HCE DESIGN GROUP

ENERGY

HCE Energy - Update 2022

For over 20 years now, we have been committed to you as enthusiastic planners, developers, structural engineers, supervisors and inspectors for your construction projects in the energy industry.
After so many years, the topic of energy production and supply is currently more crucial than ever before. The global community appears awake and is concerned about the climate, peace and social justice. Our children, the younger generation, are demanding solutions. Energy is one of the central issues.
At HCE, we want to provide answers, which is why we have developed over the years into a full-service provider of engineering services and can now offer you complete EPC-Management for projects in the energy industry.
Internationally, we have earned a renowned name for the successful planning and realisation of projects in the wind energy sector. The key to our success is our team of planners and engineers of different nationalities. Diversity has been an essential part of our work since the very beginning and is of particular importance to us.
We have remained true to our line and tradition. Despite the years of growing challanges the HCE Design Group remains a family-owned business. Our personal approach and dealings in accordance with Hanseatic business ethics are reflected in our solid, long-standing business relationships with local and international clients and partners.

Our network of partners, Hartwig Consulting Engineers & Partners, allows us to work for you with effectiveness wherever you need us. A personal local connection, coupled with the expertise of our competent team at our headquarters in Hamburg, is the formula ensuring our success for already over 20 years.
The basis, the mainstay of our work, is professional competence in engineering. Over the years, we have proven our technically advanced and innovative thinking:
Building product developments, typified constructions and designs as well as developed calculation methods find their way into the market and its guidelines.
But HCE is more than just good engineering. Starting with the choice of location or configuration of your projects, we offer you all services from a single source, from subsoil investigations and structural planning to contract and construction management. Internationally, we act as an engineer in accordance with the FIDIC White Book or equivalent modified forms.
With HCE Analytics, our new social media format, we have recently started offering you information and statistics from the construction industry. The format is not only aimed at the professionals among you, but is also intended to get the engineers of tomorrow excited about the profession.

We are well prepared for the future. Continue to challenge us!.

Project Development

Your initial project idea is the starting point for our collaboration. It is not unusual for great projects to emerge from joint brainstorming sessions with our clients!

We accompany you in your projects from the very first hour, not only with regard to engineering itself, as well as strategically.

With our many years of experience, we are your competent partner, not only when it comes to the first layout, the first technical preliminary investigations and design approaches or the initial discussions with authorities and grid operators, but also for the personal contact with those involved on site in the project area.

As experienced contract engineers, we naturally keep a strict view on the costs and realistic project processes right from the start. Both are essential for the success of your project.

You have your own capacities and only need support for a few topics or would like a cross-check of your planning?

With our experience, it‘s easy for us to get involved in your project. We contribute our expertise in an uncomplicated way and help you move your project forward.

Whether your project is a wind farm, a substation, a high-voltage overhead line or cable route or a transformer station. We know what needs to be done.

Infrastructure Planning

In alignement with you, we have set the first layout, fixed the necessary framework conditions and the essential milestones for the project. Then we can get started!

Based on the preliminary investigations of the soil conditions and the essential specifications of the project design, we record the topography and other local constraints in the construction area in order to work out a technically solid and cost-efficient development of the project. We visit the site in person, then work with our CAD experts to find the ideal route on the basis of a 3D model, naturally keeping in mind the requirements for heavy transport.

In terms of software, we are at the cutting edge. We are quickly able to determine height and longitudinal profiles and ensure the best possible mass balance. We know how to deal with difficult terrain and subsoil, and in these cases we bring in the technical expertise of our geotechnicians and engineers. We are experienced in introducing solutions with innovative geosynthetics or mixed-in-place methods into the planning process.

As soon as the planning has reached a sufficiently detailed status, we start with the detailed costing in the form of a professional tender.

Our projects are structured in sub-projects or sub-sections so that tendered items and mass optimisations in the project field can be better allocated by the bidder and accordingly reflected in the pricing.

We check the local material resources in advance, give the bidders options for secondary bids and find the optimal price-performance ratio for your project in the award negotiations.

Engineering

We offer you the required engineering for the centrepieces of your project, the supporting structures of onshore and offshore wind turbines and the masts of overhead power lines or other building structures.

In doing so, we act in an interdisciplinary manner, starting with the dimensioning of the soil improvement or the deep foundations on piles in difficult subsoil, the foundation constructions up to hybrid tower variants in concrete and steel construction.

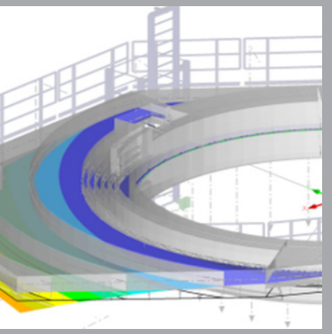
We are internationally renowned for our sophisticated foundation constructions for onshore wind turbines. Here we introduce standardised designs certified by renowned certification bodies to the market for wind turbine manufacturers. You can use these in an uncomplicated way for your standard projects.

For projects with special conditions that are not covered by the standardised solutions, we create so-called site-specific designs. Often, with good subsoil conditions, project-specific construction and thus cost optimisations can be realised compared to the standard solutions. Here, thanks to our many years of experience, we can achieve a real cost advantage for you, as well a time advantage.

We have set standards in this area, constantly refined the design methods and built up special know-how, particularly in the areas of special deep foundations and fatigue design. We can achieve statically justified service life extensions for your turbines and thus make your project even more effective.

Our expertise continues to expend and now comes to use with various support structures for offshore constructions. Here, with so-called FEED designs, we point the projects in the right direction from a technical point of view and bring our planning to implementation status.

With our engineering, we are intensively involved in shaping the grid expansion in Germany. In numerous projects, the transmission line pylons are based on structures designed by HCE.



Research & Development

What is engineering and what is research and development (R&D)?

The transition is fluid. Innovation is often to be found even in specially dimensioned everyday constructions. Our drive is to stay ahead and this can only be achieved through innovation.

Many of our innovative achievements often remain undiscovered in everyday life, hidden behind specially developed software solutions for special dimensioning situations or constructions.

Real and successful R&D is reflected in the actual market launch of developed products and processes. We have succeeded in this over the past two decades. In addition to the proven foundation constructions for wind turbines, introduction of anchor cage constructions to the international market, development of pre-stressed piles, piles with subsequent grouting as well as specific solution for the renovation of wind turbine foundations with patented anchor systems or the well-known TMC-Methodology are just a few innovations and R&D's made by HCE.

The future requires and will bring more! Expected and in the development stage are mass-optimised foundation designs for wind turbines and new FEED designs for monopile platforms of offshore wind turbines.

And there is a lot of R&D in each of the few rotor blade test stands in the world. Some of them made by HCE.

Give your ideas new technical drive. Engineering and R&D are our passion. We are the right partner for your success.

EPC-Management

Our Engineering, Procurement and Construction Management (EPC-M) is the result of years of experience.

In our development and specialisation in the field of energy projects, we have intensively experienced all planning and project phases.

Projects all over the world include our engineering. In for example Romania, Turkey, South Africa, Germany, Sweden and other countries we have negotiated and awarded services for our clients and accompanied the realisation of projects on site in various countries around the world. We have combined this experience and have been performing all EPC-M services from a single source for several years. As Contract Engineer or Owners Engineer, we are familiar with the globally recognised Guidelines of the International Federation of Consulting Engineers, FIDIC.

We find the right contract constellation for your project and help you to execute it successfully according to the rules of the so-called White Book.

In the project, we know and understand the different perspectives and ways of thinking of the stakeholders. Our engineers, eperienced in various fields, can deal even precarious situations with a cool head.

There is a difference whether a project is carried out for example in the UK or Poland. We are familiar with these differences and, for example, have all the licences for the management and inspection of planning and construction services for the Polish market.

With international experience, we take on the tasks wherever your project is to be built.

Monitoring & Remedial

The standardised TMC measurement method developed by HCE has become firmly established on the market over the years and is now also used successfully by other providers. With Tower Movement Control (TMC) we measure the vertical displacements between the foundation and tower construction. Based on the measurements and an additional visual inspection, we are able to classify the movements of the tower as normal or abnormal within minutes.

The catalogue of measures is also standardised within the framework of the TMC-Methodology. The methodology is based on the guidebook of the German Wind Energy Association, whose working group we helped to initiate.

Based on our experience, we have further developed the TMC measurement technology and supplemented it with strain measurements on the tower. TMC+ is now in standard use at HCE. The measurement is carried out at a total of 6 points and allows us to infer the actual movements at the base flange of the tower component, partly based on FE calculations. TMC+ should also be the standard in your projects. Measurement campaigns without strain measurements on the tower often lead to misjudgements more cost-intensive remediations.

We have already successfully and accurately carried out measurements on so-called anchor cages in foundation bases. In the UK, we carried out an extensive measurement campaign (365 days/24hours).

If your plant is actually in need of remediation, our engineering department will assist you with the planning of the necessary measures and will also monitor their implementation for you on site.

Due Diligence & Expert Witness

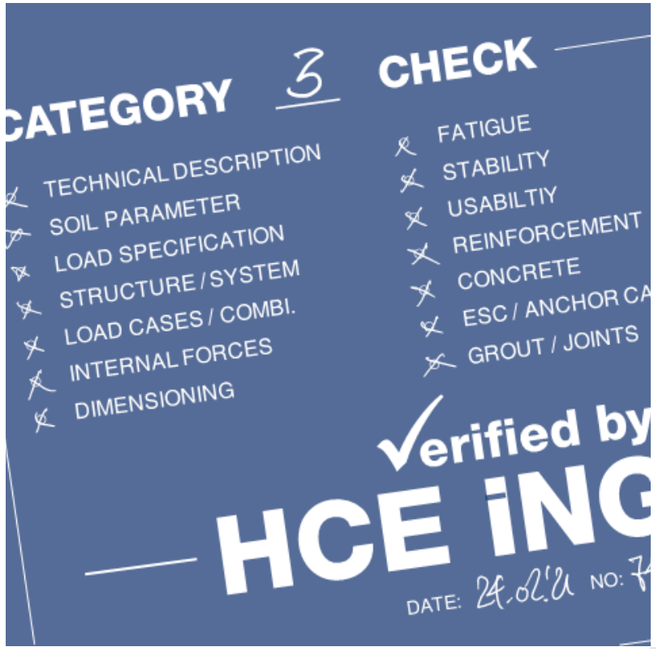
Our clients include numerous project developers, banks, investors and plant manufacturers. All of them have the goal of acting securely in their projects. Project acquisitions should not be a flop. New investments require high standards. Projects must be realistically planned and technically well-engineered in order to be delivered.

We offer a comprehensive portfolio of technical due diligence services to meet these needs. Clients such as the Bank of Scotland, Scottish Southern Energy Renewables (SSER), Vestas, UKA, OX2, KGAL, VSB, Tauron, Temporis, BayWa and many others rely on our expertise. In addition to reviewing projects, many of them also have HCE monitor the project realisation.

Particularly noteworthy is the depth of our audits. We check construction documents according to category 3, the highest inspection level. This inspection level includes, for example, a complete independent recalculation of a foundation construction of wind turbines. The inspection results in a check report. Points of complaint are then worked through in a moderated manner with the author of the structural engineering documents using the TQ method until an agreement is reached and final approval can be given by HCE.

We are also a reliable consultant in problematic cases. We are regularly appointed as member of a so-called legal teams as technical advisors or experts and have acted in court proceedings in the UK, for example. This means that we can represent your interests in a professionally founded and strategically clarified manner, both verbally and in writing.

Our expert opinions meet the highest standards and have an above-average success rate.



References

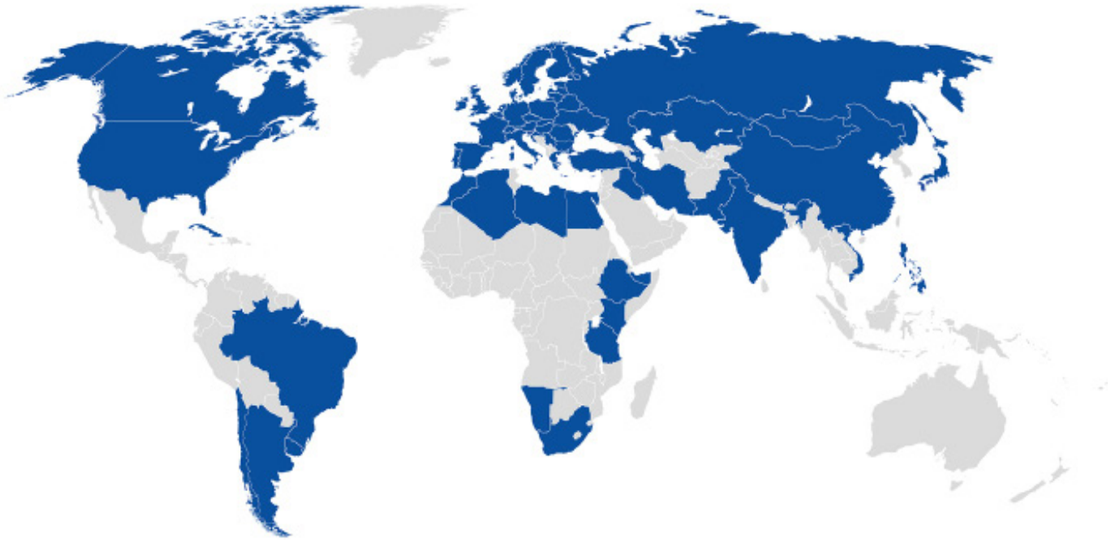
With more than 15,000 wind turbines worldwide with HCE engineering, we have stopped counting. Thanks to the development of numerous, certified standard foundations, the number is growing significantly every day.

Renowned projects for renowned customers. Our customer base, the variety of projects and internationality soeak for themeselves. But we cannot and will not rest on our laurels. As said, we are driven by technology which is constantly evolving.

References are a mirror of the past, but also a proof of experience thanks to which we are currently involved in very interesting projects: In Lithuania, we are about to inaugurate the WF Vanessa with a total of 14 Vestas V110, the Polish project FW Ujscie is currently under construction and further foundations for the Vestas V136 and V150 are about to be certified.

Presently, we are carrying out project-specific optimisations for projects with turbines of Enercon and Nordex. The Barteldorf substation is about to be approved. In Ujscie, Chodzież and Czarnków, we are working on its extensions and are currently building the associated cable routes. For the overhead 380kV line near Brunsbüttel, we are developing various post-construction. Furthermore, another FEED design for offshore platforms is in the start-up phase, after we have handed over a concept of a new rotor blade test rig to the customer. In the UK numerous acquisition projects are waiting for HCE-CAT-3 checks.

Without a strong team and you, our customers, none of this would be possible. We would like therefore to use this occasion to thank you all for the hard work and your trust. Please feel free to approch us for more detailed references if needed. Continue to challenge us.



Other Activities

Our engineering services in the energy sector reflect only a part of our activities in the construction industry.
We provide engineering services in accordance with all service phases of the German Honorarium Code for Engineers and Architects (Honorarordnung für Ingenieure und Architekten), accordingly all services in the preliminary concept phase, draft and permit planning as well as in the executive design up to the object supervision also for other building projects.
We are active in structural and civil engineering and therefore also provide our clients with comprehensive support in this specialist area. Beside other we have been involved in well-known projects such as the construction of the new ice hockey arena in Mannheim, the new football stadiums in Aachen, Essen, Ingolstadt and Frankfurt am Main, the Olympus Campus in Hamburg, the main railway station Münster-East, the foundation structures for the logistics centres of REWE, Budnikowski and DHL in the greater Hamburg area and the extension of the St. Bonifatius Hospital in Lingen/Ems.

After 20 years of activity, the list of our project participations is long and once again particularly extensive in the field of special civil engineering. Until 2017, we designed up to 200 pile foundation projects per year, then we focused on large-scale projects in this area and now offer our clients work ranging from site investigation and the structural design of foundations and excavations to the dimensioning of groundwater lowering measures.
We have particular expertise in the testing and evaluation of pile foundations. We analyse their load-bearing capacity in the subsoil and find solutions in case of deviations.

Knowledge and expertise which we can also successfully bring to your energy projects.

HCE Analytics

In our new social media format **HCE Analytics - Information and Statistics of the Building Industry** we offer you a new source of information on the topic of construction.

We report primarily from the categories of energy, sustainability, engineering, research and development, the construction industry and politics, but also, for example, on the essential soft skills crucial for construction engineer.

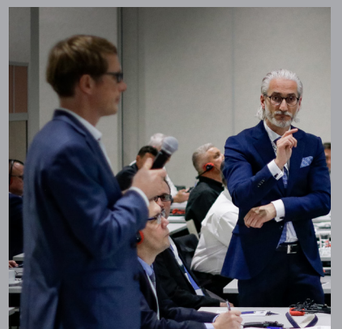
The format is not only focused on professionals, but also on pupils and students who aspire to work in the construction industry or who may become enthusiastic about it.

Our research and presentations are international in scope, but also delve deeply into local markets and topics from different countries.

Do you know how much electricity was produced from renewable energy sources and how much from fossil energy sources last month, which way the so-called Easter Package of the Federal Government is heading in Germany and which criteria are decisive for first-year students when choosing a profession? Do you know the forecasts for material price and salary developments?

With HCE Analytics, we give you answers to many questions and also analyse them personally for your needs. We are the new Statista for the construction industry!

Contact us or follow us easily on LinkedIn.



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