



# REPLACEMENT COSTS OF RENEWABLE ENERGY ASSETS

Assessing current reinstatement costs for renewable energy facilities presents an interesting challenge to owners, brokers and insurers when reviewing sums insured. Technology, equipment supply chains, government financial incentives, environmental considerations and construction techniques have all changed radically in recent years and vary by country. We explore some of these issues below.

## Overall

With many renewable assets, there has often been considerable investment in infrastructure to get to the facility location, as well as to create the base ground conditions for the assets, e.g. site levelling.

Much of this cost may not need to be insured, either because, in the example of access roads, it may have reverted to or been taken over by local government, the site preparation works may not need to be repeated or these assets are outside the insurance policy wording.

During the formative years of the renewable energy industry, many governments provided lucrative grants, subsidies and tax breaks for manufacturers and operators. Now that the cost of solar and wind energy generation is on a par or cheaper than fossil-fuel and nuclear-generated power, these financial incentives are slowly but surely being withdrawn which is likely to push up reinstatement costs.

## Hydro Power

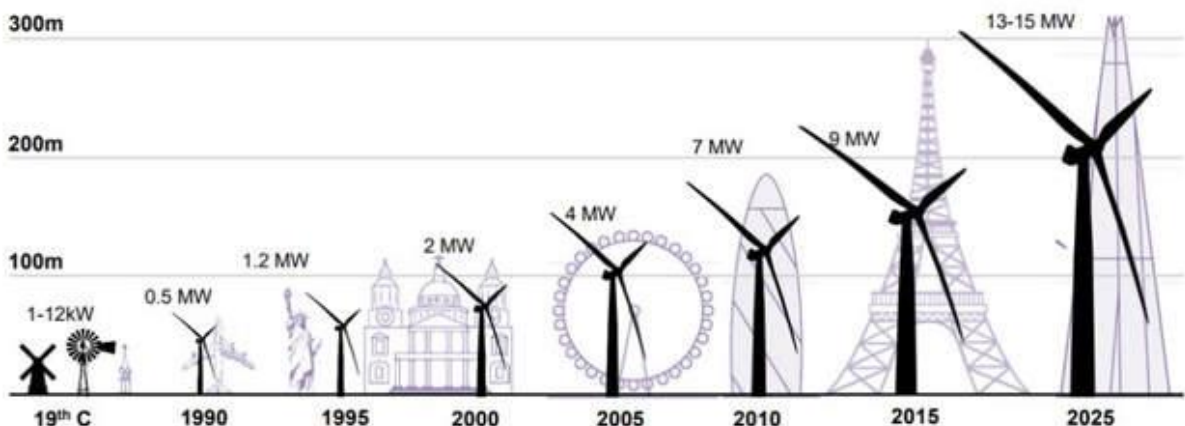
Due to the complex nature of renewable energy assets and the fact that there is often significant external interest in construction initially (e.g. from local residents' lobby groups) there is usually a material investment in upfront impact assessments and other preliminary studies. This is particularly true of Hydro power plants. Depending upon the nature of these items, their cost may not be repeated in the event of reinstatement of an identical facility at the same location and could therefore be excluded as uninsurable.

Similarly, there can be unrepeatable environmental impact study or compliance costs, design or management cost elements in the original contract prices that can be removed when considering reinstatement costs. However, environmental regulations concerning the impact of hydro facilities have tightened over the years and, if compared to original costs there could be a significant increase in compliance costs if reinstated today, even to the same designs, pushing up overall replacement costs.

## Wind Power

Wind turbine sizes have steadily increased as technology has improved and as wind farms have been developed in more remote onshore and offshore locations. In practice this has meant that the cost per kW has fallen overall and many owners now expect reinstatement costs to have reduced.

Costs per kW have been influenced by the increased capacity of wind turbines, resulting in fewer turbines required for the same output capacity, but these considerations can be tempered by partial loss considerations.



The increasing size and capacity of wind turbines

Source: London summit 2017, *Breaking Clean*, Michael Liebreich, Sept. 2017



**‘Solar PV panels prices appear to have bottomed out in recent quarters but depending upon when the facility was constructed the panels current prices could be materially lower to the costs incurred during original construction’**

This cost per kW reduction may not always be applicable to current facilities. Local planning or topographical restrictions may make replacement by different turbines impractical or illegal. Therefore, owners may be forced to replace turbines with similar sized and more costly models. Owners also need to be conscious of the risk of partial loss scenarios rather than looking at the facility overall.

Given that, it makes much more sense to ensure that any advice is being provided by a party who does not have a vested interest in the valuation outcomes and to use the services of an independent valuation firm. Insurers are often happier to pay for an arm’s length assessment which benefits all parties.

## **Solar Power**

As well as becoming cheaper, PV panels have also become more efficient meaning that for the same overall output a facility could have considerably less numbers of panels, reducing supporting structure costs and associated infrastructure. Depending upon the configuration, panel mounting brackets and supports have a bearing on reinstatement costs. In some cases, supports can be replaced with lighter or redesigned modern alternatives that can lower in numbers required so reducing overall reinstatement costs.

## **Geo-thermal Power**

On the one hand, geothermal technology has improved, and turbine efficiency has significantly improved since the earliest geo-thermal plants were developed. This means that the capital cost per kW for similar facilities has fallen over the years and many owners of older plants now expect reinstatement costs to have reduced.

On the other hand, environmental regulations concerning the operation of geo-thermal facilities have tightened over the years and existing plants may need considerably more treatment, monitoring or handling equipment if reinstated today, pushing up replacement costs.

## **Biomass Power**

There has been a significant increase in activity in the biomass energy sector in recent years, with numerous new projects and initiatives being approved across the globe. These developments have been on both a regional and local level. This is partly due to the increased efficiency of biomass energy generators and a slight lowering in implementation costs.

Higher biomass fuel cost, and unconventional biomass fuel usage, is forcing owners to use more efficient multi-fuel boilers, turbines and peripherals. This is having the effect of reducing the capital cost per kW.

Again, however, owners need to be conscious of the risk of partial loss scenarios rather than looking at the facility overall if there are multiple units at the same location. Finally, some of the government sponsored financial incentives for biomass installations have been withdrawn or reduced more recently and this is likely to mean that reinstatement costs could differ materially from original costs.

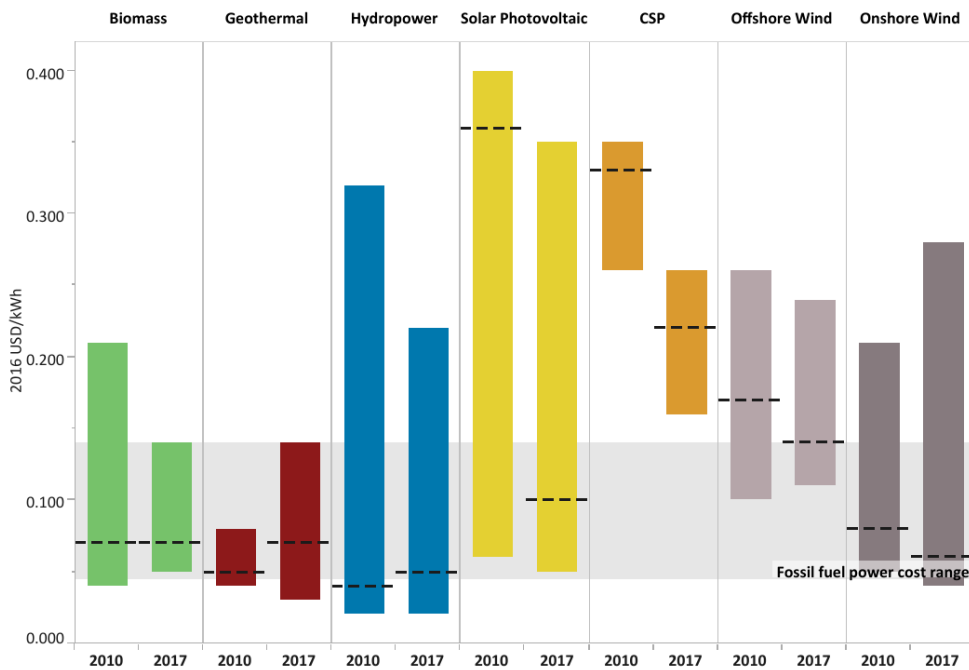


**Conclusion**

Some of the issues mentioned above may be addressed through creative approaches during policy renewals. If a facility of 50 existing wind turbines producing 150MW in total could be replaced today by 20 larger turbines producing the same output, the maximum loss for owner and insurer is reduced whereas the most likely foreseeable loss (a single turbine) remains the same. An assessment by a professional valuation firm can help you understand and navigate through these scenarios, helping you ensure adequate and appropriate coverage.

The chart below demonstrates how costs for renewable energy changed between 2010 and 2017, in some cases such as PV solar quite drastically. While solar and wind show marked reductions, the increased complexity and regulation in Hydro, Geothermal and Biomass means that some of these technologies have increased in cost.

**Global levelised cost of electricity from utility-scale renewable power generation technologies 2010- 2017**



Source: IRENA Renewable Energy Cost Database. Note: All costs are in 2016 USD. The dashed lines are the global weighted average LCOE value for plants commissioned in each year. Cost of Capital is 7.5% for OECD and China and 10% for Rest of World. The band represents the fossil fuel-fired power generation cost range.

© IRENA

For all your valuation needs, contact us at [John Foord](https://www.johnfoord.com).

This document is prepared by John Foord as an opinion and should be treated as such. John Foord and its affiliates do not accept any direct or indirect liability arising from reliance on the information stated herein. Please contact John Foord for tailored, professional and detailed valuation advice. John Foord valuations will be undertaken by qualified personnel.