TERMS OF REFERENCE FOR THE INVITATION OF BIDS FOR THE APPOINTMENT OF A SERVICE PROVIDER TO CONDUCT AN ENERGY FOOTPRINT AND ENERGY SAVINGS POTENTIAL STUDY FOR HEAVY INDUSTRY SECTORS FOR A PERIOD OF TWELVE (12) MONTHS

1. BACKGROUND

1.1 The Department of Energy is in the process of developing the Integrated Energy Plan (IEP), which will serve as South Africa's energy sector's master plan up to 2050. The development of a national Integrated Energy Plan (IEP) was envisaged in the White Paper on Energy Policy of 1998 and the Department of Energy is mandated to develop and review it on an annual basis. The IEP will provide direction for the most efficient and effective way of supplying energy considering national objectives as well as domestic and global constraints. In support of the evidence-based policy development, demand models have been developed. The use of energy is impacted upon by a number of factors such as the efficiency of technologies used within a sector as well as the end use.

1.2 In addition, the Department of Energy recently published a National Energy Efficiency Strategy (NEES) with an overall target of 12% in the reduction of energy consumption by 2015. The revised NEES set out sectorial energy intensity improvements by industry (heavy industry) and mining at 15%. It is expected that this study will determine the future targets from 2015 to 2030, which will also be in line with the National Development Plan and the National Climate Change Response Policy White Paper.

2. OBJECTIVE

2.1 The study seeks to provide a detailed analysis of the energy footprint as well as the energy savings potential, which include a clear implementation plan guidelines within each of the following key sectors within heavy industry in South Africa:

2.1.1 Iron and Steel

2.1.2 Nonferrous Metals

(i) Primary Aluminium

(ii) Other Nonferrous Metals

2.1.3 Non-Metallic Minerals

(i) Cement

(ii) Other Non-metallic Minerals

2.1.4 Chemicals

2.2 An Energy Footprint can help with providing a better understanding of the flow of energy within the various industrial sectors, more specifically the supply of energy into a facility, as well as use and loss of energy within the facility. Areas of high energy consumption or significant energy losses can indicate opportunities to improve efficiency by implementing energy management best practices, upgrading energy systems, or developing new technologies. An energy footprint thus provides a macro-scale benchmark from which to evaluate the benefits of various interventions that could be deployed to reduce energy consumption.

2.3 An Energy Savings Potential Study is intended to analyse the energy end-use with the objective of determining the energy-saving potential for various processes within a particular industry. The potential for energy efficiency improvements is a key input into long-term energy demand projections. For the industrial sector, the technical potential for energy efficiency improvements is based on implementing best practice technology and emerging technologies; and adopting methods to increase material efficiency (for example recycling). An understanding of the technical potential for energy efficiency improvements requires an analysis of the current installed capacity of energy consuming technologies against best available technology internationally. Likewise it requires an analysis and comparison of current industry methods against international best-practice.

3. SCOPE OF WORK

3.1 Development of an Energy Footprint.

3.1.1 Identify a suitable methodology for the development of Energy Footprints which map the flow of energy supply and demand within the individual heavy industrial sectors of iron and steel, nonferrous metals, non-metallic minerals and chemicals.

3.1.2 Each footprint visualises the flow of energy (in the form of fuel, electricity or steam) to major end uses in manufacturing, including boilers, power generators, process heaters, process coolers, machine-driven equipment, facility HVAC, and lighting). The footprints should present data at two levels of detail. The first level provides a high level view on the supply of energy including offsite and onsite energy flow, while the second level shows details of how energy is distributed and end use of energy (e.g. lighting, process heat, and machine drive).

3.1.3 Footprints show aggregate data for each sector, including:

(i) Electricity and steam generated offsite and transferred to the facility; as well as electricity and steam generated onsite

(ii) Fuel, electricity, and steam consumed by major end uses in a manufacturing facility

(iii) Recoverable and unrecoverable offsite and onsite energy losses due to generation, transmission and distribution, and equipment and system inefficiencies

(iv) Greenhouse gas emissions released during the combustion of fuel.

(v) Fuels include fossil fuels (e.g. coal, petroleum products, natural gas) as well as biomass and by-product fuels generated at the plant site as well as the onsite use of renewable sources such as solar, wind or geothermal energy.

3.2 Determination of Energy Savings Potential

3.2.1 An energy savings potential study seeks to analyse the energy use/consumption and quantify potential for savings in various processes/end-uses within a particular industry. The study illustrates the total energy-saving opportunity that exists in an industry if the current processes are improved by implementing more energy efficient practices and by using advanced technologies.

3.2.2 Identification of a suitable methodology for the development of an energy savings potential analysis within the individual heavy industrial sectors of iron and steel, nonferrous metals, non-metallic minerals and chemicals.

3.2.3 Determination of the Current Average Energy Consumption (CAEC) for performing a given process in South Africa. The CAEC is the energy consumed by as process based on the current installed capacity for each process.

3.2.4 Determination of the Best Practice Energy Consumption for each key technology/process in South Africa. The BPEC is the energy consumed in an industrial process using above average energy efficiency in South Africa.

3.2.5 Determination of the Best Available Energy Consumption (BAEC) for each key technology/process internationally. The BAEC is the energy consumed in an industrial process using Best Available Technology and is determined using international benchmarks.

3.2.6 Determination of the Practical Minimum Energy Consumption (PMEC) for each key technology/process internationally. The PMEC is the energy that would be required after research and development achieves substantial improvements in the energy efficiency of an industrial process and is based on international benchmarks.

3.2.7 Assessment of installed capacity of each key technology within South Africa by comparing installed capacity of key technologies within South Africa against international benchmarks of Best Available Technology (BAEC) as well as State of the Art Technology (PMEC).

3.2.8 Estimation of the energy savings potential of key technologies/end-use processes in South Africa from 2013 to 2050.

3.2.9 Identification of key technologies for each end-use/process within the individual heavy industrial sectors of iron and steel, nonferrous metals, non-metallic minerals and chemicals. At a minimum for each technology the following parameters are required:

(i) Installed capacity (fleet of technologies) for all key end use technologies (The installed capacity for each technology should be for a minimum of the following years 2000-2012 in South Africa.)

(ii) Vintage (year of installation)

(iii) Cost (Capital, Operational)

(iv) Operational Life

(v) Efficiency (Energy per unit output)

(vi) Cost per unit output

3.3 Determination of Technology Improvement Cost Curve

3.3.1 For each key technology within each sector calculate the cost of saving one unit of energy due to investments in retrofitting existing technologies so that the technology becomes more efficient. The technology improvement cost curve should be calculated from 2013-2035.

3.3.2 For each key technology within each sector calculate the cost of saving one unit of energy due to the full replacement of existing technology with a more energy efficient technology. The technology improvement cost curve should be calculated from 2013-2035.

3.4 Guidelines for the development of Implementation Plans

4 DELIVERABLES

4.1 A project inception report accompanied by a detailed project plan must be submitted within a month of the signing of the contract.

4.2 Energy Footprint

4.2.1 A document outlining the selected methodology for computing the energy footprint for each sector.

4.2.2 An analytical model for calculating sector-specific energy end-use and losses and associated GHG emissions with supporting documentation. The input and output data used in the analytical model should be supplied in a Microsoft excel sheet and the sources of the data should be properly referenced.

4.2.3 Graphical representation which would enable the visualisation of the energy footprint for each of the sectors at the two levels described in the scope. The tool/software used to design this must be configurable such that input data can be easily modified or updated.

4.2.4 Energy Footprint Report: The report should document the energy flow, from supply through consumption, for the specified heavy industry sectors as described in the scope.

4.3 Energy Savings Potential

4.3.1 A document outlining the selected methodology for computing the energy savings potential for each sector.

4.3.2 An analytical model for calculating sector-specific energy savings potential. The input and output data used in the analytical model should be supplied in a Microsoft excel sheet and the sources of the data should be properly referenced.

4.3.3 Energy Savings Potential Report: Detailed outputs from the energy savings potential study for each sector as well as relevant recommendations.

4.4 Technology Improvement Cost Curves

4.4.1 A document outlining the selected methodology for computing the technology improvement cost curves for key technologies identified for each sector.

4.4.2 An analytical model for calculating the technology improvement cost curve for key technologies for each sector. The input and output data used in the analytical model should be supplied in a Microsoft excel sheet and the sources of the data should be properly referenced.

4.4.3 Technology Improvement Cost Curve Report.

4.4.4 Guidelines for the development of Implementation Plans

5. COMPULSORY INFORMATION SESSION

5.1 A compulsory information session will be held on **18th October 2013 at 10h00,** at the **Department of Energy, 192 Corner Visagie and Paul Kruger, Pretoria, 0001**.

6. COMPLETION DATE

6.1 The project must be completed within twelve (12) months from the date of signing the contract with the successful service provider.

7. REPORTING REQUIREMENTS

7.1 The service provider shall report to the Chief Director: Energy Planning on a monthly basis.

8. INTELLECTUAL PROPERTY

8.1. The analysis tools and data together with accompanying assumptions will be the property of the Department of Energy.

8.2. Information required from the Department of Energy is to be handled as confidential unless otherwise stated.

9. EVALUATION METHODOLOGY

9.1. Cost

9.1.1. The service provider will be requested to provide a quote regarding the work to be undertaken for this project.

9.1.2. The total cost must be VAT inclusive and should be quoted in South African currency (i.e.rands). A clearly costed project plan should include the following:

(i) Total Costing and Resource Allocation for each deliverable outlined in section 4.

(ii) For each deliverable the activities associated with its completion should be outlined e.g. data collection and transformation; modeling; sector analysis (each sector should have individual cost line);

(iii) Each work element/activity should specify the amount to time involved in completing the task. For example, data collection and transformation is five (5) days; modelling three (3) days etc.

9.2 Broad Based Economic Empowerment

9.2.1. Provisions of the Preferential Procurement Policy Framework Act (PPPFA 2011) and its regulation will apply in terms of awarding points.

9.2.2. Bidders are required to submit original and valid B-BBEE Status Level Verification Certificates or certified copies thereof together with their bids, to substantiate their B-BBEE rating claims.

9.2.3. Bidders who do not submit their B-BBEE status level verification certificated or are non compliant contributors to B-BBEE will not qualify for preference points for B-BBEE.

9.2.4. In a case of Exempted Micro Enterprise (EME), the following documents MUST be submitted.

- Verification agencies accredited by SANAS
- Registered auditors approved by IRBA

9.2.5. The table below depicts the B-BBEE status level of contribution

B-BBEE Status Level of Contributor	Number of points(90/10 system)
1	10
2	9
3	8
4	5
5	4
6	3
7	2
8	1
Non-compliant contributor	0

9.3 Bidders who qualify as EMEs

(a) Accounting officers as contemplated in the CCA; or

(b) Verification agencies accredited by SANAS; or

(c) Registered auditors (Registered auditors do not need to meet the prerequisite for IRBA's approval for the purpose of conducting verification and issuing EMEs with B-BBEE Status Level Certificates)

9.4 Company Experience

9.4.1. The service provider should at least have five (5) years' experience in energy end-use analysis or demand modelling for energy services.

9.4.2. The service provider should provide proof accompanied by correspondence from (03) contactable referees indicating that similar project/s was/were executed.

9.4.3. Failure to submit the above correspondence, bidders will forfeit functionality points in this category.

9.5 Team leader and team member's experience

9.5.1. Team leader and team members must have a minimum of three (3) years' experience in energy end-use analysis or demand modelling for energy services.

9.5.2. The curriculum vitae of both the team leader and team members must be attached to the technical proposal as proof. The CVs must clearly demonstrate the following aspects:

- Good technical writing and analytical skills
- In depth understanding of the South African Energy Sector with a specific focus on the use of energy in heavy industry
- Energy end-use technologies within heavy industry

9.5.3. Credentials or track record of prior demand modelling for end use in the energy sector will be an added advantage.

9.6 Qualifications

9.6.1. The team leader and team members must have a qualification in a computational science, engineering or other numerical or quantitative field (i.e. engineering, energy studies, mathematics, applied mathematics, computer science, physics, etc.

9.7 Project Plan Methodology

9.7.1. The proposal must include a detailed project design and methodology indicating how the technical work will be undertaken.

9.7.2. This should be accompanied by a detailed project plan which outlines

(i) Key deliverables with clear timelines and key dependencies

(ii) Key milestones

10. EVALUATION CRITERIA

10.1 Bids will be evaluated on 90/10 point system as outlined in the PPPFA of 2011.

The proposals will be evaluated in two phases:

Phase 1: Bidders will be evaluated based on functionality. The minimum threshold for functionality is **70 out of 100 points**. Bidders who fail to meet minimum threshold will be disqualified and will not be evaluated further for price and preference points for B-BBEE

No.	Criteria	Weights
1	**Company Experience/ Track Record:** ❖ The service provider must have at least five (5) years of experience in energy end use analysis or demand modelling for energy services ❖ Three (3) reference letters from the organisations that commissioned the studies (mentioned above).	**30** 25 5
2	**Team leader and team member's experience :** ❖ Team leader must have a minimum of three (3) years of experience in end use analysis or demand modelling for energy services. ❖ Team members must have a minimum of three (3) years of experience in end use analysis or demand modelling for energy services. ❖ The curriculum vitae of the team leader and team members must be attached to the technical proposal as proof.	**20** 10 5 5
3	**Qualifications:** ❖ Team leader and team members must have a qualification in computational science, engineering or other numerical or quantitative filed (i.e. engineering, energy studies, mathematics, applied mathematics, computer science, physics, etc.) Certified copies of certificates must be attached to the proposal; failure to submit correspondence bidders will forfeit points in this category.	**15**
4	**Project Plan** ❖ The project plan must include a detailed project design and work programme, aligned with the IEP methodology developed by the Department of Energy	**35** 15

	❖ Key deliverables with clear timelines and key dependencies ❖ Key milestones.	15 5
	Total	**100**

For purpose of evaluating functionality, the following values will be applicable:

0=	**Very Poor**	Do not meet the requirements
1=	**Poor**	Will not be able to fulfill the requirements
2=	**Average**	Will partially fulfill the requirements
3=	**Good**	Will be able to fulfill the requirements
4=	**Very Good**	Will be able to fulfill better in terms of the requirements adequately
5=	**Excellent**	Will fulfill the requirements exceptionally

Phase 2: Price and B-BBEE

Price	**90**
B-BBEE compliance	**10**

11. FORMAT AND CONTENT OF THE PROPOSAL

11.1 All the standard bidding documents (SBD) that are included in the bid document must be completed in all respects by bidders. Failure to comply will invalidate a bid.

11.2 Bidders are requested to submit two (2) copies: 1 original plus copy of the proposal and bid documents.

12. CLOSING DATE

12.1 Proposals must be submitted on or before **31 October 2013 at 11H00** at 192 Cnr Visagie & Paul Kruger Streets, Pretoria, in the bid box marked Department of Energy. **No late bids will be accepted.**

13. ENQUIRIES

TECHNICAL ENQUIRIES:

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