CALL FOR TENDERS

N°ENER/C2/2014-639

ENERGY SYSTEM AND MARKET MODEL FOR ANALYSING
CLIMATE AND ENERGY POLICIES

TENDER SPECIFICATIONS

TABLE OF CONTENTS

1. INFORMATION ON TENDERING

1.1. Participation

Participation in this tender procedure is open on equal terms to all natural and legal persons coming within the scope of the Treaties and to all natural and legal persons in a third country which has a special agreement with the Union in the field of public procurement on the conditions laid down in that agreement. Where the Multilateral Agreement on Government Procurement[1] concluded within the WTO applies, the participation to the call for tender is also open to nationals of the countries that have ratified this Agreement, on the conditions it lays down.

1.2. Contractual conditions

The tenderers should bear in mind the provisions of the draft contract which specifies the rights and obligations of the Contractor, particularly those on payments, performance of the contract, confidentiality, and checks and audits.

1.3. Joint tenders

A joint tender is a situation where a tender is submitted by a group of economic operators (consortium). Joint tenders may include subcontractors in addition to the joint tenderers.

In case of joint tender, all economic operators in a joint tender assume joint and several liability towards the Contracting Authority for the performance of the contract as a whole.

These economic operators shall designate one of them to act as leader with full authority to bind the grouping or the consortium and each of its members. It shall be responsible for the receipt and processing of payments for members of the grouping, for managing the service administration and for coordination. The composition and constitution of the grouping or consortium, and the allocation of the scope of tasks amongst the members, shall not be altered without the prior written consent of the Commission.

The tenderer should indicate in their offer whether the partnership takes the form of:

a) a new or existing legal entity which will sign the contract with the Commission in case of award

or

b) a group of partners not constituting a new legal entity, who via a power of attorney, signed by an authorised representative of each partner (except the lead partner), designate one of the partners as lead partner, and mandate him as lead Contractor to sign the contract with the Commission in case of award.

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[1] See http://www.wto.org/english/tratop_E/gproc_e/gp_gpa_e.htm

1.4. Subcontracting

Subcontracting is permitted in the tender but the Contractor will retain full liability towards the Contracting Authority for performance of the contract as a whole.

Tenderers must give an indication of the part of the services and proportion of the contract that they intend to subcontract.

Tenderers are required to identify subcontractors whose share of the contract is above 20%.

During contract execution, the change of any subcontractor identified in the tender will be subject to prior written approval of the Contracting Authority.

1.5. Content of the tender

The tenders must be presented as follows:

Part A: Identification of the tenderer (see section 1.6)

Part B: Evidence for exclusion criteria (see section 2.2)

Part C: Evidence for selection criteria (see section 2.3)

Part D: Technical offer (see section 2.5)

Part E: Financial offer (see section 2.6)

Part F: Power of attorney (for consortia only)

1.6. Identification of the tenderer: legal capacity and status

- The tenderer's identification form in **Annex 1** shall be filled in and signed by:

    o The tenderer (including any member of a consortium or grouping)

    o subcontractor(s) whose share of the work represent more than 20% of the contract.

- In order to prove their legal capacity and their status, all tenderers (including any member of a consortium of grouping) must provide a signed **Legal Entity Form with its supporting evidence**. The form is available on: http://ec.europa.eu/budget/contracts_grants/info_contracts/legal_entities/legal_entities_en.cfm

    Tenderers that are already registered in the Contracting Authority's accounting system (i.e. they have already been direct contractors) must provide the form but are not obliged to provide the supporting evidence.

- If it has not been included with the Legal Entity Form, tenderers must provide the following information

    - For legal persons, a legible copy of the notice of appointment of the **persons authorised to represent the tenderer** in dealings with third parties and in legal proceedings, or a copy of the publication of such appointment if the legislation

which applies to the legal entity concerned requires such publication. Any delegation of this authorisation to another representative not indicated in the official appointment must be evidenced.

- For natural persons, where applicable, a proof of registration on a professional or trade register or any other official document showing the registration number.

- The tenderer (only the leader in case of joint tender) must provide a **Financial Identification Form and supporting** documents. The form is available on: http://ec.europa.eu/budget/contracts_grants/info_contracts/index_en.cfm

2. EVALUATION AND AWARD

2.1. Evaluation steps

The evaluation is based on the information provided in the submitted tender. It takes place in three steps:

(1) Verification of non-exclusion of tenderers on the basis of the exclusion criteria

(2) Selection of tenderers on the basis of selection criteria

(3) Evaluation of tenders on the basis of the award criteria (technical and financial evaluation)

Only tenders meeting the requirements of one step will pass on to the next step.

2.2. Exclusion criteria

All tenderers shall provide a declaration on their honour (see Annex 2), duly signed and dated by an authorised representative, stating that they are not in one of the situations of exclusion listed in the Annex 2.

The declaration on honour is also required for identified subcontractors whose intended share of the contract is above 20%.

The successful tenderer shall provide the documents mentioned as supporting evidence in Annex 2 before signature of the contract and within a deadline given by the contracting authority. This requirement applies to all members of the consortium in case of joint tender In case of doubt on this declaration on the honour, the contracting authority may also request the evidence for subcontractors whose intended share of the contract is above 20%.

2.3. Selection criteria

Tenderers must prove their economic, financial, technical and professional capacity to carry out the work subject to this call for tender.

The tenderer may rely on the capacities of other entities, regardless of the legal nature of the links which it has with them. It must in that case prove to the Contracting Authority that it will have at its disposal the resources necessary for performance of the contract, for example by producing an undertaking on the part of those entities to place those resources at its disposal.

2.3.1. Economic and financial capacity criteria and evidence

In order to prove their economic and financial capacity, the tenderer (in case of a joint tender the combined capacity of all tenderers and identified subcontractors) must comply with the following criteria:

- The annual turnover of a minimum of € 1,500,000 for each of the last two financial years for which the accounts have been closed.

The following evidence should be provided:

- Copy of the profit & loss account for the last two years for which accounts have been closed,

- Failing that, appropriate statements from banks and

- If applicable, evidence of professional risk indemnity insurance;

If, for some exceptional reason which the Contracting Authority considers justified, a tenderer is unable to provide one or other of the above documents, they may prove his or her economic and financial capacity by any other document which the Contracting Authority considers appropriate. In any case, the Contracting Authority must at least be notified of the exceptional reason and its justification in the tender. The Commission reserves the right to request any other document enabling it to verify the tenderer's economic and financial capacity.

2.3.2. Technical and professional capacity criteria and evidence

a.   Criteria relating to tenderers

Tenderers (in case of a joint tender the combined capacity of all tenderers and identified subcontractors) must comply with the following criteria:

- The tenderer must prove experience in the field of energy modelling, in particular to energy systems and markets - especially in electricity-, energy technologies, renewables, energy economics and EU energy policy with at least 2 projects delivered in energy modelling in the last three years with a minimum value for each project of € 300,000.

- The tenderer must prove experience of working in English with at least two projects delivered in the last three years showing the necessary language coverage.

- The tenderer must prove capacity to draft reports in English.

- The tenderer must prove experience of having projects covering at least nine EU Member States (MS) with at least two projects delivered in the last three years, the combination of which must show the necessary coverage.

- The tenderer must prove experience in data collection, statistical analyses, and drafting reports and recommendations.

b. Criteria relating to the team delivering the service

The team delivering the service should include, as a minimum, the following profiles:

Project Manager: At least five years of experience in project management, including overseeing project delivery, quality control of delivered service, client orientation and conflict resolution experience in project of a similar size and scope (being at least in one of the fields covered by this call for tender) with experience in management of team of at least ten people.

At least 4 experts whose combined expertise covers the fields of energy (related to electricity, gas and heat), energy markets (and particularly electricity markets), renewable energy and climate change. Each expert shall demonstrate relevant higher education degree and / or 5-year professional experience in at least one of the above mentioned fields.

At least 3 experts in mathematical/systems modelling related to the topics of this framework contract: algorithmic design and energy (focusing on the electricity, gas and heat sectors). Each expert shall demonstrate relevant higher education degree and / or 5-year professional experience in mathematical/systems modelling.

At least 2 experts in software design and implementation, with at least one of them also expert in databases. Each expert shall demonstrate relevant higher education degree and / or 5-year professional experience in mathematical/systems modelling.

Language quality check: at least three members of the team should have proficiency level language skills in English, as guaranteed by a certificate or past relevant experience.

The team should also have the capability to access and master all the knowledge needed (statistics, composition of the energy system, etc.) from the 28 Member States of the European Union in order to develop the models and perform the studies described under section 3 Technical Specifications.

c. Evidence

The following evidence should be provided to fulfil the above criteria:

- List of relevant services provided in the past three years, with sums, dates and recipients, public or private. The most important services shall be accompanied by certificates of satisfactory execution, specifying that they have been carried out in a professional manner and have been fully completed;

- The educational and professional qualifications of the persons who will provide the service for this tender (CVs) including the management staff. Each CV provided should indicate the intended function in the delivery of the service.

- A list of references (reports, publications) which shows the capacity of the tenderers to address the scope of the tender and its geographical extent.

2.4. Award criteria

The tender will be awarded according to the best-value-for -money procedure. The quality of the tender will be evaluated based on the following criteria. The maximum total quality score is 100 points.

- **Quality of the proposed methodology and software** (70 points – minimum threshold 60%)

This criterion will assess:

- how the tenderer plans to address the specifications and services requested by the Commission and whether the proposed methodology is sound and reliable in terms of delivering the expected results on time, as well as the quality of methodological approach for analysis of software outputs.

- the quality of the proposed energy software and databases and how well it answers the software specification of section 3.3.1.

- the quality of the methodology which is proposed to perform the studies described in section 3.3.2.

- **Management/organisation of the work** (15 points – minimum threshold 60%)

This criterion will assess how the roles and responsibilities of the proposed team and of the economic operators (in case of joint tenders, including subcontractors if applicable) are distributed for each task. It also assesses the global allocation of time and resources to the project and to each task or deliverable, and whether this allocation is adequate for the work. The tenderer should provide details on the allocation of time and resources and the rationale behind the choice of this allocation.

This criterion will also assess the potential of the tenderer to communicate effectively with the personnel of the Contracting Authority assigned to the project in a manner that the project requirements are understood and dealt with effectively and the requisite skills are transferred to the personnel to enable it to use constructively the software and the study recommendations which will be part of the deliverables.

- **Quality control measures** (15 points – minimum threshold 60%)

This criterion will assess the quality control system applied to the service foreseen in this tender specification concerning the quality of the software, of the database, their documentation, the deliverables, the language quality check, and continuity of the service in case of absence of the member of the team. The quality system should be detailed in the tender and specific to the tasks at hand; a generic quality system will result in a low score.

Tenders must score above 60% for each criterion and above 70% in total. Tenders that do not reach the minimum quality thresholds will be rejected and will not be ranked.

After evaluation of the quality of the tender, the tenders are ranked using the formula below to determine the tender offering best value for money. A weight of 70/30 is given to quality and price (quality 70 and price 30).

$$\text{Score for tender } x =$$

$$\frac{total\ quality\ score\ for\ award\ criteria\ for\ tender\ x}{100}\ multiplied\ by\ 70$$

$$+\quad \frac{cheapest\ price}{price\ of\ tender\ x}\quad multiplied\ by\ 30$$

2.5. Technical offer

The technical offer must cover all aspects and tasks required in the technical specification and provide all the information needed to apply the award criteria. Offers deviating from the requirements or not covering all requirements may be excluded on the basis of non-conformity with the tender specifications and will not be evaluated.

2.6. Financial offer

The price for the tender must be quoted in euro. Tenderers from countries outside the euro zone have to quote their prices in euro. The price quoted may not be revised in line with exchange rate movements. It is for the tenderer to assume the risks or the benefits deriving from any variation.

Prices must be quoted free of all duties, taxes and other charges, including VAT, as the European Union is exempt from such charges under Articles 3 and 4 of the Protocol on the privileges and immunities of the European Union. The amount of VAT may be shown separately.

The quoted price must be a fixed amount which includes all charges (including travel and subsistence). **Travel and subsistence expenses are not refundable separately. This fixed price is used for the calculation of the quality/price ratio.**

3. TECHNICAL SPECIFICATIONS

3.1. General background

In its 2020 energy and climate policy, the EU has set the ambitious objective of 20% of our final energy consumption produced from renewable sources by 2020. In 2012, this share had already reached 14% and we are therefore on track to reach the 2020 objective. The 2030 Climate-energy package goes further with a target of at least 27% by 2030[2]. These trends will affect substantially the overall European energy system in particular the electricity grid.[3]

While in 2011 21.3% of the electricity production originated from renewables[4], this share is expected to rise to 36.1% in 2020 and 44.5% in 2030[5] with increasing production from variable sources, such as wind and photovoltaic. This poses a number of challenges in terms of stability and balance between supply and demand. In addition, while the share of electricity in the overall final consumption represented almost 21.6% of the EU-27 final energy consumption in 2011, it is projected to increase to 22.5% by 2020 and 24.5% in 2030, becoming the second most important energy source (after oil) even before 2020.

In this context, different key technologies have been already developed towards functional maturity, like wind, solar, bio-energy, heat pumps, etc. over the last years. Currently, the tasks for research and development lie mostly in further cost reduction and development of new approaches. However, maximum benefits of these technological developments as well as a cost efficient increase of the share of renewables can be achieved only if these are integrated in a coherent, reliable and stable energy system which can operate under complex technological, economic, environmental and social boundary conditions,

At the same time, the internal energy market in electricity and gas is being implemented throughout the EU since 1996. In 2009 the "Third Energy Internal Market Package" was adopted. Its aim is to put in place the regulatory framework needed to make market opening in the electricity and gas sectors fully effective and to achieve an efficient, integrated, interconnected and transparent EU internal energy market.

More specifically, the Electricity and Gas Directives (2009/72/EC and 2009/73/EC) contain common rules for the generation, transmission, distribution and supply of electricity and for the transmission, distribution, supply and storage of natural gas and set further and more detailed harmonization measures. The Third Package introduced the grounds for establishing legally binding EU-wide Network Codes (NC) and Guidelines – implementing measures adopted by the Commission under the Regulations via comitology procedure. Several such Codes and Guidelines have been adopted already for gas (NC on

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[2] COM/2014/015 final: "A policy framework for climate and energy in the period from 2020 to 2030", European Commission of the European Union, DG ENER, 2014.
[3] Energy 2020: A strategy for competitive, sustainable and secure energy, European Commission of the European Union, DG ENER, 2011.
[4] EU Energy in Figures: statistical pocketbook 2013, European Commission of the European Union, DG ENER, 2013.
[5] EU Energy, transport and GHG emissions trends to 2050, European Commission of the European Union, DG ENER, 2013.

capacity allocation – Regulation (EU) No 984/2013, MC on balancing – Regulation (EU) No 312/2014), Guidelines on congestion Management Procedures – Decision 2012/490/EU). NC and Guidelines for electricity are forthcoming (currently at various stages of adoption process). The Codes and Guidelines contain complex, technical requirements for the operation of networks and markets of great relevance for day-to-day activities.

EU internal energy market legislation in the three energy "packages" have set the basis for opening up the electricity and gas retail markets to competition for the benefit of European consumers. Existing rules aim at ensuring to all suppliers/retailers non-discriminatory access to and usage of transmission and distribution networks by obliging vertical integrated companies to legally and functionally unbundle the operation of transmission/distribution networks from supply activities.

In the years ahead, policymakers, regulators, network operators and businesses will also face new challenges, related to generation adequacy and potentially insufficient investments in generation capacity, the required flexibility to ensure the secure operation of the grid when more variable renewable energy enters the market, climate change, fuel security, building sufficient electricity transmission infrastructure, etc. The change from highly centralised production to highly decentralised production and the fact that the users professional and household will probably play an increasingly active role will require that the existing market design adapts to this new environment through carefully determined policies.

3.2. General and specific objectives

3.2.1. General Objective

The general objective of this invitation to tender is the development of software which models the European energy system, properly customized to the European Commission needs. The software should accurately simulate the main aspects of the European energy system and be calibrated with data of the current EU energy system (covering all 28 Member States). The European Commission should be able to use this software to explore and analyse the effects of different policies and trends on regional, national and European level by running several scenarios both for different time horizons. The modelling effort will bear mainly on the electricity, gas and heat sectors, both for the short-term and the medium to long-term.

The proposed software should be extendable, through the addition of new modules or the adjustment of existing ones, in order to cover possible future needs of the European Commission. An expert or experts group, not restricted to the original provider(s) of this software, should be able to perform these extensions, which although straightforward in open source software, may require a separate interface for commercial software (to be provided by the Contractor).

3.2.2. Specific objectives

The software should be able to simulate accurately the EU energy system in the short (less than hourly intervals) to medium term (five to ten year period) or longer, focusing on electricity, gas and heat[6] sectors. It should cover supply, transmission, distribution and final demand, as well as all associated markets and be capable of assessing the impacts in terms of CO_2 emissions. Ideally each sector would be modelled by separate detailed bottom up modules, which would then be integrated in an energy system model, allowing the analysis of the interdependencies, complementarities and competition between the three main sectors which are the focus of this tender. At the same time each module should be able to run independently, thus allowing for more focused sectorial studies. The temporal resolution should depend on the horizon of each study.

Most importantly, specific attention should be given to the modelling of the energy system and the mass integration of renewables, since the increase of the share of renewables will affect it significantly owing to the variable energy production (e.g. from wind and solar origins), which needs to be balanced by temporary adjustments in the production and demand or through efficient use of storage. In this context, an integrated model of the electricity, gas and heat sectors would highlight possible synergies between fuels in resolving such issues, for example by shifting between energy carriers (electricity, gas or heating/cooling) or – based on predictive power – between different periods of the day and how market signals could assist in this direction.

The software must be able to reproduce the characteristics of present and potential future technologies (district heating, combined production of heat and power, heat pumps, wind turbines, solar thermal & photovoltaic, electromobility, etc.). It must allow the possibility to include increased flexibility from conventional generation, storage systems and smart generation, relying on existing technologies (gas turbines, dams) but also technologies under maturation (electrochemical or other types of storage, power to gas, hydrogen technologies, etc.).

In order for the European Commission to properly assess the capabilities and appropriateness of the (gradually) delivered software, a number of studies shall be also delivered together with critical parts (modules) of the software. It is essential that the software and studies are delivered gradually over the contractual period in order for the European Commission to be able to follow closely on the progress, note any failures on the quality of deliverables and request appropriate corrections. The role of the studies will be crucial in this context.

3.3. Tasks

3.3.1. Software specifications

As the goal is to acquire the capacity to anticipate potential developments and needs related to the EU energy markets and EU energy system operation, the proposed software may be commercially available and / or open source and may be comprised of a single software

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[6] For the purposes of this tender, heat sector refers to both heating and cooling.

package or different software packages integrated in one. Upon delivery, European Commission will be the owner[7] of the (customized) software package, although the Contractor may retain ownership of own proprietary models, codes, algorithms and other confidential business information, following specific agreement with the European Commission[8]. Clear descriptions should be given on the ability of the European Commission (or other third parties appointed by the European Commission) to extend the delivered software according to its needs. The tenderer should explicitly highlight any ownership, extendibility or maintenance related issues. Special consideration will be given to tenders where additional modules, software capabilities/features and studies are offered by the tenderer, compared to the minimum required and within the scope of the project, including any module proposed under deliverables D.1.4 and the level of detail of D.4.

Upon final delivery, the software should in minimum include the following:

- An accurate representation of the European energy system in all meaningful timeframes related to its operation and planning, including all related existing processes. The Pan-European Network model should include at least all critical branches. Ability to simulate the grids on a subnational resolution is desired.
- An accurate representation of the European energy markets, both on national and supra-national, including all related existing markets/processes (forward, day-ahead, intra-day, balancing). Ability to simulate accurately the EU Target Model for electricity would be desired.
- An accurate representation of the regulatory framework and market support schemes for the different sectors covered. Ability to simulate different policy measures and analyse their impacts.
- Inclusion of the following:
  - Economic modelling of investment decisions regarding power and heat plants and electricity, gas and heat networks
  - Possibility of different bidding behaviours by market participants in order to capture their effect on market prices and investment recovery.
- Separate module to handle the stochastic parameters, which should simulate unplanned variability associated with the operation of the energy system by generating real life events following predefined or customized distributions for all stochastic input variables, like the variability of RES, uncertainty of demand, plant and network outages etc.
  - The level of uncertainty should reduce as one gets closer to real time operation.
  - Forecasts (of the participants, TSOs) of the stochastic variables, which should differ from actual values.
- Explicit modelling of demand, allowing for the choice of energy carrier (electricity, gas or heating/cooling) to cover the energy needs. Moreover, demand response / demand side bidding should be allowed for all markets and services (including reserves).

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[7] A developer's license could also be acceptable, assuming that such a license would fully cover the requirements of this Tender.

[8] Ownership, extendibility or maintenance related issues should be clearly mentioned and described in the tenders. The acceptance or not of the issues raised by the tenderer and the possibility of a specific agreement for any of them lies purely with the European Commission.

- The Software System should contain or have a direct link to an updated database for all required infrastructure data (plants, networks, etc.). The possibility of connecting the Software System to the existing EMOS[9] database maintained by DG ENER should also be considered.
- A local input and output database, where all relevant data will be stored.
- A reporting tool with a number of template reports and charts, summarizing scenario input and output.
- A graphical user interface (GUI) with dashboards, panes and tabs providing quick and easy access to input data, configuration, execution parameters and results.
- All the above should be integrated into a user friendly Software System, capable to simulate the hourly operation of the European energy system under the user specified assumptions and for different sets of system conditions. All modules should be integrated under a common user interface.

The software system should be able to perform the following actions:

- Perform both short-term and medium to long-term analysis. The short-term analysis would corresponds to a single year but with an hourly (or lower) resolution, while medium to long-term analysis to a series of future years for at least 5 years ahead, with a daily, monthly or yearly resolution, depending the context of the analysis; longer time horizons are desirable, especially for addressing explicitly economic modelling of investment decisions. Commensurate with the challenge to balance energy systems at any time, the time resolution of the software should be at least 8760 hours per year[10].
- Determine the market and system parameters, as well as their intensity level, per MS or EU sub-regions. The software should allow the inclusion of additional 'regions' in the course of a study. In general, the software should be able to report results separately for its all Member States (MS), as well as for user-defined aggregations of MS results. The current candidate countries should be covered as well (Turkey, FYROM, Montenegro, Serbia and Iceland) and - by preference - also other European countries (i.e. members of European Economic Area and the countries of South East Europe).
- Ability to translate information from other relevant European Commission modelling work, most notable the EU Reference Scenario, into input for the software.
- Ability to introduce generic constraints that would allow users to examine scenarios and capture constraints affecting the energy or ancillary service contribution of certain units or groups of units.

As the objective of this tender is the acquisition of a software tool which will assist European Commission in performing effective energy policy design and allow it to better understand the consequences of past, on-going and planned national and European policy initiatives, the following points are also critical:

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[9] http://ted.europa.eu/udl?uri=TED:NOTICE:205794-2014:TEXT:EN:HTML

[10] This could also be achieved by an adequate number of representative days in the case of the medium to long term analysis.

- The user should be able to appropriately change different market/system design parameters in order to properly reflect the various policy initiatives in the modelling.
- Ideally, if requested, European Commission should be able to provide to MS or stakeholders not just the results, but even the relevant modules[11]. These MS or stakeholders should be able to directly replicate the results when using the specific modules and same input assumptions, assuming they own or have access to the specific underlying software and data.
- As discussed above, it is envisaged that the acquired tool will be upgradable, so that it can be further extended in the future to improve the representation of the complex interactions in the European energy system, if not already in the software.

Tenders should also include an Advisory Team, available throughout the contractual period, composed of individuals with the appropriate expertise required for this project. This Team is expected to assist the Contractor in finding efficient and theoretically sound solutions to technical problems that may be encountered during the lifetime of the project, offer advice to the Contractor and the European Commission when a variety of implementation options are available and comment on the study results. To this end, such individuals may be drawn from academic, research and/or consulting institutions.

The database used for the purpose of modelling should be regularly updated and contain all data series relevant to the modelling, including the input and output of the model. Ideally, this database would include for each data series: an adequate description, a characterization (input, output, policy parameter, etc.), its exact source, a time-stamp and its full history. In this case, the proposed type, contents and procedures related to the maintenance and sharing of this database should be described in the tender, but eventually will need to be agreed with the Commission.

The database should rely on credible sources and have the appropriate level of detail, length of time-series, geographical coverage, industrial sectors coverage, energy system coverage (energy sources and energy consumption – also in transport) and information on technologies and public policies.

3.3.2. Studies to be performed using the software

The Contractor should deliver a number of case studies using this software, properly documented, to be used as templates for future European Commission work. An initial list of studies to be performed is given below for which by default the geographical scope is EU28 and the time horizon short to medium term. This should be the basis for the offer from the tenderer. The detailed nature, content, structure and format of each study will be further discussed and determined during the project between the Contractor and European Commission. The last will define the exact geographical scope and time horizon.

Studies and scenarios to be made with the software at energy system levels should assess among other:

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[11] This could implicitly also be achieved through some form of web-interface.

S.1.   Potential gains resulting from synergies between the energy networks (electricity, gas, heating and cooling),

S.2.   Effect of change in generation or grids assets to the electricity system and markets,

S.3.   Strategies for the redirection of energy flows among the electricity, gas and heat sectors in the case of crisis, including regional aspects and market impacts,

S.4.   Generation and system adequacy analysis,

S.5.   Effects of gas system constraints (e.g. Russian gas export interruptions) to electricity system and markets,

S.6.   Extent in which direct electric heating/heat pumps can be cost-efficiently used to integrate heating with electricity and gas markets,

S.7.   The role and need for storage, in particular with respect to security of supply and the reduction of market price volatility,

S.8.   The role and potential of heat pumps, hydrogen, electromobility, 'prosumers'.

S.9.   Cost-efficient heating and cooling development for district heating

More specifically on the increase of the share of renewables:

S.10. Required energy infrastructure investments due to the increase of the share of renewable energy, in particular from variable sources and to the increase of the share of electricity,

S.11. Effect of increase of share of renewables on electricity market prices and demand of electricity, gas and heat,

S.12. The role, sizing and potential of smart generation and storage to compensate for variable sources, and its effect to (balancing) prices

S.13. Effect of electromobility on the sizing and the dynamics of the electricity networks and integration of variable renewable electricity.

On market related issues:

S.14. Energy markets integration analysis (across all energy carriers),

S.15. Modelling the single European gas market,

S.16. The potential impact of the introduction of new market mechanisms and pricing schemes to bidding behaviour, investment recovery and security of supply, e.g. existence and solution of the "missing money problem".

Innovation aspects will be included and discussed in the studies (i.e. economic, regulatory and environmental issues) when analysing the different scenarios. Some of the innovation aspects may have to be included in the modelling when relevant.

3.4.   Input by the European Commission

To ensure relevance of the modelling work for the development of an energy policy for Europe, the policy parameters of the studies will be set out by the European Commission, as well as decisions on options concerning the quality and level of detail of the delivered software.

The Commission will provide guidance on the policy initiatives and legislation enacted so far on the European level. It will also provide information from other relevant European Commission modelling work, most notably the EU Reference Scenario, but without the obligation to translate it itself into input for the software.

The databases of the European Commission (Eurostat) are publicly available but if necessary the Commission might assist in the contacts with Eurostat in order to facilitate the data extraction and analysis. The Commission may also facilitate access to data retained in ENTSO-E and ENTSO-G databases.

The possibility of retrieving data from the existing EMOS database maintained by DG ENER should also be considered as an additional data source.

3.5. Intermediate outputs and deliverables

It is envisaged that the project's specific objectives can be accomplished through the deliverables below, each documented by a report. Due to the complexity of the project and the multitude of ways to achieve the goals of the project, this initial list of deliverables and timetable may be appropriately adjusted during the project, if to improve the quality of the final deliverables and if agreed by the European Commission and the Contractor. The tenderers' could already provide such adjustments with a proper justification in the tender.

Particularly as regards to deliverables that involve (a) the completion or integration of a software extension, and (b) the completion of a study where the Advisory Team may be involved, it would be helpful to identify the individuals to be involved and the time expected to devote on the specific task.

3.5.1. Work Programme

Deliverable D.0 will detail the work programme for the duration of the project and shall be submitted to the Commission within 2 months after the entry into force of the contract.

3.5.2. Software deliverables

D.1.   Software Implementation of EU electricity sector supply and grid module, comprising of the following sub-modules[12]:

   D.1.1.   EU electricity system operation
   Dispatch and unit commitment, including implementation of power flows. The module should especially be able to address system operation issues related to mass RES integration (e.g. requirements for ancillary services, grid constraints, etc.).

   D.1.2.   EU electricity day-ahead markets
   Modelling of the national day-ahead markets and market-coupling.

   D.1.3.   EU electricity balancing markets
   Similar to D.1.2 but for balancing markets.

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[12] The term module used for the deliverables does not preclude other forms of software design and implementation.

D.1.4.   Other EU wholesale electricity markets
Similar to D.1.2 and D.1.3, but covering all other markets that can be modelled on top, like intra-day, forward and ancillary services markets, including capacity markets or mechanisms. The tenderer must propose which additional markets, if any, is able to include in D.1 and in what detail. Each market should be described as a separate sub-module.

D.2.   Software Implementation of EU gas sector supply and grid module, comprising of the following sub-modules:

D.2.1.   EU gas system operation
Simulation of physical operation of the natural gas transmission system both at steady and transient natural gas flow conditions. Gas Storage facilities should be included in the modelling.

D.2.2.   EU gas wholesale markets
Modelling of the wholesale markets and their interaction on EU level.

D.3.   Software Implementation of the EU heat sector supply and grid module
Covering mainly district heating and CHP plants. Heating and Cooling from electricity and renewable sources could be addressed in this module or in the demand module.

D.4.   EU Energy Demand Module

Covering electricity, gas and heat sectors. Allowing the provision of demand response whenever applicable. Although the greatest possible detail in demand side modelling is desired, the tenderers are given flexibility on their tenders for the specific module in order to be able to submit an overall balanced tender. In all cases, strong emphasis should be placed on the extendibility of the specific module.

D.5.   Capacity Expansion & Investment Module
Planning of optimal transmission and generation expansion in the EU. Ability to do cost-benefit analysis on specific investments.

D.6.   Stochasticity Module
Handling stochastic parameters in order to simulate unplanned variability associated with the operation of the energy system.

D.7.   Accounting Module
Simple accounting software representing settlement rules and all other financial transactions (including RES support mechanisms), as well as emission calculations.

D.8.   Input / Output Database

D.9.   Reporting Tool

D.10. Fully Integrated Software System
Integrating all the above modules under a common user graphical user interface (GUI), from where the user should be able to configure and have quick access to all modules.

The Software System should be accompanied by:

D.11. A programmer's manual on integrated code and individual components including algorithm descriptions and documented (commented) source code.

D.12. User's manual on integrated code and individual components, including algorithm descriptions, input and output description and a data base of all the studies performed during the project.

The Software System under D.10 shall be delivered by the end of the third year. On the fourth year the Contractor shall work on the following:

D.13.   The Contractor is expected to continue improving the delivered software until the end of the Contract, especially regarding the functionality of the graphical user interface and the overall software usability. The Contractor should fix any bugs that were noted up to that point and test software extendibility. A final update of the software database is expected just before the end of the contract.

The tender should also include limited provisions of maintenance and support, including implementation of limited code changes that may appear necessary or desirable during the year following the final deliverable. Programmer and analyst time of at least 30 days and at most 60 days.

The software will be fully compatible with the operation system used by the European Commission.

3.5.3. Studies deliverables

Each module delivered under D.1, D.6 and D.10, as well as each sub-module under D.1 should be accompanied by one or several of the studies mentioned under section 3.3.2 Studies to be performed using the software, every time relevant with the object of the module or sub-module. At least one study should accompany each yearly interim report, to show the overall progress at the end of each respective year, while the final report should be accompanied by at least two detailed studies, fully exploiting the capabilities of the delivered integrated software, preferably one focusing on the energy system and one on the energy markets. A first agenda combining studies deliverables and software deliverable is proposed under section 3.6.

3.5.4. Interim reports/Annual progress reports

The interim payments in Article I.4.1 of the contract are linked to the acceptance by the EC services of the draft interim reports mentioned below.

The **draft interim reports (3×)** showing progress on the list of tasks and deliverables as defined in the Tender Specifications shall be submitted to the Commission at the latest at the end of the 13th, 25th and 37th month after the date of entry into force of the contract.

The Commission shall have 30 days from receipt to make observations. Within 20 days of receiving the Commission's observations, the Contractor will submit additional information or another report, and depending on the Commission's observations, may even have to resubmit software deliverables or studies.

Interim reports should refer to all progress up to that point and include as appendices the produced studies, while also referring to the completed software modules up to that point of time. Each interim report should update the previous one, i.e. will refer to cumulative progress from the signing of the contract and not to annual one. The latest available interim report will serve as the single reference point on the progress of the contract.

3.5.5. Final output and deliverables

The Contractor will submit a **draft final report** to the Commission at the latest **46 months** after the date of entry into force of the contract, i.e. two months before the expiration of the contract. The draft final report shall cover the tasks described in the Technical Specifications above.

The Commission shall have 30 days from receipt to make observations. Within 20 days of receiving the Commission's observations, the Contractor will submit additional information or a new final report.

Following the submission of the draft final report, a meeting will be organised in Brussels to discuss the Commission's observation. The exact date will be agreed upon with the Contractor.

The final report shall include:

- A maximum 1 page publishable abstract with one illustration intended for generalists in the field of energy, which can be posted on a web site with a quality level typical of articles for the press; to be delivered both in English and French;

- A maximum 3 page publishable executive summary with illustrations intended for policy makers in the field of research and innovation in the field of energy with a quality level typical of a publishable document;

- A final technical report including the studies and findings of these studies, structured according to the tasks described in section 3.6. of the Technical specifications; The quality level should be typical for a technical report.

- The software and an installation package, together with its documentation

- All the intermediate deliverables mentioned under section 3.5 organised in a comprehensive way.

The Commission may publish some results of the work. For this purpose, the tenderer must ensure that the results are not subject to any restrictions deriving from intellectual property

rights of third parties. Should he intend to use data in the study, which cannot be published, this must be explicitly mentioned in the offer.

The publishable executive summary shall be provided in both English and French and shall include:

- The following standard disclaimer:

    "The information and views set out in this report are those of the author(s) and do not necessarily reflect the official opinion of the Commission. The Commission does not guarantee the accuracy of the data included in this study. Neither the Commission nor any person acting on the Commission's behalf may be held responsible for the use which may be made of the information contained therein."

- Specific identifiers which shall be incorporated on the cover page provided by the European Commission.

All non-software deliverables should be delivered in 3 copies in paper form and one copy in electronic form, in MS Word. Extensive numerical annexes should be provided on CD or DVD in agreement with the Commission. All software deliverables should be delivered on CD or DVD.

3.6. Duration of the tasks

The duration of the tasks shall not exceed 48 months. This period is calculated in calendar days.

Execution of the tasks begins after the date on which the Contract enters into force.

In principle, the deadlines set out below cannot be extended. The Contractor is deemed solely responsible for delays occasioned by subcontractors or other third parties (except for rare cases of *force majeure*). Adequate resources and appropriate organisation of the work including management of potential delays should be put in place in order to observe the timetable below.

Task #	Task	Indicative Accompanying Study	Scheduled delivery (in calendar days)
1	Inception Report D.0	-	end of month 2
2	Deliverable D.1.1	S4	end of month 6
3	Deliverables D.1.2 and D.1.3 integrated with D.1.1	S7, S12	end of month 9
4	Deliverable D.2	S15	end of month 12
5	Deliverable D.6 for electricity and gas	-	end of month 12
6	Draft interim Report Year 1	S2	end of month 12
7	Deliverable D.7 *Preliminary versions of the module should be available from month 9 to support other modules.*	-	end of month 15

8	Deliverable D.1.4 and D.1	S16, S13	end of month 15
9	Deliverables D.1 and D.2 integrated	-	end of month 18
10	Deliverable D.5	S10	end of month 21
11	Draft interim Report Year 2 IR.2	S5	end of month 24
12	Deliverable D.3	S9	end of month 27
13	Deliverable D.4 for electricity	-	end of month 27
14	Extension of deliverable D.4 for gas	-	end of month 30
15	Deliverable D.6 for all sectors. *Preliminary versions of the module could be available from month 6 to support other modules.*	S11	end of month 30
16	Deliverable D.4 for all sectors	S8	end of month 33
17	Deliverable D.8. *Preliminary versions of the module should be available from month 6 to support other modules.*	-	end of month 36
18	Deliverable D.9 *Preliminary versions of the module should be available from month 6 to support other modules.*	-	end of month 36
19	Deliverable D.10 *Preliminary versions of the graphical user interface and other functionalities is acceptable, to be improved throughout the next year.*	S3	end of month 36
20	Draft interim Report Year 3	S6	end of month 36
21	Deliverables D.11, D.12	-	end of month 45
22	Deliverable D.13	-	end of month 48
23	Draft Final Report	S1, S14	end of month 45
24	Final Report	S1, S14	end of month 48

3.7.   Timetable to observe

A **kick-off meeting** will take place in Brussels, at the latest 30 days following the signature of the contract, in order to settle all the details of the software, studies, reports, etc to be undertaken.

Following each submission of the draft final deliverables or interim reports, progress meetings shall be organised in Brussels to discuss the Commission's observations. The exact dates will be agreed upon with the Contractor.

If the Commission finds it necessary, it may organise additional meetings, at which the Contractor is obliged to participate.

The Consultant should foresee regular and close cooperation with the European Commission during all phases of the project.

3.8. Place of performance

The task will be performed on the Contractor's premises. However, meetings between the Contractor and the Commission shall be held on Commission premises in Brussels.

3.9. Estimate of the amount of work involved

The amount of the work involved has been estimated at approximately **3500 man days**.

3.10. Intellectual property rights

The Commission may publish (in full or in part) the studies and reports, further elaborate the data and extract materials for publications. For this purpose, the tenderer must ensure that the studies are not subject to any restrictions deriving from intellectual property rights of third parties. Should the tenderer intend to use data in the studies, which cannot be published, this must be explicitly mentioned in the offer.

Upon delivery, European Commission will be the owner[13] of the (customized) software package, although the Contractor may retain ownership of own proprietary models, codes, algorithms and other confidential business information, following specific agreement with the European Commission[14].

4. CONTENT, STRUCTURE AND GRAPHIC REQUIREMENTS OF THE FINAL DELIVERABLES

All studies produced for the European Commission and Executive Agencies shall conform to the corporate visual identity of the European Commission by applying the graphic rules set out in the European Commission's Visual Identity Manual, including its logo[15].

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[13] A developer's license could also be acceptable, assuming that such a license would fully cover the requirements of this Tender.

[14] Ownership, extendibility or maintenance related issues should be clearly mentioned and described in the tenders. The acceptance or not of the issues raised by the tenderer and the possibility of a specific agreement for any of them lies purely with the European Commission.

[15] The Visual Identity Manual of the European Commission is available upon request. Requests should be made to the following e-mail address: comm-visual-identity@ec.europa.eu

The Commission is committed to making online information as accessible as possible to the largest possible number of users including those with visual, auditory, cognitive or physical disabilities, and those not having the latest technologies. The Commission supports the Web Content Accessibility Guidelines 2.0 of the W3C.

For full details on Commission policy on accessibility for information providers, see: http://ec.europa.eu/ipg/standards/accessibility/index_en.htm

Pdf versions of studies destined for online publication should respect W3C guidelines for accessible pdf documents. See: http://www.w3.org/WAI/

For graphic requirements please refer to the template provided in the annex 4. The cover page shall be filled in by the Contractor in accordance with the instructions provided in the template. For further details you may also contact comm-visual-identity@ec.europa.eu.

5. ANNEXES

1. Tenderer 's Identification Form

2. Declaration related to the exclusion criteria and absence of conflict of interest

3. Power of Attorney (mandate in case of joint tender)

4. Standard Word template for studies

5. Draft Contract

ANNEX 1

IDENTIFICATION OF THE TENDERER

(Each service provider , including any member of a consortium or grouping and subContractor(s) whose share of the work is more than 20% of the contract must complete and sign this identification form)

Call for tender ENER C2/2014-639

Identity	
Name of the tenderer	
Legal status of the tenderer	
Date of registration	
Country of registration	
Registration number	
VAT number	
Description of statutory social security cover (at the level of the Member State of origin) and non-statutory cover (supplementary professional indemnity insurance)[16]	
Address	
Address of registered office of tenderer	
Where appropriate, administrative address of tenderer for the purposes of this invitation to tender	
Contact Person	
Surname: First name: Title (e.g. Dr, Mr, Ms) :	

---

[16] For natural persons

Position (e.g. manager): Telephone number: Fax number: E-mail address:	
Legal Representatives	
Names and function of legal representatives and of other representatives of the tenderer who are authorised to sign contracts with third parties	
Declaration by an authorised representative of the organisation[17] I, the undersigned, certify that the information given in this tender is correct and that the tender is valid.	
Surname: First name:	Signature:

---

[17] This person must be included in the list of legal representatives; otherwise the signature on the tender will be invalidated.

ANNEX 2

Declaration of honour on
exclusion criteria and absence of conflict of interest

(Complete or delete the parts in grey italics in parenthese)
[Choose options for parts in grey between square brackets]

The undersigned *(insert name of the signatory of this form)*:

❑ in [his][her] own name *(for a natural person)*

or

❑ representing the following legal person: *(only if the economic operator is a legal person)*

full official name:

official legal form:

full official address:

VAT registration number:

➢ declares that [the above-mentioned legal person][he][she] is not in one of the following situations:

a) is bankrupt or being wound up, is having its affairs administered by the courts, has entered into an arrangement with creditors, has suspended business activities, is the subject of proceedings concerning those matters, or is in any analogous situation arising from a similar procedure provided for in national legislation or regulations;

b) has been convicted of an offence concerning professional conduct by a judgment of a competent authority of a Member State which has the force of *res judicata*;

c) has been guilty of grave professional misconduct proven by any means which the contracting authorities can justify including by decisions of the European Investment Bank and international organisations;

d) is not in compliance with all its obligations relating to the payment of social security contributions and the payment of taxes in accordance with the legal provisions of the country in which it is established, with those of the country of the contracting authority and those of the country where the contract is to be performed;

e) has been the subject of a judgement which has the force of *res judicata* for fraud, corruption, involvement in a criminal organisation, money laundering or any other illegal activity, where such activity is detrimental to the Union's financial interests;

f) is a subject of an administrative penalty for being guilty of misrepresentation in supplying the information required by the contracting authority as a condition of participation in a procurement procedure or failing to supply this information, or having been declared to be in serious breach of its obligations under contracts covered by the Union's budget.

➢ *(Only for legal persons other than Member States and local authorities, otherwise delete)* declares that the natural persons with power of representation, decision-

making or control[18] over the above-mentioned legal entity are not in the situations referred to in b) and e) above;

> declares that [the above-mentioned legal person][he][she]:

g) has no conflict of interest in connection with the contract; a conflict of interest could arise in particular as a result of economic interests, political or national affinity, family, emotional life or any other shared interest;

h) will inform the contracting authority, without delay, of any situation considered a conflict of interest or which could give rise to a conflict of interest;

i) has not granted and will not grant, has not sought and will not seek, has not attempted and will not attempt to obtain, and has not accepted and will not accept any advantage, financial or in kind, to or from any party whatsoever, where such advantage constitutes an illegal practice or involves corruption, either directly or indirectly, inasmuch as it is an incentive or reward relating to award of the contract;

j) provided accurate, sincere and complete information to the contracting authority within the context of this procurement procedure ;

> acknowledges that [the above-mentioned legal person][he][she] may be subject to administrative and financial penalties[19] if any of the declarations or information provided prove to be false.

In case of award of contract, the following evidence shall be provided upon request and within the time limit set by the contracting authority:

For situations described in (a), (b) and (e), production of a recent extract from the judicial record is required or, failing that, a recent equivalent document issued by a judicial or administrative authority in the country of origin or provenance showing that those requirements are satisfied. Where the tenderer is a legal person and the national legislation of the country in which the tenderer is established does not allow the provision of such documents for legal persons, the documents should be provided for natural persons, such as the company directors or any person with powers of representation, decision making or control in relation to the tenderer.

For the situation described in point (d) above, recent certificates or letters issued by the competent authorities of the State concerned are required. These documents must provide evidence covering all taxes and social security contributions for which the tenderer is liable, including for example, VAT, income tax (natural persons only), company tax (legal persons only) and social security contributions.

For any of the situations (a), (b), (d) or (e), where any document described in two paragraphs above is not issued in the country concerned, it may be replaced by a sworn or, failing that, a solemn statement made by the interested party before a judicial or administrative authority, a notary or a qualified professional body in his country of origin or provenance.

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[18] This covers the company directors, members of the management or supervisory bodies, and cases where one natural person holds a majority of shares.

[19] As provided for in Article 109 of the Financial Regulation (EU, Euratom) 966/2012 and Article 145 of the Rules of Application of the Financial Regulation

If the tenderer is a legal person, information on the natural persons with power of representation, decision making or control over the legal person shall be provided only upon request by the contracting authority.

Full name   Date   Signature

ANNEX 3

POWER OF ATTORNEY

mandating one of the partners in a joint tender as lead partner and lead Contractor 20

The undersigned:
– Signatory (Name, Function, Company, Registered address, VAT Number)

having the legal capacity required to act on behalf of his/her company,

HEREBY AGREES TO THE FOLLOWING:

1) To submit a tender as a partner in the group of partners constituted by Company 1, Company 2, Company N, and led by Company X, in accordance with the conditions specified in the tender specifications and the terms specified in the tender to which this power of attorney is attached.

2) If the European Commission awards the Contract to the group of partners constituted by Company 1, Company 2, Company N, and led by Company X on the basis of the joint tender to which this power of attorney is attached, all the partners shall be co-signatories of the Contract in accordance with the following conditions:

   (a) All partners shall be jointly and severally liable towards the European Commission for the performance of the Contract.

   (b) All partners shall comply with the terms and conditions of the Contract and ensure the proper delivery of their respective share of the services and/or supplies subject to the Contract.

1) Payments by the European Commission related to the services and/or supplies subject to the Contract shall be made through the lead partner's bank account: [Provide details on bank, address, account number].

2) The partners grant to the lead partner all the necessary powers to act on their behalf in the submission of the tender and conclusion of the Contract, including:

   (a) The lead partner shall submit the tender on behalf of the group of partners.

   (b) The lead partner shall sign any contractual documents — including the Contract, and Amendments thereto — and issue any invoices related to the Services on behalf of the group of partners.

   (c) The lead partner shall act as a single contact point with the European Commission in the delivery of the services and/or supplies subject to the Contract. It shall co-ordinate the delivery of the services and/or supplies by the group of partners to the European Commission, and shall see to a proper administration of the Contract.

Any modification to the present power of attorney shall be subject to the European Commission's express approval. This power of attorney shall expire when all the contractual obligations of the group of partners towards the European Commission for the delivery of the services and/or supplies subject to the Contract have ceased to exist. The parties cannot terminate it before that date without the Commission's consent.

Signed in ………………………… on   [dd/mm/yyyy]

Place and date:
Name (in capital letters), function, company and signature:

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[20] To be filled in and signed by each of the partners in a joint tender, except the lead partner;

ANNEX 4

Standard Word template for studies

Add document title 1

Add title 2

Table of Contents

How to Use This Document Template

Cover page

Add the title of the document which should be center aligned. Add any other relevant information if necessary which should be left aligned on the left vertical axe of the EC logo.
The font colour of the title should be **White**.

Page set up

- Top margin: 3.5

- Bottom margin: 2.5

- Left margin: 3

- Right margin: 2.5

Headings and subheadings

The following styles should be used for headings and subheadings.

- Heading 1
  Font type: Verdana
  Font Size: 14
  Colour: R:38, G:54, B:115

- Heading 2
  Font type: Verdana
  Font Size: 11
  Colour: R:38, G:54, B:115

- Heading 3
  Font type: Verdana
  Font Size: 10
  Colour: R:38, G:54, B:115

Do not use capital letters for the headings/subheadings, the format should always be "sentence case", except for abbreviations.

Body text

Font style: Verdana
Font size: 10
Font colour: Gray 80%

Header

The header should include the EU flag and the reference text:

- European Commission

- The title of the document

- Font type: Verdana Italic

- Font size: 8

Footer

Add the relevant name of the month and year in the footer which should appear to the left below the line.

- Font type: Verdana Italic

- Font size: 8.

- The page numbers will appear automatically.

Bulleted list

The bullet should be square and the colour should be Black. For reference please see list under "Headings and subheadings". To apply the style of the list, select "List Bullet 2" from the "Style" drop down menu.

Hyperlinks

By default the hyperlinks will appear in blue (colour coder: R:26, G:63, B:124), no underline.

Table of Contents

This template is complete with Styles for a Table of Contents. From the **Insert menu**, choose **Reference**, then **Index and Tables**. Click on the tab **"Table of Contents"**. In the "Format" box, select "From template".

ANNEX 5
DRAFT CONTRACT

Please see separate document