

Introduction

Steel and stainless steels are widely used in PV, applications, particularly in the base constructions of large-scale plants. The advantage of these materials is their worldwide availability, the possibilities of large-scale industrial production and their positive material properties. The manufacture and distribution of BOS (balance of system) components is an important part of the supply chain, but as modules become more cost effective, it also represents an increasingly large share of the overall costs. Mounting and installation alone accounts for one third of the total costs. These costs are to be kept to a minimum by selecting the most suitable materials when developing the mounting systems, using efficient production techniques or improving ease of installation by reducing the installation time.

Requirements

The following basic requirements are taken into consideration when selecting the most suitable material for such sub-structures.

- **Static requirements:** If a tilt angle is required, it should be able to withstand different loads such as, snow, wind and the weight of the construction.
- **Operational site and environmental conditions:** Rate of precipitation, air temperature, humidity, coastal regions and various ground conditions.
- **Life cycle of the construction and measures against corrosion:** Use of alloys, surface treatment using alloys, protecting slit edges, strip edges and punched out areas, preventing contact corrosion of joints and support surfaces.
- **Ease of installation**

New Dimensions of Cold Roll-Forming – Innovative Product Simplifies Supply Chain and BOS-costs - Methods

The new method from Welser Profile also includes a new roll forming process, which is the answer to many requests and gives positive arguments for our customers:

- Weight saving due to the variation in wall thickness, optimized to meet the specification of the component. An example is replacing existing hot rolled beams with special lightweight construction profiles.
- Significantly reduced carbon footprint over the complete supply chain.
- Improvement of existing and integration of new functions (Fig. 1), due to thinning and thickening of the material in the cross section, such as optimization of the weld seam rating, design of the running surface ...
- Optimization of mechanical properties: Increased surface hardness, which in turn improves the longevity of running surfaces and telescopic profiles and tubes. An increase in strength makes the profiles more stable and increases load bearing capacity.
- New optical design possibilities of special sections with complex designs. The optimization of the strip thickness integrated into the process allows for a different design to opposite faces: Grooving or beading on the top face no longer excludes a flat bottom face.
- Maximum protection against imitation due to the exclusive design possibilities of the patented Welser forming technique: this makes it difficult to copy your products and distinguishes them from the competition.

The basis for the newly developed process was the increasing pressure in all areas of the economy in respect of conserving resources and reducing cost, as well as the search for diversification on the market with end products.

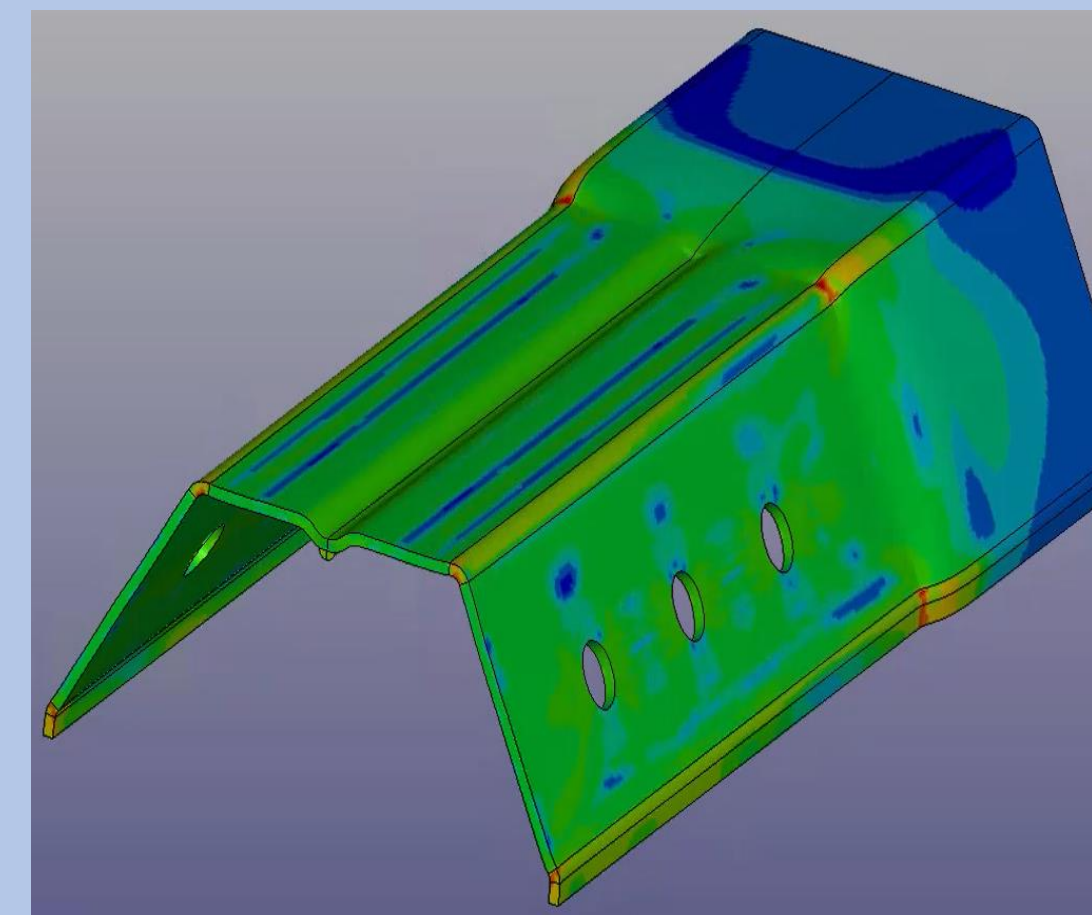


Fig. 1: Simulation and state of the art of a solid forming at a hexagonal welded pipe for Single-Axis-Tracker
 (Source: Welser Profile)

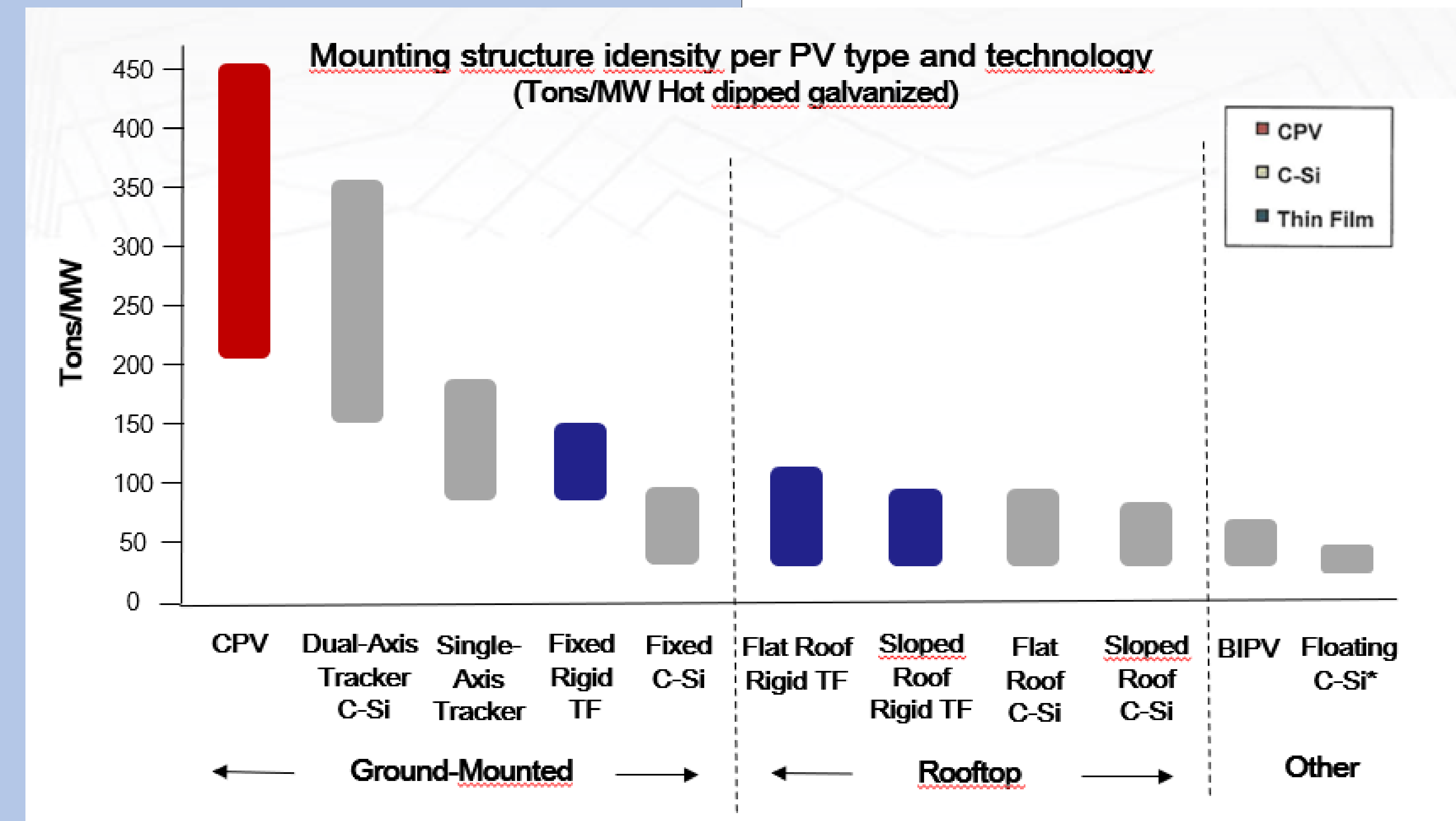


Fig. 2: Mounting structure intensity
 (Source: Welser Profile, *) fixed on plastic platform)

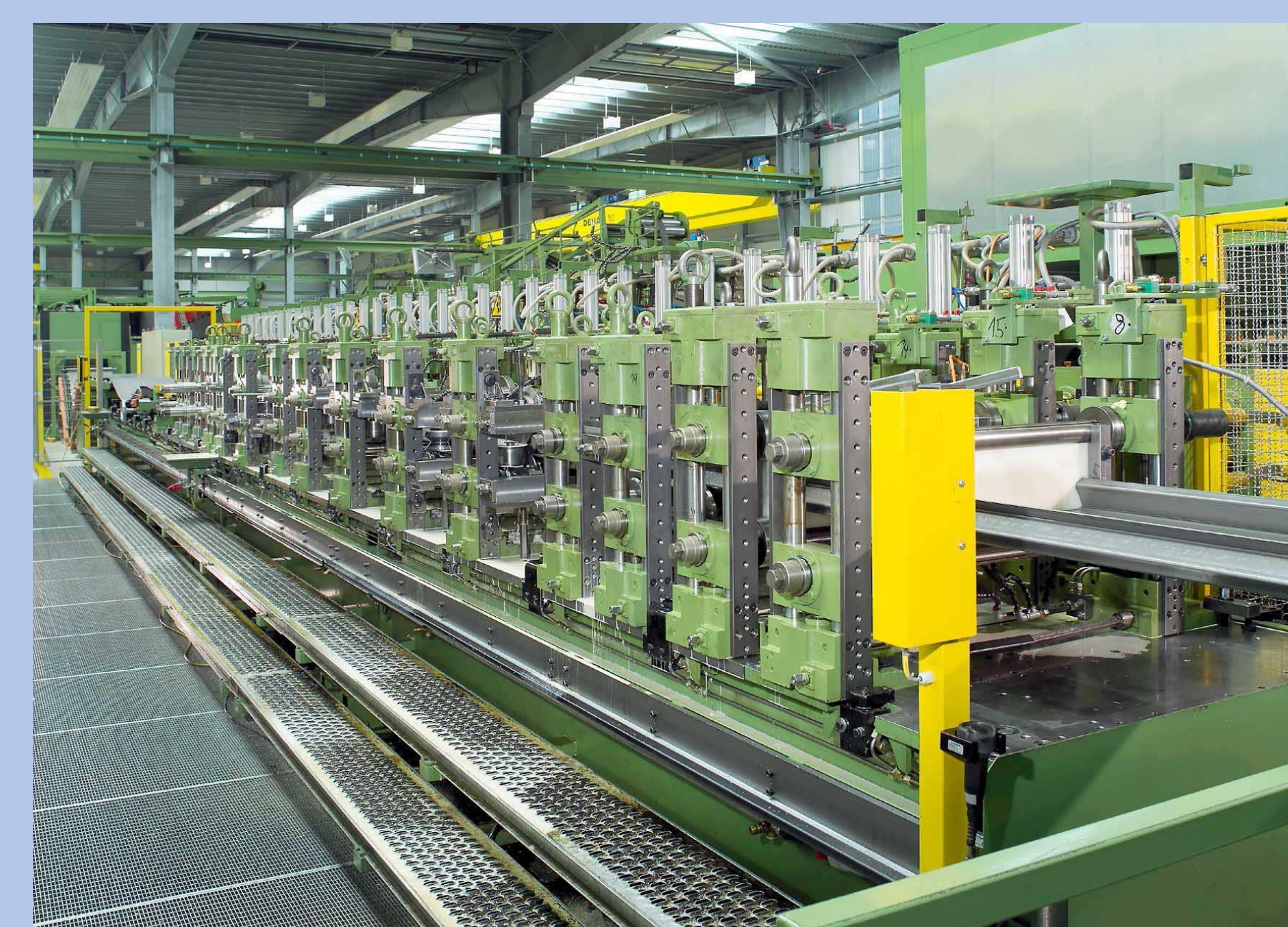


Fig. 3: Rollforming line at WPNA, OH
 New dimensions of cold-rollforming reduced construction time and logistic costs by an optimized steel profile.
 (Source: Welser)

Results:

One goal is to reduce the use of racking structure materials for each installed PV-power. The graph for Mounting structure intensity (Fig 3) shows the development in tons per Megawatt installed capacity of steel. e.g. in Central European Countries is actual a usage of 40 tons/MW state of the art.

Conclusions:

The requirements for racking systems shows an R&D potential

Economical solutions can be developed for large free-standing PV structures, particularly with steel, due to the large production quantities..

The high level of quality required by the customer and long functional life required of the photovoltaic systems should also be taken into consideration for R&D programs.

The most common challenges include different quality standards and tolerances, insufficient pre-material availability, inadequate production facilities - tooling, precision, general production feasibility and reliability of the partner on site.