This problem is answered by theorem 2 because the lifting up to homotopy problem for fibrations and the equivariance up to homotopy problem are equivalent in the following manner: Suppose $Y \xrightarrow{f} X$ is equivariant up to homotopy. Now the map f can be replaced by a fibration $p: E \to X$ where E is homotopy equivalent to Y. Then G lifts up to homotopy on this associated fibration. Conversely if the associated fibration admits a lifting up to homotopy, then clearly $f: Y \to X$ is equivariant up to homotopy.

To see the first half of this statement, suppose that $Y \xrightarrow{f} X$ is equivariant up to homotopy. Without loss of generality we can assume that f is actually equivariant. Now $E = \{(y,\sigma) \in Y \times X^I \mid f(y) = \sigma(o)\}$ and $p: E \to X$ is given by $p(y,\sigma) = \sigma(1)$. Now let G act on E by $g(y,\sigma) = (g(y), go\sigma)$. This action is well defined since f is equivariant, and p is clearly equivariant.

Now given an action of G on X, the projection $Z \times X \to X$ is clearly equivariantizable. We ask whether there are any actions G on X such that the only equivariant map is homotopy equivalent to the projection $Z \times X \to X$?

Propostion 19: An action of G on X admits only projections as equivariant maps if and only if $i: X \to X_G$ is homotopic to a constant. Such an X must be an H-space.