

# Critical issues in the planning and execution phase of a pump storage or other hydro power plants – possibilities and limits of contractual solutions

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**ABSTRACT.** – Planning and erecting a pump-storage or other hydro power plants (“HPPs”) is an ambitious and complex process, in which the interests of the contractual partners and – in a wider sense – of all stakeholders of the project have to be taken into account and unforeseen events have to be coped with. There are multiple ways of structuring a contract regarding the erection of a HPP. The purpose of the contract is always the same: to balance the different interests of the parties and to define the mutual obligations and consequences in the case of changes (“Variations”) or any sort of non-compliance with the contractual obligations, be it delay, defects or other non-compliance. Depending on the choice of the parties or the tendering authority – the Owner & Operator of the plant (i.e. the “Employer”) – regarding the structure of the project (Turnkey or “multi-contracting”) and the applicable law the content of the contract will vary. Parties might want to base their relationship on an internationally accepted standard form contract (e.g. FIDIC or NEC) or alternatively negotiate a tailor-made individually drafted contract.

This paper shows various possibilities for contractual solutions covering these issues.

Key-words: PSP, hydro powerplant, contract.

## Problèmes rencontrés lors de la phase de planification et d’exécution d’une centrale de pompage ou d’autres centrales hydroélectriques – possibilités et limites des solutions contractuelles

**RÉSUMÉ.** – La planification et la construction d’une installation de stockage d’énergie par pompage ou d’autres centrales électriques hydrauliques (« des HPP ») sont un processus ambitieux et complexe, dans lequel les intérêts des partenaires contractuels et – dans un sens plus large – de toutes les parties prenantes du projet doivent être pris en compte et les événements imprévus doivent être pris en compte. Il y a les façons multiples de structurer un contrat quant à la construction d’une centrale. Le but du contrat est toujours le même : équilibrer les intérêts différents des parties et définir les obligations mutuelles et les conséquences dans le cas de changements ou de n’importe quelle sorte de non-respect des obligations contractuelles, y compris le retard, les défauts ou tout autre non-respect. Selon le choix des parties ou du Maître d’ouvrage – le Propriétaire et l’Opérateur de l’usine (c’est-à-dire « l’Employeur ») – quant à la structure du projet (Clés en main ou pluri-contracts, c’est-à-dire l’attribution des différents lots à plusieurs entrepreneurs) et la loi applicable le contenu du contrat variera. Les parties peuvent vouloir baser leur relation sur un contrat standard internationalement accepté (par exemple. FIDIC ou NEC) ou négocier autrement un contrat sur mesure individuel.

Cet article montre les diverses solutions contractuelles.

Mots-clés : centrale hydroélectrique, PSP, contrat.

### I. INTRODUCTION: THE CONTRACTUAL SET-UP, THE CHOICE OF LAW AND THE TYPE OF CONTRACT

While planning the construction/ erection of a HPP, the contracting parties have to (i) choose the contractual set-up, and make a choice (ii) regarding the applicable law and (iii) the type of contract. While utilities with long-time and extensive experience in the erection of HPPs often prefer a multi-contracting structure with around 10 – 12 lots, others (Owners, private investors or other financing institutions) might prefer to deal with only one Contractor, who assumes the responsibilities of a Turnkey Contractor. Both contract structures have their advantages and disadvantages. A multi-contracting structure will lead to a lower overall price as well as increase the Employer’s ability to exercise

a high degree of control on the works in all aspects. On the other hand the Employer or his (mandated external) Engineer has the burden of coordinating all the works and a considerably higher interface risk.

Another issue is the level of detail of the design, where various solutions are possible. Even state utilities with long-time experience often prefer – particularly with respect to components such as the turbines or generators - to establish only the design basis and the basic design, and leave the detailed design in the responsibility of the Contractor being the specialist in the field, whereas the works regarding dams & tunnels are typically employer-designed.

An adequate contract has to reflect these situations: in a multi- contracting structure the interface management responsibility will usually be the Employer’s responsibility, although I have seen (rather untypically!) large-scale

project contracts, in which the Employers tried to oblige their various Contractors to coordinate the interfaces among themselves and make them jointly liable for a successful interface coordination. From a Contractor's point of view such a contractual provision should be rejected as long as each Contractor has not specifically agreed rights vis-à-vis his Co-Contractors enabling him to enforce these cooperation obligations.

The issue of the applicable contract law is sometimes not given sufficient attention or confused with the issue of the dispute resolution mechanism (state courts /arbitration procedure)<sup>1</sup> or the local administrative law mandatorily governing the erection of the HPP with respect to environmental issues, labour law, the construction or operation permit or any other administrative law issue. In principle the contracting parties can choose the applicable contract law<sup>2</sup>. The applicable contract law signifies the legal system which determines the contractual relationship between the Employer and the Contractor or – to put it differently – the legal system on which the contract is based. This issue is important for two reasons: the provisions of the underlying law, and this is in particular true in legal systems with Civil Codes (civil law countries), provide for the typical statutory provisions governing the different types of contracts such as construction contracts and apply as complementary rules as far as they are not explicitly excluded in the contract.

To give an example: Civil Code laws often provide for remedies in case of delay, granting the Employer not only the right to claim (unlimited) compensation for damages, but also a right of rescission, which many Contractors do not want to accept. In these cases the contract has to explicitly exclude the Employer's right of rescission or to clearly stipulate that the agreed so-called "Liquidated Damages" are the Employer's sole and exclusive remedy in case of delay. Another important example: the soil risk under the German Civil Code (BGB) lies with the Employer, which is a risk that, as mentioned above, some Employers do not want to bear. Secondly, at least all legal systems I am aware of have so-called mandatory provisions or "ordre public" provisions from which the contracting parties cannot, even if they would want to, deviate in a legally valid way. Consequentially the contracting parties should make their choice regarding the applicable contract law<sup>3</sup> taking into account these considerations. In case the law is determined by the tendering Employer, Contractors should at least have sufficient knowledge about the statutory complementary rules to calculate their risk. There are for example civil law countries, where the mandatory law in certain cases does not allow a limitation of liability<sup>4</sup>.

Finally the tendering Employer has to consider which type of contract he wants to use: one of the internationally

accepted standard form contracts such as FIDIC or NEC<sup>5</sup> or a tailor-made contract. The advantage of a standard form contract is that in most cases they are considered to be fairly balanced and usually Contractors are already familiar with the rules therein, meaning negotiations will be less time consuming. On the other hand it might be worthwhile in large-scale projects to have a tailor-made contract. In any case it should not be forgotten that some of these model contracts have been drafted in the light of e.g. common law principles. Thus the users should have knowledge of this legal system as the contract should be understood and interpreted in the light of this legal system. Special attention should be paid to the fact that such a model contract is a work product balanced in itself with interdependency between various provisions even without explicit cross references. Contracting parties adapting a model contract to a specific project and modifying some provisions should be aware of the effects such a modification might have on other provisions of the model contract.

## II. SUCCESS FACTOR NO. 1: A CLEAR-CUT DEFINITION OF THE SCOPE OF WORKS

The crucial success factor of the construction/ erection contract is clear-cut unambiguous definition of the Scope of Works. Even in Turnkey contracts in which the risk of incomplete supplies is much lower for the Employer than in a multi-contracting structure, a precise definition of the Scope of Works together with the limits of supply and – as far as applicable – the definition of the parties' responsibility with regard to the interfaces is of utmost importance.

The Scope of Works – including the quality requirements – is the reference for evaluating whether the plant has deficiencies or not. And, it is the benchmark in disputes between the Employer and the Contractor if the latter asserts a claim for an extension of time ("EOT") and compensation of additional costs, alleging that works requested by the Employer are "extra work" requiring a Variation/ "Change Order".

There are different approaches to define the Scope of Works. In countries such as Germany, Austria or Switzerland, or in other countries with a long tradition in hydro power plant construction projects, state utilities seem to prefer to specify their requirements down to the smallest detail, e.g. down to the properties of the construction material to be used<sup>6</sup>, whereas in World Bank-financed projects Employers prefer a functional description of the plant to be delivered – leaving it up to the Contractor how to achieve this. A certain caution is appropriate: an Employer stipulating detailed specifications risks bearing the responsibility that the specified parameters are "fit for the intended purpose". In these cases, a Contractor might be released from its responsibility for the functioning of the equipment if it fully complies with the requested specifications.

Needless to say, the plant has to be free of any deficiencies regarding third parties' proprietary rights (patent rights).

While drafting the Scope of Works clause and setting up the Employer's requirements, the parties need to avoid ambiguous expressions such as "of superior quality". Usually Employers expect the Contractors to comply with

1. Both solutions have their (dis)advantages (regarding costs, confidentiality of the procedure and expertise of the judges). Well known and accepted arbitration rules / institutions are the ICC International Court of Arbitration, Paris (<http://www.iccwbo.org/products-and-services/arbitration-and-adr/arbitration/icc-rules-of-arbitration>) or the Swiss Chambers' Arbitration Institution, Geneva (<https://www.swissarbitration.org/sa/en/rules.php>).

2. This principle applies in general worldwide; with respect to the EU see the Regulation (EC) No 593/2008 of the European Parliament and of the Council of 17 June 2008 on the law applicable to contractual obligations (Rome I).

3. In the absence of an explicit choice of the applicable law parties risk that the contract will be governed by a law, determined by the conflict of law rules, which, had they been aware of, they would have avoided. This paper shall not constitute or substitute a specific legal advice, which will depend inter alia on the applicable law.

4. Cf. "la garantie décennale" in French law regarding certain construction works.

5. See e.g. the presentation of R. Patterson, at the HYDRO 2015 in Bordeaux, and his report (R.Patterson and W.Fergusson) in "nec users' group NEWSLETTER" – no. 76 – January 2016, page 5 ff.

6. E.g. *RWhM Richtlinien für Werkstoffe in hydraulische Maschinen* des Verbandes Elektrizitätswerke Österreichs.

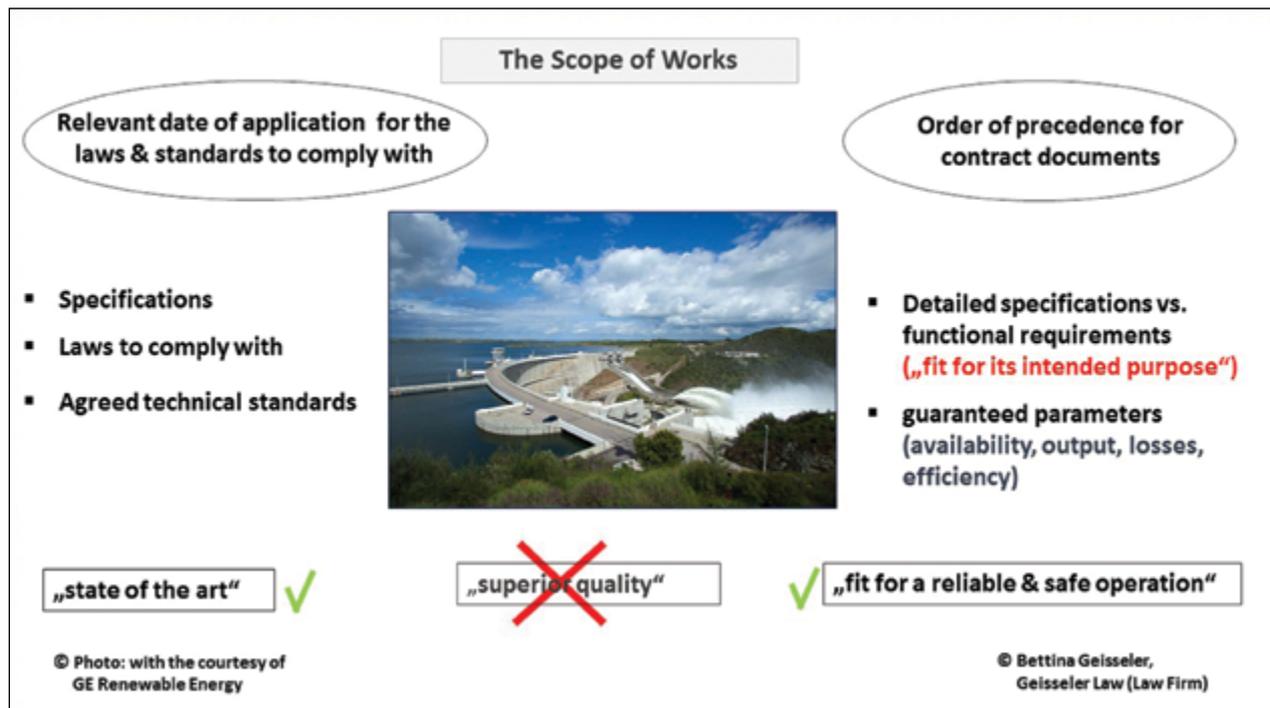


Figure 1 : Defining the Scope of Works.

internationally in the hydro business accepted technical standards & norms of national/ international standardisation bodies such as DIN, IEC, ASME or NEMA. As far as these norms do not directly result from the applicable legal norms<sup>7</sup> or, respectively, do not substantiate the “state of the art” requirement which the Contractor must comply with, these norms should be explicitly listed in the Employer’s requirements. It is important to make reference to a specific edition (year) of an applicable standard and to avoid as far as possible contradictions when declaring various standards as applicable – even if the contract provides for an order of precedence regarding the different annexes.

It is of utmost importance to determine the contractually relevant date of application with respect to the applicable laws and technical standards. The contract must stipulate to what extent the Contractor must comply with changed laws/ standards and which party shall bear the risk in terms of time and costs in case the Contractor has to comply with changing laws. It seems to be clear – and often is explicitly stipulated as an obligation – that the Contractor must comply with all applicable (administrative) laws, meaning all laws governing the construction, manufacturing and erection of the plant, wherever these activities will take place. Otherwise, the Contractor risks the infringement of law and the Employer risks site activities being stopped by the responsible authorities or that the necessary operation permit will not be granted or will be withdrawn. The Contractor must enable the Employer to operate the plant according to the laws in place at the moment of the Provisional Acceptance. However, that does not automatically mean

7. Cf. on an EU level the BREF Documents substantiating the requirements of the Directive 2008/1/EC (15 January 2008 concerning integrated pollution prevention and control) for the approval practice of the state authorities granting operation permits for industrial installations. In case of authorisations under the German environmental law the “BVT Merkblätter” substantiate the “state of the art” requirement, stipulated by the relevant legal provisions.

that the Contractor bears the additional costs in the event of laws changing between the agreed relevant date of application (Contractors prefer to stipulate e.g. a date 28 days before signing of the contract as the relevant date) and the Provisional Acceptance date.

Regarding changing *technical standards* which are not legally binding, the Contractor will often be obliged to inform the Employer about this fact, but the Employer might reserve the right to decide whether modified (and more stringent) standards must be complied with and which of the parties will have to bear the financial consequences of complying with these standards. A typical contractual clause in this case would provide for a Change Order by the Employer entitling the Contractor to an extension of time (“EOT”) and/ or compensation for additional costs.

And, last but not least, the parties must agree on the guaranteed parameters<sup>8</sup> such as availability, output, efficiency and accepted losses, e.g. of the transformers. Depending on the structure of the project and the available measuring methods, there will be a discussion to what extent the Employer can obtain the requested guarantees not only for the whole plant, but also separately for the major components such as the turbine and the generator or, respectively, the entire generating unit.

Experience shows: for the purpose of evaluating the (legal and financial) impact of a definition/ formula/ technical graph in the tender documents defining the guaranteed parameters in question, the advising lawyer and the Contractor’s responsible project engineer should work in close cooperation and *not* each of them isolated in his “ivory tower”, studying either only the contractual provision in the body of the contract stipulating the legal consequences of a non-compliance, or only the formula in one of the annexes to the contract without considering the legal consequences of

8. These parameters are sometimes referred to as “technical guarantees” or “functional guarantees”.

a non-compliance. It makes a huge difference in a formula or a contractual clause stipulating the legal consequences, whether only events/ standstills caused by the Employer or all events beyond the Contractor’s responsibility do not count for the calculation of the non-availability.

### III. COPING WITH INTERFACES

Coping with interfaces first of all requires both from a technical point of view as well as from a contractual point of view to identify the interfaces.

In particular in multi-contracting projects there are many interfaces between the different Scope of Works. However there are also interfaces between the Employer and other stakeholders of the projects, and last, but not least the interfaces between the Employer and the Contractor. The role of the contract is to clearly attribute the respective responsibilities and to define the mutual obligations regarding the interfaces. Besides the definition of the Scope of Works the interface *management* is one of the most critical success factors of the project execution. While the Scope of Works determines the limits of supply, and thus determines which components found at the interfaces fall within the Contractor’s responsibility, the interface management relates to the question of which of the parties is responsible for coordinating the different lots. The parties need to decide who shoulders the risk if one lot upon which another lot is dependent is performed poorly or delivered too late.

Regarding interfaces, usually the Employer tries to stipulate in a contract two obligations, which the Contractor has to fulfil: (i) the Contractor must deliver – within the limits of his Scope of Works - a complete work and he is obliged to perform all supplies and services which are necessary for the functioning of the plant even if they are not explicitly mentioned in the Employer’s Requirements; and (ii) the Contractor has to cope with the interfaces. It should be

noted, that in case (i) this clause still requires Employers to clearly stipulate the limits of supplies or, differently spoken, the “Excluded Works” and that regarding case (ii) I would recommend to be much more specific. In such cases it can make sense to establish a detailed “Interface Matrix” in the annexes to the contract.

As mentioned above, one of several Contractors has no direct contractual relationship with anyone of the Employer’s other Contractors. Thus he cannot exercise and enforce any rights vis-à-vis his Co-Contractors. Unless specifically otherwise agreed upon in a contract, the respective rights and obligations only exist between the contracting parties. Therefore it is typically – or should be, from a Contractor’s perspective – the Employer or his engineer (“Owner’s Engineer”) who assumes the interface *management* responsibility.

In case of dependency between different lots (e.g. the alignment of the turbine/ generation unit with the foundations; or the diameter of a headrace tunnel) it might be in the interest of the Employer that one Contractor (Contractor 1) checks the design and/ or works of another Contractor (Contractor 2) and points out potential defects to the Employer. In this case the Employer not only has to oblige his various Contractors to check the other Contractors’ works, but he also must e.g. oblige Contractor 2 to grant Contractor 1 access to the works at the site. If the Employer mandates an Owner’s Engineer to coordinate or supervise the works on his behalf, the contracts with the various Contractors have to stipulate the rights and powers of the Owner’s Engineers vis-à-vis the respective Contractors. And if the Employer wants all his Contractors to be present and cooperate in the process of the Provisional Acceptance, he must stipulate this in each Contract.

The Employer himself has various other contractual/ legal relationships to other stakeholders of the HPP project. He must comply with the conditions of the Concession Agreement, the grid code requirements or the obligation under a Power Purchase Agreement. In recent years Owners/

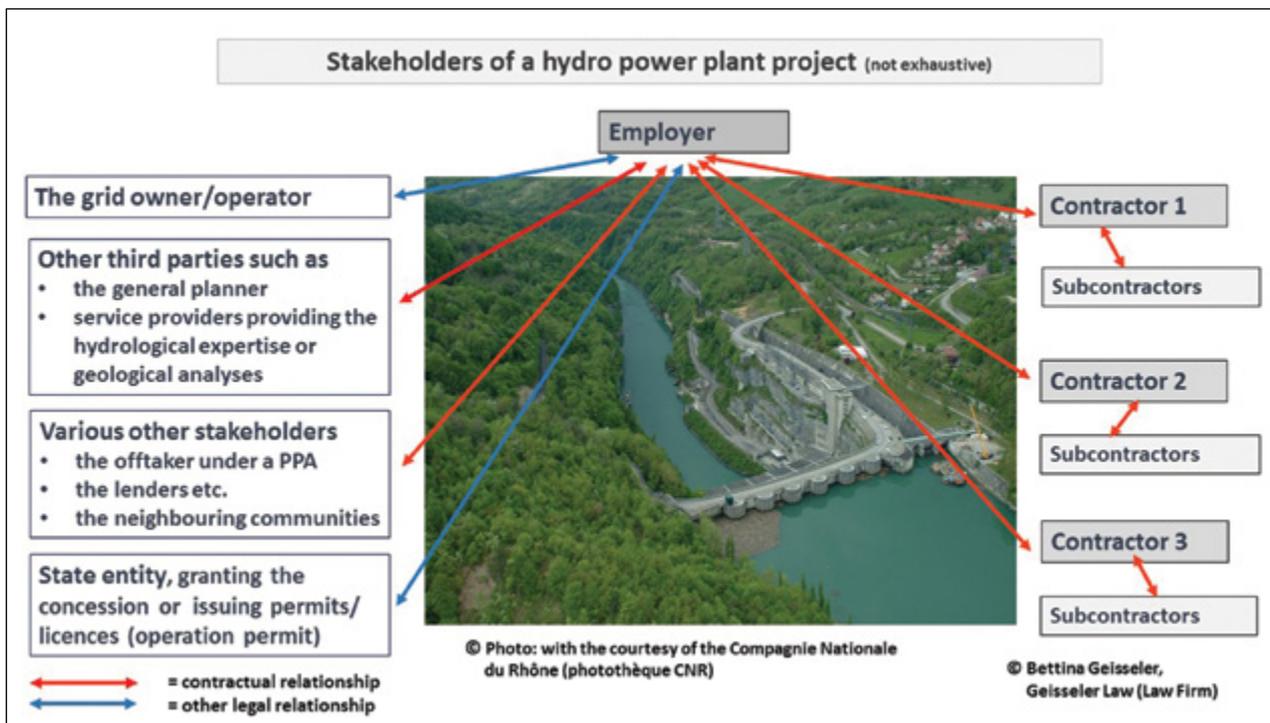


Figure 2 : Stakeholders of a hydro power plant project and possible interfaces.

Operators have in some cases entered directly into contracts with neighbouring communities or other stakeholders, e.g. if huge water reservoirs serve a multiple purpose (besides power generation: e.g. irrigation, fishing and recreation). The Owner (Employer) is well advised to pass on the requirements of these contractual relationships, as far as they are influenced by the construction and erection works, individually to each of his Contractors and make them an integral part of the contracts with its civil works or other Contractors.

The above shows that the works of one Contractor (Contractor 1) are within the Employer's sphere of risk in the Employer's relationship vis-à-vis another Contractor (Contractor 2). This means: in case of deficiencies of the information established by Contractor 1 and provided by the Employer to Contractor 2, it is the Employer who must indemnify Contractor 2 for rectifying measures within his design/works because of inaccurate/ faulty information established by Contractor 1. The same applies if Contractor 2 can erect its component only after the performance of works by Contractor 1 and the latter is in delay. An Employer should take this fact into account while calculating the (maximum) amount of available Liquidated Damages/ remedies under the contract.

From a time perspective all the time schedules (programs) of the various lots have to be aligned and integrated into the overall program. The erection contract should contain ample and adequately frequent reporting obligations by the Contractor enabling the Employer to efficiently manage the interfaces. Importantly, in case of deviations from the program or the quality becoming visible these reporting obligations must be immediate. An Employer might want to link the non-compliance with these reporting obligations with the payment of Liquidated Damages. Sometimes contracts provide for the Employer's right to declare suspension of all works in case of a considerable delay in the performance of works of one Contractor (Contractor 1) on which another Contractor (Contractor 2) depends (against compensation of unavoidable additional costs incurred by Contractor 2). This will allow an Employer to re-align all programs and to adapt the overall framework time schedule.

#### IV. UNFORESEEABLE EVENTS – RISK ALLOCATION BETWEEN THE PARTIES – CONTRACT MODIFICATIONS (“VARIATIONS”)

Each of the contracting parties has an interest to have the works completed on time, at the calculated costs/ agreed contract price, and in the agreed quality. However, many events occurring over the course of the project might have a negative impact on those goals. Unforeseen events during the project execution (be it the pre-construction/ planning phase, be it the construction phase) might not only lead to higher costs, but to considerable delays in the project realisation<sup>9</sup>.

The question is, how do the parties want to deal with hindrances during the execution phase? Which of the contracting parties assumes the risk in case of unforeseeable events? Or, put differently: is the Contractor entitled to claim for EOT and/ or the compensation of additional costs incurred? From a legal point of view it is important to distinguish

between the cause of a hindrance, its impact on time and costs, and the agreed legal consequences.

Among the typical situations which the contractual provisions should cover are *Force Majeure* (“F.M.”) events. Often the expression *Force Majeure* is used synonymously for all sort of hindrances beyond the sphere of influence of the affected party. In the international project business it is common practise to insert a *Force Majeure Clause* into hydro power plant erection contracts, although in particular the Civil Codes in the civil law countries typically provide for the same legal consequences. F.M. clauses should be drafted with due care – both regarding the definition of the F.M. events and the legal consequences. Catch-all clauses with a broad general wording covering all sorts of hindrances beyond one party's sphere of influence may be used, followed by an example list of typical events. Caution is appropriate as this list might under some applicable laws limit the scope of the general clause. Alternatively, the parties agree on an exhaustive list of events. The events covered by these clauses are not only “natural events” like adverse weather conditions, but can also be all sorts of environmental (including the legal environment) and social issues.

The typical legal consequence of the occurrence of a *Force Majeure* event is an extension of time, as the parties are considered to be released from their obligation to perform. The extension period should cover a sufficient period of re-mobilisation of the works on the site. The parties can agree on the Contractor's obligation to stay on the site and to hold workforce and machines available on the site (in order to shorten the re-mobilisation period), and e.g. agree on a compensation for this obligation (either for the whole waiting period or starting from a set week after the beginning of the impediment).

Often Contractors request in cases of F.M. the compensation of additionally incurred costs. In case of longer lasting F.M., either party should have the right to terminate the contract.

Commonly accepted prerequisites are that the event (i) has been unpredictable (by applying reasonable diligence), (ii) unavoidable, i.e. is not capable of being influenced by the affected party, and (iii) puts an excessive burden on the affected party which means that the affected party cannot mitigate the negative impacts with reasonable efforts.

Anyhow, it should be clearly stated that the risks which might not have been specifically foreseeable in concrete terms, but which the parties have allocated to one of the contracting parties, will not be considered as a *Force Majeure* event, when they materialise.

Parties should carefully consider circumstances which are quite typical risks in a HPP erection project and think about a risk allocation. One typical risk are the soil conditions, in particular with respect to tunnels and underground works. Whereas some standard form contracts provide for the compensation of additional costs incurred by the Contractor if the soil conditions prove to be worse than predicted, investors of privately – funded projects want to have a high degree of cost certainty.

A contractual solution can and should mirror the intention of the contracting parties. Various alternatives are possible. It starts with the design responsibility. As the design basis and the basic design are usually delivered by the Employer, contracts quite often stipulate that the Contractor has to check all the drawings & data provided by the Employer and that he has to draw the Employer's attention to any discovered discrepancies. From a Contractor's perspective the

9. See also: Loss of value: effects of delay on hydropower stakeholders, Plummer Braeckman J. and Guthrie P. Proceedings of the Institution of Civil Engineers – Engineering Sustainability (ahead of print).

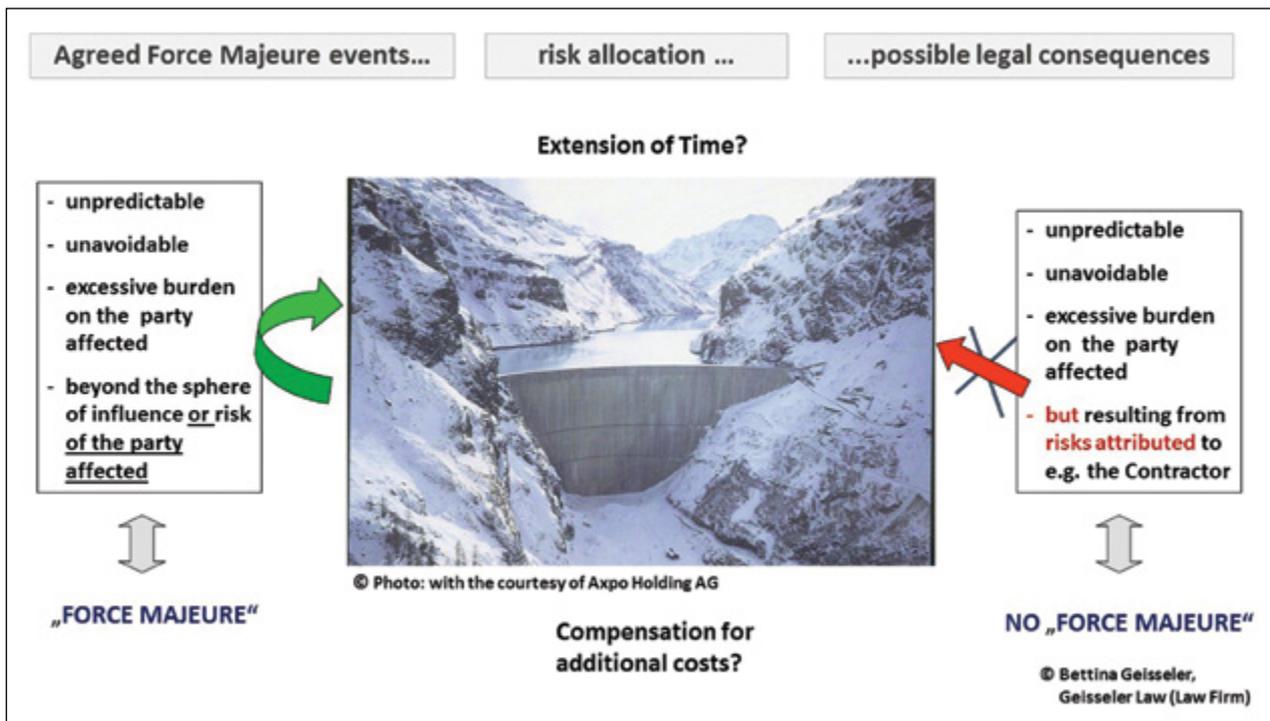


Figure 3 : Unforeseeable events – risk allocation.

contract should not only precisely define which information has to be checked and to which extent, but also which of the data delivered by the Employer is part of the so-called “rely-upon information”. If the circumstances later on deviate from the “rely-upon information” it is the Employer having established the documents/ drawings who assumes the risk. Regarding the soil conditions many solutions are possible. I have seen contracts in projects, in which soil/ subsoil conditions are a typical risk, stipulating that the Employer delivers the relevant subsoil data after having performed the necessary soil investigation, but that the Contractor himself is obliged to further investigate the soil/ subsoil conditions to a precisely defined extent. Under the condition that the Contractor had performed the additionally agreed investigation the risk of deviating conditions remained with the Employer with the consequence of the Contractor’s entitlement to an EOT and the compensation for additional costs.

Any successful claim by the Contractor for an EOT or additional payment is legally spoken a “Variation”, which means a contract modification. However there are not only Variations initiated by the Contractor, but also those initiated by the Employer. The Employer might want to extend or reduce the Scope of Works or even modify the quality requirements. If the contract is silent with regard to this issue, a Variation comes into effect only upon mutual agreement by the both parties. From a Contractor’s perspective thus the best contractual solution is the confirmation of this legal principle: “any variation initiated by the Employer needs a mutual agreement on the adaptations of the time schedule, the modification of the contract price or modifications of other contractual stipulations such as the guaranteed performance parameters”. Often however the Employer reserves the right (e.g. change of the quantities – extension or reduction! – up to e.g. 20% of the agreed original contract price) to request a Variation from the Contractor. Often the Contractor has the obligation to notify the Employer about potentials for optimisation he becomes aware of during the

project execution. In case the Employer has requested a Variation, the usual contractually agreed procedure is that the Contractor has to make a proposal covering impacts on the price, the time schedule and other contractual obligations. In case of a (final) disagreement between the parties with respect to the necessary contract price adaption, the Employer in most cases reserves the right to have the lack of an agreement between both parties substituted by a third party, e.g. the competent judge/ arbitration court. Unfortunately the parties seem not always to consider that in these cases the contract has to provide for a price determining method, in order to give the third party a legal guideline (the third party must not take a commercial decision!) how to determine the price according to the contracting parties’ intention. This issue is one of the reasons why even contracts with a “fixed and firm” lump-sum price, which is probably the most commonly used pricing method for large-scale projects and in particular in “EPC” (Engineering – Procurement – Construction)/ Turnkey Contracts, detail the price structure to some extent and indicate unit prices and/ or prices for all major key components. One option can be to take these prices as reference or – in case that the Variation concerns supplies/ services for which the contract does not indicate (unit) prices – to take the Contractor’s original overall price calculation as reference. Usually the Contractors are obliged to deposit their original price calculation e.g. with a notary public and to grant the price determining third party access to it in case of a Variation and a disagreement of the parties regarding the contract price adaption.

**V. SUITABLE (CONTRACTUAL) INSTRUMENTS OF AN ADEQUATE QUALITY ASSURANCE IN SUPPLY CHAINS**

HPP erection contracts have always provided for instruments to ensure the quality requirements of the Employer.

But in times where the level of vertical manufacturing integration seems to become continuously lower and supplied parts for key components are sourced in countries all over the world, the issue becomes increasingly important. One option is to specify as detailed as possible the Employers' Requirements, e.g. by specifying the construction materials and the country of origin (e.g. for the steel). The Employers usually do not only reserve the right to approve the Contractor's design and drawings. Typically the contracts oblige the Contractors to seek the Employer's prior approval for the subcontractors supplying major components. This can be done by way of approval in each particular case or by way of a list annexed to the contract establishing a number of pre-approved suppliers for major components. From the Contractor's perspective a certain caution is appropriate in the latter case. In order not to be faced with prices of the pre-approved sub-suppliers far beyond the usual market price, the Contractors should insist on a contractual clause allowing them to deviate in justified reasons from this list (under the condition that the alternatively engaged sub-supplier meets the quality requirements) and to state as one of the possible reasons the fact that the pre-approved sub-suppliers request prices being x % above the European/worldwide market price.

Other important instruments are broad inspection and instructions rights exercised by the Employer and the detailed specification of a quality assurance system/ quality assurance plan, which the Contractors are obliged to comply with and which they are to impose on each single subcontractor/ sub-supplier in the supply chain. A typical example is the obligation of the Contractor to grant the Employer

access to the Contractor's production sites for the purpose of inspections of the manufacturing process, especially of the manufactured (key) components before they are integrated into the plant during the erection process. Experience shows that it might be in the Employer's interest not to leave it to his Contractors to inspect the manufactured parts at the sites of their subcontractors, but to make large use himself of his rights and to double-check, even if the components in question are manufactured by a sub-sub-supplier and/ or in production sites 'at the other end of the world'.

Another aspect of the quality assurance is the evidence that the agreed technical parameters are met. In order to avoid discussions the contracting parties should pre-agree in detail on the measuring instruments and methods and on the institution carrying out the verifications on behalf of the Employer.

## VI. SUMMARY

The paper could only touch some of the critical issues. Every project is different regarding the technical and commercial parameters, the site conditions, the legal and social environment and the various stakeholders. The devil is in the details: there is no one legal solution, but – as mentioned before – the concerned parties are well advised to discuss with their legal advisors the details of the project to benefit from a contract which does not only balance their interests according to their intentions, but is adapted to the circumstances in which the HPP will be erected.