Transforming a building roof into a solar generator has not been easy due to high installation costs and tedious roof-solar integration. As a pioneering in U.S. residential and commercial building-integrated photovoltaic (BIPV) business, SPDLabs has developed hybrid solar/thermal solutions to favorably balance the cost of BIPV roof panels over solar modules. Our building integrated thermal electric roofing system (BITERS) enables efficiency increase by 40% when thermal is included in the solar harvest, while the highly durable Sunslates ensures long-term material integrity and performance. To further develop a lightweight yet higher-efficiency Roofing panel, we have applied a well-controlled foaming process to produce foamed concrete for the support substrate of BIPVT roofing panels. The thermal and mechanical performance of the foamed concrete composite is evaluated to ensure its strength and ability to reduce energy consumption in buildings.