

Comments on LD 1730 – CONCEPT DRAFT

PROPOSED SPONSOR AMENDMENT Offered by Senator Grohoski December 30, 2025

NEW TITLE: An Act to Make Small, Portable, Plug-in Solar Generation Devices Accessible for All Maine Residents to Address the Energy Affordability Crisis

By John Duffy

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I certainly applaud the idea of allowing Mainers to install plug-in solar panels. Such panels are allowed in Utah and in Germany and are being considered in VT and NH. But the panels should be safe electrically and mechanically. The main issues I have with the proposed bill are below, with details following:

1. Safety from wind. All we need is have solar panels not properly secured flying through the air during a severe wind storm or hurricane!
2. GFCI in outdoor receptacles is probably incompatible with reverse current from solar module inverters. Electrocution protection would then be eliminated from the circuit.
3. Is zero export to the grid necessary unless there is a power failure from the grid? This requirement would prevent free electricity to the grid that the owner would not use anyway, without more expensive battery backup. Zero export requires equipment in main load center box in the dwelling.

1. Structural safety should be required to prevent panels from being blown away by the wind. The modules should be secured to withstand wind velocities specified in the Maine Uniform Building and Energy Code, specifically International Building Code 2021 Section 1609, and should comply with ASCE 7-22.
2. GFCI protection has been required by the National Electrical Code on outdoor receptacles since 2020. Hence, in newer dwellings or newly updated dwellings, outdoor receptacles will have GFCI protection either in the receptacle or from the circuit breaker feeding the receptacle. Many GFCI receptacles and circuit breakers are not designed for reverse current flow that would come from plug-in solar

panels. The GFCI internal circuitry would be damaged, removing protection from shocks and possible electrocution from that circuit or receptacle. Therefore, plug-in solar modules should be used with a GFCI circuit breaker or GFCI receptacle approved for supporting reverse current and have dedicated circuits only to be used by the solar modules and not for appliances. This requirement may necessitate unique plugs and receptacles for plug-in solar. More extensive discussion of these issues is contained in the UL white paper https://delivery-p133222-e1298791.adobeacmcloud.com/adobe/assets/urn:aaid:aem:cd9fa992-2d42-4716-bdeb-d1fd5cea03a3/original/as/Plug-in_PV_Safety_Whitepaper - Final.pdf.

Germany, which is estimated to have more than 1 million plug-in modules, is in the process of requiring unique plugs and receptacles for these systems or allowing direct hard-wired connection of the plug-in system to the load center circuit breakers to address the issue of a dedicated circuit (<https://www.bundeswirtschaftsministerium.de/Redaktion/DE/Downloads/J-L/kurzinformation-zusteckersolargeraeften.pdf?blob=publicationFile&v=11>). Either of these solutions might require an electrician (although homeowners are allowed do some electrical work on their own) and thus add inconvenience and possible expense to the installation.

3. Zero export control is required by the proposed bill. This requirement would prevent free electricity to be provided to the grid unless the user added a battery charged by the solar module. Of course, zero export would be essential during power outages to protect electrical workers. But this protection is already required in the bill. Zero export control would require devices in the main breaker panel that would communicate with the solar module and throttle back the solar output until no export would be detected (see, for example, <https://craftstrom.com/products/>). Therefore, the throttled back electricity would be lost anyway and not benefit the owner, again unless a battery system is added by the user. Perhaps utilities should be required to install meters that are capable of reverse flow if they are not already installed in a given location. Germany allows “free feed-in” to the grid from these modules and requires the plug-in solar owner to register to a federal data base which then alerts the appropriate utility.

A separate but related issue is that it is not clear if it would be wise or convenient for owners or renters to install the needed devices in the main breaker panel for the

dwelling. Thus, the plug-and-play advantage of plug-in solar modules would be removed.

John Duffy is a professor emeritus of renewable energy engineering at U Mass Lowell. He ran the graduate program in renewable energy engineering there for sixteen years. He has designed and installed dozens of photovoltaic-battery systems. He has no financial connection with any solar company. He has lived in Kittery, ME for fifteen years.