



EU GPP Data Centre criteria development

(Draft) Structure for a procurer and project team guidance document

Author(s): Felice Alfieri and Nicholas Dodd, JRC B5	Date: 8th June 2018
Background: <p>The aim of the guidance document is to provide simplified guidance to procurers and project teams on how to procure an environmentally improved data centre, with a focus on the potential for consolidation of existing distributed server rooms into new data centres.</p> <p>The initial structure has been developed as a matrix so that stakeholders can easily comment on it and adjust the steps and content. It is then proposed that it will be written into the chapters of a first draft document, for consultation in October 2018.</p> <p>The matrix has been structured to reflect the key steps in a generic process of consolidation and procurement, as well as the associated project activities that may be involved. First notes on the key issues and challenges that may be faced at each step are also described. The descriptions and actions are quoted from other guidance documents.</p> <p>The steps identified by so far by the JRC are as follows:</p> <ol style="list-style-type: none">1. Scoping<ol style="list-style-type: none">1.1 Involvement of Key Stakeholders (internal and external);1.2 Needs assessment1.3 Location and physical layout;2. Call for tender process<ol style="list-style-type: none">2.1 Procurement routes2.2 Market dialogue2.3 Call for tender procedure2.4 Tender evaluation3. Contract execution<ol style="list-style-type: none">3.1 Concept Design3.2 Detailed Design3.3 Construction / Commissioning3.4 Operation and Monitoring4. Decommissioning<ol style="list-style-type: none">4.1 Decommissioning / End of Life. <p>One of the main ideas of having the guide is that it will highlight where in the process GPP criteria can be best used, as well as also highlighting aspects of the process that are not easily addressed by criteria.</p> <p>The process of constructing a data centre or carrying out a major consolidation of a distinct</p>	

sequence of procurement activities. Each contract relates indicatively to distinct phases of activity as a project proceeds. This guidance document has been structured in order to reflect these activities, focussing on some of the key issues and challenges in seeking to integrate EU GPP criteria into procurement. The activities covered are the following:

Step	Description	Actions	Examples
1. Scoping			
1.1 Involvement of Key Stakeholders (internal and external)	<p><i>Ineffective communication between the disciplines working directly and indirectly in the data centre is a major driver of inefficiency as well as capacity and reliability issues (CLC-TR50600-99-1 / EU Code of Conduct for data Centres).</i></p> <p>Specific issues in a consolidation process Before diving into planning and designing a consolidation, data centre professionals must get input from business leaders and departmental managers in the enterprise about what they hope to achieve through consolidating as well as what different business units require for computational power, continuity, storage, back-up, and future capacity. <i>(Schneider Electric, 2016. 5 Steps to a Successful Data Center Consolidation)</i></p> <p>Implications of a data centre consolidation, including any necessary changes in processes or organizational structure must to be considered. <i>(Schneider Electric, 2016. 5 Steps to a Successful Data Center Consolidation)</i></p>	<p><u>What can be done in practice?</u> Internal stakeholders from relevant departments who will need to be engaged in the process shall be identified and brought together, as well external expertise to help guide the authority.</p> <p>Establish a group containing representatives from all disciplines (software, ICT equipment, mechanical, electrical and procurement) for the approval of any significant decision to ensure that the impacts of the decision have been properly understood and an effective solution reached. This group could be seen as the functional equivalent of a change board. <i>(CLC-TR50600-99-1 / EU Code of Conduct for data Centres)</i></p>	Examples / case studies needed.
1.2 Needs assessment	<p>Once enterprise decision makers are committed to data centre consolidation, the project team must conduct a thorough assessment of existing data centre technology and physical facilities, including remote locations, along with current level of IT staff skills. By first determining what they have, IT leaders can better determine what they need for a data centre consolidation in terms of technology and human resources. <i>(Schneider Electric, 2016. 5 Steps to a Successful Data Center Consolidation)</i></p>	<p><u>What can be done in practice?</u> The auditing of the existing equipment is an import step to maximise any unused capability by ensuring that all areas of optimization and consolidation are identified prior to new material investment.</p> <p>Audit existing physical estate and services. Audit the existing physical and logical estate to establish what equipment is in place and what service(s) it delivers. Consider the implementation of an ITIL type Configuration Management Data base and Service</p>	Examples / case studies needed.

		<p>Catalogue. A useful standard and reference to use in support of this Practice could be ISO 55000 (CLC-TR50600-99-1 / EU Code of Conduct for data Centres)</p> <p>Analyse current utilisation patterns: This may be of the overall data centre or grouped by service/location ICT server estate. The ISO IEC 30134-5 specifies a method for measuring the average utilisation of server equipment in a data centre.</p> <p>Audit of existing ICT environmental requirements Identify the allowable intake temperature and humidity ranges for existing installed IT equipment. Equipment with restrictive intake temperature ranges should be identified so that it may be either marked for replacement with newer equipment capable of a wider intake range or moved to a separate environmental zone. (CLC-TR50600-99-1 / EU Code of Conduct for data Centres)</p>	
1.3 Procurement routes	<p>Evaluate the potential benefits of procurement routes alternative to the construction of a new data centre, in particular:</p> <ul style="list-style-type: none"> • Procurement of co-location services/space • Outsourcing part of the Enterprise IT functions to an hosting datacentre • Outsourcing part of the Enterprise IT functions to the cloud 	<p><u>What can be done in practice?</u> <i>To be discussed further with stakeholders</i></p>	Examples / case studies needed.
1.4 Location and physical layout	<p>The shift from distributed IT and server closets to a proper data centres can include the choice of a new location/building to host the IT equipment. The location and physical layout of the building hosting the data centre are important to achieving flexibility and efficiency. The physical layout of the building can present fundamental constraints on the applicable technologies and achievable efficiencies.</p> <p>The geographic location for a data centre may</p>	<p><u>What can be done in practice?</u></p> <p>Locate the data centre in areas of low ambient external temperature in order to maximize the potential of free and economised cooling technologies. (CLC-TR50600-99-1 / EU Code of Conduct for data Centres)</p> <p>Locate the data centre in areas of low external humidity in order to maximize the potential of</p>	Examples / case studies needed.

	<p>impact achievable efficiency, primarily through the influence of external climate. Data centres may use a significant quantity of water to provide environmental control. The type and source of water may affect the energy consumption. <i>(Schneider Electric, 2016. 5 Steps to a Successful Data Center Consolidation)</i></p>	<p>free and economised cooling technologies. <i>(CLC-TR50600-99-1 / EU Code of Conduct for data Centres)</i></p> <p>Locate the data centre close to the power generating equipment as this can reduce transmission losses. <i>(CLC-TR50600-99-1 / EU Code of Conduct for data Centres)</i></p> <p>Ensure that the physical layout of the building does not obstruct or restrict the use of cooling economisers (either air-side or water-side), or other equipment with an economization mode. <i>(CLC-TR50600-99-1 / EU Code of Conduct for data Centres)</i></p> <p>Ensure sufficient ceiling height to enable the use of efficient air cooling technologies such as raised floor, suspended ceiling, aisle containment or ducts in the data centre when air movement is used to cool the ICT equipment. <i>(CLC-TR50600-99-1 / EU Code of Conduct for data Centres)</i></p> <p>Capture and store rain water for evaporative cooling or other non-potable purposes in order to reduce overall energy consumption. <i>(CLC-TR50600-99-1 / EU Code of Conduct for data Centres)</i></p> <p>Use of local non-utility water sources for evaporative cooling or other non-potable purposes as this may reduce overall energy consumption. <i>(CLC-TR50600-99-1 / EU Code of Conduct for data Centres)</i></p> <p>Locate the data centre where there are available opportunities for the reuse of waste heat. Heat recovery can be used to heat office or industrial space, hydroponic farming and swimming pools resulting in a significant overall net energy saving. <i>(CLC-TR50600-99-1 / EU Code of Conduct for data Centres)</i></p>	
--	---	--	--

2. Call for tender process			
2.1 Market dialogue	<p>The procurement directives specifically allow for preliminary market consultation with suppliers in order to get advice, which may be used in the preparation of the procedure. Such a process must be carried out in a transparent and non-discriminatory manner. The results of the consultation may not confer an unfair advantage on any of the suppliers who participated – to avoid this you should ensure that information is made available to all potential candidates or tenderers and allow adequate time for preparation of tenders. (<i>Buying green! A handbook on green public procurement 3rd Edition</i>)</p>	<p><u>What can be done in practice?</u> Options for a preliminary market consultation include:</p> <ul style="list-style-type: none"> • Publishing a Prior Information Notice (PIN), is one way to do this. • You may also consider publishing information on your website, or holding an information day for interested suppliers. <p>(<i>Buying green! A handbook on green public procurement 3rd Edition</i>)</p>	<p>Examples / case studies needed.</p>
2.2 Call for tender procedure and documentation	<p>Choices for the procedure:</p> <ul style="list-style-type: none"> • open procedure, where any operator may submit a tender. • restricted procedure, environmental and technical capacity can be assessed in a prior stage and also limit the number of operators you invite to tender. • Competitive procedure with negotiation and competitive dialogue • Innovation Partnership 	<p><u>What can be done in practice?</u> <i>To be discussed further with stakeholders</i></p>	<p>Examples / case studies needed.</p>
2.3 Tender evaluation	<p>Apply, where appropriate, selection criteria based on environmental technical capacity or environmental and supply chain management measures, and exclude tenderers who do not comply with applicable environmental laws</p> <p>Set award criteria which encourage tenderers to deliver even higher levels of environmental performance than those you have specified, and apply these in a transparent way. Assess lifecycle costs when comparing tenders and reject abnormally low tenders if these do not comply with environmental law. (<i>Buying green! A handbook on green public procurement 3rd Edition</i>)</p>	<p><u>What can be done in practice?</u> It is possible to apply environmental award criteria, provided those criteria:</p> <ul style="list-style-type: none"> - are linked to the subject-matter of the contract; - do not confer an unrestricted freedom of choice on the contracting authority; - ensure the possibility of effective competition; - are expressly mentioned in the contract notice and tender documents, together with their weightings - and any applicable sub-criteria; and - comply with the Treaty principles. 	<p>Examples / case studies needed.</p> <ul style="list-style-type: none"> - Proposal: Pisa GPP Case Study

		<ul style="list-style-type: none">• You may allocate points during the award stage to recognise environmental performance beyond the minimum requirements set in the specifications. There is no set maximum on the weighting you can give to environmental criteria.• Adopting a life-cycle costing approach reveals the true costs of a contract. Considering energy and water consumption, maintenance and disposal costs in your evaluation may indicate that the greener option is also the cheaper option over the full life-cycle.• Labels and other forms of third-party evidence can help you to assess how well a tender performs against your chosen award criteria, and to verify tenderers' claims. <p><i>(Buying green! A handbook on green public procurement 3rd Edition)</i></p>	
--	--	---	--

3. Contract execution			
<p>3.1 Concept design</p>	<p>The early parts of the design process need to focus exclusively on initial options for providing the required capabilities of the data center and its cost, and avoid investing in work on detailed design and specification.</p>	<p>What can be done in practice?</p> <p>Design options to deliver the appropriate resilience level. Utilise appropriate levels of resilience at the data centre, ICT equipment, software and network levels to achieve the required levels. <i>NOTE High resilience at the physical level is rarely an effective overall solution.</i></p> <p>Design options to deliver appropriate IT Capacity, Growth Plan, Density Other foundational decisions that will control the system architecture and environmental performance are:</p> <ul style="list-style-type: none"> • IT Capacity – Maximum IT load (in kW) that the data center physical infrastructure can support • Growth plan – Description of the ramp-up to the maximum power requirement, incorporating uncertainty • Density – The average and peak power that IT cabinets are expected to consume (kW/rack) and the amount of floor space required along with information regarding density uncertainty <p>Limit provisioning of power and cooling to a maximum of 18 months of computer room growth capacity Eliminate the provisioning of excess power and cooling capacity in the data centre. Designing a data centre for modular (scalable) expansion and then building out this capacity in a rolling programme of deployments is more efficient. NOTE 2 This also allows the technology 'generation' of the ICT equipment and supporting mechanical and electrical infrastructure to be matched, improving both</p>	<p>Examples / case studies needed.</p>

		efficiency and the ability to respond more effectively to changing business requirements. (CLC-TR50600-99-1 / EU Code of Conduct for data Centres)	
3.2 Detailed Design	In a conventional contracting arrangement, a design is procured for the building project and a contractor is procured to construct this design. In other contracting arrangements detailed design and construction can be procured together (in "design and build" or "design, build and operate" contracts). It may be necessary to procure expertise at this stage in order to prepare the performance requirements. <i>(EU GPP Office Building criteria)</i>	<u>What can be done in practice?</u> Take into consideration the Recommended practices for energy management (CLC-TR50600-99-1 / EU Code of Conduct for data Centres) and the more in general follow the requirements and recommendations included in the EN 50600 series to support the design of the data centre.	Examples / case studies needed. - Proposal: Vienna GPP Case Study
3.3 Construction / Commissioning	Thorough commissioning helps avoid a performance gap between design and operation. Processes check that mechanical and electrical systems perform in line with design targets before handover by verifying performance using test loads. This allows optimisation of control for efficient (and reliable operation).	<u>What can be done in practice?</u> Functional performance testing routines for equipment and monitoring systems.	Examples / case studies needed.
3.4 Operation and Monitoring	The development and implementation of a monitoring and reporting strategy is key to managing the environmental performance of a data centre. The ability to measure energy use and factors impacting energy use is a prerequisite to identifying and justifying improvements. It should also be noted that measurement and reporting of a parameter may also include alarms and exceptions if that parameter passes outside of the acceptable or expected operating range. Once data on energy consumption and environmental (temperature and humidity) conditions is available through the installation of measurement devices it should be collected and logged. Energy consumption and environmental (temperature and humidity) condition data needs to be reported to be	<u>What can be done in practice?</u> The proposal for the EU GPP criteria includes a series of Contract Performance Clauses related to the monitoring of performance. Systems can include Data center infrastructure management (DCIM) and Energy Management Control System. Reference standards: - EN 50600-2-2: Information technology - Data centre facilities and infrastructures - Part 2-2: Power distribution - EN 50600-2-3: Information technology - Data centre facilities and infrastructures - Part 2-3:	Examples / case studies needed.

	<p>of use in managing the energy efficiency of the facility.</p> <p>Utilization of the ICT equipment is also a key factor in optimizing the energy efficiency of the data centre.</p>	<p>Environmental control</p> <ul style="list-style-type: none"> - ISO 30134 Part 5 – IT equipment utilisation for servers. 	
4. Decommissioning			
4.1 Decommissioning / End of Life	<p>An overall strategy can be developed in order to manage end of life ICT equipment and replacement according to refresh rates and environmental operating parameters.</p>	<p><u>What can be done in practice?</u></p> <p>Replacement. A plan for the replacement of ICT equipment according to an optimal refresh rate and wider environmental operating ranges.</p> <p>Decommissioning. Decommission and remove any ICT equipment supporting unused services. This equipment should be collected and properly treated/depolluted.</p>	<p>Examples / case studies needed.</p> <ul style="list-style-type: none"> - Application of EURECA metric