



# Red tape in residential solar permitting

Slow and unpredictable permitting adds delays and costs for Texans

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Slow and unpredictable permitting adds delays and costs for Texans



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# Table of contents

- Executive summary** ..... 4
- Introduction** ..... 7
- The benefits of residential solar energy and battery storage in Texas** ..... 9
  - Improved resilience ..... 9
  - Reduced air pollution ..... 9
  - Financial savings for consumers who install solar panels and/or battery storage ..... 10
- Permitting and inspection red tape discourages the installation of solar panels and battery storage** ..... 11
  - Delays and higher costs for families ..... 11
  - More hassle for homeowners and solar installers ..... 13
- Common permitting problems that add delays and costs to residential solar panel and battery storage projects** ..... 14
  - Permit applications must be submitted or obtained in person ..... 14
  - Permit review process is slow ..... 15
  - Permit review process involves many parties ..... 15
  - Poor communication by the permitting authority ..... 16
  - Varying application of health and safety codes ..... 18
  - Variation in permit application processes between jurisdictions ..... 19
  - Additional requirements not related to health or safety ..... 19
  - Expensive application fees ..... 20
- Case studies of Texas communities with difficult permitting processes** ..... 21
  - Dallas: Slow permitting timelines aggravated by poor communication ..... 21
  - Irving: Slow and demanding permit review ..... 23
  - Highland Park: Slow and inconsistent permit review process ..... 24
- Case studies where inspection delays may discourage solar installation** ..... 25
  - McKinney: A prolonged inspection ..... 25
  - Frisco: Quick permitting, but a drawn-out inspection process ..... 25
  - Fort Worth: Fast permits, slower inspections, plans for improvement ..... 26
- Instant permit review can make permitting quicker and more predictable** ..... 28
  - Shorter wait times for permits ..... 28
  - Standardized inspection process ..... 29
  - Reduced permitting office workloads ..... 29
  - Reduced costs for consumers ..... 29
  - Increased adoption of rooftop solar energy ..... 29
  - Instant permitting in Texas ..... 30
- Policy recommendations** ..... 32
  - Remove unnecessary red tape to reduce costs and expedite residential solar and batteries ..... 32
  - Address other obstacles to residential solar and batteries ..... 33
- Notes** ..... 34

# Executive summary

**INSTALLING RESIDENTIAL SOLAR PANELS** and batteries for energy storage can allow Texas to build a more resilient electric grid, provide financial savings to households and produce clean electricity. Many Texas jurisdictions require permits for the installation of solar panels and batteries – a process intended to ensure that those installations are safe. However, too often, the permitting process is unnecessarily slow, complicated and uncertain, which frustrates the wider deployment of residential solar and battery storage.

Red tape during the permitting and inspection process for residential systems adds costs for consumers who want to install solar panels and/or battery storage on their homes. In the most extreme cases, it can make it difficult for homeowners or business owners to “go solar” at all and may lead consumers to cancel planned projects. In a 2021 national survey, many solar installers reported that they either avoid jurisdictions with onerous requirements or they charge customers a price premium, in some cases of more than 10%.<sup>1</sup>

**Cutting unnecessary red tape in local solar and storage permitting, including through the use of proven instant permitting tools, can allow more Texans to reap the benefits of rooftop solar and home batteries, while reducing administrative burdens for local governments.**

For this report, we interviewed representatives from 10 companies that install residential solar panels, sometimes with battery storage, to learn about the problems they have encountered with permitting and inspection in various Texas cities, and how those hurdles have slowed down adoption of residential solar energy and storage. We also reached out to officials in the permitting departments in those cities for their responses, though we did not always receive a response.

Common problems with the solar permitting process, which raise costs and slow down deployment timeframes for Texas families interested in installing solar panels and battery storage, include:

- **Slow and unpredictable permit review timelines** that raise costs and make it hard for installers to schedule projects. Data collected by Ohm Analytics, a private firm that gathers data on solar permitting from a variety of sources including local governments and solar installers, show wide variation in permitting timelines for solar projects in Texas. Even in many cities that approve most solar or solar-plus-storage permit applications quickly, some projects remain subject to lengthy delays. For example, in Mesquite, a city of 150,000 east of Dallas, 152 solar project permits in 2024 were approved in a median of three business days, but 10% of permits took 27 business days (five weeks) or longer.<sup>2</sup>
- **Permit review may involve multiple city staffers**, which slows down the permit review process and may make it harder for installers to know where their applications are in the process or who to contact. For example, in Dallas, staff with building, electrical and fire expertise each review applications for solar project permits and do so in sequence rather than at the same time.
- **Poor communication from permitting departments** aggravates other problems with obtaining a solar installation permit. Communication problems include a lack of clarity about what information a permit application should contain, no information on how many reviewers will be commenting on a permit application, and no contact information for reviewers who have requested revisions.

- **Varying application of health and safety codes** that raises costs and slows permit review. One installer said that his company tries to install each project as if they're operating in one of their most rigorous jurisdictions, but even that doesn't ensure smooth sailing through the permitting and inspection process because jurisdictions may have different requirements for similar projects.<sup>3</sup> An additional impact of this inconsistency is that he can't standardize the equipment and materials he uses because "everybody is asking for something different."
- **Variations in permit application processes between different jurisdictions.** Solar installers typically serve homeowners in multiple communities and must navigate the variations in solar photovoltaic system permits in different jurisdictions. Three companies mentioned that they maintain their own proprietary manuals for how to navigate the solar and storage application process in many of the cities where they install projects, which increases their cost of doing business.
- **Additional requirements unrelated to health or safety** that can increase the cost of or slow down solar installations. For example, in Highland Park no equipment is allowed to be visible from the street, limiting the ability of some homeowners to install solar panels in the direction that will generate the most electricity and deliver the most benefit.<sup>4</sup>

The experience of solar installers in several Texas cities shows the ways in which these common permitting problems can combine to make solar installations challenging and more expensive for homeowners. For example:

- The application process for a residential solar project in **Dallas** requires the use of two different online portals that are not automatically connected to each other. Once the application is submitted, multiple city staffers review the application, doing it one at a time rather than simultaneously. Installers said receiving approval for a permit often is slow

and that obtaining a permit for solar-plus-storage projects is particularly difficult. One company no longer operates in Dallas to avoid the long timelines associated with the city's permitting process. Installers stated that receiving approval for a permit often takes weeks. City data show that permits are approved on average more quickly than what installers shared, though third-party data shows that the slowest 10% of projects took five or more weeks to receive approval in the first seven months of 2024.<sup>5</sup>

- One solar company reported the permitting process in **Irving** is so time consuming that it doesn't accept any projects in the community, while another company said it turns down 80% of requested projects in Irving involving batteries. Irving's requirements for battery installations are more stringent than those in other communities, according to installers, though the city defends its practices as necessary for protecting health and safety. The city says that its standard turnaround time for residential solar permits is three days, though data from Ohm Analytics, which collects data on solar energy permitting, show that 10% of solar-only and solar-plus-battery projects take 34 business days (nearly seven weeks) or longer to receive approval.<sup>6</sup>

Instant permitting can reduce the variability and complexity of solar permitting – making solar faster to install, cheaper for consumers, and more readily available.

- An instant permit review process requires the solar installer to submit detailed information about its proposed project – system design, equipment specifications, installation plans and other pertinent information – to a software platform, which automatically evaluates permit applications to ensure compliance with the relevant building codes and safety standards.
- If the application meets all of the requirements, permit approval is granted immediately. If corrections are needed before approval, instant

permitting software can respond as soon as the installer has provided additional or corrected information.

- After the project is installed, it is inspected to ensure compliance with code and safety requirements.

State and local governments should remove unnecessary permitting barriers to residential solar panels and battery storage that do not help to protect health or safety.

- City and county governments that permit solar panels and battery storage should adopt instant permitting and allow remote inspections where appropriate.
  - Local governments can either adopt an instant permitting platform or, if they allow qualified third parties to review permit applications, the third party can utilize an instant permitting platform.
  - Once a residential solar project is permitted and constructed, installers should have the option for a remote inspection sufficient to guarantee the safety of the system. The permitting office or a qualified and licensed third party should be able to conduct the inspection, either via photos or recorded videos.

- Other regulatory requirements that can impede residential solar and battery adoption without improving health or safety should also be reconsidered.
  - Permitting fees should have limits that are reasonable and do not impede the development of residential solar.
  - For any given residential solar project, one authority should conduct permitting for all components of the system. Too often, multiple layers of government are involved in reviewing a single project.
  - States, counties, regional governments or building departments in neighboring municipalities should seek to standardize as many processes and requirements for residential solar panels and battery storage permitting as possible. This could include the application, required documentation, code requirements, code interpretations and steps to receive a permit.
  - Review of residential solar permit applications should be focused on determining whether the proposed system meets all health and safety requirements of building safety codes and not on other concerns, such as the visibility of solar panels from the street.

# Introduction

**FROM THE 2.6 MILLION** Texas electricity customers who lost power following Hurricane Beryl in 2024<sup>7</sup> to the more than 4.5 million customers who lost power during Winter Storm Uri in 2021,<sup>8</sup> many Texans know what it's like to have to ride out the days after a storm in the dark, without heat or air conditioning. Rising demand also threatens the reliability of the power system. Peak demand for electricity on the Texas grid smashed records several times during summer 2024, as hot temperatures and rising power demand pushed the grid near the breaking point.<sup>9</sup>

Solar panels on residential rooftops and energy storage in our homes – when designed to operate independently of the grid – can play an important role in helping Texans to keep the lights on when there are outages, and provide a critical source of power to help neighborhoods bounce back from storms. After Hurricane Beryl, for example, residents with solar panels and battery storage systems not only kept power in their own homes, but they also helped their neighbors keep their homes and food cool in the sweltering Texas heat.<sup>10</sup> Residential solar and batteries are flexible – they can power an entire home or just the most important outlets – meaning when there is a power outage, homes can still keep the lights on, be heated or cooled, preserve food, and power important medical devices.

Texas needs local, residential solar energy and energy storage more than ever. But, in many parts of the state, Texans who want to install solar panels and battery storage in their homes run into a familiar problem: government red tape.

Local governments in Texas are responsible for permitting and inspecting solar panel installations in their communities. The purpose of those rules is to keep residents and the public safe and to ensure that solar panels and energy storage systems are designed and installed properly.

Too often, however, solar installers and would-be solar homeowners find themselves tangled in unnecessary red tape, navigating conflicting messages from local officials, unclear regulations, and long delays in order to install the same solar energy systems that have already been safely installed on millions of homes across the United States.<sup>11</sup>

At best, these conflicts and delays are an annoyance. More commonly, they drive up costs for solar installers – costs that are passed along to homeowners – and reduce the attractiveness of “going solar” in the first place. At their worst, nightmarish local permitting processes can make it nearly impossible for solar installers to deliver – and local residents to obtain – solar panels and batteries at any price.

Texans can no longer afford to let bureaucratic delays stand in the way of the local, resilient energy we need. Thankfully, there is a solution – one that is currently being used in 211 communities nationwide that makes “going solar” faster and easier without compromising public safety.<sup>12</sup>

Instant permitting, including the SolarAPP+ tool developed by the U.S. Department of Energy, allows qualified third parties or local governments to process most residential solar permitting requests quickly and painlessly. Issuing solar and battery storage permits



instantaneously saves time and reduces cost and uncertainty for installers and customers alike.

By adopting instant permitting, Texas communities can help residents prepare for future storms and disruptions to the grid, control their electricity costs and produce cleaner electricity.

This report describes how permitting red tape is slowing the adoption of solar power in many Texas communities while also making it more expensive. It also tells the stories of Texas communities that are successfully speeding solar adoption through streamlined and instant permitting. The case studies in this report reflect more than a dozen conversations with solar installers and municipal officials across Texas. And while those installers and officials don't agree on everything, the overall picture the interviews paint is clear: solar and battery permitting in Texas is often confusing, difficult and takes longer than necessary.

It's a problem that residents, solar installers and municipal officials must now work to solve. The stability of our electric grid – and our ability to weather the next big storm – depend on it.

# The benefits of residential solar energy and battery storage in Texas

**MAKING IT EASIER TO INSTALL** residential solar panels and battery energy storage systems, including by simplifying and streamlining the permitting process, will enable Texas to capture more of the benefits of solar, including a more resilient electricity system, financial savings for families, and improved air quality.

## Improved resilience

Solar panels and batteries installed at homes can help protect families from the effects of power outages and improve the overall resilience of the grid.

Texas customers lose electricity more often than customers in other regions of the country. Texas experienced more power outages than any other state from 2019 to 2024. The 263 power outages in that time lasted an average of 160 minutes each and impacted an average of 172,000 Texans.<sup>13</sup>

Extreme weather events with high wind can knock down trees or trigger fires that damage electrical lines.<sup>14</sup> Weather events with extreme cold, such as Winter Storm Uri, can create ice that brings down electrical lines or even force major power plants to close down.<sup>15</sup> Damage to power lines or drops in electricity production may leave customers without power for days in extremely cold or hot weather as they wait for linemen to repair lines and for companies to turn power back on.

Rooftop solar panels, especially when paired with battery storage, offer families a way to protect themselves from power outages. Homes with solar

panels and battery storage systems that are designed to operate independent of the grid can keep generating and using power even when the broader grid goes down. And with these solar-plus-storage systems, excess power generated during the day can be kept for later use – ensuring that lights, heat and other essentials stay on when people need them most.

Residential solar and storage also provide benefits when the grid is functioning without a problem – and not just to the homeowner. Solar-charged batteries owned by individual homeowners can be connected into a “virtual power plant” controlled by a private operator. The operator can use software to release electricity into the grid at times of high demand, reducing the amount of electricity that needs to be generated at central power plants and transmitted through the electricity grid. Replacing expensive power plants that operate only at times of peak demand with virtual power plants fed by solar energy can reduce the total cost of power for all consumers.<sup>16</sup> In addition, individual homeowners who own batteries can potentially receive compensation for exporting power.

## Reduced air pollution

Many Texans live in areas with poor air quality. The Houston, Dallas-Fort Worth, El Paso and San Antonio metropolitan areas are among the 25 urban areas in the U.S. with the worst ozone pollution, according to the American Lung Association’s 2024 annual report card.<sup>17</sup> This means nearly 20 million Texans live in areas where cars, trucks, power plants, industrial facilities and other



*Batteries mounted in a garage can store electricity generated by solar panels on the roof of a home.*

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sources create so much ozone pollution that outdoor air fails to meet air quality standards.<sup>18</sup> Breathing ozone-polluted air can cause shortness of breath, decreased lung function and greater risk of respiratory infections, among other problems.<sup>19</sup>

The Dallas-Fort Worth, Houston-Galveston and San Antonio metropolitan areas currently fail to meet air quality standards that protect public health from ozone pollution. The U.S. Environmental Protection Agency approved Gov. Greg Abbott's proposal to reclassify these pollution problems as "serious," up from "moderate," in 2024, and the state now has a goal of reducing pollution and improving air quality by mid-2027.<sup>20</sup>

Greater use of rooftop solar and batteries can help increase pollution-free electricity generation. If the untapped rooftop solar potential in Texas were developed, it could produce the equivalent of about one-third of the state's total electricity consumption in 2020.<sup>21</sup>

### **Financial savings for consumers who install solar panels and/or battery storage**

Rooftop solar panels and battery storage may also provide financial benefits for consumers. Residential solar power is more cost-effective when electricity rates are higher, and as many Texans are aware, average electricity prices have increased in recent years.<sup>22</sup>

Not including their value for resilience, the cost-effectiveness of batteries varies according to how electric companies pay homeowners for excess solar electricity they provide to the grid. The cost-effectiveness of battery storage is higher in areas where utilities pay nothing or very little for surplus electricity generation,<sup>23</sup> as is the case in some regions of Texas.<sup>24</sup>

On top of energy bill savings, solar boosts property values. National data show that homes with solar panels sell for 4.1% more than comparable homes without them.<sup>25</sup> Texas homeowners can enjoy lower electricity bills and higher home values while contributing to a more resilient and sustainable grid.

# Permitting and inspection red tape discourages the installation of solar panels and battery storage

## THE BUILDING AND ELECTRICAL PERMITS

required by many Texas jurisdictions can help to ensure that solar panels and batteries are installed safely and do not present a threat to homeowners or others.\* However, too often the permitting process can be slow, overly complicated and inconsistent, adding costs and delay for consumers who want to install solar panels and/or battery storage to their homes.

The permitting process typically allows city or county officials to confirm that safety criteria have been met, including that:

- The solar contractor has the correct licenses to perform the work to be done.
- The project complies with building and electrical codes, including that the solar panels won't be too heavy for the roof they are mounted on, won't blow off during high winds, or won't obstruct key points of rooftop access for firefighters.
- The selected solar panels or batteries are designed to shut off the flow of power to the electrical grid if there's any chance a utility lineman might be conducting repairs near the home, and a safety placard warns anybody working on the home's electrical system that solar or stored power is feeding into the electrical panel.

- Batteries installed in a garage won't be in danger of being damaged by a vehicle.

These are important functions – many of which can be fulfilled automatically via instant permitting. Often, however, the permit application and review process is opaque and time consuming. This adds to the cost of solar and storage projects, and discourages homeowners from installing solar energy and battery storage.

## Delays and higher costs for families

Slow or difficult permitting creates delays and adds to the costs of installation. Delays may cause some homeowners to cancel planned projects, while high costs can deter other families from even considering solar energy.

In Texas from April 2022 through March 2023, a review of more than 11,000 permit applications shows that 25% of planned solar projects (with or without batteries) were canceled after solar installers had submitted permit applications and before the relevant jurisdiction had approved the permit.<sup>26</sup> Cancellations raise costs for solar installers, who must absorb the expenses of time spent on site visits, system design and/or submitting a permit application. This can equal up to \$5,000 in costs for projects canceled after a permit application has been submitted.<sup>27</sup>

\* Note that a permit is not required for residential solar systems or battery storage projects installed in hundreds of jurisdictions in Texas.



Permitting delays are the largest source of project cancellations, according to a 2021 national survey of solar companies.<sup>28</sup> In addition, many solar installers reported that they either avoid jurisdictions with onerous permitting, inspection or interconnection requirements, or they charge a price premium. One-third of those who charge a premium increase their price by more than 10%.<sup>29</sup>

Solar panels, racking and other hardware account for approximately one-third of the cost of installing solar panels on a home.<sup>30</sup> The other two-thirds are

“soft costs,” such as permitting, financing, advertising, taxes, installation labor and overhead expenses.<sup>31</sup> The time and direct expenses of permitting and other bureaucratic barriers account for an estimated \$6,000 to \$7,000 for a typical residential system.<sup>32</sup>

The cost of solar panels and other hardware fell by 85% from 2010 to 2020,<sup>33</sup> meaning permitting and other soft costs are a larger share of residential solar costs than in the past. When permitting delays add to soft costs, they can have a large impact on total solar expenses.

Credit: Sunshine Renewable Solutions

EQUIPMENT INFORMATION		House
69 (N) Aptos Solar 365W Modules (DNA-120-MF26-365W) (Page D1)		TOTAL SOLAR AREA: 900 sqft
69 (N) Tigo Optimizers (TS4-A-C) (Page D2)		TOTAL ROOF AREA: 3600 sqft
1 (N) Junction-Box		% OF COVERED AREA: 25%
2 (N) SOLARK 15.0 KW Inverter MODEL # SOL-ARK-15K-P (Page D3) (Inside The Garage)		
3 (N) 19.2KW HomeGrid Battery Stack (120/240V) (Inside The Garage)		
4 (N) 200A Visible-Isolable Labelled-Push-AC Disconnect Within 10 feet from the Utility Meter (120/240V)		
5 (E) 200A Service Sub Panel (Inside The House) (120/240V, 1φ, 3W)		
6 (E) 200A Main connect (120/240V, 1φ, 3W)		
7 (E) 200A Main Service Panel (Inside The Garage) (120/240V, 1φ, 3W)		
8 (E) Utility Meter (120/240V, 1φ, 3W)		
A 24 Aptos Solar 365W / 24 Tigo Optimizers / Pitch 36° / Az. 175°		
B 11 Aptos Solar 365W / 11 Tigo Optimizers / Pitch 30° / Az. 85°		
C 10 Aptos Solar 365W / 10 Tigo Optimizers / Pitch 30° / Az. 175°		
D 24 Aptos Solar 365W / 24 Tigo Optimizers / Pitch 34° / Az. 175°		

House	Garage
TOTAL SOLAR AREA: 900 sqft	TOTAL SOLAR AREA: 480 sqft
TOTAL ROOF AREA: 3600 sqft	TOTAL ROOF AREA: 1470 sqft
% OF COVERED AREA: 25%	% OF COVERED AREA: 32.7%

SCALE  
0 5 10 15ft

021 W. GALENA PARK BLVD. STE. 101  
DURANGO, UTAH 84020  
PHONE: (801) 990-1775  
WWW.VECTORSE.COM

02/28/2023  
Firm License Number: F11411  
VSE Project Number: U3656.0266.221  
**STRUCTURAL ONLY**

Project Name	Address	Project Description	Contractor	Address & Phone Number	Company Logo	Note	Drawn By: Unique Solar Design	General Notes
		26.19KW DC Roof Mounted PV Electrical System 69-Aptos Solar 365W Modules 2-Solar 15.0kW Inverters	Sunshine Renewable Solutions TELE: #33831, PV-102117017852 Electrolux #500043	4011 Valley Green Ct. Houston, TX 77069 sunshinerenewable.com info@sunshinerenewable.com Phone Number: 632-290-8838			UNIQUE SOLAR DESIGN	DATE: FEBRUARY 28, 2023 REV: AS INDICATED PV SYSTEM <b>PV1</b>

A page from a solar permit application shows what equipment will be used and where it will be installed.

## More hassle for homeowners and solar installers

Difficult permitting processes can lead installers to avoid performing work in some jurisdictions, potentially making it harder for families in those areas to find a contractor willing to install solar energy and battery storage. One installer described how, when his company is working in a jurisdiction where it hasn't worked previously, it applies for a permit, installs the project, and waits until it passes inspection before committing to any other projects in that jurisdiction. If that first project is "too painful," the company will not agree to install any more solar projects there.

One installer interviewed for this report said "I thought I was benefiting society and the planet and all these people I employ" by installing solar energy but felt like the permitting hurdles he encounters send the opposite message and discourage solar installation.<sup>34</sup>

Many Texans want to add solar power to their homes, an investment that will allow them to produce their own power and help lift strain on the state's electricity grid. Complicated and opaque permitting processes raise costs for families and discourage solar installers at a time when the state should be doing the opposite.

# Common permitting problems that add delays and costs to residential solar panel and battery storage projects

**TO LEARN MORE** about the obstacles that the permitting process can create for residential solar photovoltaic and battery projects, and how this can prevent or discourage families from adopting the technology, we interviewed staff at 10 companies that install residential solar panels and batteries. In some cases, we spoke with company owners and CEOs, while in others we interviewed “permit runners,” the staff whose primary job is to obtain a permit for each project the company plans to install.

We asked open-ended questions about permitting and inspection challenges. Companies told us in great detail about the permitting process in some cities, and for other cities provided just a short example of a permitting or inspection obstacle that had added time and cost to a specific solar project. Many of them requested that they not be named in connection with permitting concerns in any specific city because they are concerned about damaging relationships that are important to the operation of their businesses.

After we spoke with solar installers, we reached out to each city or jurisdiction mentioned. Where we heard back, we included the city’s information and perspective in response to the problems flagged by solar companies.

The problems installers described included slow and multi-step application review processes, poor communication, inconsistent application of building

and electrical codes and unpredictable variation from one jurisdiction to another.

## Permit applications must be submitted or obtained in person

Jurisdictions that don’t offer an online portal for submitting a solar permit application rely on slower or less-reliable alternatives, such as in-person, mail or email submissions. These options can increase the cost or time involved in applying for a permit.

For example, the city of Garland, located northeast of Dallas, requires permits to be submitted in person or via mail.<sup>35</sup> Even for an installer based in the Dallas-Fort Worth area, an in-person trip to Garland can be time consuming. Though the city allows solar companies to submit applications via mail, that slows the permit application process compared with an online submission process.

Solar installers mentioned that some jurisdictions rely on email for their permit application process, rather than an online portal, which has several potential drawbacks. If the permit staffer at the building department who receives the email is on vacation, the permit might sit for a week or more. Another drawback of emailed applications is that there’s no way for the solar installer to know if the application has been received or to check its progress through the review process.

Another inefficient approach to processing permits occurs when jurisdictions require permits to be picked up in person. Pecos, in West Texas, requires that approved permits be picked up by someone with at least a journeyman electrician certification.<sup>36</sup> The solar installer who mentioned this said her company sometimes is able to pick up the permit the same day a project is scheduled to be installed; in other cases, the company sends someone on a separate trip from the Dallas-Fort Worth area just to pick up the permit.

One solar installer observed that, in general, “permitting processes aren’t the most modern.”

### Permit review process is slow

When any step in the permit review process is slow, it prolongs the time between when an installer applies for a permit and when they receive approval. These slowdowns can affect the timeline for a solar PV project at several points: during initial review of a permit application, during the review of any revisions or corrections requested before the permit is approved, or after the permit has been approved if the installer needs to make changes to the plan.

Data collected by Ohm Analytics, a private firm that collects data on solar permitting from a variety of sources including local governments and solar installers, shows wide variation in permitting timelines for solar projects in Texas. Austin, Frisco and El Paso were among the cities that approved solar or battery storage permit applications in a median of one business day, based on 2023 or partial 2024 data for more than 500 permit applications in each city. In 2024, Lubbock had a median approval time of two business days (based on data for more than 550 permit applications) while San Antonio’s was three business days (based on more than 300 permit applications). Waco, on the other hand, required a median of 11 business days to approve a permit (based on data for 89 permit applications) and Killeen required 13 business days (based on data for 63 permit applications).

In some cities where the median time for issuing a permit is relatively short, a subset of permits is nonetheless subject to lengthy delays. In Mesquite, for example, solar project permits were approved in a median of three business days, but 10% of permits took 27 business days or longer, according to Ohm Analytics’ data on 152 permit applications in 2024.<sup>37</sup> In League City, median approval time for 87 permit applications was six business days but 10% of permits took 28 business days or more, while in San Antonio the median time was three business days but 10% of permit requests waited 10 or more business days for approval. Installers do not know in advance which of their applications will experience these delays.

Permitting delays make it difficult for solar companies to accurately schedule projects for installation. The lack of predictability makes it hard to set expectations with customers, as well as difficult to manage employees’ schedules.

To try to keep permits moving through the review process, solar installers reach out to permitting offices frequently. A permitting tech at one solar company reported that she calls permit offices every day or two to check on the status of permits and that her strategy is to be “pleasantly nudging” at all times to keep each permit moving through the process.<sup>38</sup>

### Permit review process involves many parties

Permit review may involve many different parties, either in the same department or across multiple departments. For example, in Dallas, staffers with building, electrical and fire expertise each review applications for solar project permits. In Houston, permits that are submitted for manual processing are reviewed by the structural and electrical departments. In addition, if the project is located in a floodplain, it requires flood review.<sup>39</sup> Reviewing the structural, electrical, fire and flood implications of each project for health and safety is reasonable; it becomes a problem when each step takes too long, resulting in lengthy permit review timelines.





Some components of a solar and storage project. From left to right: a battery, inverter, transfer switch, main electrical panel and electricity meter.

## Poor communication by the permitting authority

Permitting departments often do not communicate clearly throughout the application process, aggravating many of the other problems that arise during permit review.

Too often, it is not clear what information a solar contractor needs to submit as part of the permit application process. One installer commented that every jurisdiction seems to have slightly different requirements for what information must be included in the plan set; those are the drawings, diagrams and specifications of the planned installation. Depending on the city, the installer may need to list the conduit or wire type, for example, or to get a professional engineer to review and stamp the plans. While these requirements are not necessarily onerous, the many possible variations mean that a correct and complete permit application will look different from one jurisdiction to the next.

Faced with this uncertainty about the requirements, installers can choose among several bad options. They can submit an application that meets the written requirements but that might be rejected for being incomplete; they can spend time compiling information that might not even be needed for the application and that could irritate the plan reviewer who has to wade through excess information; or they can build a custom database to track the requirements and expectations of each jurisdiction and use that to guide what they submit with each permit application.

Poor communication can also be a problem once an application has been submitted. If the jurisdiction's permitting process is not clear, installers don't know who to follow up with or from how many reviewers to expect comments. If the permit reviewers' feedback or requested revisions on a permit application are unclear, it is hard for the applicant to make proper corrections.

Installers mentioned communication problems in Dallas, Laredo and other cities. One installer mentioned that confusing communication in The Woodlands, a township north of Houston, can slow down projects. Even if the solar contractor submits the permit application, the township sends the approved permit to the homeowner and tries to notify the contractor as well.<sup>40</sup> If the contractor doesn't receive notification and the homeowner doesn't realize that they need to reach out to the contractor, there are delays in completing the project. In Irving, a representative from a different solar installer said she has to call so many times to get updates on the status of permits that "the city of Irving has probably blocked my phone number at this point."<sup>41</sup>

Communication problems can also happen during the inspection process. For one project in Laredo, the solar installer arranged with the utility company to shut off power to a home to upgrade the main electrical panel and add solar panels.<sup>42</sup> Typically, the utility reconnects the power the same day after a city inspector approves the upgrade. However, in this case city offices were closed for a local holiday and no inspector even appeared – though the installer had been able to schedule an inspection through the city's website for that day. (We reached out to the city about this but did not receive a response.) The homeowner was without power for a weekend. The installer mentioned that communication problems between inspectors and utility companies sometimes leave customers without

## Communication problems in Lubbock after a policy change

**A RECENT POLICY CHANGE** in Lubbock provides an example of how inadequate communication within city departments and with contractors can delay homeowners' plans to install solar panels. In summer 2024, a solar installer noticed that Lubbock was rejecting its permit applications without explanation. Only after the company called the city did it learn that the City Council had updated the city's building code in fall 2023 to limit the percentage of a home's roof visible from the street that could have solar panels on it.<sup>45</sup> The installer had to redesign all of the Lubbock projects that it had in the pipeline, as well as deal with how the changes affected contracts covering panel ownership and power purchase agreements.

In an interview for this report, Jack Egerton, a development technician in the Planning and Zoning Department, said that the city engaged in extensive publicity before the City Council voted on the code updates, and that solar installers should have done more research to understand how the requirements were changing. He also noted that state law does not require cities to notify contractors of changes after they are adopted.

The implementation of the new limits on panel visibility from streets and other public areas may also have been complicated by poor communication within city government. Lisa Hernandez, a development technician in the Building Safety Department, said the department initially did not realize that the new requirements meant solar permit applications also needed to be reviewed by the Planning and Zoning Department for compliance with the visibility limits.<sup>46</sup> As a result, the Building Safety Department approved a number of projects that didn't comply with the new limits. Once Building Safety Department staff realized their omission, they added review by the Planning and Zoning Department to the application review process.

Seemingly minor communication problems such as these add to the many other delays, hiccups and obstacles in the permitting process that contribute to making it slower and more expensive for Texas families to install residential solar panel and battery storage.

power. As a general practice, when that happens, the installer said, the company buys a generator for the customer or pays for them to stay in a hotel until power is turned back on.

Some other jurisdictions received praise for their clear communications. Plano, according to one solar company, is easy to communicate with. City staff monitor the permitting department's email address and typically respond faster than the three to five days the city's autoresponder promises. Another installer praised Fort Worth for clearly communicating its permit requirements, reassuring installers that if a permit application follows the guidelines it will be approved.<sup>43</sup> Heath Wierck, senior staff analyst with the city of Houston, said that the city's plan reviewers are required to provide their contact information when providing correction comments to make it easier for the applicant to ask follow-up questions, and that the city's goal is for its staff to respond to any inquiries within 24 hours.<sup>44</sup>

## Varying application of health and safety codes

Structural, electrical, fire and other codes related to safety are set by national authorities and have been adopted by the state. This means that all jurisdictions are working from the same basic set of safety rules, though some communities may have adopted amendments to the codes. However, code requirements may be interpreted differently in different jurisdictions and sometimes even in the same jurisdiction. This makes it difficult to anticipate whether a particular application will meet code requirements.

There are multiple ways in which code interpretations and permit approvals vary.

- Different towns may interpret national codes differently. Texas has adopted the National Electrical Code established by the National Fire Protection Association.<sup>47</sup> It applies to all residential and commercial construction. Municipalities may use different years of the code and may adopt local amendments, which Dallas<sup>48</sup>, for example, has done. Even if they have the same code, cities and

inspectors may have their own interpretations of code.

- Staff in the same town may apply the code differently. An installer described having a permit application rejected by a plan reviewer and then subsequently approved without revisions after the company appealed to the reviewer's supervisor. Another installer noted that consistency is critical for installers' ability to navigate the process in each jurisdiction.

The inconsistent interpretation and application of health and safety codes slows down solar installations and raises costs. Nick Manto of The Solar Scouts said, "The amount of knowledge that these people (inspectors) have is encyclopedic." However, he continued, it's like "every jurisdiction is using a different date of encyclopedia." Each was correct at the time it was adopted, but knowledge changes over time and newer editions get published. Local governments adopt new codes on different timelines, meaning installers encounter different codes in different places. While both the older and newer versions may address the same safety concerns, newer codes may be more prescriptive, for example, about how to address particular health and safety risks and leave less to the judgment and discretion of the permit review official. Manto's company tries to install each project as if it's operating in one of its most rigorous jurisdictions, but even that doesn't ensure smooth sailing through the permitting and inspection process because jurisdictions may contradict each other. One consequence of this is that Manto can't standardize the equipment and materials he uses because "everybody is asking for something different."

Even permitting officials note that the variation in code interpretations between cities is one reason that solar installers sometimes submit permit applications that require corrections.<sup>49</sup> An official in the city of Irving expressed frustration that installers are "unfamiliar with code requirements or differing interpretations across jurisdictions."



## Variation in permit application processes between jurisdictions

Variations in permit application processes make seeking a permit more labor-intensive for installers without improving the health or safety characteristics of the installed system. This adds to the cost for families who are interested in installing rooftop solar systems or battery storage.

Solar installers typically serve homeowners in multiple communities and thus must navigate the variations in solar system permits in different jurisdictions. Base Power works in 25 different jurisdictions, The Solar Cowboys works in more than 75, and Sunshine Renewable Solutions works in approximately 50. Base Power, Sunshine Renewable Solutions, Tesla and Freedom Forever maintain their own proprietary manuals for how to navigate the solar and storage application process in the many cities where they install projects.

The Solar Cowboys works with lots of smaller communities in the Rio Grande Valley, where Roxanne Hoffman says there's "nothing uniform" about the requirements from one city to the next: A project might need a building permit, an electrical permit and/or a solar permit.<sup>50</sup> When her company signs a contract for a new solar project, she has to call the permitting department to figure out what permits she will need to apply for.

Justin Lopas of Base Power said that the process of applying for a permit is different everywhere. Each jurisdiction has its own permit portal. An additional challenge is that many cities have not yet created a standard permit application for batteries. Though they might have clear permit requirements for solar projects and for conventional generators, they don't have a battery permit and it isn't clear what kind of permit to request for projects that include storage.

## Additional requirements not related to health or safety

Some jurisdictions impose requirements that don't relate to the health or safety impacts of the proposed solar energy system. These requirements can raise costs, reduce the effectiveness of the panels, add delays, and even block a project entirely, discouraging or preventing some homeowners who might otherwise install rooftop solar systems and battery storage.

Some communities may use aesthetic considerations in the permit review process. For example, Highland Park's solar permit application stipulates that "Roof-mounted Small Solar Energy Systems shall not be visible from any street."<sup>51</sup> Lubbock also limits the percentage of a roof visible from a public right-of-way that can have solar panels on it. For some homes, this means that solar panels cannot face the direction that receives the most sunlight and produces the most energy. In this case, the panels will generate less electricity and may mean the project is so uneconomical that the homeowner may decide not to install any solar panels at all.

*Photo: Sunshine Renewable Solutions*



*Solar panels on a roof in Houston.*



In addition to making solar projects less economical, requirements not related to health or safety can add delays to the permitting process. The Woodlands, for example, requires a site inspection before the project is built to review where the equipment will be located, to check the visibility of solar panels and other equipment, and to review how they will impact adjacent properties.<sup>52</sup> In Missouri City, south of Houston, a family applying for a permit to install solar panels must first seek the approval of the homeowners association, according to one installer. The HOA has up to 30 days to respond to the homeowner's request, which when added to the city's review process means that two months may pass before a project is approved. (A staffer with the city confirmed that the homeowner must let the HOA know about the solar project, but some HOAs prefer the homeowner obtain the permit before engaging with the HOA.<sup>53</sup> She said it "should be straightforward but it's not.")

Another barrier that solar permit applicants may encounter is a requirement that all existing structures and investments on the property fully comply with

zoning and building codes, even if those structures have nothing to do with the solar project. This requirement raises costs and adds uncertainty for homeowners interested in installing solar panels or batteries, increasing the odds that some families will drop the idea entirely.

### **Expensive application fees**

High application fees raise the overall cost of solar projects, putting rooftop solar systems and battery storage out of financial reach for many Texas families.

One solar company that works in many parts of the state estimated that fees typically are \$50 to \$300. However, costs are much higher in some jurisdictions and for some projects. Solar installers reported paying permit fees of \$600 to \$900 in Lake Dallas, which bases its fees for solar projects greater than 120 square feet on the valuation of the project.<sup>54</sup> Watauga, in the Dallas-Fort Worth area, charges \$445 for a system with up to 25 panels.<sup>55</sup> Permit application fees are also high in Dallas, starting at \$998.

# Case studies of Texas communities with difficult permitting processes

**THE EXPERIENCE OF SOLAR** companies in several Texas cities shows the ways in which common permitting problems create delays for the installation of residential solar panels and battery storage, making it harder for Texas families to generate their own power and protect themselves from problems in the electricity grid.

## **Dallas: Slow permitting timelines aggravated by poor communication**

The process of getting a permit for a residential solar PV project, with or without battery storage, is complicated and slow, according to multiple installers. The City of Dallas reports that permits are approved on average more quickly than the timelines the installers described, but third-party data show that the slowest projects can take many weeks to receive approval. In addition, permit applications in Dallas are expensive, starting at nearly \$1,000.

One permitting specialist for a solar contractor described the steps involved in applying for a permit for a solar-only project in Dallas.<sup>56</sup> The permit runner accesses Dallas' Online Application and Inspection Portal and navigates through several menus to reach the correct permit application. Once she completes the initial application with basic information such as the project location and the company's building and electrical registration numbers, she waits for several hours or up to a day to receive notification that she is allowed to submit details of the project to a *second* portal, known as ProjectDox, where city staff will review the application and comment on

any problems. There, she uploads details of the plan for the specific solar PV project into the appropriate folders – the layout sketch in one, the engineering calculations in another, and so forth – and also resubmits the application from the first portal. This entails downloading the blank application, completing it again, printing it, having the company owner sign it, and scanning it to be added to ProjectDox as a PDF.<sup>57</sup>

From there, the permit application goes through several review steps, according to the installer. The initial reviewer confirms that the application is complete, and then sends it for building review. If it passes there, it then is sent for electrical review. This sequential, rather than simultaneous, review adds to the length of the permit review. If the permit is approved, the permit runner returns to the first portal to submit confirmation that the permit received approval from the building and electrical reviewers, to pay for the permit, and to download it.<sup>58</sup>

If the permit is not approved, however, the permit runner from the solar company receives an email alerting her that there is a problem.<sup>59</sup> To learn why the permit has not been approved, she logs into the ProjectDox site to see comments from the permit reviewer. She can respond through the portal, though she commented that the reviewer responds more promptly if she responds via email. She typically has to email the general email address for the residential permitting department, rather than emailing the specific reviewer, because Dallas reviewers usually don't provide their direct contact information.

She finds that it takes roughly 30 days, on average, from the time she submits a permit application in the first portal to the time she receives the permit, provided that she frequently follows up with the department to nudge the permit through the process. If she doesn't push, she estimates the process takes closer to two months.

Installers interviewed for this report said that obtaining a permit for solar-plus-storage projects was particularly difficult in Dallas. One installer described Dallas' permitting as the "most onerous and complicated" he had encountered. His company no longer operates in Dallas to avoid the long timelines associated with the city's permitting process. Another installer mentioned he had never gotten a storage project approved without revisions in Dallas.

In addition to review for compliance with building and electrical requirements, battery storage projects must also be reviewed for fire safety. According to one installer, permits for projects with solar plus storage take six weeks if the installer repeatedly calls the permitting department and confirms the permit is moving through the process. However, another installer reported having recently received an email from Dallas saying it would take three months to get a solar and storage project approved. A third installer mentioned that the fire review process has the longest review times, at six to eight weeks. According to one installer, all fire review in Dallas is conducted by one person.

Staff with the City of Dallas provided different information about permit review timelines for solar and solar-plus-storage projects.<sup>60</sup> According to Vernon Young, deputy director of Planning and Development and assistant director over the department's Plan Review and Field Service Inspections division,<sup>61</sup> "processing timelines are around 3-5 business days,"<sup>62</sup> much faster than what installers mentioned.

Raw permit data gathered by Ohm Analytics for more than 500 permit applications submitted from January through July 2024 shows the median approval time for solar or solar-plus-storage permits was 10 business days

(two calendar weeks).<sup>63</sup> The slowest 10% of projects took 37 business days or longer to receive approval.

Solar installers may be especially conscious of these outliers. The risk that a solar company might wait more than 37 business days (seven weeks) for an individual project to receive its permit makes it difficult for installers to schedule projects and make firm commitments to homeowners. It also colors the homeowner's experience of installing a solar PV system and perhaps makes them less likely to recommend that friends install solar panels.

Young, with the City of Dallas, noted that "projects involving battery installations tend to have the most deficiencies at the time of application submission. These submissions often lack the necessary detailed information and documentation required for our team to complete reviews efficiently. Consequently, the timelines for addressing deficiencies can be extended, depending on the applicants' responsiveness in submitting the required revisions."<sup>64</sup>

Multiple installers described difficulty communicating with the Dallas Department of Planning and Development. One solar installer commented that Dallas permitting staff are not responsive to questions and comments in the ProjectDox app. Phone calls often involve "terrible" hold times. The installer has even visited the office in person only to be turned away by plan reviewers who say they don't have time to talk. The best option, this company has found, is to call as soon as the office opens in the morning and ask to speak to a supervisor or the head of the department.

Another installer shared a story of a recent project where communication had been difficult.<sup>65</sup> The solar company applied for a permit for a solar project to be installed on an existing garage, and the reviewer replied that the permit was on hold due to the lack of a permit for the garage. The installer asked the permitting office for guidance on how to fix this problem and waited a month before receiving an answer. The homeowner then found a garage permit from 1985 that possibly could be valid, which the installer submitted to the city. The installer had not heard a response at the time

she shared her story for this report, despite trying to get in touch with someone in the permitting office for more than a month.

### **Irving: Slow and demanding permit review**

Multiple installers identified Irving, a city of 250,000 people between Dallas and Fort Worth, as a difficult and slow place to obtain a permit, especially for projects involving storage. Irving city staff contend that their detailed review process is necessary for ensuring residential solar PV and storage projects do not create a health or safety risk.

Solar companies interviewed for this report have responded to their experiences with Irving by changing their policies about accepting requests for rooftop solar and battery storage projects in the city.

- One company no longer accepts any projects in Irving because the permitting process is so inconsistent and difficult; Irving is the only jurisdiction in the state where the company has made this decision.
- A different installer said his company is very reluctant to install batteries in Irving. When a homeowner requests a battery, he has one of the company engineers look at the city's requirements to see if there's any hope of getting the project approved. He estimates that 80% of the time his company chooses not to even attempt the project.

The decision by some solar companies to limit their work in Irving means homeowners have fewer options if they want to install solar panels and battery storage at their homes. The uncertainty in the permitting process may also increase costs.

Installers reported that permit applications, especially for storage projects, receive more scrutiny and must meet different requirements in Irving than in other jurisdictions. For example, one installer said that the city seems to rely on a different interpretation of electrical and fire codes than encountered in most jurisdictions, and that it applies these during permit review. Another installer mentioned that the city has

strict requirements for protecting batteries in garages from potential damage by vehicles. A third installer described how batteries located outside must be in some sort of enclosure, even though the exterior case on the battery keeps anyone from accidentally coming in contact with electrified components.

Herb Gilliland, assistant director of field operations for Irving's Inspections Department, says that the city's review process "ensures accuracy and alignment" with the current code and "ensures the system is safe and compatible prior to installation."<sup>66</sup>

The city says that its standard turnaround time for residential solar permits is three days if all the required information is submitted.<sup>67</sup> This is similar to the average reported by Ohm Analytics, a private entity that collects data on solar permitting timelines from a variety of sources. Ohm Analytics shows that the median time for permit approval in Irving was five business days. However, 25% of projects require 16 business days (three weeks) or more, and 10% of permits take 34 business days (nearly seven weeks) or longer.<sup>68</sup>

In response to questions about complaints that the city's permitting process is slow or overly demanding, Gilliland flagged that permitting delays "are not always due to the jurisdiction" and that cities sometimes have trouble with unqualified solar installers.<sup>69</sup> He said that projects with very long timelines are not due to delays by the city but "a lack of timely responses from applicants to requests for missing or incorrect information."<sup>70</sup> Common problems in permit applications include incomplete documentation, lack of compliance with the minimum standards set by the codes the city has adopted, and misinterpretation of codes by installers who are "unfamiliar with code requirements or differing interpretations across jurisdictions." He noted that Irving's "strict adherence" to building and electrical codes "ensures that installations meet modern safety, structural, and electrical guidelines, protecting both the end users and the community at large."<sup>71</sup>



## Highland Park: Slow and inconsistent permit review process

Obtaining a permit for solar panels, with or without battery storage, in Highland Park can take months.

One installer said “We’ll send a plan set that 95% of jurisdictions will approve. [The permit reviewer] will sit on it for six weeks, then send an email requesting revisions, some of which have nothing to do with electrical code.”<sup>72</sup> The solar company will submit the requested changes and then wait another six weeks to hear back, at which point the reviewer often will ask for even more changes unrelated to the first changes. This drags out the review process and raises costs for the solar contractor.

One particular permit application in Highland Park dragged on for nearly a year.<sup>73</sup> The project was for solar shingles on a large home, paired with battery storage. Six months after the installer submitted the permit application and had not yet received approval from the city due to the slow series of requested revisions, the homeowner threatened to cancel the project because he thought the installer was incompetent.<sup>74</sup> The homeowner requested his sizable deposit back, which would have imposed a financial strain on the small solar installer.

At that point, the installer met with the head of the city’s permitting department, brought all the documentation associated with the project, and mentioned his willingness to resort to legal action if

the project wasn’t approved. After one last round of revisions, the department issued a permit. (We reached out to Highland Park, emailing twice, calling once, and then twice emailing a new contact as instructed but did not receive a response.)

The solar company shared some of its correspondence with the central Dallas County city of about 9,000 to illustrate specific problems with the permit review process for this project.

- The city was inconsistent in how it wanted materials to be submitted. The city’s permit reviewer requested that the installer upload stamped approval letters from an engineer as part of the drawing set. The solar installer says that the industry standard is to upload stamped letters as separate documents.<sup>75</sup> In addition, previous guidance from the town of Highland Park itself had specified that engineer-stamped letters should be separate from the drawing set. While Highland Park’s specific request in this case may not have been particularly difficult to fulfill, this kind of variation adds to the time and effort an installer must expend on applying for a permit – and thus raises costs for customers.
- The reviewer imposed requirements that he hadn’t imposed for similar solar and storage projects, nor on other electrical or heating/cooling projects. Many of these requirements were added in the middle of the review process.

# Case studies where inspection delays may discourage solar installation

**IN A NUMBER OF CITIES**, installers mentioned that inspections were the most difficult aspect of working with the local permitting authority. While delays during the permit review process may cause homeowners to cancel their plans for installing solar panels and battery storage entirely, delays during the inspection process do not result in cancellations but increase costs as installers must budget for additional staffing to deal with delayed or repeated inspections. This results in higher prices for homeowners who wish to add electricity generating capacity and power storage to their homes.

## **McKinney: A prolonged inspection**

Nick Manto, founder and CEO of The Solar Scouts, described a recent project in McKinney, a northern suburb of Dallas, that illustrates how unexpected decisions by inspectors can raise costs and extend project timelines.<sup>76</sup>

According to Manto, McKinney requires a two-stage inspection: a first inspection at the “rough-in” stage when everything except the panels is in place, and a second inspection once the panels have been installed. At the first inspection, the inspector raised two objections. First, he requested an emergency shutoff switch on the battery, though that was not required according to the permit the city had approved. Second, he said he wasn’t able to do the inspection because the panels weren’t in place, though The Solar Scouts had called the city’s chief inspector prior to the inspection and confirmed it shouldn’t install the panels yet.

After Manto’s team installed the emergency shutoff on the battery, the inspector returned to redo the rough-in inspection. This time, he failed the project because he wanted a different kind of wiring in the attic. The inspector wanted metal-coated wiring in the attic instead of the plastic-coated wiring that had been installed in compliance with the permit and is acceptable to use in enclosed spaces. Changing the wires to satisfy the inspector’s request took 1.5 hours, at which point the Solar Scouts requested a third rough-in inspection. It was at this point that Manto shared his story.

Hoping that the inspector might be able to do the final inspection the same day, the solar company also had installed the panels. If the inspector signed off on the rough-in inspection, the Solar Scouts hoped he would wait on site while they used the city’s online portal to schedule the final inspection, something they couldn’t do until the project had passed the first inspection. That would enable them to complete the project without yet another day on site. Manto later confirmed the final inspection went smoothly and occurred all in one inspection.

## **Frisco: Quick permitting, but a drawn-out inspection process**

Frisco, a city in the Dallas-Fort Worth metropolitan area with an estimated population of more than 237,000, received praise from installers interviewed for this report for its predictable and speedy permit review process. However, interactions with the city still aren’t

entirely smooth, making it harder for solar companies to plan project timelines and accurately estimate how much a project will cost.

Mo Abdalla, founder of Good Faith Energy, praised Frisco for the willingness of its staff to provide written guidance before a permit application is submitted and to adhere to that written advice.<sup>77</sup> That makes the process of getting a permit from Frisco relatively predictable.

The lead permit coordinator at another solar company praised Frisco for its quick turnaround on permits. The application takes just 60 seconds to submit, and the application is the same for projects that are solar only or solar plus storage. The design and engineering requirements are straightforward, the permit application is reviewed by a single reviewer, and the city issues the permit within one to two days. The city uses a single portal, ProjectDox, where staff can leave comments on permit applications that require revision. When the installer has questions, the company is easily able to reach city staff by calling the department's main phone line. If the solar company cancels a project and no longer needs the permit, Frisco will issue a refund.

In contrast, Nick Manto of The Solar Scouts reported a drawn-out inspection process on a recent project.<sup>78</sup> With the permit application, he submitted stamped electrical and structural engineering plans, including the manufacturer and model number of the equipment that would be used on the project, and the city issued the necessary permits. However, The Solar Scouts encountered multiple problems during inspection. The first inspector sent by the city said he hadn't seen this particular equipment before and that he'd need to reschedule for a time when he could return with the city's chief inspector. At the rescheduled inspection, the chief inspector said that he needed more details from the manufacturer about the equipment. The Solar Scouts staff were able to call the manufacturer and promptly obtained the data the inspector needed.

Manto expressed frustration that city inspection staff weren't better prepared. The permit that the city approved indicated what kind of equipment would

be installed at the project and the city could have sent an inspector who was familiar with it or was prepared to review something new. In addition, if the city's inspectors need additional details from the manufacturer about the equipment, the time to ask for that would be during permit review, not during the inspection. Had the city decided the equipment didn't meet its requirements during the inspection process, it would have added to the installer's costs.

Rescheduling and repeating inspections raises costs. Cities often charge the installer an additional fee if a project fails its inspection the first time and a second inspection is needed. If the city is unable to complete the inspection at the scheduled time and reschedules without charging a fee, as happened in Frisco, the installer faces additional costs due to having to send an electrician, one of the company's most skilled and best paid staff, to the job site another day.

Permitting and inspections are a bottleneck in the process for small solar installers, Manto argues. Customers don't make their final payment until the system is fully approved and operational. Thus, delays in the permitting and inspection process can unexpectedly affect cash flow and are hard on small businesses. Manto points out that "if the goal is the growth of solar [energy], this is bad."

### **Fort Worth: Fast permits, slower inspections, plans for improvement**

Receiving a permit for a residential solar PV project in Fort Worth is relatively simple using the city's permitting tool. Getting the installed project inspected is slower, according to the solar installers interviewed for this report. The city has acknowledged that limited staffing can extend inspection timelines.

Fort Worth adopted an almost fully automated permitting process more than five years ago.<sup>79</sup> The city's solar PV permitting checklist says that "Permits are auto issued once it has been determined that all required documents are present" and notes that heavy workloads or staff vacations might delay this review beyond the city's one-day target.<sup>80</sup> Installers described

the city's custom tool as straightforward and speedy. One installer said her company can get a permit quickly and that the department is helpful when she calls them for assistance.<sup>81</sup> Another installer praised Fort Worth for its clear communication, noting that the city sends out correspondence in advance of any change in permitting requirements.

Inspections are not as fast, however. Inspections can be scheduled by calling the city department the day before a project needs inspection. The city doesn't schedule inspections for a specific time during the day, a limitation that the city attributes to the volume of inspections versus staffing levels.<sup>82</sup> Solar installers reported this means they need to have a technician on site for the day until the inspection is complete because someone who is qualified to open the electrical panel must be present for the inspection.<sup>83</sup> A licensed electrician who waits at a completed project cannot be scheduled to work on a different storage installation that day. However, according to the city, installers often leave it to the homeowner to wait for the inspector.<sup>84</sup> One installer mentioned that some inspectors will allow trusted installers to perform video-based inspections, removing the need for an electrician to sit on-site the day after the installation.

Another challenge of inspections for solar projects in Fort Worth is that they must pass both an electrical and building inspection,<sup>85</sup> which installers reported often requires two different inspectors.<sup>86</sup> The city says that the "goal is to have one inspector, who is qualified to do both the electrical and building inspection" but due to staffing shortages and some "newer inspectors who are still going through the training and certification process" not all inspectors are able to conduct both inspections. This can extend the amount of time the solar company must have a person on site.<sup>87</sup>

Fort Worth recently applied for and received SolSmart silver designation.<sup>88</sup> SolSmart is a federally funded program that recognizes cities that have "made a commitment to solar energy and removed obstacles to growth" and provides technical assistance to help participating cities expand solar energy use.<sup>89</sup> Fort

Worth applied for SolSmart designation as part of its effort to help clean energy grow and to improve the customer experience of adopting solar energy.<sup>90</sup> In its application letter for SolSmart status, the city said SolSmart would, among other things, help it train staff on best practices for solar PV permitting and inspection, and develop a more streamlined permitting or inspection process.<sup>91</sup>



# Instant permit review can make permitting quicker and more predictable

**CUMBERSOME AND COMPLEX** permitting requirements in many jurisdictions in Texas can mean the process of applying for and receiving a permit to install a residential solar PV system, with or without batteries, takes days, weeks, or even months, causing major hold ups to solar projects. The end result of complex and drawn-out permitting processes is that fewer Texas families are able to improve the resilience of their homes than would like to. However, these obstacles can be mitigated or removed by replacing traditional bureaucratic permitting processes with the use of software to review, process and approve permit applications without the need for each application to be reviewed manually by permitting officials. Such software can be adopted by a city or county or by a third party who is qualified to review solar project applications.

Rather than having each permit application undergo lengthy reviews by local building departments, instant permitting typically involves applicants submitting detailed information about their proposed project – system design, equipment specifications, installation plans and so on – into an automated software platform, which evaluates permit applications to ensure compliance with the relevant building codes and safety standards. If the application meets all of the requirements, permit approval is granted immediately.

If a permit requires corrections or revisions, automated review makes the process faster. Perhaps the installer no longer can obtain the solar panels they put in the original plans so they need to use a different model or manufacturer instead; the installer may show up on installation day and discover there's a vent pipe where one of the panels was supposed to be installed; or the homeowner may decide they want a bigger system than what the original permit covers. In the manual review process, such changes can add significant delay as both the installer and permitting official review and respond to each other's questions and submissions. With instant permitting, the installer can make a change and receive a prompt reapproval.

One common instant permitting tool is Solar Automated Permit Processing Plus (SolarAPP+). SolarAPP+ was developed by the Department of Energy's National Renewable Energy Laboratory (NREL) in collaboration with building and safety experts to expedite permitting for residential rooftop solar systems and rooftop solar paired with battery storage.<sup>92</sup> Using an online portal, SolarAPP+ asks the solar contractor a list of questions to verify that the design of the proposed solar system is up to code, and if all of the requirements are met, issues a permit instantly.<sup>93</sup> By mid-2024, the platform had issued instant permits for more than 46,000 projects, saving an estimated 46,000 hours of staff time.<sup>94</sup>

In cities that have adopted instant permitting, homeowners, solar installers and permitting offices are starting to see tangible benefits.

### Shorter wait times for permits

The use of instant permitting platforms reduces the often-lengthy wait times for permits. The 211 jurisdictions across the country that have adopted SolarAPP+ have been able to cut average permit processing time to essentially zero.<sup>95</sup> For example, the city of Tucson, Arizona, was able to reduce permitting review time from an average of around 20 business days to zero.<sup>96</sup> Equally important, SolarAPP+ nearly eliminated the extremely lengthy review periods that a subset of solar projects experience with traditional review methods.<sup>97</sup>

### Standardized inspection process

Instant permitting potentially can improve the inspection process. SolarAPP+, for instance, generates a standardized inspection checklist for use by installers and inspectors to confirm compliance of a given system in the field.<sup>98</sup>

In 2023, solar-only projects approved through SolarAPP+ were more likely to pass their inspection than projects permitted via traditional methods in seven of 11 cities and counties studied.<sup>99</sup> Solar-plus-battery-storage projects were as or more likely to pass their inspection in all six of the jurisdictions for which the National Renewable Energy Laboratory had data on 10 or more inspections in 2023. The researchers concluded that SolarAPP+ permitting does not introduce any problems with inspections and may reduce inspection failure rates in most jurisdictions.

Faster permitting and standardized inspections means shorter and more predictable project timelines, and, in turn, more families being able install solar and batteries on their homes. Data collected for NREL's 2023 annual evaluation of SolarAPP+ found that a typical SolarAPP+ project is permitted and inspected 14.5 business days sooner than projects processed through traditional permitting processes.<sup>100</sup>

### Reduced permitting office workloads

By checking system designs for safety and code compliance, instant permitting software helps ease the workload of permitting departments. In 2023, according to SolarAPP+ performance review data, instant permitting saved around 15,400 hours of municipal staff time and accelerated solar permitting by a total of around 150,000 business days.<sup>101</sup> This may enable staff to focus on other types of permits and tasks.

### Reduced costs for consumers

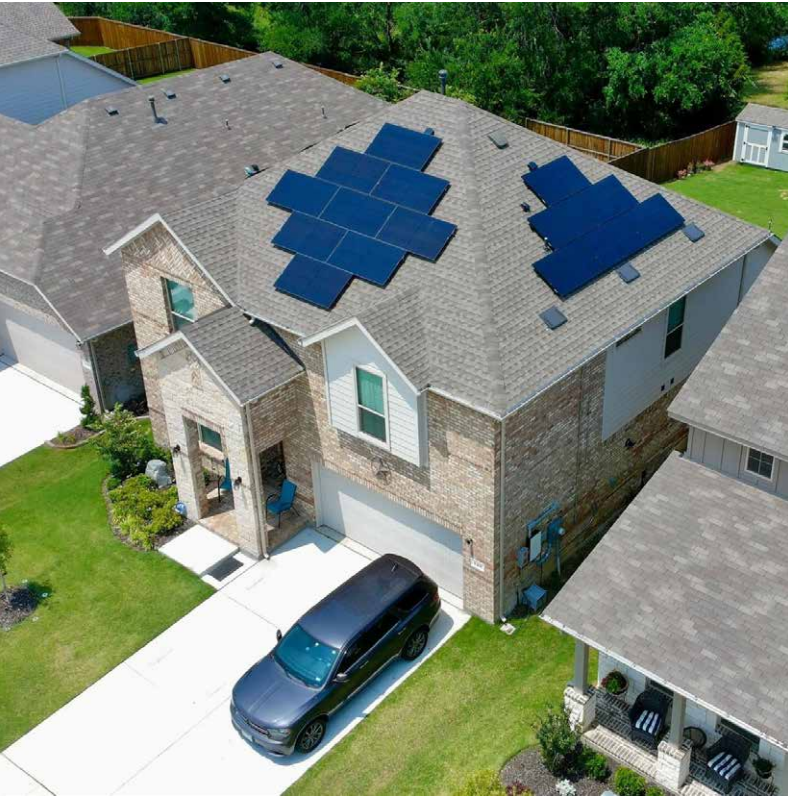
While the costs of solar panels and installation have fallen dramatically over the last decade, the “soft costs” of solar installation – including costs associated with the permitting process – have not. According to the U.S. Department of Energy, soft costs are the most significant barrier for many American families interested in going solar.<sup>102</sup>

Data from 2023 indicates that instant permitting through SolarAPP+ reduced the cost of installing residential solar projects by up to 13%.<sup>103</sup>

### Increased adoption of rooftop solar energy

Perhaps most importantly, cities and counties that adopted instant permitting increased rooftop solar deployment by between 2% and 17% in 2023, according to the National Renewable Energy Laboratory.<sup>104</sup> A separate analysis in Arizona found that in the two years after Tucson and Pima County adopted instant permitting, solar installations increased by 140% compared with 66% in the rest of the state.<sup>105</sup>

The Solar Cowboys, a solar company based in the Dallas area, sometimes does work in Oklahoma City, which uses instant permitting. According to a permit runner, the company is able to obtain permits more quickly there and as a result projects in Oklahoma City are “more attractive” than projects in other locales.<sup>106</sup> In short, by ensuring that homeowners, installers and permitting offices aren't wasting time and money



*Instant permitting can make it faster and less expensive for Texas families to install solar panels.*

bogged down in lengthy permitting processes, instant permitting can help accelerate solar adoption while still maintaining safety and compliance standards.

## Instant permitting in Texas

Several jurisdictions in Texas have adopted or tested instant permitting for some or all of their solar permit applications.

Houston uses SolarAPP+ for solar-only projects in areas of the city that are not at risk of the highest wind speeds. San Antonio and Tool are testing SolarAPP+ through pilot programs.<sup>107</sup>

### Houston

For some projects, Houston offers solar installers the option of using a traditional manual review process or using SolarAPP+ for instant permit review. Instant permitting issues permits more quickly, has eased workload for city staff, and resulted in a higher rate of completion for solar projects.

Houston adopted SolarAPP+ for solar-only projects in July 2024, after testing a pilot version of the program beginning in 2022.<sup>108</sup> Instant permitting is available for solar-only projects located in areas not at risk of the highest hurricane wind speeds.<sup>109</sup> Given that approximately one quarter of solar installations in Texas include batteries, many projects still require manual review.<sup>110</sup>

For projects that are eligible to use SolarAPP+, once the solar installer has entered the required information and documentation into SolarAPP+, the permit approval process is instantaneous.<sup>111</sup> Houston received 610 solar permit applications during the SolarAPP+ trial period. Heath Wierck, senior staff analyst with the city of Houston, says that the “completion rate” for solar projects is slightly higher with SolarAPP+ than for manually reviewed projects, meaning that a higher share of permitted projects have actually been built, inspected and approved.

The inspection process in Houston is the same for projects permitted through SolarAPP+ or reviewed manually.<sup>112</sup> The solar installer provides a letter to the city’s structural inspections group from an engineer “verifying compliance with the Houston Construction Code based on a post-construction inspection of the solar PV installation.” The city still sends an electrical inspector to verify the electrical work.

Wierck says that SolarAPP+ has taken some of the load off the normal permitting process, though it is too early for the city to have an assessment of exactly how much time it has saved. A national assessment of SolarAPP+ estimates that each application processed automatically saves an hour of staff time.<sup>113</sup>

In the future, the city may launch a separate SolarAPP+ pilot program for projects that include battery storage.<sup>114</sup> The city started with solar-only projects because automating that process would provide the greatest benefit for the permit review and inspection department.

Instant permitting is much faster than Houston’s manual permit review process, which takes an average

of five business days if no revisions are needed.<sup>115</sup> This is based on the days that the permit is in the city's system for review and thus within the city's control. When a permit is returned to the solar installer for a correction or revision, the city doesn't include those days in its calculation of how long the permit review process is. Wierck estimates if the city sends a permit back to an installer for revisions or corrections, the permit is out of the city's system for an average of two weeks.



# Policy recommendations

**STATE AND LOCAL GOVERNMENTS** should remove unnecessary permitting barriers to residential solar panels and battery storage by adopting instant permitting and remote inspections. Governments should seek to facilitate adoption of solar panels and battery storage while still protecting health and safety. Because this red tape is not the only obstacle to residential solar projects, state and local governments should also seek to address other hurdles, including by limiting permitting fees, establishing one permitting authority per project, encouraging clear and consistent requirements across jurisdictions, and reconsidering requirements unrelated to health or safety. These improvements should apply to solar projects that include home batteries and main panel upgrades.

## **Remove unnecessary red tape to reduce costs and expedite residential solar and batteries**

### **Adopt instant permitting**

One of the most effective ways to remove permitting barriers for families installing solar is to issue permits for code-compliant systems instantly. Local governments can either adopt an instant permitting platform or, in areas that allow qualified third parties to review permit applications, the third party can utilize an instant permitting platform. These platforms ask the contractor a series of questions to verify the solar system's design is up to code, and then approve the permit application automatically, allowing installation to begin. SolSmart, a federally funded program that recognizes local governments

for encouraging solar development, has set instant permitting as the standard to receive platinum-level certification.<sup>116</sup>

The most common instant permitting platform is SolarAPP+ (Solar Automated Permit Processing Plus), which was developed by the federal Department of Energy's National Renewable Energy Laboratory beginning in 2019 and is now being run by a nonprofit, the SolarAPP+ Foundation. Since SolarAPP+ launched in 2021, 211 cities and counties in 10 states across the country have adopted the platform.<sup>117</sup> Many other cities and counties offer instant solar permitting using private-sector platforms such as Symbium or by building their own software.<sup>118</sup>

### **Allow remote inspections**

Once a residential solar project is permitted and constructed, installers should have the option for a remote inspection sufficient to guarantee the safety of the system. The permitting office or a qualified and licensed third party should be able to conduct the inspection, either via photos or recorded videos. Such inspections eliminate the need for the installer to make an additional trip to the job site at a later date and wait, frequently for hours, for the inspector to arrive. The National Fire Protection Association has created a standard for remote inspections and the International Code Council has created recommended best practices.<sup>119</sup> These inspections should be offered at no greater cost, and should be available with no greater delay, than in-person inspections.

Additionally, no more than one inspection per project should be required unless the project fails its first inspection. In the event that different government units conduct inspections on different components of the system, the government units can sign memoranda of understanding to consolidate the inspections into one. This may require additional training for inspectors, so that, for example, a single inspector can perform both a building and an electrical inspection.

### **Address other obstacles to residential solar and batteries**

Other regulatory requirements that can impede residential solar and battery adoption and are unneeded for health or safety should also be reconsidered.

#### **Limit permitting fees**

Permitting fees should have limits that are reasonable and do not impede the development of residential solar. The costs paid by the installer should reasonably reflect the resources expended by the permitting office, such as staff time, equipment, software and overhead, and the office should streamline permitting processes to keep the resources expended at a modest level. Permitting fees should not be based on factors that are poor metrics to determine the resources expended by the permitting office, such as valuation of the solar system.

Local governments should publish their solar permitting fees online and share the fees with a state agency to publish the fees for every permitting office.

#### **Encourage clear and consistent permitting processes across jurisdictions**

Both installers and permit department staff expressed frustration about the variation in residential solar and battery permit requirements from one jurisdiction to the next. Installers spend extra time to track the differences between cities, and permitting officials have to spend more time reviewing permits when installers submit applications that do not incorporate local variations.

States, counties, regional governments or building departments in neighboring municipalities should seek to standardize as many processes and requirements for residential solar panels and battery storage permitting as possible. This could include the application, required documentation, code requirements, code interpretations and steps to receive a permit.

All components of a solar system, such as a battery, and related work, such as a main panel upgrade, should be part of the solar permit application and follow the same standardized permitting process.

Where local processes and requirements exist for residential solar permits, local governments should post the process and requirements on their websites. All plan reviewers should adhere to the process and requirements set online to eliminate variation within the permitting office.

#### **Reconsider permitting requirements not based on health or safety**

Review of residential solar permit applications should be focused on determining whether the proposed system meets all health and safety requirements of building safety codes. For example, local governments should not deny a solar permit based on the visibility of the system from the street. Similarly, local governments should not enforce any requirements set by homeowners associations or utilities, as such requirements are the purview of those entities and fall outside the building codes.

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