DOCKETED	
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9.27.20

To: CEC

re: CEC Preliminary Conclusions / Town of Truckee Petition

The CEC and the Town of Truckee evidently agree that it is best to not require PV panels where they would experience more than 125 psf crushing pressure from snow. However, the CEC and TTEA appear to be unnecessarily conservative in their resulting chart of acceptable ground snow loads.

To explain, it is important to begin with Section 7.4 "Slope Roof Snow Loads" in ASCE 7, which states that: "Snow loads acting on a sloping surface shall be assumed to act on the horizontal projection of that surface". In other words, the snow is assumed to act in a vertical (plumb) direction. Next, it should be assumed that the PV panel manufacturers tested the allowable pressure on their panels by applying a pressure in an out-of-plane direction, ie perpendicular to the surface of the panel. Therefore, the CEC should not limit the panels to a vertical Ps snow load of 125 because the panels do not feel the full pressure of that 125 psf. Instead, the CEC may, if it wishes, limit the panels to an out-of-plane snow load component of 125 psf, which will result in a significantly higher limit of Ps, and therefore, Pg.

Please see diagrams and examples in pages 2-4 attached.

Thank you for your work in evaluating responsible policies in the use of renewable energy sources.

Best,

Louis "Rocky" Woods / PE

TTEA / Structural Committee Active Member & Chairman Emeritus

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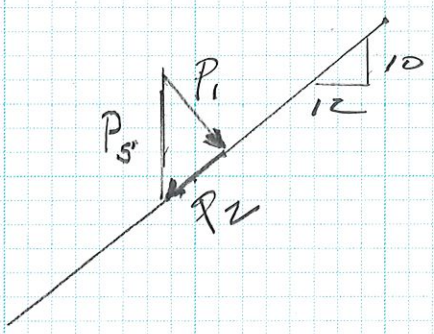
GABBART & WOODS **TAHOE PARTNERS**
STRUCTURAL ENGINEERS

JOB SOLAR PANELS
SHEET NO. 2 OF 4
CALCULATED BY RW DATE 8.1.20
CHECKED BY DATE
SCALE

DESIGN EXAMPLE FOR 10:12 if P_S = 162 psf

P_S SNOW LOAD IS APPLIED ON THE HORIZONTAL PROJECTION PER ASCE

(162psf)



P_1 = OUT OF PLANE (NORMAL) COMPONENT

P_2 = IN PLANE COMPONENT

- THE PANELS THEMSELVES WOULD BE DESIGNED FOR P_1 (10:12 ≈ 40°)

$$P_1 = (162)\cos 40^\circ = (162)(.77) = \boxed{125 \text{ psf}}$$

("OUT OF PLANE")

- THE ATTACHMENT OF THE PANELS TO PREVENT SLIDING WOULD BE DESIGNED FOR P_2 ("IN-PLANE")

$$P_2 = (162)\sin 40^\circ = (162)(.64) = \boxed{104 \text{ psf}}$$

("IN-PLANE")

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FINDING LIMITS for P_g

FIND P_g allowable for PV panel mounting capacity of 125 psf

10:12 (C_s = .50)

STEP 1

For out-of-plane force of 125 psf, corresponding vertical P_s allowed $= \frac{125}{.77} = 162$ psf

STEP 2

For P_s vertical force of 162 psf, corresponding $P_f = \frac{162}{.50} = 325$ psf

STEP 3

For P_f of 325 psf, corresponding

$$P_g \text{ allowed} = \frac{325}{(.70) I_s C_e C_t}$$

$$= \frac{325}{(.70)(.8)(1.0)(1.1)} = 527 \text{ psf}$$

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JOB CEC/PV
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Similarly, for 12:12 Pitch ($C_s = .40$)

P_s allowed $= \frac{125}{.71} = 177$ psf

P_f allowed $= \frac{177}{.40} = 441$ psf

P_g allowed $= \frac{441}{(.70)(.8)(1.0)(1.1)} = 710$ psf