **Streamlined permit processing.** Using automation to simplify permitting workflows and improve communication among planning stakeholders
- **Targeted technical assistance.** Identifying and addressing regulatory barriers to accelerate infrastructure implementation at scale.

Speeding Energy Permitting Through Automation

Across the United States, rooftop solar photovoltaic installations have grown rapidly, with over 550,000 installations per year. Local governments must review each design and final inspection, leading to delays, confusion, and added costs.

NREL's Solar Automated Permit Processing Plus (SolarAPP+) is an automated online platform that instantly approves permits for code-compliant residential solar and solar storage systems. SolarAPP+ has enabled the issuance of **70,000+ permits** in **270 jurisdictions** across **13 states**. Key highlights on SolarAPP+ include the following:

- **Shorter project timelines.** A typical SolarAPP+ project is permitted, installed, and inspected around 14.5 business days sooner than traditional projects.
- **Staff time savings.** NREL estimates SolarAPP+ saved around 15,400 hours of staff time through automated permit reviews in 2023.
- **Fewer permitting delays.** SolarAPP+ projects have eliminated over 150,000 business days in permitting-related delays.



SolarAPP+ has the potential to accelerate project timelines across the country. *Figure from Jeff Cook et al. (2024), NREL*

Utilities Save Time and Money With NREL Interconnection Tools

Costly analysis and cautious planning often leave utilities spending more money for less efficient interconnection processes. NREL's PRECISE™ tool changes the game.

PRECISE is an automated interconnection evaluation tool that quickly assesses the impact of solar on the grid and leverages smart inverter functionality.

PRECISE was deployed in 2022 at the Sacramento Municipal Utility District, and since then, has processed over 5,000 distributed solar applications and enabled the interconnection of over 10 megawatts of rooftop solar. Automating the process not only increases the speed of the interconnection process but also saves utilities money by recovering labor hours.

Resulted in **\$300,000 in annual labor savings** for the Sacramento Municipal Utility District

Enhanced customer experiences by shortening application turnaround time and rejecting fewer reapplications

Avoided thousands of work hours of planning engineers' time

NREL's expansive grid and regulatory expertise, combined with innovative artificial intelligence capabilities, equips NREL to strategically pinpoint permitting challenges and quickly develop solutions. NREL also partners with governments and utilities of all jurisdictions to help them improve processes and save time and money.

Learn more about NREL's grid modernization and energy analysis work.



www.nrel.gov/analysis



www.nrel.gov/grid

Cover image: Photo from Adobe Stock

Reference: Cook, Jeff, Sertac Akar, Danny Chang, Anneliese Fensch, Katie Nissen, Eric O'Shaughnessy, Kaifeng Xu. 2024. *SolarApp+ Performance Review (2023 Data)*. Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A20-89618. <https://docs.nrel.gov/docs/fy24osti/89618.pdf>.



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