Solar panels for hot water

Solar water heating systems (also known as 'solar thermal') use sunshine to warm water which is stored in a hot water cylinder. In 2013 less than 1% of buildings had solar hot water systems.

To estimate the roof area available for panel installation we have used the average floor area of houses in Ireland (119m^2). If we assume that the practical roof resource is 25% of the floor area, and some access constraints, the maximum available average roof area per house is about 22m^2.

Trajectory 1

Trajectory 1 assumes that in 2050, as today, only a very small proportion of buildings have a solar thermal system.

Trajectory 2

Trajectory 2 assumes that in 2050 about 30% of suitable buildings have 30% of their annual hot water demand met by solar thermal. In 2050 solar thermal delivers around 1.2 TWh of heat annualy.

Trajectory 3

Trajectory 3 assumes that all suitable buildings have some solar thermal heating system in 2050, meeting 30% of the buildings hot water demand. This reuires 1.3 m^2 of panels per person or about 3m^2 per household generating 3.5 TWh of heat annualy.

Trajectory 4

Trajectory 4 assumes that in 2050 all suitable buildings have 60% of their annual hot water requirments met by solar thermal. This means 2.5 m^2 of solar panels per person, delivering 6.9 TWh of heat annualy. Given that all south-facing domestic roofs could accommodate 5 m^2 per person, this is technically feasible.

However, there could be competition for roof space between solar photovoltaic and solar thermal panels, in which case some solar panels may appear as ground-based solar farms instead.

It is estimated that 1.5 m^2 of solar thermal panel per person is needed to supply all households with summer hot water using today's technology. Trajectory 4 assumes almost double this area of panels. To avoid wasting the excess heat delivered in the summer, seasonal heat storage systems are needed to store heat so that it can be used during the winter.

Figure 28: Thermal energy produced under 4 trajectories (TWh/yr)