

# Backtracking Gains the Edge in High Diffuse Conditions: Impacts of Tracker Strategy on First Solar Module Performance

- First Solar suggests true-tracking, which follows the sun to maximize POA despite row-to-row shading because First Solar has cells extending from module bottom to top, and therefore has linear losses.
- At low diffuse fractions, relative performance differences between backtracking and true-tracking are negligible, demonstrating that backtracking provides no additional benefit under these conditions.
- **High-diffuse cases: backtracking is favored.** In high-diffuse examples, true-tracking reduces generation by roughly -0.23% to -0.61%, with the largest differences in higher GCRs.

- Under **diffuse-heavy conditions**, true-tracking underperforms relative to backtracking, with relative deltas between true-tracking and backtracking becoming positive and growing in magnitude as diffuse fraction increases.
- Figure 1 highlights the importance of **diffuse irradiance in tracking strategy**.

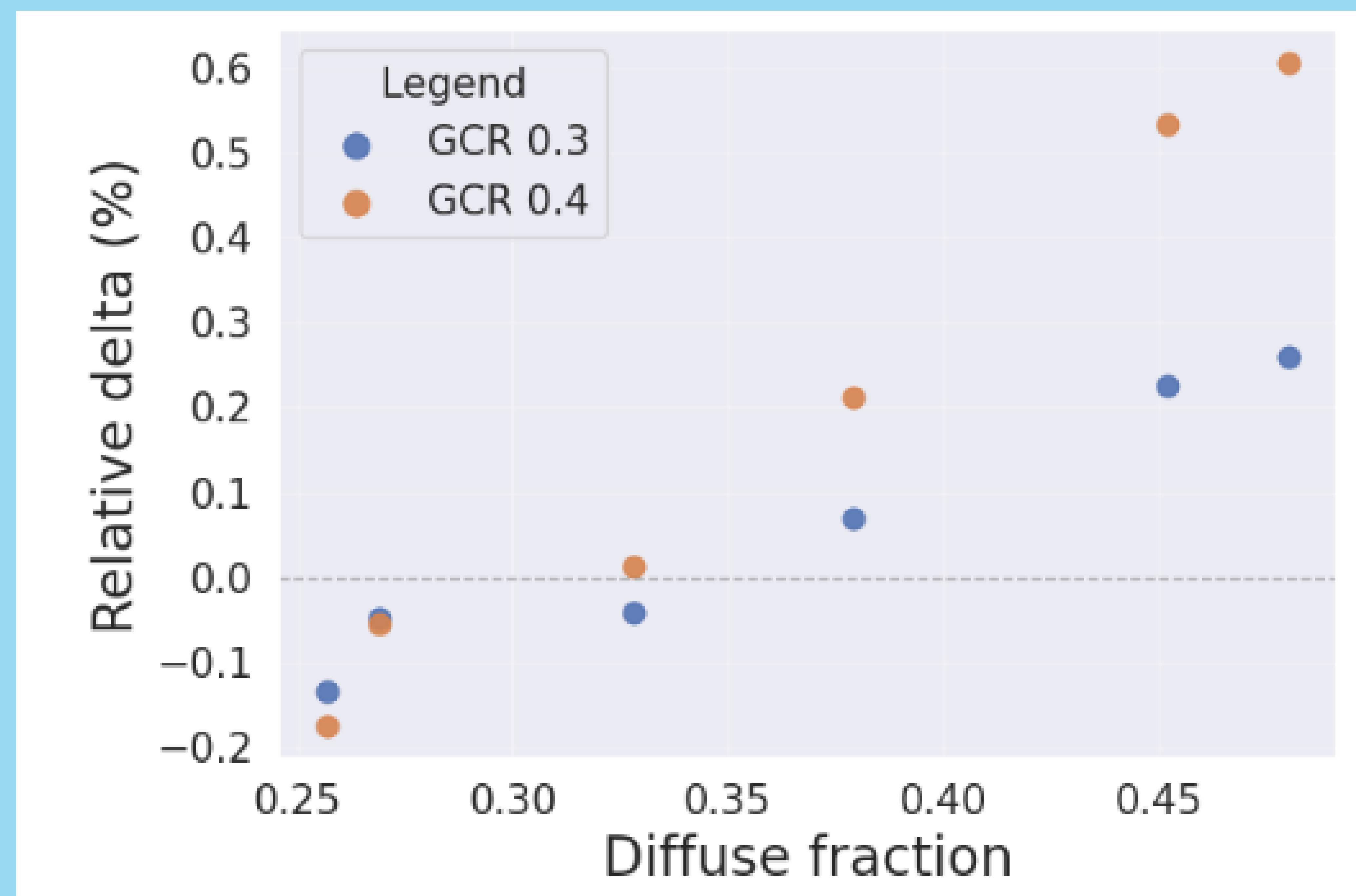


Figure 1: Relative delta = (Backtrack Generation/True-track Generation - 1)\*100%, considering True-tracking and Backtracking as a function of diffuse fraction for two ground coverage ratios (GCR = 0.3 and 0.4), therefore, a positive value signifies backtracking is greater than true-tracking. Points represent individual project cases.

- **High GCR layouts are more sensitive** to tracking assumptions, particularly when diffuse irradiance represents a larger share of total POA.
- Applying uniform backtracking assumptions across all sky conditions introduces a systematic modeling bias, especially for projects in diffuse climates or with tight row spacing. This bias is directionally conservative but non-negligible.

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