ELECTION TECHNOLOGY SERIES

Electronic Voting & Counting Technologies

A Guide to Conducting Feasibility Studies

Ben Goldsmith
Senior Electoral Advisor

International Foundation for Electoral Systems
IFES
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Introduction

Automating Elections
The Philippines introduced electronic voting and counting technologies during its May 2010 national elections.

In many areas of modern life today, technology dominates. It is believed that technology is progress; progress is good and should, therefore, be embraced. An initial look at the field of elections may lead to a similar conclusion.

Electronic voting and counting technologies are being increasingly used around the world. India, the world's largest democracy, now uses electronic voting machines exclusively for national and provincial elections. Brazil, Belgium and the Philippines also use electronic voting or counting technologies for all of their national elections. Countries such as Estonia, Indonesia, Kazakhstan, Nepal, Norway, Pakistan, Russia and the United States are at various stages of piloting or partially using electronic voting and counting technologies, including the use of Internet voting.

Some countries, however, are moving in the opposite direction. The Netherlands, in 2008, after several decades of increasing use of electronic voting machines, decertified all of its machines and moved back to paper balloting. Germany, likewise, recently banned the use of electronic voting machines it had been using, and in Ireland €52 million[1] worth of electronic voting machines were bought but only used for a small pilot project. Furthermore, the use of electronic voting and counting technologies in the United States is deeply controversial and generates fierce debate between advocates and opponents of these technologies.

1 See parliamentary debate on Irish e-voting at http://historical-debates.oireachtas.ie/D/0625/D.0625.200610170016.html (last accessed on 24 January 2011).

How are we to reconcile these very different approaches to the suitability of electronic voting and counting technologies? For a country considering electronic voting or counting technologies, which is the right approach and when is it advisable to proceed using these technologies?

The answer is, of course, that there is no one answer. The factors which may push one nation towards an electronic voting or counting technology may not be present for another nation, or may indicate a different solution. The challenges of moving paper ballots around large countries such as Russia and Kazakhstan make the use of electronic voting technologies potentially beneficial on logistical grounds. The existence of a smart ID card with digital signature for the majority of the population in Estonia makes the use of Internet voting more feasible in Estonia. The Philippines adopted an electronic counting solution to deal with issues related to fraud during the counting process.

In short, the factors that argue for or against the use of electronic voting or counting technologies in a particular country are specific to that country and will have many different sources — legal, cultural, political, logistical, environmental, etc. This guide attempts to provide a framework for conducting a full assessment of whether electronic voting and counting technologies are appropriate for a particular electoral process.

A key theme in this guide is that transparency and openness are essential to successful consideration and implementation of

“The factors that argue for or against the use of electronic voting or counting technologies in a particular country are specific to that country and will have many different sources.”

electronic voting and counting technologies. Change can be unsettling, and it is crucial that stakeholders trust the electoral process. When decisions are taken behind closed doors without involving stakeholders, the rationale for those decisions will not be clear and stakeholders will naturally question who the change is intended to benefit. This can lead to erosion of trust in the process and severely undermine the credibility of the elections and the elected institutions.

As Thad Hall argued in a presentation at the EVOTE2010 Conference, it is not the technology that is used that matters, but the way in which the technology is implemented that ultimately determines the success of the election technology project.[2] This guide provides a solid basis for the decision-making process involved in whether or not to implement these technologies. The guide stresses that proper consideration should be given to all factors influencing the decision whether to adopt voting and counting technologies and that all stakeholders have the opportunity to understand and express their opinions during the process.

2 Notes from Session 1, 22 July 2010, Thad Hall Presentation on “Voting Technology and Election Experience: The 2009 Gubernatorial Races in New Jersey and Virginia”, EVOTE2010 Conference, Bregenz Austria.

Terminology

The current discourse on electronic voting and counting technologies is scattered with various terms and phrases — electronic voting machines, e-voting, e-enabled elections, remote voting, precinct count optical scanning, etc. This array of terminology generally relates to slightly different technological solutions. The field of election technologies related to voting and counting is a rapidly changing field and the conceptual framework for consideration is still emerging. Therefore, it is easy to find the same terminology being used in different ways in different countries or regions,[3] adding to the confusion caused by this proliferation of terms.

When people tend to discuss electronic voting, they are generally referring to two separate but sometimes related technologies — electronic voting and electronic counting. The traditional paper-based voting system consists of a voter manually marking the paper ballot and the ballot being counted by hand by election officials. In elections using electronic voting or counting technologies one or both of these processes are automated using an electronic device. In electronic voting an electronic device records the voting preference of the voter. This voting device may be located at the polling station or a remote location; for example, a personal computer is used to cast a ballot over the Internet or a mobile phone is used to cast a ballot via text message or SMS. In electronic counting an electronic device is used to count the ballots cast, whether paper or electronic.

Any combination of manual/electronic voting/counting is possible. A full electronic solution involves an electronic voting machine, remote or otherwise, directly recording the preference of the voter through a ballot interface (e.g., a touch screen), electronically counting the votes received at the end of polling and providing these results to election officials. Partial electronic solutions are also available whereby paper ballots are marked manually but counted by machine (e.g., optical scan solutions) or an electronic device is used to create a printed vote which is placed in the ballot box and counted by hand or electronically.

The various technological solutions offered by electronic voting and counting technologies mean there are many options available for election administrators while considering the introduction of such technologies. Electronic voting and counting technology vendors offer different ways of implementing each specific technical solution. The variety of technologies offered might be one factor which has led to very different experiences in countries which have used and attempted to use electronic voting and counting technologies.

In order to avoid confusion caused by different election technology terms, this guide will use the term 'electronic voting and counting technologies.' The only exception to this will be when the text of the guide is relevant to either voting or counting technologies.

3 For example, some experts would see the term 'electronic voting machines' as also covering ballot counting machines and remote electronic voting, whereas other experts would restrict the use of this term solely to actual machines used to cast, and not count, a ballot.

Benefits & Challenges of Electronic Voting and Counting Technologies

The act of conducting an election has been described as the largest and most complex logistical operation a country undertakes in peacetime. This complexity is not fully evident to those who participate in the election — voters, candidates, political parties and observers. Election management bodies around the world understand, however, that once an election is called they have to embark on a massive operational challenge to ensure all aspects of the election run relatively smoothly. As can be seen from the United Kingdom's 2010 General Election, even experienced election administrators in established democracies can make mistakes in planning, leading to the disenfranchisement of voters — a violation of fundamental political rights.[4]

Therefore, it is understandable that election administrators should seek ways in which the operational burden and risks involved in implementing such a complex operation can be diminished. Technology is one of the tools that can be used to assist in efficient, accurate implementation of elections. Technology assists in providing reliable and fast communication mechanisms, registration of voters, identifying voters, tabulating results, publishing election information, etc. Many technologies are clearly beneficial to the conduct of elections and can be adopted without issue. However, electronic voting and counting technologies are much more controversial.

There is recognition that such technologies have benefits, even amongst opponents. Although benefits vary among solutions, the following are possible:

- *Reduced Logistical Arrangements* — A significant challenge for election administrators is the finalization of design, printing, distribution, storage, security and counting of ballot papers. Electronic voting technology can reduce or eliminate these ballot logistical arrangements. There are, of course, logistical arrangements associated with electronic voting technology which need to be considered, such as configuration and preparation arrangements for the technology and appropriate storage and security for the hardware between elections.

- *Voter Identification Possibilities* — Whether in the polling station or remotely, the use of technology for the voting process allows improved mechanisms for voter identification at the point of polling. This can be done through biometric recognition systems such as automated fingerprint identification systems or the use of multiple factor authentication (smartcard and personal identification number). This significantly reduces voter registration fraud and ensures that the person voting is the person on the voter register.

4 See the report of the UK Election Commission (2010) Report on the Administration of the 2010 UK General Election, which concluded that these problems were caused by "poor planning, the use of unsuitable buildings, inadequate staffing arrangements and the failure of contingency plans", p. 3 (last accessed on 24 January 2011).

- *Accessibility* — Where remote electronic voting technology is used, there is a significant increase in accessibility to the electoral process. It may make the process more engaging to groups which are computer literate (e.g., young voters), but also make access to the ballot more feasible for voting groups which currently struggle to participate in the process. Such groups may include persons with disabilities, out of country voters (e.g., military and diplomatic personnel) and residents of remote communities with no polling station nearby.

- *Increased Speed of Voting* — If voting technology is properly designed and sufficient voter education is conducted in advance, electronic voting machines may lead to a faster voting process as there are fewer steps. There would be no ballot issued to the voter and no need to fold and place the ballot in the ballot box afterwards.

- *Ability to Deal With Complex Elections* — Electronic voting and counting technologies are generally able to deal with complex elections easily. This includes more complex electoral systems, such as preference voting and block voting, as well as holding multiple elections at the same time (e.g., concurrent presidential, parliamentary and local government elections).

- *Late Changes to the Ballot* — While any last minute changes to the ballot should be avoided, last minute changes through late inclusion or exclusion of a candidate or party, possibly as a result of court cases, do happen. This results in election administrators having to manually amend ballot papers which have already been printed. It can be easier to amend ballot design software in affected constituencies later in the election process with electronic voting and counting technologies compared to paper ballots; and much easier if voting is done remotely (e.g., Internet voting).

- *Less Polling Staff* — With a simpler process in the polling station, no ballot to be issued and no ballot box to monitor, it may be possible to reduce the number of staff required for each polling station. It is sometimes difficult to find staff for polling stations so this may be a significant benefit. Where the technology also counts the ballots, it means polling staff do not need to work as long on Election Day.

- *Access for People With Disabilities* — Electronic voting and counting technologies can be developed to facilitate casting secret ballots by voters with disabilities. These voters may normally require assisted voting, violating their right to a secret ballot.

- *Problems in the Official Stamp* — The need to have an official stamp on paper ballots can cause problems if polling staff forget to stamp the ballot (thus invalidating the ballot) or if the stamp smudges on the ballot, making it look like a second mark on the ballot (also invalidating the ballot). Electronic voting technologies do not suffer from this problem.

- *Increase in Turnout* — Electronic voting and counting technologies may increase turnout if these technologies help improve trust in the electoral process; if the technology makes people more interested in participating or increases access for certain communities.[5]

> *"Electronic voting and counting technologies may increase turnout if these technologies help improve trust in the electoral process."*

- *Elimination of Invalid/Incorrectly Cast Ballots* — In some countries significant numbers of ballots are deemed invalid and not counted. Those voters are disenfranchised. Where ballots are cast and recorded electronically, the electronic voting software can be configured to ensure only valid ballots are cast (although blank ballots may still be allowed). Likewise where paper ballots are inserted into an electronic ballot box, the validity and choices of the voter can be displayed, allowing voters to change their ballot if a mistake was made.

- *Speed of Counting* — An important advantage of using electronic voting technology, which directly record votes electronically, is that results are immediately available after polls close, without a lengthy counting process. Even when paper ballots are used, but electronically counted, the results are normally available a lot faster than manual counting.

- *Standard Adjudication of Ballots* — Counting paper ballots electronically ensures that the same kind of ballot marking is adjudicated in the same manner across all polling stations. This ensures consistency on which ballots are counted and which are determined to be invalid. This is often not the case with manual counting of ballots.

- *Accurate Tabulation of Results* — When results are electronically recorded and transmitted to the election management body (EMB) for tabulation, the possibility of data entry errors during results tabulation is greatly diminished.

- *Impartiality* — Electronic voting and counting technologies follow predefined rules and are independent from human influence and impartial.

- *Fraud Prevention* — Electronic voting and counting technologies can mitigate some fraud in polling stations. For example, some electronic voting and counting technologies only allow votes to be cast at a certain speed, thus mitigating 'ballot stuffing.' Similarly, electronic counting of ballots mitigates fraud during the counting process. Electronic voting and counting technologies cannot, however, eliminate all aspects of electoral fraud.

5 For example, geographically remote communities, people with disabilities and overseas voters.

- *Cost* — Electronic voting and counting technologies remove the need for expensive ballot printing, distribution, storage, etc. However, these technologies also incur different costs which need to assessed over the life cycle of the technology.

Disadvantages of voting and counting technology listed by opponents include:

- *Lack of Transparency* — Transparency is a key component of building and maintaining trust in the electoral process. The paper balloting system is very transparent. Observers can watch ballots being issued, voters placing their marked ballots in the ballot box and ballots being counted. Electronic voting technology, more so than electronic counting technology, is often considered to be a 'black box.' This is because it is not possible to observe the way in which the selected choices of voters are aggregated to produce the results announced. We simply have to trust that these results accurately reflect the choices made by voters. This makes the checking of results produced by electronic voting and counting technologies all the more important.

- *Confidence* — Lack of transparency with electronic voting and counting technologies means that confidence in the operation of the technology is a considerable problem. Election management bodies need to ensure that trust in the electoral process is maintained. Once trust is lost, it is difficult to re-establish. While the introduction of electronic voting and counting technologies does not have to lead to an erosion of trust in the electoral process, it has happened in some countries. Election management bodies are likely to have to introduce new procedures, possibly random audit of results or publication of source code for electronic voting and counting technologies, in order to maintain trust in the process.

"Lack of transparency with electronic voting and counting technologies means that confidence in the operation of the technology is a considerable problem."

- *Audit of Results* — A great strength of the paper balloting system is that if the results of an election are challenged then the ballots can be recounted to check the result. Many electronic voting machines[6] have no such possibility for auditing and checking the results of an election. The ability to audit and check is an important feature of building trust in the electoral process and increasing acceptance of the results. Some electronic voting machines do have what is called a Voter Verified Paper Audit Trail (VVPAT), which prints a copy of the electronic ballot and is verified by the voter before casting the ballot. This VVPAT can be used to audit/check electronic results produced by the electronic voting machine (EVM).

6 Electronic counting machines have the paper ballot completed by the voter as a natural audit trail.

The provision of a VVPAT is increasingly seen as a standard for EVMs,[7] but the inclusion of a VVPAT does have cost and logistic implications.

- *Secrecy of the Ballot* — A key international standard for elections is that it should not be possible to determine how an individual voter has voted. Electronic voting and counting technologies can undermine this secrecy. With some VVPAT systems, but not all, the order of ballots cast is clear from the paper audit trail. If the order of voters is recorded by observers/party agents then the way in which voters voted can be determined. Also, electronic voting systems which identify the voter first (as all remote electronic voting systems must do) provide the possibility for, but not the necessity of, linking the voter to the ballot cast. Remote voting does not ensure that the vote cast is secret or without coercion.

- *Setup Procedures for Electronic Voting Machines* — Procedures that need to be conducted at the beginning and end of polling may be difficult for many Presiding Officers who may not be sufficiently technology literate to understand and implement them.

- *Tendered Ballots* — Some countries allow voters not on the voter register or who are thought to have voted before to cast a 'tendered ballot,' 'conditional ballot' or 'challenged ballot' which will only be counted in certain circumstances. Most electronic voting and counting technologies do not allow the casting of such ballots as any vote cast will be included in the results. While it is possible that electronic voting and counting technologies could be adapted to cater for these types of ballots, it adds a level of administrative complexity which may outweigh the benefit.

- *Consequences of Breakdown* — If an electronic voting machine breaks down before or during polling and it is not possible to fix it, the potential consequence is disenfranchisement of the voters in that polling station.[8] This is a serious consequence which would require that spare electronic voting machines be available at a local level in order to cope with any breakdowns. The need for stand-by voting machines and the logistical arrangements to cover this would increase the cost of introducing electronic voting technologies.

- *Confusion for Illiterate/Uneducated Voters* — Any change in a system can cause confusion since users of the system have to adapt to new procedures. Electronic voting and counting technologies, while simple to use for most educated voters, may be confusing for illiterate and poorly educated voters. While this is a genuine

7 The Council of Europe (2004) Legal, Operational and Technical Standards for E-Voting, Recommendation Rec(2004)11 adopted by the Committee of Ministers of the Council of Europe on 30 September 2004 and Explanatory Memorandum, requires that the correctness of the result produced by an e-voting system should be verifiable and that the system should be auditable – recommendations 26, 59 and 100-110.

8 This is not an issue for electronic counting machines as ballot can be counted at any time after the close of polls.

Considerations such as storage and maintenance of voting and counting technology may be just as important as cost.

concern, it is worth noting that simpler electronic voting and counting solutions have been successfully used for populations with high levels of illiteracy.

- *Digital Divide* — Access that some voters may have to new voting technology, especially Internet voting technology, may serve to exclude some sections of the community which do not have such similar access to cast their ballot. This may increase barriers to participation amongst poor, illiterate voters and violate the principle of equal access to the electoral process for all eligible to participate.

- *Voter Education* — A considerable amount of voter education would be required to educate and prepare voters for a move to electronic voting technology, and to a lesser extent electronic counting technology. This voter education exercise would likely be costly.

- *Specialized IT Skills* — Maintenance and repair of hardware used by electronic voting and counting technologies requires specialized IT skills which may or may not be available in sufficient supply and at a reasonable cost in the local labor market. These skills may be required centrally as well as at the local level in order to deal with problems closer to Election Day if field based electronic voting or counting machines are used. More specialized IT skills may even be required at the polling station in order to operate any electronic voting or counting technology being implemented there. If these skills are in short supply then the use of electronic voting and counting

technologies may either be unsustainable or may require the expensive import of foreign expertise.

- *Integrity and Accuracy of Source Code* — Electronic voting and counting technologies rely on software to function. This software is a set of instructions to the electronic voting or counting system defining how it operates. As with any set of instructions, mistakes can be made and a thorough review of the source code has to be conducted before using any electronic voting or counting technologies. As it takes specialized technical skills to be able to read and understand source code, an independent testing authority may be required to review any electronic voting or counting system. This review would determine, to the greatest extent possible, whether the system is functioning according to its specifications and whether the system performs sufficiently well before it is accredited for use in an election.

- *Storage of Equipment* — Some electronic voting and counting system hardware is required to be stored under temperature controlled conditions between elections. Temperature controlled storage may be difficult and costly to find, especially on a regional or local basis.

- *Environmental Considerations* — Electronic voting and counting hardware, especially the machinery, may be required to withstand and perform reliably under a wide range of environmental factors including extreme heat, cold, humidity and dust. Finding electronic voting and counting solutions which reliably operate in such situations may be difficult.

- *Power Considerations* — Electronic voting and counting technologies require a source of power, with most running on mains electricity. For solutions based in polling stations, chronic power shortages or the lack of electricity entirely could require electronic voting or counting machines to run for the entire period of polling on an alternative power source. Such power requirements limit the options available.

- *Security* — Different security challenges are presented by electronic voting and counting technologies compared to paper balloting systems. For example, electronic transmission of results for tabulation presents the possibility for the system to be hacked and false results be inserted. Secure systems of protection and verification for electronic data need to be ensured.

- *Consequences of Fraud* — While fraud conducted using the paper balloting system is often localized and not widespread, the possibility exists with electronic voting and counting technologies for fraud to be implemented on a nationwide scale. Electronic voting and counting software could be manipulated to record vote preferences which are different from those made by the voters, or fraud and manipulation could

occur in the electronic tabulation of results if such tabulation occurs directly from the electronic voting or counting machines.

> *"The electoral environment also determines, to some extent, the advantages and disadvantages that may be experienced."*

- *Management Complexity* — Managing the introduction, testing, deployment, retrieval and security for electronic technologies can be more complicated than managing a paper-based election. Election management bodies often lack adequate experience in management of such complex systems. This can lead to a heavy reliance on the technology contractor to the point of surrendering control of the electoral process to a foreign entity.

- *Cost* — The cost of electronic voting and counting machines ranges from $300 per unit for the more simple solutions to approximately $5,000 per unit for more complex solutions. When aggregated for an entire election this can represent a potentially huge investment for many countries, although a full comparison against the costs of paper balloting needs to take into consideration the life cycle of electronic voting and counting technologies and the number of election cycles they would be expected to cover.

The relevance of these advantages and disadvantages vary significantly between electoral situations. Different electronic voting and counting technologies will be more likely to realize different possible advantages and be faced with different challenges. No solution is likely to realize all possible advantages listed above or to suffer from all of the disadvantages.

The electoral environment also determines, to some extent, the advantages and disadvantages that may be experienced. Logistical challenges may not be significant in a geographically small democracy such as Luxembourg, but could be of critical importance for a large country like Russia, which has many isolated communities. Countries which have no, or very poor, means of voter identification would likely not be able to consider remote voting, such as Internet voting. However, those with smartcards with personal identification numbers and wide Internet access, such as Estonia, might consider the challenges of Internet voting to be manageable — at least as an alternative voting channel.
It is also worth noting that as electronic voting and counting technologies change rapidly, the list of possible advantages and disadvantages will also change. This list provides examples of various issues a feasibility study may consider. The challenge for a good feasibility study will be to balance advantages and disadvantages in the particular electoral context and determine whether it is possible and/or beneficial to introduce electronic voting and counting technologies.

Electronic Voting and Counting Technology Feasibility Study

The decision to introduce an electronic voting or counting system for an election is complex and should not be rushed. The full process of adopting such technologies, if that is the decision, is likely to take years rather than months. The first stage in the process of considering the adoption of electronic voting and counting technologies is conducting a feasibility study, defined below:

"A general term that refers to various types of systematic evaluations carried out to better assess the desirability or practicality of further developing a proposed action. Such studies are typically performed during the planning stages."[9]

Each feasibility study is different. The components of a feasibility study and the order in which they are completed may vary from one context to another. The components and the order presented in this guide are recommendations and should be adapted for the particular electoral context.

Nevertheless, these components are presented here as a model of good practice for the conduct of feasibility studies into the possibility of using electronic voting and counting technologies. It is worth noting there are many steps to conducting a good feasibility study as identified in this guide. It is important to understand that reaching an informed decision on the possible use of voting and counting technologies may take considerable time.

In fact, adopting electronic voting and counting technologies is a complex decision and will need the appropriate time and resources to be made available. Any attempt to take short cuts in this deliberation process may result in adopting a technology which does not suit the electoral context in question or in taking a decision without the support of key stakeholders. Either of these results may seriously undermine the credibility and legitimacy of the electoral process.

Any experimentation with new technologies should start on a small scale and be provided ample time for proper consideration, as clearly stated in an IFES publication on election technology.[10] Entering the feasibility study process with a target in mind for when full scale implementation will take place may be natural from a planning perspective, but is a dangerous approach to the feasibility process. In effect it predetermines that (1) technology will be found to be feasible and (2) ignores the fact that the time it takes to conduct a good feasibility process cannot be determined at the beginning.

This guide suggests four key stages in the decision making process for the adoption of these technologies.

9 See this definition at http://www.i395-rt9-study.com/glossary.html (last accessed on 30 January 2011).

10 Yard, M. (ed.) (2010) Direct Democracy: Progress and Pitfalls of Election Technology, p. 18-19.

Stage 1: Decision in Principle — There are four components to taking a decision in principle about the possibility of introducing electronic voting and counting technologies.

- *Technical Feasibility* — Given the objectives identified for introducing electronic voting and counting technologies and any existing infrastructure limitations, a decision can be made as to whether introduction is possible and/or meets the requirements of the electoral environment from a technical perspective.

- *Beneficiality* — Each electronic voting and counting solution will have particular advantages and disadvantages. Each solution will meet the requirements for change in different ways. The balance of advantages to be offered, the importance of those advantages and the disadvantages and risks involved in using electronic voting and counting technologies will lead to an overall assessment of how beneficial the introduction of this technology could be.

- *Financial Feasibility* — An assessment of comparative costs of the current system of balloting compared to the estimated costs of electronic voting and counting technologies needs to be conducted. Even when an electronic voting or counting system is found to be more expensive, this may not mean that the introduction of such technology is not financially feasible. On the other hand, the assessment may show that the additional costs of introducing technology are so in excess of existing costs as to be beyond the resources available to the EMB.

- *Stakeholder Acceptance* — Even when an electronic voting or counting technology was found to be beneficial, technically feasible and financially feasible, it would be a brave, if not foolhardy, EMB that proceeded with the implementation of this technologies in the absence of stakeholder support. The perception of credibility is as important for electoral processes as actual integrity. If key stakeholders do not trust a new technology then they are unlikely to accept the election results generated, creating a deficit of legitimacy for the elected institutions. Therefore, an important component of the decision in principle will consist of an assessment of the willingness of stakeholders to accept and trust the introduction of electronic voting and counting technologies.

The combination of these four components leads to an overall decision in principle. The technical feasibility assessment may indicate there are no products available which meet the requirements of the electoral process. The resulting decision should be that the use of electronic voting and counting technologies is not feasible with the current products available. This does not mean that the consideration of electronic voting and counting technologies should cease entirely. New products are being developed on a regular basis and can be measured against the requirements identified through the feasibility study to see if the technical feasibility criteria are met at some point in the future.

When an electronic voting and counting solution is technically feasible, there still may be grounds for deciding not to pursue it if the advantages are minimal, the disadvantages are significant, the risks are higher, the costs are far greater than the advantages or there is significant stakeholder resistance to the new technology. The way in which these factors are balanced will be entirely dependent on the particular electoral environment. Countries or election management bodies with significant resources may be willing to spend a lot more to obtain an electronic voting and counting solution for the same net benefits than countries and election management bodies with fewer resources.

At the end of the day the decision will not be a purely administrative one, it may be political. The feasibility study will need to fully explore these different components of the decision in principle so that all stakeholders are aware of the technical and financial aspects of possible electronic voting and counting technologies adoption, the net benefits, and likely stakeholder reaction to the technologies.

While a well executed decision in principle will go a long way in ensuring that any introduction of electronic voting and counting technologies is done in a sound manner, there is only so much that can be understood about electronic voting and counting technologies without actually using them. Therefore, before any final decision can be made about the possible use of electronic voting and counting technologies it is essential that the technology be piloted.

“Before any final decision can be made about the possible use of electronic voting and counting technologies it is essential that the technology be piloted.”

Stage 2: Pilot Prerequisites — While the inclination may be to jump straight into a pilot project, there are a number of prerequisites and parameters that need to be established before conducting a pilot. Such prerequisites and parameters include the establishment of the pilot project mandate, passage of legislation enabling the pilot, development of requirements and technical specifications for the solution to be piloted and funding for the conduct of the pilot project. Once these are in place, the next stage of the process, the pilot project can start.

Stage 3: Pilot Project — The purpose of a pilot project is to demonstrate whether an idea or concept is feasible in practice. In the context of an electronic voting and counting feasibility study it should be used to determine the following:

- The solution(s) being piloted operates as expected
- The benefits anticipated can be achieved
- The disadvantages entailed in using the technology are as anticipated and can be mitigated in an acceptable way
- To assess and revise, if necessary, the list of requirements for any solution to meet the needs of the electoral environment

- To make a more accurate assessment of the costs involved in using the technology
- To assess organizational capacity of the EMB to effectively implement the change management required when introducing these technologies
- To test the reaction of key stakeholders in the process, especially voters, to using the electronic voting or counting technology

A pilot project can be conducted in many different forms and will need to be followed by a comprehensive analysis of its operation and success.

Stage 4: Decision on Adoption of Electronic Voting or Counting Technology — A pilot project may lead to a revision and reconsideration of any or all aspects of a decision in principle, resulting in a different decision in principle. This reconsideration, and possible revision, will lead to the final decision on the feasibility of introducing electronic voting and counting technologies.

The description above may make it seem that feasibility studies follow a linear path through these stages of the process. In reality some studies may never make it beyond the first step in the process because it is clear that electronic voting and counting technologies do not suit the electoral environment in question. Other electoral situations may see several iterations of the pilot project stage, as requirements and electronic voting and counting solutions are refined over time, before a final decision to proceed or not is taken.

A few final points should be made about the general process of the feasibility study, points which are succinctly raised by the Council of Europe (CoE) in its recent E-voting Handbook relating to confidence, public debate and accessibility:

"...confidence should not be taken for granted and states need to do their utmost to ensure that it is preserved, all the more so as once trust and public confidence are eroded, they are exceedingly hard to restore. ... Fostering transparent practices in member states is a key element in building public trust and confidence."[11]

Confidence in a system of voting is essential if the results of an election are to be accepted and elected institutions perceived as legitimate. This guide takes this warning to heart and seeks to apply procedures and mechanisms that are open and transparent. The guide attempts to ensure that the process of piloting, and potentially adopting, electronic voting and counting technologies does not undermine the trust and confidence of stakeholders in the electoral process.

This is closely linked to the second point of public debate. The guide seeks to include as many stakeholders as possible in the consideration of and debate about the use of electronic voting and counting technologies. Openness throughout the process, and

11 Council of Europe (2010) E-Voting Handbook: Key steps in the implementation of e-enabled elections, p.14-16.

making details of the process accessible, will ensure that sufficient information is available in the public arena for informed debate outside of the mechanisms provided for by the Feasibility Study Committee. This will help to mitigate baseless accusations by those concerned about the technologies being considered.

Finally, the use of electronic voting and counting technologies has great potential for improving voter access to the electoral process. The CoE identifies a number of groups which may benefit from the greater accessibility provided by such technologies, including people with visual disabilities, those who struggle to travel to polling stations, access for those using official minority languages, military personnel overseas and citizens living and working abroad.[12] However, using electronic voting and counting technologies also has the potential for excluding voters, especially those who may not understand how to use new systems and may feel intimidated by trying to do so. The Council of Europe states that:

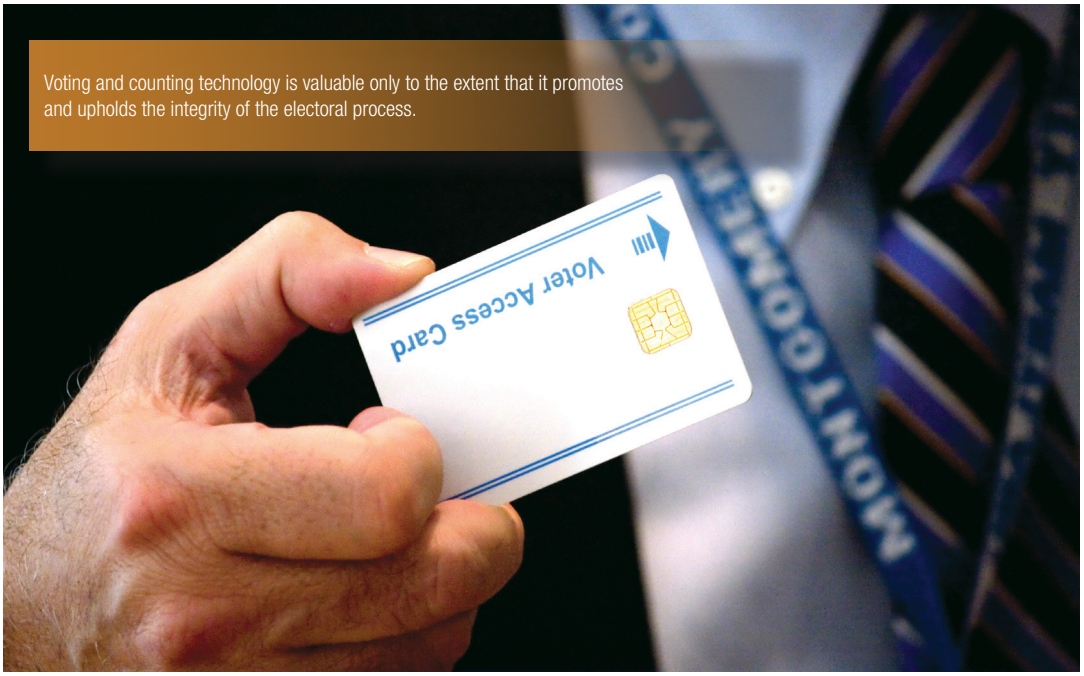
"E-voting should result in inclusion, never exclusion, of certain groups."[13]

This is an important point to keep in mind throughout the consideration of electronic voting and counting technologies.

After a brief discussion on international electoral standards related to electronic voting and counting technologies, the guide will take each of these stages of the feasibility study process one by one, explaining the kinds of issues that will need to be considered in implementing them.

12 Ibid, p. 15-16.
13 Ibid, p. 16.

International Electoral Standards



Voting and counting technology is valuable only to the extent that it promotes and upholds the integrity of the electoral process.

When considering a change in any sort of system, especially an important one such as a voting and counting system, it is vital that the underlying standards by which different systems can be judged are kept in mind. There are a number of different approaches to the challenge of judging electoral processes. In recent years, opinion appears to have coalesced around the concept of international electoral standards as defined by public international law.[14]

Public international law based electoral standards are well elaborated in documents issued by the United Nations,[15] the European Commission,[16] the Organization for Security and Cooperation in Europe (OSCE)[17] and the Venice Commission.[18] The way these electoral standards are categorized by the different institutions are not exactly the same, but it does illustrate a common understanding of the content of international electoral standards. Drawing directly from the wording of Article 25 of the International Covenant on Civil and Political Rights (ICCPR), the core of these international electoral standards can be defined as the following:

14 See for example the Inter-Parliamentary Union's publication in 1994 - Goodwin-Gill, G. (1994) *Free and Fair Elections: International Law and Practice*, Inter-Parliamentary Union: Geneva and the updated version - Goodwin-Gill, G. (2006) *Free and Fair Elections: New Expanded Edition*, Inter-Parliamentary Union: Geneva.

15 Centre for Human Rights (1994) *Professional Training Series No.2: Human Rights and Elections – A Handbook on the Legal Technical and Human Rights Aspects of Elections*, United Nations: New York and Geneva.

16 European Commission (2007) *Compendium of International Electoral Standards: Second Edition*, European Commission: Brussels.

17 OSCE (2007) *Election Observation Handbook: Fifth Edition*, OSCE Office for Democratic Institutions and Human Rights: Warsaw.

18 European Commission for Democracy Through Law (Venice Commission) (2002) *Code of Good Practice in Electoral Matters: Guidelines and Explanatory Report,* Adopted by the Venice Commission at its 52nd session (Venice, 18-19 October 2002), CDL-AD(2002) 23 rev.

- *Fair Elections (without any distinctions)* — Elections should be conducted so as to ensure equal conditions for participation in the electoral process for all eligible candidates and voters, irrespective of gender, religion, ethnicity, political affiliation, language, literacy or disability.

- *Genuine Elections* — Elections must be held for institutions which have authority, must be conducted in a credible manner, must present voters with real choices between candidates for election, with the results of elections representing the will of the people.

- *Periodic Elections* — Elections must be held frequently enough to ensure that governmental authority continues to reflect the will of the people and that there is regular opportunity for the voters to change government.

- *Universal Suffrage* — Legal and operational limitations on access to candidacy or the right to vote must be minimized and must not be discriminatory in nature, except where such limitations are reasonable or necessary.[19]

- *Equal Suffrage* — Voters should each be provided the same number of votes in each election being conducted and electoral districts should be reasonably equal in size so that each vote cast has a similar weight.

- *Secret Ballot* — In order that voters be able to freely express their electoral preferences in the absence of intimidation, the ballot should be completed in private and it must not be possible to link a voter to a voting preference.

- *Free Elections* — The electoral environment must be such that information on electoral contestants can be made available to voters, informed discussion about electoral options can take place, and voters are able to make electoral choices without intimidation.

These political/electoral rights and standards do not operate in a vacuum. In fact political rights work in parallel with other human rights and a healthy electoral environment relies on the realization of these broader human rights. Human rights relevant to the conduct of elections include the rights to freedom of expression,[20] freedom of information,[21] freedom of assembly,[22] freedom of association,[23] freedom of movement,[24] to non-discrimination,[25] and to self-determination.[26] Transparency is also an essential component for a credible electoral process. The requirement for transparency is derived in part from some of the human and political rights standards outlined above.[27] It is also based on other international standards, such as anti-corruption standards,

19 For example, on the basis of age, nationality, residence, mental incapacity or criminal conviction.

20 Article 19 of the ICCPR.
21 Article 19 of the ICCPR.
22 Article 21 of the ICCPR.
23 Article 22 of the ICCPR.
24 Article 12 of the ICCPR.
25 Article 2 of the ICCPR.
26 Article 1 of the ICCPR.
27 For example, the right to information, that elections are credible (genuine) and that elections are conducted in a fair manner.

which require public affairs to be conducted in a transparent manner.[28]

The international electoral standards outlined above are equally relevant for the use of technologies to assist the processes of voting and counting, as clearly stated in the Council of Europe's 2004 Recommendation on Legal, Operational and Technical Standards for E-voting, which states:

"e-voting shall respect all the principles of democratic elections and referendums."[29]

Increasingly so, the use of new technologies for voting and counting are fundamentally changing the way these components of the electoral process are conducted. As a result, the use of technologies for voting and counting is also challenging this body of international electoral standards.

Some of these standards are no longer adequate to deal with electronic voting and counting technologies. Other technology related operations are not covered at all by the existing set of standards. For example, it is clear that the use of electronic voting and counting technologies will have little or no impact on the right to freedom of movement or freedom of association. However, other standards such as the secrecy of the vote or the fairness of the electoral process may be significantly impacted by the use of such technologies.

As a result, there have been initiatives in recent years to evolve these international electoral standards in order to cope with the challenges of using voting and counting technologies.[30] The Council of Europe's 2004 Recommendation on Legal, Operational and Technical Standards for E-voting[31] did much to set the agenda for this adaption of existing standards for electronic voting and counting technologies. The CoE has followed up this recommendation with the publication of an E-voting Handbook[32] presenting guidelines for implementing e-enabled elections and soon to be published guidelines on certification and transparency for e-enabled elections.[33] In 2006 the European Commission also published a report titled Methodological Guide to Electoral Assistance which covers support for the introduction of election technologies, including electronic voting and counting

28 See the United Nations Convention Against Corruption, especially articles 5, 7, 9, 10 and 13.

29 Council of Europe (2004), p. 7.

30 It is worth noting that a number of national standards have been developed to guide the use of electronic voting and counting technologies, such as the US Election Assistance Commission's (2005) *Voluntary Voting System Guidelines* (http://www.eac.gov/testing_and_certification/voluntary_voting_system_guidelines.aspx - last accessed on 30 January 2011). However, these standards are only national standards and do not entail international obligations on other states. The sources referenced in the discussion on emerging standards all relate to international organization's commitments or guidance to their members states, or international NGOs which are influential in the area of establishing electoral standards.

31 Council of Europe (2004).

32 Caarls, S. (2010) *E-voting Handbook: Key steps in the implementation of e-enabled elections*, Council of Europe Publishing: Strasbourg.

33 Council of Europe (forthcoming) *Certification of e-voting systems: Guidelines for developing processes that confirm compliance with prescribed requirements and standards* and Council of Europe (forthcoming) *Guidelines transparency of e-enabled elections* both drafted by the Council of Europe's Directorate of Democratic Institutions, "Good Governance in the Information Society" Project.

technologies and the standards that might be applicable in their use.[34]

The OSCE's Office for Democratic Institutions and Human Rights,[35] the Organization of American States,[36] the Carter Center[37] and the National Democratic Institute for International Affairs (NDI)[38] have also approached the issue of standards for electronic voting and counting technologies from the perspective of observing elections in which these technologies are used. Elections using electronic voting and counting technologies are inherently less transparent than paper based elections, as electronic events take place which are not possible to observe with the naked eye.[39] This makes it more difficult to determine the credibility of the electoral process and whether any fraud or mistakes have taken place in their conduct. In fact leading experts in the field of e-voting argue that the lack of transparency with electronic voting and counting systems is the greatest challenge facing the implementation of such technologies.[40]

"Leading experts in the field of e-voting argue that the lack of transparency with electronic voting and counting systems is the greatest challenge facing the implementation of such technologies."

As a result, the use of electronic voting and counting technologies has presented particular problems for organizations attempting to observe and evaluate the conduct of elections. Publications by these leading election observation organizations are consequently highly relevant to the debate on emerging standards for the use of electronic voting and counting technologies.

In analysing these important publications it is clear that some trends are emerging in the recommendations being made by all of these organizations about the conduct of elections using electronic voting and counting technologies. Common themes can be seen in the following areas:

34 European Commission (2006) *Methodological Guide to Electoral Assistance*, see http://ec.europa.eu/europeaid/multimedia/publications/documents/thematic/ec_methodological_guide_on_electoral_assistance_en.pdf (last accessed on 31 January 2011).

35 OSCE (2005) *Challenges of Election Technologies and Procedures: Final Report*, Supplementary Human Dimension Meeting, PC.SHDM.GAL/5/05; OSCE (2008) *OSCE/ODIHR Discussion Paper in Preparation of Guidelines for the Observation of Electronic Elections*, ODIHR.GAL/73/08.

36 OAS (2010) *Observing the Use of Electoral Technologies: A Manual for OAS Electoral Observation Missions*, General Secretariat of the Organization of American States (GS/OAS), see www.oas.org/es/sap/docs/Technology%20English-FINAL-4-27-10.pdf (last accessed on 27 January 2011).

37 The Carter Center (2007) *Developing a Methodology for Observing Electronic Voting*, see http://www.cartercenter.org/documents/elec_voting_oct11_07.pdf (last accessed on 30 January 2011).

38 Pran, V. and Merloe, P. (2007) *Monitoring Electronic Technologies in Electoral Processes: An NDI Guide for Political Parties and Civic Organizations*, National Democratic Institute for International Affairs, see http://www.ndi.org/files/2267_elections_manuals_monitoringtech-preface_0.pdf (last accessed on 2 February 2011).

39 OSCE (2008), p. 2.

40 Krimmer, R. (Ed.) (2006) *Electronic Voting 2006: Overview of Proceedings of 2nd International Workshop,* co-organised by the Council of Europe, ESF-TED, IFIP WG8.6 and E-Voting.CC.

- *Transparency* — Transparency is related to many of the more specific emerging standards below, but is important enough to merit discussion separately. Transparency is a general electoral standard, but one which is particularly challenged by the use of electronic voting and counting technologies. Special focus needs to be placed on the realization of transparency while using these technologies. This means that as much of the operation of the process using electronic voting and counting technologies is transparent or observable.[41] However, access should be provided for observers in a manner that does not obstruct the electoral process.[42]

- *Public Confidence* — Closely related to and relying heavily upon transparency, is the requirement that voters understand and have confidence in the electronic voting or counting technology being used.[43] Public confidence requires that stakeholders are involved in the introduction of electronic voting and counting technologies,[44] are provided information so they understand the technologies being used,[45] simulations of the systems take place[46] and voters are informed well in advance about the introduction and what is required to participate.[47]

- *Usability* — Electronic voting and counting technologies must be easy to understand and use for as many voters as possible.[48] Users (voters) should be involved in the design of electronic voting and counting technologies[49] and in public testing.[50] Furthermore, these electronic voting and counting technologies must try to maximize the accessibility of the voting system for persons with disabilities[51] and afford voters the possibility to stop and cancel their vote before confirmation of their choice.[52]

- *System Certification* — Electronic voting and counting technologies must be certified by an independent body before use and periodically thereafter. This ensures the system continues to meet the requirements of the electoral jurisdiction as well as the technical specifications for the system. Furthermore, the certification process should be conducted in a transparent manner providing electoral stakeholders access to information on the process.[53]

- *System Testing* — Any electronic voting or counting system should be subjected to a comprehensive range of testing[54] before it is approved for use

41 Council of Europe (2004) Recommendations 23 and 56; OAS (2010) p.28.
42 Pran and Merloe (2007) p. 62.
43 Council of Europe (2004) Recommendation 20.
44 The Carter Center (2007) p. 8.
45 Council of Europe (2004) Recommendation 21; OAS (2010) p.20.
46 Pran and Merloe (2007) p. 59.
47 Council of Europe (2004) Recommendation 38; OSCE (2008) p. 14.
48 Council of Europe (2004) Recommendation 1; OSCE (2008) p. 13; OAS (2010) p.20.
49 Council of Europe (2004) Recommendation 62.
50 OSCE (2008) p. 14.
51 Council of Europe (2004) Recommendation 3; OSCE (2008) p. 13; OAS (2010) p.20; Pran and Merloe (2007) p. 76.
52 Council of Europe (2004) Recommendation 14; OSCE (2008) p. 13-14.
53 Council of Europe (2004) Recommendations 24 and 25; OSCE (2008) p. 22; Pran and Merloe (2007) p. 65-66 and 72; Carter Center (2007) p. 7.
54 A full range of tests are described later in this guide.

by an EMB,[55] This testing should take place transparently and with access for political actors.[56]

- *System Security* — The opportunities for systematic manipulation of the results mean that system security needs to be taken extremely seriously. Security measures need to be taken to ensure that data cannot be lost in the event of breakdown, only authorized voters can use an electronic voting or counting system, system configuration and results generated can be authenticated and only authorized persons are allowed to access electronic voting, counting and results management functionality.[57] Attempts to hack into electronic voting and counting machines or the election management system into which results are received, need to be detected, reported and protected against.[58]

- *Audit and Recount* — Electronic voting and counting technologies must be auditable[59] so it is possible to determine whether they operated correctly. It must be possible to use an electronic voting or counting system to conduct a recount.[60] Such recounts must involve meaningful manual recounts of ballots cast electronically[61] and not merely a repetition of the electronic result already provided.[62]

- *Voter-Verified Audit Trail* — In addition to the above requirements for auditability in any electronic voting or counting system, it must also be possible to assure voters that their votes are being counted as cast[63] while also ensuring that the secrecy of the vote is not compromised.[64] This requires that electronic voting systems[65] create an audit trail which is verifiable. It should provide the voter with a token/code with which to perform the verification externally and not show the way in which the vote was cast. The most common solution to this for in-person electronic voting machines is through the production of a VVPAT, and this solution is emerging as a standard in this regard.[66] It should be noted that this VVPAT solution is not appropriate for remote electronic voting which uses electronic voting machines (e.g. internet voting, text message voting etc.) as there would be nothing to stop a voter from removing

55 Council of Europe (2004) Recommendation 31; OSCE (2008) p. 22; OAS (2010) p.20; Carter Center (2007) p. 7.
56 OAS (2010) p.28; Pran and Merloe (2007) p. 67.
57 Council of Europe (2004) Recommendations 32-33 and 77-99; Carter Center (2007) p. 7-8; OAS (2010) p.19-20.
58 OSCE (2008) p.12.
59 Council of Europe (2004) Recommendation 59; OSCE (2008) p. 7; OAS (2010) p.20.
60 Council of Europe (2004) Recommendation 26; OSCE (2008) p. 7.
61 OSCE (2008) p. 19.
62 Pran and Merloe (2007) p. 78.
63 Carter Center (2007) p. 7.
64 OSCE (2008) p. 18.
65 Electronic counting machines have a natural voter verified audit trail in the paper ballot which was completed by the voter.
66 OSCE (2008) p. 8 and 23; Pran and Merloe (2007) p. 72 and 75. Although it must be said that a voter verified *paper* audit trail is not the only way in which this can be achieved. In Belgium for example, the vote is stored on a magnetic card which can be verified on other voting machines before being placed in the ballot box. This Belgian system is creates a voter verifiable audit trail without the use of paper. This is not to say that the Belgian system is better or worse than the VVPAT solution, merely to indicate that there may be other non-paper methods of achieving the standard.

"Whenever electronic voting and counting technologies are introduced they should be done so in an incremental manner and should start with less important elections."

the paper record of the vote, making vote buying and voter coercion possible.[67]

- *Mandatory Audit of Results* — The existence of an audit trail for electronic voting and counting systems achieve little if it is not used to verify that the electronic results and the audit trail deliver the same result. Doing so also serves to build public confidence in the operation of the electronic voting or counting technologies. A mandatory audit of the results generated by electronic voting or counting technologies should be required by law and take place for a statistically significant random sample of ballots.[68]

- *Secrecy of the Ballot* — The secrecy requirement is not a new standard but it is one that is made more difficult by electronic voting and counting technologies. This is especially the case for remote electronic voting systems where voters have to first identify themselves and vote electronically using the same interface. The use of electronic voting and counting technologies must comply with the need for secrecy of the ballot.[69]

- *Incremental Implementation* — Whenever electronic voting and counting technologies are introduced they should be done so in an incremental manner and should start with less important elections. This will allow public understanding and trust to develop in the new system, and provide time to deal with problems and resistance.[70]

It is far too early at this stage to say that international standards have completed their evolution in order to adapt to the challenges posed by electronic voting and counting technologies. Nevertheless, the trends that can be seen in these emerging electoral standards for the use of electronic voting and counting technologies should be carefully considered as any new technology is assessed.

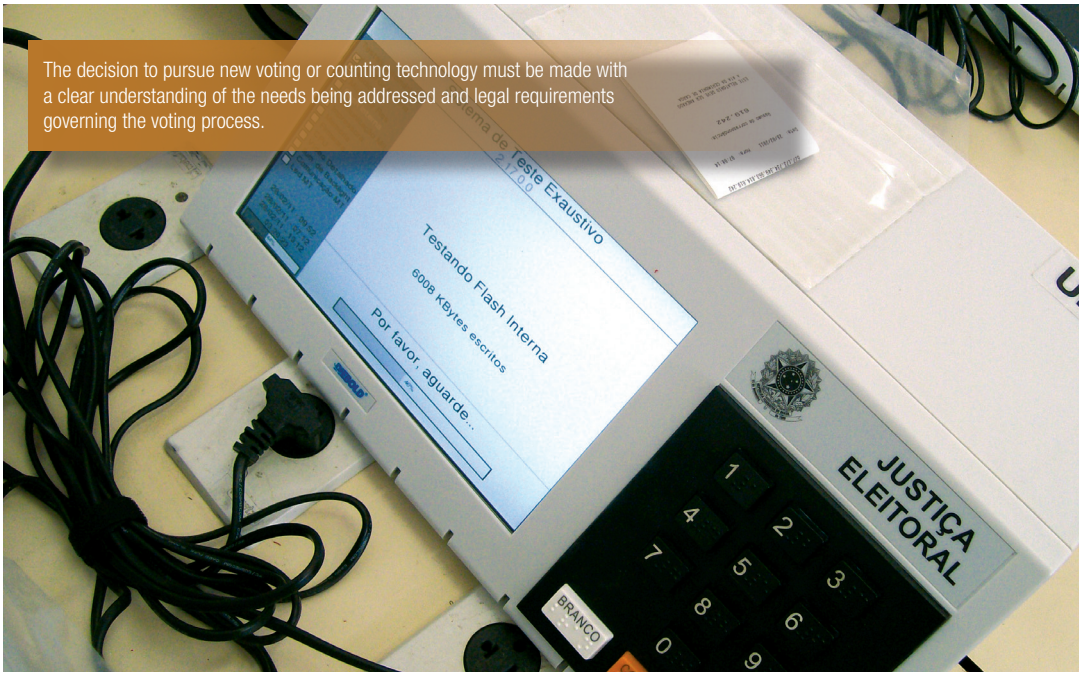
67 In fact, one of the greatest challenges facing remote e-voting remains the establishment of a vote verification mechanism for remote voters in an easily understandable way which does not also provide a way to violate the secrecy of the vote. There are some solutions which provide codes to voters which can be checked to see that the vote is included in the count, but nothing that can prove the value of the verified vote without relying on complicated mathematical proofs which the average voter would have to trust just as much as the operation of an electronic voting machine.

68 Council of Europe (2010) p.12; OSCE (2008) p. 18; Pran and Merloe (2007) p. 64 and 79.

69 Council of Europe (2004) Recommendations 16-19; OSCE (2008) p. 11-12; Carter Center (2007) p. 9; OAS (2010) p. 19.

70 OSCE (2008) p. 23; Carter Center (2007) p. 2.

Decision in Principle



The decision to pursue new voting or counting technology must be made with a clear understanding of the needs being addressed and legal requirements governing the voting process.

This section outlines how to accomplish the first stage in the feasibility study process, the 'decision in principle.' This critical stage aims to identify the objectives that are sought through the introduction of new technology before measuring available technologies against these objectives. Establishing this foundation, the agenda for change, first and foremost will do much to ensure that a well considered decision is initially taken as to whether electronic voting and counting technologies can meet the requirements of the elections in question. The issue of cost will also be addressed in this stage. This issue determines whether the technology is feasible from a financial perspective and whether the benefits to be obtained from the technology are sufficient to justify additional costs.

All the components identified in this stage are seen as important in reaching a decision in principle on the feasibility of electronic voting and counting technologies. Other issues, specific to the electoral context, may be included for consideration. There is logic to the order in which these components are listed. The suggestion is that this order be roughly maintained while implementing this stage of the feasibility study. Components later in this stage are more productive if preceded by the earlier ones. However, since this is a guide, the components of the decision in principle should be adapted to the specific electoral requirements being considered.

The Mandate of the Study

It is critical at the outset of the feasibility study that the mandate of the study is clearly defined. This mandate should be defined by the authority which initiated the feasibility study.

The mandate should identify the following parameters for the study:

- *Purpose* — The objectives the study intends to meet need to be clearly identified. For example, is it to study the potential use of electronic voting or electronic counting, or both? Should it also assess the possibility for remote voting — kiosk voting, Internet voting, mobile phone voting, etc.? Should any voting machine also be capable of identifying voters at the point of polling? What levels of elections would need to be conducted using these technologies? Will they be presidential, parliamentary, provincial, regional, local, etc.? These parameters will have significant impact on the conduct of the feasibility study and should be clear from the beginning.

- *Feasibility Study Project Organization* — Management of the feasibility study will need to be entrusted to an organizational unit which plans and oversees different components of the study in an objective and impartial manner. Often a Feasibility Study Committee will be established for this purpose.

The Feasibility Study Committee need not be from the same institution or office which provides the mandate for the study. For example, a government institution could request an EMB to investigate the feasibility of using electronic voting and counting technologies. Even if an EMB itself decides to investigate the suitability of using such technology it may decide to entrust the task to a Committee that does not entirely consist of EMB staff.

In fact, it is recommended to include membership on the Feasibility Study Committee from a wider spectrum of stakeholders[71] than from only one institution. Including multiple stakeholders is an advantage because these technologies straddle the boundaries between legal, technical, social and political considerations.

Feasibility Study Committee members from the EMB are essential since they will implement any solution agreed upon and have a unique perspective on the possibility of implementing voting and counting technologies. Information Technology experts will also be required to properly assess the technological aspects of electronic voting and counting technologies, especially security and integrity aspects. Such experts may be present in the EMB. Government stakeholders may also be included in a Feasibility Study Committee since the government may have to pay for any solution and pass legislation required to make the use of electronic voting and counting technologies possible.

Other stakeholders to consider for inclusion in the Committee are: political party representatives, election related civil society organizations (e.g., domestic observer organizations), organizations providing

71 In fact the Council of Europe (2004) recommendation in e-voting recommends that users be involved in the design of the e-voting system and test the ease of use of the system at each main point in the process – recommendation 62. This does not mean that they have to be on Feasibility Study Committee, but depending on how inclusive this Committee is it could be considered.

election technical assistance to the EMB, technology institutes and parliamentarians.

A balance will need to be found between including stakeholders in the Feasibility Study Committee process and the effectiveness of the Committee. Too large a Committee may prove too cumbersome to be effective. As recommended below, there should also be other opportunities to consult with key stakeholders during the course of the feasibility study so the establishment of a smaller, technical Feasibility Study Committee to manage the study does not preclude an appropriate level of consultation with key stakeholders.

It is recommended that the same Feasibility Study Committee continue on to additional stages which are conducted as part of the feasibility process beyond the initial 'decision in principle' stage. This provides consistency throughout the process and ensures institutional memory is maintained.

- *Timeline* — An indication should be provided to the Feasibility Study Committee as to how long it should be before they report back to the mandating authority on their findings. A suitable amount of time should be provided for the study. A minimum of six months is required for a suitably comprehensive decision in principle to be reached (Annex 1 shows a sample timeline for the decision in principle stage). The later stages of the feasibility study could take years to complete as electronic voting and counting technology specifications are developed, pilot machines procured and tested, legislation amended, procedures developed, training and voter education delivered, post-pilot consultations conducted and follow-on pilot projects implemented.

- *Format of Report and Recommendations* — The mandate of the feasibility study should also indicate the recipient and the format of the report from the Committee on the decision in principle. The report may be required to provide recommendations on whether to proceed with piloting electronic technologies, on the most appropriate technology, specifications for the technologies recommended, a plan and timeline for proceeding with pilot testing, the budget for piloting and full adoption of the recommended technology, etc. (Annex 2 has a sample table of contents for the report for the Feasibility Study Committee report on the decision in principle).

The Feasibility Study Committee

The use of electronic voting and counting technologies is a very technical issue and the Feasibility Study Committee should be well briefed on the kinds of issues and challenges they need to consider, and be briefed on recent developments in the field. A briefing pack of relevant electronic voting and counting technology materials should be developed and provided to all members of the Feasibility Study Committee — ideally before the first meeting of the Committee. If

it's not possible to deliver the materials before the first meeting, then they should be ready at the time of the first meeting (Annex 3 provides a sample briefing pack). In addition to written briefing materials it is recommended to receive verbal briefings from an organization or organizations which have developed an expertise in this field. Such organizations include the OSCE, European Commission (EC), CoE, Organization for American States (OAS), IFES, NDI and the Carter Center, if they are active in the country in question.

The first meeting of the Feasibility Study Committee might consider the following agenda issues:

- *Review of the Mandate of the Feasibility Study Committee* — It will be important for the Feasibility Study Committee to review and fully understand the mandate provided. A full understanding of the scope and limitations of this mandate will ensure that the Feasibility Study Committee remains focused on the issues it has been requested to investigate. If the Committee determined that its mandate is not clear or it needed to be extended, it might seek clarification/extension of its mandate from the authorizing institution.

- *Discussion of Key Challenges Related to the Introduction of Electronic Voting and Counting Technologies* — It will also be important for the Feasibility Study Committee to fully understand the possible advantages and disadvantages associated with the use of electronic voting and counting technologies at the beginning of the feasibility study. The benefits and challenges listed in the introduction to this guide can serve as a starting point. It may be relevant for the Feasibility Study Committee to understand which of these issues are likely to be relevant for their study.

  Briefing materials provided to the Feasibility Study Committee might also be discussed at this point, especially to identify other studies or experiences which might be particularly relevant. This agenda point provides an opportunity for any international organization with experience in the field of electronic voting and counting technologies to provide its advice and guidance to the Feasibility Study Committee, especially if such organizations are already providing technical assistance to the EMB.

- *Overview of the Work of the Feasibility Study Committee* — In line with the different stages of a feasibility study outlined in the introduction, the Feasibility Study Committee should first focus on reaching a decision in principle as to whether electronic voting and counting technologies would be feasible for the elections being considered. The different components required to make this decision in principle should be discussed in detail so there is full understanding of the tasks involved.

- *Division of Responsibilities and Establishment of Working Groups* — There are many varied components involved in the decision in principle

stage of the feasibility study and will make sense to divide these components and allocate responsibility to several working groups or sub-committees (referred to as 'working groups' hereafter). Again a clear mandate and membership should be provided to each working group established.

The membership of these working groups may extend beyond the membership of the Feasibility Study Committee if specialized skills (e.g. IT or legal skills) would be useful in the working group and are not available on the Committee.

One of the first tasks for each working group is to develop a plan for the conduct of its specific work and provide this to the Feasibility Study Committee. The Feasibility Study Committee may define the timeframe for the conduct of working group tasks when it establishes them.

> *"There may be a lot of political interest in the deliberations of the Feasibility Study Committee and any working groups if the Committee is established through a governmental or parliamentary process."*

- *Openness of the Process* — The Feasibility Study Committee will need to decide the extent to which its work will be open to observation, if not specified in the mandate. There may be a lot of political interest in the deliberations of the Feasibility Study Committee and any working groups if the Committee is established through a governmental or parliamentary process. The Feasibility Study Committee will need to determine whether its meetings, and those of its working groups, are open to observers or closed. If observers are allowed, then who is allowed to observe and mechanisms for controlled and fair access to meetings need to be specified. Decisions will have to be made as to whether materials, workplans and interim reports are made available to interested parties.

  Since steps identified in this guide provide for significant levels of consultation from stakeholders, such open access and transparency to the Committee and working groups may not be required. However, if the feasibility study is in the public or political spotlight there may be great interest in the work of the Feasibility Study Committee. Providing this access may help increase the credibility of the Committee and its recommendations.

- *Schedule of Meetings and Working Group Updates* — The Feasibility Study Committee should establish a regular meeting schedule for itself, and require working groups report back at the first meeting with a workplan and timeline for their activities. Establishing a regular meeting schedule will assist in transparency in the process if meetings are open for observers.

It is also worth noting that the work of the Feasibility Study Committee, and the working groups, may be facilitated by establishing support services, similar to a 'secretariat'. This secretariat would support the work of the Feasibility Study Committee by preparing meeting documents and briefing packs for members, assisting in drafting agendas, informing members of meeting arrangements, drafting minutes from the meetings (where necessary) and drafting the report of the Committee.

Vendor Relations

A dialogue with vendors is an essential part of any feasibility study. Information is required from the vendors about the technologies in order to understand the products which are currently available on the market. The information initially provided by vendors may leave many questions unanswered. This will require further clarification from the vendors. Through the course of the feasibility study the requirements which these technologies are being measured against may evolve, necessitating follow on requests to vendors to see if they can still meet these changing requirements.

A potential country-wide implementation of electronic voting or counting technologies is a profitable exercise for vendors, and one that is bound to increase a vendor's reputation and profile. Therefore, the Committee will need to ensure that it deals fairly and equally with all electronic voting and counting technology vendors. The Committee should protect itself from any allegations of favoritism and inappropriate conduct/contact with vendors.

Many countries have clear regulations defining the way in which public institutions can communicate with companies which are, or may be, likely to submit tender proposals. The approach to vendor relations provided here should in no way be seen as suggesting that these regulations be ignored. The Feasibility Study Committee needs to ensure it understands any procurement and vendor relations regulations before it determines its communication strategy with vendors. Within the limitations imposed by these national regulations for public institutions, the European Commission and UNDP's recent publication on procurement procedures for election technologies[72] can be used to guide relations with vendors and the broader procurement process.

To the extent possible it is recommended that contacts with vendors be established early on in the process so vendors can have time to consider and respond to the Feasibility Study Committee's requests for information. It is suggested that one point of contact be established for the Committee's contacts with vendors. This point of contact (POC) should, to the extent possible, ensure that the same information is provided to all vendors. The POC may consider having the Committee approve all communications with vendors.

72 Joint EC-UNDP Task Force on Electoral Assistance (2010) *Procurement Aspects of Introducing ICT Solutions in Electoral Processes: The Specific Case of Voter Registration*, see http://aceproject.org/ero-en/misc/procurement-aspects-of-introducing-icts-solutions (last accessed 24 January 2011).

Feasibility Study Committee Working Groups

A comprehensive feasibility study needs to investigate the use of electronic voting and counting technologies from a range of perspectives and deal with technical and complex issues. A feasibility study requires a lot of work. Many of the issues being considered may require, or benefit from, the input of specialized personnel (e.g., lawyers, IT experts and communications specialists). Therefore, it may make sense to divide the work of the Feasibility Study Committee into several working groups where specialized personnel can be called.

The number and mandate of working groups will be very context specific. It will depend on what key issues are most relevant to the particular electoral environment at that time. The suggested list below represents the minimum key issues that should be addressed by the Feasibility Study Committee. Separate working groups need not be created to deal with each of these issues. It may be possible for one working group to cover several issues.

Many of the issues considered by working groups are very technical in nature and will benefit from technical advice of experts in relevant fields. Any EMB would be well advised to secure the services, either directly or through a technical assistance provider, of an expert, or experts, in this field to advise them on these issues and guide them through possible pitfalls.

Issue 1: Assessment of the Current System of Voting and Counting — A key component of any feasibility study on the use of electronic voting and counting technologies will be to determine what a change from the current system to one with such technologies will achieve. Only by fully defining this will it be possible to determine if the available solutions can meet these requirements for change and whether it is feasible to implement them for the elections in question.

Reaching a conclusion on this issue will require the following questions to be answered:

- What are the strengths of the current balloting system?
- What are the weaknesses of the current balloting system?
- Can any or all of the weaknesses identified in the current system be addressed through reform of the existing balloting system?
- If so, what would be required to address these weaknesses in the current system of balloting?
- What improvements are expected from implementing change to the current system of balloting?
- What desired improvements cannot be easily resolved through reform of the current system?

The working group should write up its findings and submit a report to the Feasibility

Study Committee. The report of this working group constitutes an important component of the overall feasibility study, helping define the agenda for change — the objectives sought through the introduction of electronic voting and counting technologies.

Issue 2: Assessment of the Advantages and Disadvantages Offered by Voting and Counting Technologies — Even if a significant agenda for change is identified by the working group considering issue 1 above, using electronic voting and counting technologies may not be the solution. It is also important to recognize that using such technology presents new challenges to the conduct of elections.

Consideration of this issue will consist of two aspects, a general assessment in principle of what technology has to offer in terms of electronic voting and counting technologies and an assessment of the solutions currently offered by a range of vendors. In order to do this, electronic voting and counting technology vendors will need to be contacted and asked to provide information on their current products.

The following questions will need to be answered by the working group addressing this issue:

- What are the advantages that electronic voting and counting technologies offer compared to the current balloting systems?
- What are the disadvantages of using electronic voting and counting technologies compared to the current balloting systems?
- Are there external infrastructure requirements and resource requirements within the EMB that would be essential in implementing electronic voting or counting technologies (e.g., electricity or communications requirements, specialized skills in the EMB)? Do these infrastructure and resources currently exist? If not, what is required to provide the necessary infrastructure and resources?
- On the basis of the consideration of the above three issues, what are the requirements that any new electronic voting or counting technology would need to fulfill in order to meet the objectives of holding the elections in question?
- What specific challenges would the EMB face in implementing electronic voting and counting technologies, including training of staff, voter education, cultural sensitivity, stakeholder trust, specialized staff skills required, physical and data security, storage and maintenance requirements and preparation prior to elections?

Consideration of these questions forms a critical component of any feasibility study. It is essential that sufficient thought is given to these issues as failure to do so could

“One possible result of a feasibility study may be that no suitable electronic voting and counting technology products are found which meet the electoral requirements in question.”

fundamentally affect the success or failure of any technology project. Of particular importance is the development of a set of requirements that the solution would be required to meet. If this is not properly defined then the solution recommended by the feasibility study may not be appropriate for the electoral process.

The development of this set of requirements may also be of importance beyond the scope of the feasibility study. One possible result of a feasibility study may be that no suitable electronic voting and counting technology products are found which meet the electoral requirements in question. If this is the case, the set of requirements identified by addressing this issue will remain valid and can be used in the future when new products are developed which might better meet these requirements.

Issue 3: Review of IT Security Aspects — System security is an incredibly important feature of electronic voting and counting technologies. These technologies are inherently less transparent than the use of paper ballots, where all steps in voting and counting are observable. If an electronic voting or counting system is to be properly trusted by electoral stakeholders it is important that the security challenges presented by the use of the technology are understood. Mechanisms should be in place to mitigate these security challenges and any security breaches should be easily identified.

There are a number of questions that need to be considered by the working group on this issue:

- Will the source code for the electronic voting or counting technology be open source or not?
- How will the source code be tested and certified?
- How will it be verified that the source code used for the conduct of elections is the same as the one tested and certified?
- What mechanisms are in place to ensure that the new system is protected against tampering and that it can be easily determined when it has been tampered with?
- If results are electronically transmitted from electronic voting or counting machines to a regional or central tabulation facility, how will the results be encrypted to ensure there is no unauthorized access to the results?
- How will results transmitted electronically, to a regional or central tabulation facility, be verified on receipt to ensure that they are legitimate and they are submitted from an authorized officer or location?

The working group addressing these technical issues will need to make sure that it is able to clearly articulate the results of the discussions around these issues to the Feasibility Study Committee. This will be very important in order to provide technical requirements to the working group dealing with issue 2 above. It will also help define the technical components of any later

procurement process and ensure any legal amendments properly address the technical issues discussed and agreed upon.

The issue of open source code is worthy of further discussion. Whether source code is open source or not is a significant issue in debates about the security and transparency of electronic voting and counting systems. Source code is the set of instructions that determines how the system functions. Traditionally, with electronic voting and counting systems developed by commercial organizations this source code has been deemed to be proprietary in nature, exclusively owned by the supplier and not by the EMB. While an EMB may procure the right to use the software, and potentially the right to analyze the source code, there is no right to modify or further distribute the source code.[73]

Alternatively, the source code can be made open source. Open source code is publically available to all interested parties. Anyone can analyze the code and determine whether it accurately functions to record the intentions of the voters, or identify mistakes in the code. While the pool of people who can read and understand computer source code is relatively limited (compared to the overall voting population), the idea is that there are enough who can do so to provide a check and balance to ensure the source code functions correctly. It is also expected that publishing the code makes the deliberate inclusion of malicious code less likely. Using open source code is a way to increase trust in the use of electronic voting and counting technologies. It can significantly reduce the costs involved in developing them.[74]

This is not a simple decision for an EMB to take, especially as requiring open source code may dissuade some suppliers from submitting proposals. Suppliers may see the source code as their intellectual property and the result of many years of development resources.

One alternative to open source or proprietary software could be to allow a limited 'independent, expert group' to have access to the source code to review it before it is used for an election. Such a group would have full access to the code, but would agree to not disclose the source code. There are complications in this approach because a proper report of findings is open and transparent. The report may inadvertently disclose proprietary aspects of the source code. On the other hand, a closed review and report which is not made available to stakeholders is not likely to generate the trust and confidence in the process that this review is meant to achieve.

The decision on the status of the source code will need to be considered prior to the commencement of the procurement process. It may be preferable to leave the final decision on this open at this stage. For example, if a decision was taken to pursue an open source option then this may restrict many or even eliminate all of the vendors who might otherwise be interested in the project. For now, a preference might be identified and

73 See Council of Europe (2010) *E-Voting Handbook*, p. 16.

74 *Ibid*, p. 17.

compliance with this preference could be a factor taken into consideration during any subsequent electronic voting and counting technology procurement process.

Issue 4: Determining Technical Feasibility — Once a set of requirements for a possible electronic voting or counting solution has been defined it will need to be determined whether products exist, or could be developed, which meet these requirements. A full consideration of this issue obviously requires information on current products. This information should be provided by vendors of electronic voting and counting technologies. It will be important to ensure a wide range of vendors are contacted and given the opportunity to provide information on their products. To do otherwise may result in accusations of bias on the part of the Feasibility Study Committee.

In fact, an ongoing dialogue with these vendors may be relevant as the work of the feasibility study progresses. Information initially provided by vendors may well lead to a number of follow on questions from the working group. It will also be important to inform vendors when a detailed set of requirements is developed so vendors can better understand the electoral needs and respond to the requirements with targeted product solutions.

Vendors may take some time to respond to a request for information from the Feasibility Study Committee; therefore, the request for information from vendors should be initiated early in the process. An initial request for information could be made at the beginning of the process, followed up by the provision of additional information when, for example, a detailed set of requirements have been developed.

Once information has been received from a suitable number of vendors, each recommended product should be measured to see the degree of compliance with the set of requirements. This analysis of electronic voting and counting technology products against the requirements will determine whether the use of these technologies for the elections in question is technically feasible or not.

If the result of this analysis is that no electronic voting and counting technology products are found which meet the set of requirements, and therefore the needs of the elections in question, then a number of options are available:

- *Reconsideration of the Requirements —* It may be that the standard is too high in the requirements developed for a possible electronic voting and counting technology solution. If one or more of the components of the requirements are consistently not met by the products suggested then these components of the requirements should be reconsidered. Are they really necessary? Could the requirements be softened in a way that is acceptable so some electronic voting and counting products complied with the requirements? The answer to both of these questions may well be “no,” but it is worth consideration.

Voting and counting technology can be used in almost any election, but it should be used only if it meets all the requirements of that specific election.

- *Contacting Additional Suppliers* — Depending on the initial response from suppliers for information on their products, and the number of suppliers contacted, it might be worth increasing the number of electronic voting and counting technology vendors contacted or generating a greater level of response from those originally contacted. Surveying a larger number of products might help to find ones which do meet the requirements.

- *Development of New Products* — It is possible that the requirements developed for the feasibility study are unique; products may not have yet been developed. This does not mean that products cannot be developed to meet the requirements. The Feasibility Study Committee may decide to request vendors to consider the possibility of developing new products to meet the criteria. In fact vendors may be very willing to adapt software or even hardware to emerging requirements as part of their business development strategy.

It may be that all these options fail to provide electronic voting and counting technology products which meet the requirements identified in the feasibility study. In this case, the Feasibility Study Committee would conclude that the electronic voting and counting technologies on the market do not meet the needs of the electoral situation. This is an important caveat for finding that current electronic voting and counting technologies is not feasible. Of course, almost any election can be conducted using an electronic voting or counting solution, but it is not necessarily the case that such a

solution should be used. This would require that the electronic voting and counting technology meet all the requirements of the election in question.

Finding that using electronic voting and counting technologies for elections is not feasible is not a failure for the study. In fact, if the previous steps in the study are conducted comprehensively then the study will lead to a well defined set of requirements for an appropriate electronic voting and counting technology solution. This set of requirements will remain valid and can be used to re-assess, on a periodic basis, any newly developed products.

Issue 5: Cost Benefit Analysis — Should an electronic voting and counting solution, or solutions, be found which meet the requirements previously identified then a further assessment will need to be made as to whether the implementation of these solutions would, on balance, be beneficial and cost effective.

There are two components to this analysis. Before the analysis can be conducted a limited number of electronic voting or counting solutions will need to be selected for cost benefit analysis purposes, as the process is quite complex to conduct. The best electronic voting or counting solution and the cheapest solution, which still meets the requirements, should be selected. Another electronic voting or counting solution which is mid range in terms of cost and in terms of meeting the requirements could also be selected.

The first step is to identify the benefits that each solution provides compared to the current system of balloting. Similarly a list of disadvantages/challenges associated with each solution should be identified. The comparison of these two lists of advantages and disadvantages of the different electronic voting or counting solutions will show the overall benefits of using each solution.

There is no predefined formula involved in this assessment of beneficiality. It could be that there are many disadvantages involved in using an electronic voting or counting solution and only one benefit. However, that benefit could be of such critical importance that it would still support the introduction of electronic voting or counting technologies. In addition, the importance attached to each advantage and disadvantage will be determined by the particular electoral circumstance. Therefore this analysis of advantages versus disadvantages is something that can be done in a Committee format, but is probably something that should be consulted on very widely amongst electoral stakeholders to ensure there is consensus on the recommendations resulting from this assessment.

The second stage of this cost benefit analysis requires a comprehensive cost analysis of the technology and a comparison of costs associated with using this technology vis-à-vis the existing system of balloting and counting — likely paper-based voting.

A key component of this cost analysis is to recognize that the costs associated with using electronic voting or counting

technologies should not be considered solely on the basis of the initial investment and a comparison of this cost against the cost of paper balloting for the next election (if paper balloting is the current system). Electronic voting and counting technologies are an investment which last for a long period of time and will be available to use for many elections. Therefore, the initial investment needs to be considered and compared to the current system recognizing this is a long term perspective and there are additional costs associated with maintaining and using these technologies beyond the initial investment.

This is achieved by calculating the costs associated with each solution over the life cycle of the electronic voting or counting technology, such that initial investment costs and ongoing costs are averaged out over the number of elections that the electronic voting or counting solution would last. By adopting this approach an average cost per election of using a system can be calculated and compared to a similar calculation for the existing system.

This comparison needs to take into consideration the fixed costs associated with the existing and the electronic voting or counting systems, as well as the variable costs associated with each system. Fixed costs relate to initial investments in the system which will not be repeated each time an election is conducted; it could include the following:

- *Paper Balloting*
  - Cost of replacing damaged ballot boxes
  - Cost of replacing damaged voting booths
  - Cost of storage of ballot boxes and voting booths

- *Electronic Voting or Counting Technology*
  - Cost of buying the electronic voting or counting technology
  - Cost of procuring central utilities for configuration and result management
  - Cost of buying stands/voting booths for the electronic voting machines
  - Cost of storage of electronic voting or counting technologies
  - Cost of repair/replacement of broken electronic voting or counting hardware
  - Cost of independent testing and certification of the technologies
  - Cost of developing new procedures and legislation to use the technology

In some ways this comparison of fixed costs between the existing system and a proposed electronic voting or counting system is unfair as the initial investment in the existing system has already been made (e.g., ballot boxes and voting booths will have been procured). Therefore, only the replacement costs of fixed assets associated with using the existing system, resulting from expected wear and tear and expected life expectancy of ballot boxes and voting booths that need to be considered for the existing system. Whereas for the proposed electronic voting or counting system, the fixed costs associated with establishing a completely new system will need to be considered. While in principle this means that the comparison is a little unfair,

it does represent the reality of the decision being considered — the costs of continuing with the existing system versus those associated with a completely new system.

Variable costs relate to the kinds of costs that are repeated for each election that the system is used and could include the following:

- *Paper Balloting*
  - Cost of printing ballot papers
  - Cost of printing voter lists for the polling station
  - Cost of transportation of materials (ballots, ballot boxes, voting booths, etc.)
  - Cost of ballot box seals
  - Cost of voter marking ink
  - Cost of other polling materials (official stamps, ink pads, forms, envelopes, etc.)
  - Cost of polling staff required for paper balloting
  - Costs of educating voters on paper balloting

- *Electronic Voting or Counting Technology*
  - Cost of printing voter lists for the polling station or uploading voter lists to electronic voting machines
  - Cost of transportation of materials (electronic voting or counting machines, stands/voting booths, etc.)
  - Cost of replacement batteries for electronic voting or counting machines
  - Cost of ballot papers for electronic counting systems or paper for any Paper Audit Trail with an electronic voting machine solution
  - Cost of voter marking ink
  - Cost of other polling materials (voting machine activation keys, official stamps, ink pads, forms, envelopes, etc.)
  - Cost of polling staff with the necessary skills to administer the use of the electronic voting or counting technology
  - Cost of any additional polling station infrastructure required by the electronic voting or counting technology
  - Cost of any results data transmission hardware (connectivity or portable storage devices)
  - Cost of specialized staff/technicians required to configure, test and support the electronic voting or counting technology
  - Costs of managing the change in system, including significant costs of training staff and educating voters on using electronic voting or counting technology

These fixed and variable costs vary from electoral environment to electoral environment. It is highly likely that the initial investment costs associated with using electronic voting or counting technologies are much higher than those associated with paper balloting (even if a complete new investment in ballot boxes was being considered). The variable costs associated with using an electronic voting system may be much less than those associated with paper balloting, if only because electronic voting systems (but not electronic counting systems) will not require paper ballots to

be printed. In most elections the printing of ballots represents a significant cost.[75]

The process of determining the costs associated with paper balloting or using electronic voting or counting technologies is complex. It is difficult to isolate all the costs associated with paper balloting and identify all of the costs associated with a system which has not been used before. Therefore, to some extent the cost analysis will be an exercise in best guessing such costs, but the exercise is nevertheless important.

While estimating the fixed and variable cost of the existing (e.g., paper) ballot system, the working group should consider incorporating the cost of implementing any required improvements to this system identified under issue 1 above. Under all circumstances, historical data related to the cost of the existing system in past elections should be adjusted for likely future price inflation.

Once all fixed and variable costs have been identified for paper balloting and the electronic solutions being considered, the total costs of using the technology can be calculated over the life expectancy of the electronic voting or counting technology hardware.

All of the elections that electronic voting or counting technologies will be used for over their lifetime need to be determined and the total cost of using the technologies for these elections calculated. This calculation will be the fixed costs plus the variable costs per election multiplied by the number of elections over the lifetime of the electronic voting or counting technology. From this the average cost of using the electronic voting or counting technology per election can be calculated.

Total Costs of Using Technology = *Fixed Costs of Technology* + *(Variable Costs of Using Technology x Number of Elections)*

Average Costs of Using Technology = *Total Costs of Using Technology* ÷ *Number of Elections*

A similar calculation will need to be made for continued use of the existing system in order to generate a per election cost of continuing with the existing system of balloting.

These two costs then need to be compared so that, given the life cycle of the electronic voting or counting technology under consideration, it can be determined what the difference in cost will be between using the technology and continuing with the existing system of balloting. The difference in costs needs to be weighed against the additional benefits provided by the electronic voting or counting solution and the disadvantages associated with it.

Again, there is no formula with which this overall cost-benefit analysis can be made. The process above is an attempt to clearly identify the costs and benefits (and disadvantages) associated with the use of electronic voting or counting technologies. In some cases this analysis will clearly indicate

75 This assertion is somewhat supported by the findings of the Election Commission of Pakistan's (2010) *Committee on the Use of Electronic Voting Machines in Pakistan: Final Report and Recommendation*, p. 31. While the cost analysis in this report does not include all of the costs identified here, it does indicate a much lower variable cost level for using electronic voting machines compared to paper balloting.

one decision or another. For example, if the benefits of using electronic voting or counting technology are many and the additional per election cost are small then there is a strong case for the new technology.

More likely the 'balance sheet' will be very mixed. There may be a significant additional cost involved in using electronic voting or counting technologies but some important benefits resulting as well as some potential problems. It will be up to the Feasibility Study Committee to decide whether the benefits to be realized by using electronic voting or counting technologies are sufficient to justify any additional expenditure and make its recommendation accordingly.

Issue 6: Institutional Capacity — A critically important issue for the working groups to consider is whether the institutional capacity exists to implement electronic voting and counting technologies. This issue does not only relate to the EMB, but also to other bodies which would support the conduct of elections using these technologies.

A number of key areas should be considered in order to reach this assessment:

- *EMB Organizational Capacity* — The management of an electronic voting and counting technology project is an incredibly complex task, even if only for a small pilot of the technology. The EMB will need to coordinate a range of tasks to implement the project, including procurement of the technology, logistics, procedural development, training, voter education and IT configuration and support. This will require that the capacity exists within the EMB to provide sufficient qualified resources for implementation of the project.

"If the benefits of using electronic voting or counting technology are many and the additional per election cost are small then there is a strong case for the new technology."

- *Training Capacity* — Implementation of electronic voting and counting technologies requires a significant revision of the procedures for polling and counting. Revised procedures, however good, will have little effect if they are not properly communicated to all staff who will implement them. This will require a robust training infrastructure, especially if it is required to deliver training to all polling and counting staff.

- *Information Technology Capacity* — Significant information technology expertise will be required at many points during the implementation of electronic voting and counting technology projects. The EMB will need to conduct full testing of any electronic voting or counting technology being used. The central election management system will need to be configured for the elections being held and the candidates/political parties standing for election. If electronic voting or counting machines are being used then these machines, possibly tens or hundreds

of thousands depending on the size of the election, will also have to be configured and tested. Finally, the EMB will need to provide technical experts on Election Day who can resolve technical problems which arise while using the technologies. This will require skilled, and possibly large numbers of, IT staff within the EMB.

- *Polling and Counting Staff Capacity* — Wherever new technologies are implemented, at the polling station or local counting centers, the staff who work in these polling or counting centers will have to be sufficiently IT literate to operate the electronic machines. An assessment of the technical capabilities of these staff will be essential in determining this level of capacity.

- *Voter Education Capacity* — Voters will need to be informed well in advance about the use of electronic voting and counting technologies and how to interact with the technology. This will require that effective mechanisms exist, either directly through the EMB or in partnership with political parties and civil society, to communicate these voter education messages.

- *Independent Certification Capacity* — The independent certification of electronic voting and counting technologies is a very important aspect of building trust in the new technologies, It will be covered later in this guide. An assessment will need to be made as to whether independent and trusted technology organizations which could conduct this testing and certification of electronic voting and counting technologies exist.

Not only will such capacities be required to ensure that any electronic voting or counting technology project is implemented successfully, it will also be necessary to ensure that the EMB remains in control of the process. Some electronic voting and counting technology projects have seen vendors filling gaps in the institutional capacity of domestic institutions. While this has often been done in the interest of implementing the project successfully, it represents an abdication of responsibility on the part of the domestic institution and creates an unhealthy dependency on these vendors. It also indicates a lack of sustainability in the use of the electronic voting or counting technologies.

It may be that in assessing institutional capacities required for successful electronic voting and counting projects, some or all of the assessments may state that the capacity does not exist. This will need to be added into the overall consideration of the decision in principle. However, a negative assessment of the capacity on any of these aspects of institutional capacity need not be an insurmountable obstacle. It may be that the capacity does not currently exist, but could be developed by certain strategies. Where this is the case any insight into possible strategies to develop the required capacity will represent important additional recommendations from the working group.

Issue 7: Legal Reform Issues — The final issue for consideration concerns the possibility for using electronic voting or counting technologies under the existing electoral legal framework. It may well be that the existing electoral legal framework makes reference to physical ballot boxes and ballot box seals, to actual ballot papers and the ways in which ballots are counted and adjudicated. Obviously all of these processes occur with an electronic voting or counting machine. The working group needs to assess whether it would still be in compliance with existing law. Therefore the electoral legal framework needs to be reviewed to determine if it is in compliance with using electronic voting or counting technologies. It is highly likely that if only paper balloting has been used in the past then the laws will be written in such a way as to preclude the use of these technologies. The working group will need to do the following:

- Identify the parts of the current legal framework for elections that need to be amended in order to allow an electronic voting or counting system.

- Propose the amendments that would be required to allow the use of an electronic voting or counting system.

In addition to this, the working group dealing with this issue may wish, and may be advised, to take a more comprehensive look at the legislation governing elections and how it would relate to the implementation of an electronic voting or counting technology. Merely adapting the existing legislation so it does not preclude the use of voting or counting technologies is not sufficient to properly regulate the use of these technologies. The working group should also consider the following issues and legal amendments:

- The transparency mechanisms that would need to be implemented through the election law in relation to the use of electronic voting and counting technologies, including access to key components of the election administration process using these technologies for observers.

- Security mechanisms and safeguards would need to be established in legislation to ensure the accuracy and integrity of elections using electronic voting and counting technologies.

- Legal requirements for initial and periodic independent certification of electronic voting and counting systems. The institutions which are permitted to conduct this certification. The registration process and requirements for certifying institutions and consequences of non-certification of electronic voting and counting technologies.

- The status of an election if the mechanisms for producing an audit trail did not work (e.g., the printer did not work or the machine ran out of paper).

- The legal status of the electronic record of voting produced by an electronic voting or counting machine compared to the audit trail record, and which record takes precedence in the event they are different.

- If the audit process results in different results than generated electronically, is there a requirement for mandatory audits of electronic voting and counting machines after the election? What is the scale of this mandatory audit process? What are the selection mechanisms for the mandatory audit and possible consequences?

- The mechanisms for challenging results generated using electronic voting and counting technologies and instances in which a challenge against the result will lead to a manual recount of the audit trail for the voting or counting machine.

While conducting this task, a number of points should be borne in mind. First, legislation should be amended to allow, not require, the use of electronic voting or counting technologies. Changing legislation in this manner does not mean that electronic voting or counting technologies have to be used. Legislation should allow for the possibility of using electronic voting and counting technologies and paper balloting in different locations at the same time. This will likely be the case when the technology is piloted or even if the technology is introduced in a phased manner. Second, the process of legal amendments may be a lengthy one, therefore, if legal changes are required in order to use electronic voting or counting technologies then it is prudent to start the process as early as possible, based on the findings of the working group.

Study Trips

The Feasibility Study Committee may consider the possibility of conducting one or more study trips to see other countries which have used or are using electronic voting or counting technologies. Study trips should take place to countries with similar electoral circumstances to the one in which the feasibility study is being conducted. This does not mean that lessons cannot be learned from very different electoral environments. It would also make sense to visit countries which are implementing technologies of interest to the Feasibility Study Committee. For example, it would probably make little sense to visit a country only implementing internet voting if this was not an option being considered.

Any study trip should meet with a range of stakeholders, including the EMB, the technology provider, political party representatives, civil society representatives, voting activists and domestic election observation organizations. The study trip should seek to address the following issues:

- Type of technologies that have been or are being used.

- Process followed in taking a decision to adopt the technology.

- Stakeholder opinions on the advantages and disadvantages of these technologies.

- Challenges presented by using the technologies, and the ways in which these challenges had been met.

- Country specific factors which led to the success or failure of using these technologies.

Depending on the size of the Feasibility Study Committee it may not be possible for all members to participate in such a study trip. If this is the case then it will be important to ensure that proper reporting of the study trip findings and recommendations are made to the Feasibility Study Committee and become part of the record of the proceedings of the feasibility study.

Vendor Demonstration

There is only so much that can be revealed about a system by reading technical specifications and marketing materials about electronic voting or counting solutions. A fuller understanding can only be achieved by seeing electronic voting or counting technologies in action, initially through a demonstration. Such a demonstration is far superior to even seeing the technology being used for an actual election. This allows participants in the demonstration to ask questions along the way and try to violate the procedure or 'break' the machine.

The demonstration environment allows for a detailed discussion between the Feasibility Study Committee and the vendors about the ways in which their products work, or could be adapted to work. Again it is important that a wide range of vendors are invited to present their products at the demonstration so any perception of favoritism in the process is countered. Organizing such an event with a suitable range of vendors may take quite some time to arrange, so it is important to initiate preparations for the event well in advance.

Participation at the vendor demonstration event needs to be carefully considered. The vendor demonstration could be limited to only the Feasibility Study Committee itself, or could be opened up to a wider group from the EMB. It is recommended that participation in any vendor demonstration be widened to include representatives from political parties and civil society. These are important stakeholders in the electoral process; providing them access to the vendor demonstration will help their understanding of recommendations made by the Feasibility Study Committee. It also means that consultations held with these stakeholders can take place from a more informed starting point. On the other hand, excluding these groups from the vendor demonstration might be helpful so expectations are not created. If included, the Feasibility Study Committee needs to be very clear with stakeholders about the purpose of its work, the demonstration and that it represents an initial investigation into the feasibility of using electronic voting and counting technologies.

The timing of the vendor demonstration in the process of the feasibility study is important. If held too early in the process, the Feasibility Study Committee will not be sufficiently informed about the relevant issues related to the use of electronic voting and counting technologies. The Feasibility Study Committee can make the most of its face-to-face interaction with vendors if it engages with the vendors from an informed position. Waiting until the work of the Feasibility Study Committee and its working groups are well developed, with preliminary conclusions and recommendations, will also allow the Feasibility Study Committee

to brief these findings to the participants of the demonstration. Presenting these findings will be especially useful if a broad range of stakeholders are invited to the demonstration.

It will also be important to clearly communicate the following issues when contacting vendors to determine their interest:

- *Dates of the Event* — Dates on which the event is scheduled need to be clearly communicated to the invited vendors, clarify the recommended arrival date and any pre-event briefing that will be provided.

- *Event Participants* — Provide a description of the audience that vendors will present their products to.

- *Financial Arrangements* — When inviting vendors to attend the event, it is vital to inform them whether any of the costs involved in attending the vendor demonstration will be covered by the Feasibility Study Committee. Such costs could include travel costs, accommodation costs and living expenses.

- *Support Provided* — The invitation to the vendors should indicate whether the Feasibility Study Committee, or sponsoring institution for the study (e.g., Election Commission), is able and willing to provide any support for vendors wishing to attend. This could include support in obtaining visas, customs clearance for equipment brought to the event, making hotel reservations, etc.

- *Expectations of the Vendors* — Vendors should be clearly informed what will be required of them at the demonstration, including the kinds of electronic voting or counting solutions that they should bring to demonstrate, details of any presentations that they will be requested to make and additional meetings that they will be requested to attend.

- *Stage in the Decision Making Process* — It should be made clear to vendors that the Feasibility Study Committee is in the early stages of its consideration concerning the possible adoption of electronic voting and counting technologies, and that there is no commitment at this stage that these technologies will be introduced. This may make some vendors more reluctant to attend the event, but it will avoid any false expectations on the part of the vendors.

The agenda for the vendor demonstration will depend to a certain extent on the participants who are invited to attend. Assuming that a range of electoral stakeholders are invited, the agenda should include the following items:

- Presentation on the challenges and opportunities presented by using electronic voting and counting technologies and the global experience of using these technologies.

- Presentation of preliminary findings of the Feasibility Study Committee and working groups.

- Suggested list of requirements for any electronic voting or counting system.

- Presentations by each vendor attending.
- Question and answer session after each vendor presentation.
- Open viewing and testing of vendor equipment.
- Individual closed meetings between the Feasibility Study Committee and vendors.

In order to ensure transparency in the process the Feasibility Study Committee, or sponsoring institution for the feasibility study, should issue a press statement after the vendor demonstration. The statement should outline what happened and any preliminary conclusions from the discussion which can be shared.

The Feasibility Study Committee might consider using the vendor demonstration as an opportunity to test the usability of different vendor solutions and the reaction of a sample of the voting population to the technologies.[76] Participants at the demonstration could be broken down into groups of voters, one group for each electronic voting or counting technology being tested. Each group would vote using its designated electronic voting or counting solution and fill in a questionnaire about their experience with the technology. The groups could rotate and try other technologies, providing feedback afterwards.[77] This process could provide invaluable pre-pilot information on the usability of different options, as well as boost the confidence and interest of stakeholders in the consideration of these technologies.

Should the vendor demonstration be used to conduct such testing, vendors would need to be informed well in advance so they could prepare and adapt their electronic voting and counting solutions for this test, possibly translating user interfaces and instructions. The actual testing would also need to be well organized to avoid a chaotic and unprofessional impression. Questionnaires would need to be developed for those testing the technologies.

Stakeholder Consultation

As identified earlier, it is essential that stakeholders participate in the feasibility study process so they can understand the work of the Feasibility Study Committee. Their participation also ensures they have the opportunity to present their opinions and concerns about the possible use of electronic voting and counting technologies. This inclusion and openness is more likely to lead to acceptance of the resulting recommendation by the Feasibility Study Committee and should ensure that those recommendations take into consideration a wide range of perspectives in the use of electronic voting and counting technologies.

76 Although it would have to be understood that the sample of voters present at the demonstration would in no way be representative of the voting population in general. Nevertheless it could provide interesting feedback on the electronic voting and counting technology options being demonstrated.

77 This process was used by the Philippine election commission, COMELEC, at a vendor fair prior to introducing electronic counting machines for its 2010 elections.

At a minimum, consultation should be conducted with political party and civil society representatives, especially domestic observer organizations. However, this consultation could also be extended to key media representatives, political science institutes, government stakeholders and technology industry leaders. The purpose of including technology industry representatives would be to encourage these representatives to consider developing domestically produced electronic voting and counting solutions. These may be cheaper and more sustainable in the long term (it is recognized that the development of such capacity is a long term project).

It may be possible to combine the stakeholder consultation with the vendor demonstration, although it is preferable to hold them separately. Holding the two events separately will allow stakeholders, if invited to the vendor demonstration, the opportunity to carefully consider the information presented to them during the demonstration, rather than requesting an immediate decision if the technologies they are presented with are suitable.

Even if a broad range of stakeholders were invited to the vendor demonstration it will still be important to initiate the consultation with presentations on the challenges and opportunities presented by electronic voting and counting technologies, the global experience of using these technologies, the work and preliminary findings of the Feasibility Study Committee and its working groups, any requirements that have been developed and potentially a list of key questions that need to be considered during the consultation.

The Feasibility Study Committee may also want to consider the possibility of a much more broad ranging consultation than a face-to-face consultation mechanisms. The Committee might consider accepting written submissions from any interested party as a way to gauge general voter attitudes and concerns about the possible use of electronic voting and counting technologies.

According to the sequence provided in this guide, the consultation with stakeholders is conducted quite late in the process of reaching a decision in principle. In principle, stakeholders should be included in the process as early as possible. The reason for suggesting that stakeholders not be included in the process earlier is based on the assumption that the EMB is considering the issue of electronic voting and counting technologies for the first time. If this is the case, then introducing stakeholders with little understanding of technology issues into the process too early will likely lead to an uninformed discussion about the likely benefits and operation of any electronic voting or counting solution. The Feasibility Study Committee will need to guide stakeholders in this debate. It can only do this once informed and has had a chance to consider the range of issues involved. Should stakeholders be much better informed about the use of electronic voting and counting technologies,[78] then stakeholder consultation may be considered earlier in this stage of the feasibility study process.

78 For example if EVM solutions had been used in previous elections.

Decision in Principle

The decision in principle will be a result of all of the issues identified earlier — technical feasibility, beneficiality, financial feasibility and stakeholder acceptance. These issues will have been explored fully through the steps discussed above. These various factors will have to be balanced against each other in order to reach the decision in principle.

A positive technical feasibility assessment on using electronic voting or counting technologies in an electoral process will be required for further steps. If electronic voting or counting technologies are technically feasible and supported by stakeholders then the decision in principle may be that there should be no further steps to implement if the benefits to be achieved are not sufficiently greater than the disadvantages or the cost is too excessive or does not justify the expected benefits.

Even if the technologies are technically feasible, provide significant benefits over the existing system and are not excessively expensive, the decision may still be taken to not proceed if there is significant stakeholder concern or resistance to the introduction of these technologies. While it is not impossible to implement such technologies without the support of key stakeholders, to do so would be a risky strategy potentially leading to a wasted investment in electronic voting and counting technologies.

The Feasibility Study Committee will need to assess other less tangible costs and benefits, such as public and political perception. The Committee may need to consider both change management and risk management strategies in order to address issues identified during such an assessment. It should be noted that a fiscal cost benefit analysis resulting in a favorable outcome for an electronic solution may not mean that the technology should be used. For example, the risk of politicians banning the use of such technologies late in the game or a high logistical risk of not being able to distribute electronic voting or counting machines in time — indicate the potential "costs", e.g., delay of elections, are too high.

Ultimately the decision in principle is a very difficult one to determine and a range of factors need to be considered by the Feasibility Study Committee. It should be recognized that to take an affirmative initial decision in principle does not commit the EMB to anything at this stage. The next stages in the feasibility study process are experimental. Therefore, a decision to proceed to these next stages does not mean that a decision has been made to fully implement the technology.

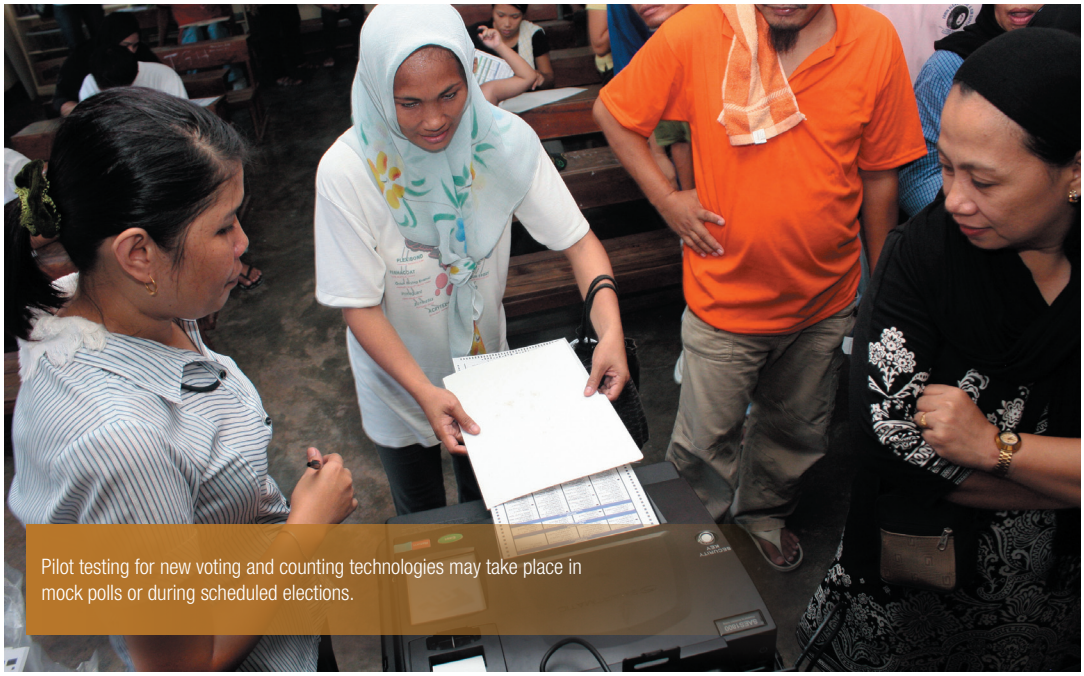
If some of the issues in reaching the decision in principle indicate that electronic voting and counting technologies should not be pursued and instead relied on a number of assumptions whose accuracy was not certain, then a pilot project could be pursued to verify the validity of these assumptions. For example, uneducated voters would not understand how to use an electronic voting machine.

Whatever decision is reached at this stage of the feasibility study it will be important to ensure that the reasoning behind the decision

is clearly elaborated by the Feasibility Study Committee, including any assumptions. This ensures that even if the decision in principle is to not proceed with investigating the use of electronic voting and counting technologies, the work invested in the feasibility study can be used in the future as a starting point for reconsideration if requirements, financial considerations or electronic voting and counting products change.

Should the Feasibility Study Committee decide there is sufficient reason to continue its consideration of using electronic voting or counting technologies, then it will need to recommend that a pilot project be conducted and clearly define the mandate and parameters for this pilot. There are, however, a number of prerequisites that need to be in place before the actual pilot can be initiated.

Pilot Prerequisites



Pilot testing for new voting and counting technologies may take place in mock polls or during scheduled elections.

It is important to recognize there are certain issues that need to be addressed before any pilot project can be initiated. Other prerequisites are essential if the pilot is to be as effective as possible. These issues are fundamental to the way in which the pilot project is planned and conducted and should be established before this pilot process starts.

Pilot Project Mandate

It is essential that any pilot project conducted is provided a clear mandate. There are a number of issues that will need to be defined to provide this clear mandate — the type of pilot project to be conducted, pilot locations, technological solutions that should be piloted (single solution or multiple solutions) and the issues that need to be explored in detail through the pilot.

Type of Pilot

The type of pilot can vary in a number of different ways and situations. Options in this regard are as follows:

- *Mock Pilot* — Electronic voting and counting technologies solutions could be piloted in an entirely different electoral situation, a mock electoral situation. However, piloting these technologies in a mock electoral situation is likely to skew the results of the pilot as it may result in a very different profile of electorate taking part (only interested, educated citizens) than the normal voters who would need to use the electronic voting or counting technologies. This may mean that the results of the pilot are not a good representation of

how the electorate in general would cope and respond to these technologies.

- *Parallel Pilot* — Electronic voting and counting technologies could be piloted alongside an existing voting process such that all voters cast their ballots as normal using the existing system. They would also have the opportunity to cast a mock ballot, or maybe the same ballot, afterwards, using the technology. The results of the parallel pilot would have no force with respect to the result. Again, the kind of voters who might exercise their right to participate in this parallel pilot may not be representatives of the average electorate, with uneducated voters not taking the opportunity as often as more educated ones. However, this approach is more likely to survey a broader cross section of voters than the mock pilot.

- *Optional Pilot* — Electronic voting and counting technologies could be piloted alongside the existing voting process, with voters having the option to either use the existing system or the electronic voting or counting system. The results for the polling station would then be calculated by combining the results from ballots cast using the existing system and the electronic voting or counting system. Votes cast using the technology would have equal validity as those cast using the existing system. Again this optional pilot may result in only certain members of the electorate using the electronic voting or counting technology.

- *Compulsory Pilot* — This type of pilot exclusively uses electronic voting and counting technologies for selected members of the electorate. These voters would have to cast their ballots using the technology and these votes would provide part of the overall result.

Clearly the best option for obtaining a definitive assessment of how the general electorate responds to using electronic voting and counting technologies is where a section of the electorate is required to use the technology being piloted and is not able to opt out. However, this is also risky. If the electronic voting or counting solution being piloted is defective in some way or is seen to favor some of the electorate over others, then its compulsory use could be challenged in the courts at a later date. A successful challenge could call into question the validity of the election result in which the pilot was conducted and possibly require a repeat election to remedy the situation.[79]

Pilot Locations

The mandate will need to define the scale of the pilot to be conducted, in terms of number of locations that it will be held in, and some parameters as to where these locations might be.

Where an in-person electronic voting or counting solution is being piloted, (e.g., a solution in an in-person polling location as

79 See the example of Finland, where a problem in the confirmation of the vote using electronic voting machines during a 2008 pilot project led to a challenge in the court and new elections being ordered in the three pilot project municipalities – see Council of Europe (2010), p. 20.

opposed to internet voting replacing voting by mail), then the identification of the voters who will participate, or have the opportunity to participate, in the pilot will be clear. All of the voters registered to vote at that location, or a subset of this group, will participate in the pilot.

It is advisable that electronic voting and counting technologies be piloted in multiple locations, so that a cross section of the electorate can test the use of the selected technologies. This will require that consideration be given to the different kinds of voters that should be provided the opportunity to test the use of the electronic voting or counting technologies. For example, only testing electronic voting or counting technologies in urban locations would not be advisable as rural voters may have a very different reaction to using these technologies.

It may well also be that there are a range of environmental factors in which electronic voting and counting technologies need to be tested, and therefore pilot locations will need to be selected accordingly. Initial pilots may also be chosen for constituencies/areas which are not contentious politically so as to avoid politically charged scenarios and allow trust to build in the pilot technologies. If the situation permits, a pilot could be conducted first in a single location to primarily test the EMB's ability to cope with the new process, procedures, training, voter education and logistical requirements. Subsequent pilots could be conducted at a number of locations representing a broader variety of the electorate.

Piloting remote electronic voting solutions, such as internet voting, may require a different approach to selecting pilot participants. The selection of participants for a remote electronic voting pilot may be limited by voter identification mechanisms that the remote voting system would utilize. Or the remote voting solution may be targeted at a specific section of the electorate, such as voters abroad, indicating that this entire group should take part in the pilot project.

Solutions Being Piloted

The decision in principle may indicate that one electronic voting or counting solution best meets the needs of the electoral process. This does not mean that it has to be the only solution piloted. Likewise, if a specific type of technology is being piloted (e.g., electronic counting of scanned ballots), then this does not mean that several other counting solutions cannot be tested as part of the pilot.

The mandate may indicate which specific technology is to be piloted and if a range of solutions or a single solution is to be piloted. It is recommended that more than one electronic voting and counting solution be piloted. This is important if this is the first time these technologies are being investigated; allowing for greater understanding of the various systems. Where the solutions to be piloted have not been made clear in the mandate, this needs to be determined at the early stage of the pilot project management process.

Legislation

The process of taking the decision in principle should have identified if the existing electoral legal framework permits the use of

electronic voting and counting technologies, or whether changes are required to allow their use. If existing legislation does not allow the use of electronic voting and counting technologies then the types of pilot identified above (Optional or Compulsory) will not be possible until legislation is changed to allow these technologies to be used.

> *"It is recommended that more than one electronic voting and counting solution be piloted."*

Where legislative changes are required, they can be temporary in nature for a specific election at which the pilot will take place so either the existing system of balloting can be used or an electronic system can be used. The latter approach provides maximum flexibility for the pilot process and means new legislation does not need to be passed for each election in which a pilot takes place (it is entirely possible that electronic voting and counting technologies could be piloted over several elections). However, changing electoral legislation so that either system could be used by the EMB might be seen as an invitation to use electronic voting and counting technologies at the discretion of the EMB.

In addition to legislative changes required to allow the use of electronic technologies, it is almost certain that electoral regulations will need to be changed. In most electoral jurisdictions these regulations are passed by the EMB, so changing them is less problematic than changing electoral legislation. It is still essential that the regulations be amended to facilitate the use of electronic voting or counting technologies.

Electronic Voting and Counting Technology Specification

The steps conducted during the decision in principle process will help the Feasibility Study Committee, and the EMB, to ensure that any electronic voting and counting technology pilot process is driven by the actual needs of the electoral process. The requirements, previously defined, will be central to drafting a comprehensive request for proposal for the electronic voting or counting technology procurement process. The request for proposal will need to identify the technical specifications which the solution must comply with for it to be considered and also request information on other product and support related issues relevant to the bid selection process.

The technical specification will need to provide the following parameters for vendors to comply with:

- Type of electronic voting or counting solution for which quotes are being requested (e.g., electronic voting, electronic counting, remote voting solutions, etc.).

- Scale of the pilot, including number of locations, number of voting or counting machines required, scope of any remote voting pilot and number of registered voters the pilot will need to accommodate.

- Details of any paper audit trail, or other mechanisms for auditing or verifying the accuracy of the result[80], required by the electronic voting or counting solution.

- Power requirements related to using electronic voting or counting hardware in locations which do not have reliable mains power sources.

- Electoral systems that need to be accommodated by the electronic voting or counting technology (e.g., first past the post, list based proportional representation, preference voting, bloc voting, etc.).

- Requirements for coping with multiple languages, the scripts that will need to be accommodated and any specific requirements to ensure electronic voting or counting solutions are easy to use for voters.[81]

- Details of any environmental conditions the electronic voting or counting hardware would have to be able to deal with, including extremes of heat, cold, humidity and dust.

- Security requirements for the electronic voting or counting technology.[82]

- Quantity of electronic voting or counting hardware and software that will likely be procured, and whether this is likely to be split between one or more suppliers.

- Services that will be required from the vendor during the conduct of the pilot project in addition to delivery of the electronic voting or counting solution (e.g., project management services, configuration, training, and service support during the voting period in the pilot).

- Anticipated delivery times for all services and goods to be provided once a contract has been awarded.

- Project management arrangements that would be put in place by the vendor to coordinate pilot project implementation issues, clearly identifying the responsibilities that would be covered by these arrangements.

Additional information will also be required for the selection process such as information not directly covered by the requirements for change (previously identified). This information may relate to basic functionality of the electronic voting or counting system, functionality that all systems will have, but will likely be implemented differently on each machine.

Therefore, the request for proposals should ask for information from the vendors on the following:

- Intellectual property rights the vendor will expect to exercise over the hardware and software provided as part of the bid.

80 The Council of Europe (2004) recommendation on e-voting requires that the correctness of the result produced by an e-voting system should be verifiable and that the system should be auditable – recommendations 26, 59 and 100-110.

81 The Council of Europe (2004) recommendation on e-voting requires that the voter interface of an electronic voting system be understandable and easily usable – recommendation 1.

82 The Council of Europe (2004) recommendation on e-voting requires that the reliability and security of an e-voting system be ensured and that all possible steps be made to mitigate against fraud using the system – recommendation 28 and 29.

- Will the election management system that accompanies the electronic voting or counting solution allow configuration of the machines for specific elections, lists of candidates and electoral systems being used?
- Ways in which the electronic voting or counting hardware would cope with a sudden loss of power, ensuring that data is properly secured.
- Maximum capacity of the electronic voting or counting solution in terms of number of electoral races and number of candidates that can be accommodated (in the case of screen based electronic voting machines it may be relevant to request the total number of candidates that could be accommodated on a single page of the screen with a specified font size).
- Means of verifying that loaded software is the same as that tested and approved by the EMB.
- Means by which the electronic ballot box can be verified as being empty at the start of polling.
- Means by which it can be demonstrated before the start of polling to observers and party/candidate agents that the machine counts votes/ballots accurately.[83]
- Can an electronic voting machine solution include an electronic voter list and integrated biometric voter identification system? If so, what are the mechanisms that ensure the voter cannot be linked to the vote?
- Means by which electronic voting or counting solutions are activated for use by voters to ensure that voters can only cast the correct number of votes.[84]
- Whether the electronic voting technology can accommodate the display of party and candidate symbols and photographs.
- Mechanisms for review and confirmation of the ballot choices made by the voter.[85]
- Whether the solution has the possibility for accepting blank ballots, or a 'none of the above' option on the ballot.[86]
- Ways in which the electronic voting solution can provide access to people with disabilities.[87]

83 The Council of Europe (2004) recommendation on e-voting requires that observers be able to be present to observe and comment on the e-elections, including the establishing of the results – recommendation 23.

84 The Council of Europe (2004) recommendation on e-voting requires that voters shall be prevented from casting more than one electronic ballot or from casting ballots on multiple channels (paper and electronically for example) – recommendations 5 and 6.

85 The Council of Europe (2004) recommendation on e-voting requires that voters be prevented from casting their ballot without reflection and to alter or terminate their vote before completion of the e-voting process – recommendation 10 and 11.

86 The Council of Europe (2004) recommendation on e-voting requires that the casting of a blank vote should be possible – recommendation 13.

87 The Council of Europe (2004) recommendation on e-voting states that e-voting systems should be designed to maximize the opportunities for access for people with disabilities – recommendation number 3.

- Mechanisms for ensuring voters have completed the casting of their ballot when they leave an electronic voting solution.[88]

- Whether an electronic voting machine (may not be relevant for electronic counting machines) has the possibility for limiting the speed with which ballots are cast in order to mitigate electronic ballot box 'stuffing.'

- If a printer is used in an electronic voting machine for a paper audit trail or to print the ballot, what type of printer is used (thermal, laser, inkjet, etc.) and what are the environmental limitations on its use?

- For paper audit trails on an electronic voting machine, how will the paper be changed part way through polling?

- Means by which the secrecy of an electronic vote is maintained by the system.[89]

- Means by which results can be generated by the electronic voting or counting solution at the end of polling.[90]

- Means by which results can be transferred/transmitted from the machine for tabulation of results and the mechanisms by which these results can be verified as from a legitimate source on receipt.[91]

- What kind of software is used to tabulate and publish the results of elections using the electronic voting or counting solution?

- Means by which the electronic voting or counting solution is designed to deal with well established security challenges presented by the use of electronic technologies.

- Mechanisms that are in place to ensure that if electronic voting or counting system has been tampered with, it can be detected.[92]

- Life expectancy of the electronic voting or counting solution and the period of vendor guarantee for the hardware.

- Maintenance and storage requirements to ensure that the electronic voting or counting solution is kept in good working order.

It will be necessary to define the technical requirements for the electronic voting or

88 The Council of Europe (2004) recommendation on e-voting requires that it is clearly indicated to the voter the voting process has been completed.

89 This is a general international electoral standard repeated in the Council of Europe (2004) recommendation on e-voting, but also expanded on to require that in an electronic ballot box it is not possible to reconstruct the link between the voter and the vote cast, and furthermore that any remote e-voting system should not allow a voter to prove the content of their vote – recommendations 16, 17, 51 and 52.

90 The Council of Europe (2004) recommendation on e-voting requires that the counting process shall accurately count the votes, and that the e-voting system maintain the availability and integrity of the electronic ballot box and counting process – recommendation 98 and 99.

91 The Council of Europe (2004) recommendation on e-voting states that the integrity of data communicated during the voting stage be maintained, and that data-origin authentication be carried out – recommendation 97.

92 The Council of Europe (2004) recommendation on e-voting requires that sufficient means be provided to ensure that the systems used to cast the vote are protected against modifying influences – recommendation 92.

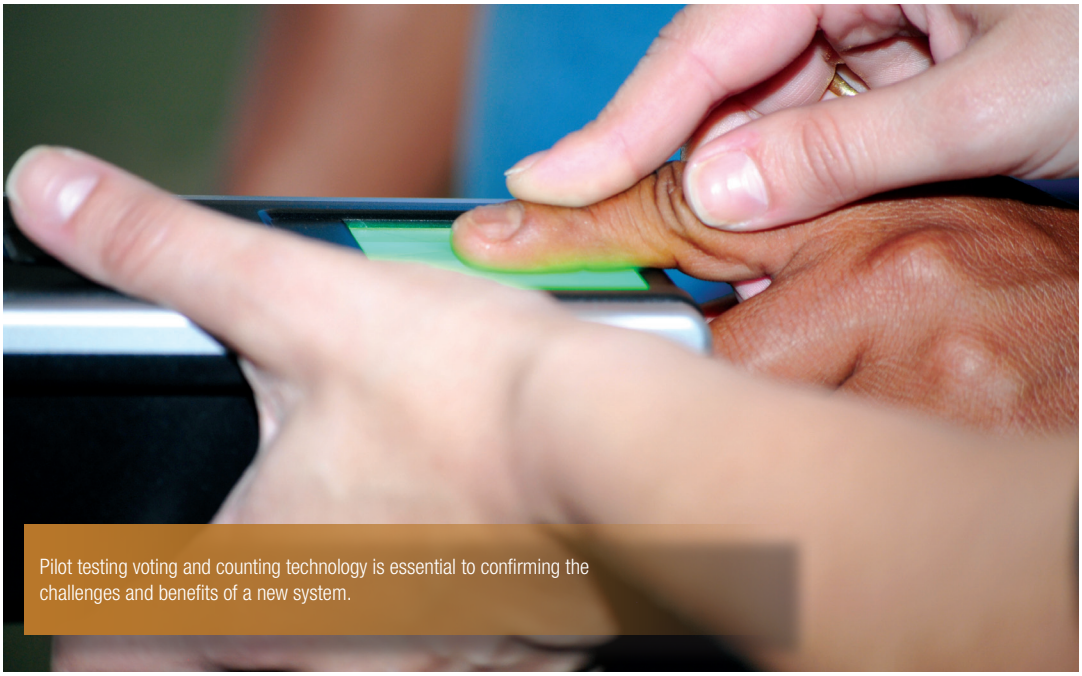
counting solution prior to the commencement of the pilot as many of these components will be fundamental to the way in which the pilot is conducted.

In addition to the information sought in this request for proposal, vendors who submit proposals should be required to commit to implementing their solutions during the pilot in accordance with good practice for the conduct of elections.

Pilot Project Funding

The conduct of a pilot project will entail a number of costs, the least of which may be the procurement of any electronic voting or counting equipment itself. A budget will need to be developed for the conduct of the pilot project. The budget will depend a lot on the scale of the pilot being recommended, and can draw heavily on the costs identified by the working group looking at the financial aspects of using these technologies.
It may be that the budget for the pilot project will be drafted at the same time the decision in principle to proceed with a pilot is taken. It should almost go without saying that the process of implementing a pilot project cannot start before the budget required to conduct the pilot has been secured.

Pilot Project



Pilot testing voting and counting technology is essential to confirming the challenges and benefits of a new system.

Piloting electronic voting and counting technologies is a way of testing many of the assumptions and conclusions reached during the process of reaching a decision in principle. This includes a practical assessment of actual benefits and disadvantages in using the piloted electronic technologies, the actual costs involved in implementing these technologies and the suitability of the list of requirements developed for electronic technologies. The pilot will also allow the Feasibility Study Committee to assess issues which could only be guessed at during the decision in principle stage of the process, including the ability of voters to properly use the new technology.

A good pilot will need to take into consideration the following issues.

Managing the Pilot Project

Implementation of an electronic voting and counting technology pilot project is an incredibly complex task. It requires a good project management structure to ensure that it is planned effectively and that timelines and objectives are continuously monitored and amended as required. The implementation of the pilot will require a lot of components of the EMB to work effectively together, calling for significant commitment from the EMB to deliver on the various aspects of the project. This guide will not provide a specific framework for project management of the pilot since there are sufficient guides available.

At a minimum, it is suggested that the following project management structures be established to implement an electronic voting and counting technology pilot project:

- *Pilot Project Committee* — This should include at least some members of the Feasibility Study Committee (assumed to be the case in this guide) and senior members of the EMB. It will also be important to include representatives from all of the components of the EMB which will need to have an active role in implementing the pilot project. This may include representatives from field operations, training, logistics, voter education, legal and IT sections.

- *Pilot Project Manager* — Day-to-day management of a complex project cannot be done by a Committee. Therefore, proper management of the pilot project will require that a competent staff member be identified as the focal point for pilot project activities. This project manager would need to be full time on the pilot project, empowered with authority to take decisions while reporting back to the Pilot Project Committee on developments and compliance with the implementation plan.

The issue of contact with vendors prior to the issue of a contract for the supply of electronic technologies is worth mentioning again. Contacts with vendors will be required as the procurement process is under way. The Pilot Project Committee will need to ensure it deals fairly and equally with vendors and protects itself from any allegations of favoritism and inappropriate conduct with respect to vendors. A single point of contact should be established, with communications approved by the Pilot Project Committee.

Risk Management Plan

The Council of Europe recommends that a risk management plan should always be developed for an electronic voting and counting technology project.[93] This is good practice for any project, but especially so for electoral projects where timely delivery of voting services are so critical. The risk management plan should cover the following potential difficulties if or when they occur:[94]

- Equipment is late or missing.
- Equipment breaks down.
- Internet connection fails.
- Access to the voting website or the voter register fails due to firewalls or other security measures.
- There is a software error.
- Polling station personnel do not arrive.
- There is a power failure.
- There is a natural disaster or other emergency.
- Challenges in securing the necessary recruitment of skilled human resources.

93 Council of Europe (2010), p. 31.
94 Mainly drawn from Council of Europe (2004) p. 31, but with a few additions.

- Possible legal challenges to the use of electronic voting and counting technologies.

This risk management plan should be established at the beginning of the pilot project process and reviewed periodically throughout the process. The same risk management plan — as adjusted based on lessons learned during the pilot — should be used during any future full scale implementation of the electronic voting and counting technologies.

Procuring Electronic Voting and Counting Technologies

The process of procuring electronic voting and counting technologies can take some time and needs to be conducted in an open and transparent manner. The EMB needs to ensure it is in control of this procurement process in terms of defining the requirements for the technologies to be piloted. The process must not be vendor driven, with vendors telling the EMB what it is that they require.

Good procurement practice would indicate adhering to the following three procedures:

- *Time* — Sufficient time will need to be provided to vendors to properly respond to the many facets of the request for proposals. A reasonable timeframe for such a request for proposals would be in the region of four to six weeks. Vendors should be allowed to seek clarifications on aspects of the request for proposals at a predefined date part way through the procurement process. The questions raised and answers provided should be made available to all through the EMB or a sponsoring institution's website, including vendors who submitted questions.

- *Open and Impartial Procurement Process* — The procurement process itself should be open and impartial. Request for proposals should be widely published through the media and on the sponsoring institution's website; decisions should be taken according to pre-established criteria. In addition, it may also be decided to send the request for proposals directly to well-established electronic voting and counting technology vendors, especially those with whom a relationship has been built during the decision in principle stage of the feasibility study.

- *Evaluation Criteria* — The request for proposals should indicate to the bidders which evaluation criteria will be applied in selecting vendor(s) to supply products for the pilot project. Evaluation criteria might include compliance of the proposal with technical specifications, experience of the vendor in delivering similar solutions, quality and experience of the project management team offered by the vendor, access provided by the vendor to the source code and the price.

  Each criterion needs to be individually scored (e.g., on a scale of 1–10, with 1 indicating the lowest score and 10 the highest). Each evaluation criterion will not be of equal importance; therefore,

the criteria will need to be weighted to provide an overall scoring for each proposal received. An example of such a weighting could be technical specifications (50 percent), vendor experience (15 percent), project management team (15 percent) and price (20 percent). A sample of how to implement such a weighted ranking for proposals is included in Annex 4.

Other typical decisions to be determined in establishing such a selection procedure are whether to make the weightings known to the bidders and whether there is a minimum requirement for consideration, either for each category or in total. In some cases financial proposals are only accepted for bids achieving a set minimum score in the technical evaluation.

It is clear that the specification and resulting proposals will be complex and detailed documents. A Proposal Review Committee, possible the entire Pilot Project Committee (depending on the size of this Committee), should review the proposals received and agree on the ranking against different evaluation criteria. On the basis of this, a recommendation will be made on which electronic voting or counting solution, or solutions, will be procured for the pilot project.

Testing and Certification

Once delivered, it is essential that an EMB ensure that an electronic voting or counting system not only meet the specifications developed for the system, but also meet the requirements of the electoral environment.

The CoE's E-Voting Handbook identifies six types of testing that the EMB should conduct. Quoting from the CoE Handbook, these are:

- *Acceptance testing* — This is a method of testing software that tests the functionality of an application performed on a system (for example software, batches of manufactured mechanical parts, or batches of chemical products) prior to its delivery.

- *Performance testing* — This test is used to determine the speed or effectiveness of a computer, network, software programme or device. This process can involve quantitative tests done in a laboratory, such as measuring the response time or the number of MIPS (millions of instructions per second) at which system functions. Qualitative attributes such as reliability, scalability and interoperability may also be evaluated. Performance testing is often done in conjunction with stress testing.

- *Stress testing* — This is a form of testing used to determine the stability of a given system or entity. It involves testing beyond normal operational capacity, often to breaking point, in order to observe the results. Stress testing may have a more specific meaning in certain industries, such as fatigue testing for materials.

- *Security testing* — This is a process to determine that an information system protects data and maintains functionality as intended. The six basic security concepts that need to be covered by

security testing are: confidentiality, integrity, authentication, authorisation, availability and non-repudiation.

- *Usability testing* — This is a technique used to evaluate a product by testing it on users. This can be seen as an irreplaceable usability practice, since it gives direct input on how real users use the system.

- *Review of the source code* — This is a systematic examination of the computer source code intended to find and rectify mistakes overlooked in the initial development phase, improving both the overall quality of the software and the developers' skills.[95]

Conducting all these tests takes time and it is important that time for full testing is made available in the project timeline.

In addition to comprehensive testing of electronic voting and counting technologies prior to use, it is increasingly seen as good practice to have these systems certified prior to use.[96] The purpose of certification is similar to testing in that it determines whether the electronic voting or counting technology operates effectively. The difference is that it is conducted by an authority independent of the EMB, political parties, the government and suppliers. Ideally the certification process will be conducted in an open and transparent manner, and is intended to build confidence in the operation of the electronic technology. Time is again an issue, and the process of certification may take between 6-12 months, depending on how many issues are found which require fixing.[97]

While a number of institutions could play a role as certifying institutions, such as university departments of information technology or technology institutes, the process of certification will need to be well defined. In some countries the certifying institutions themselves have to be pre-authorized and must meet a series of standards for the work they will conduct certifying electronic voting and counting technologies. Clear guidance will need to be developed for certifying institutions on how they are to conduct the certification process, the records they should make of their findings, the consequences of a product failing to comply in some way, the mechanisms for a vendor to resubmit after failing certification and the openness of the certification process and certification reports.

Polling and Counting Procedures

Many aspects of electronic technologies will likely be different from the existing system of balloting, especially if the existing system is a paper balloting system. The procedures for storage of the electronic voting or counting machines, pre-polling preparations, transportation, security, placement in the

95 CoE (2010), p.34-35.

96 The Council of Europe (2004) recommendation on e-voting requires that before any e-voting system is introduced, it be certified by an independent body to verify that it is working correctly and meets all necessary security measures – recommendations 25 and 111.

97 CoE (2010), p.33-34.

polling station, demonstrating an empty ballot box, initiating polling, activation of the electronic voting or counting machines for the voter and reporting of results will be different.

These changes in procedure will need to be carefully considered by a competent and experienced group of election management officials, in consultation with other stakeholders. Full procedures for each amended part of the process will need to be developed and tested before they are ready to be used in a pilot.

The type of pilot being conducted will not change the need for carefully considered and comprehensive procedures for the use of electronic technologies during the pilot process. While the development of new procedures can begin prior to procurement of the technology, finalization of the procedures can only be made once the exact technology is selected.

Voter Education

Educating voters on the use of new electronic voting or counting technologies is essential,[98] and must start before they are confronted with the new system on Election Day. A change in balloting system, especially if moving from paper balloting to an electronic voting solution, will be confusing for voters. This confusion, and problems in using electronic voting or counting technologies, can be mitigated to a large extent by effective voter education in advance of the pilot project. There are a number of key messages that need to be communicated to voters in advance of a pilot project:

- *Existence of a Pilot* — Voters need to understand electronic voting or counting technologies are going to be used, the locations they will be used in and why the technologies are being tested.

- *Type of Pilot* — Outlined previously, there are a number of different types of pilot projects that can be implemented — mock, parallel, optional and compulsory. It should be clearly communicated to voters which of these will be implemented.

- *Follow Up* — Voters should be made aware if a sample of those using the electronic voting or counting system during the pilot will be surveyed by the EMB to assess their experiences of using the technology immediately after completion. This way, they are not surprised or suspicious when approached and asked questions when leaving the polling location.

> *"Educating voters on the use of new electronic voting or counting technologies is essential, and must start before they are confronted with the new system on Election Day."*

The task of voter education will need to be conducted in a targeted manner as the pilot will only be in a limited geographic

98 The Council of Europe (2004) recommendation on e-voting requires that information on the functioning of an e-voting system be made publicly available and that voters understand and have confidence in the system – recommendations 20 and 21.

area. Mass means of communication are less suitable as they would communicate messages about the pilot to many who would not be involved and therefore likely lead to confusion about where the pilot will be conducted. This means local level mechanisms for voter education should be employed for the project.

The CoE makes an additional recommendation with respect to voter education before an electronic voting or counting solution is implemented. It recommends that voters be provided with the opportunity to practice any new method of electronic voting before and separately from the actual casting of the vote. This will help minimize voter anxiety about the new means of voting and promote understanding and confidence in the new system.[99] The feasibility of doing this will depend on the scale of the pilot project, but certainly voters and other stakeholders should be provided the opportunity to sample using the system before Election Day. Such 'testing' of the system by voters could be done at the polling station prior to Election Day — making clear that this is not the actual election — or by taking the electronic machines to community meetings in advance of the pilot.

Training

Just as the education of voters in the use of piloted electronic voting and counting technologies is essential to the success of the pilot, so is proper training of staff who will use the technologies. As already discussed, the procedures for many, if not most, aspects of polling and counting may be changed by the introduction of these technologies. Not only must new procedures be developed, but training on these new procedures needs to be effectively delivered.

This training will be required not only by polling staff, but also the staff required to prepare the electronic voting or counting hardware at centralized facilities and staff who receive the results provided by the electronic voting or counting technology. As initial pilots are generally small in scale, delivering training to the staff involved should not be too difficult from a logistics perspective.

From a technical and procedural perspective, the preparation of training for the pilot needs to go through all the steps of policy, procedure and material development that any other aspect of polling operations would need to. Procedures need to be drafted and tested and training materials for these procedures developed. These procedures need to cover the configuration of the hardware, setup of any machines in the polling station, conduct of polling, close of polls, production of results, transfer of results for tabulation and receipt of results for tabulation.

The training provided on these new procedures will need to be comprehensive since these components will be significantly different with electronic voting or counting solutions when compared to paper balloting. While it is essential that election administration staff be provided this training, it would also be beneficial if similar briefings were to be provided to candidates, party

99 Council of Europe (2004) recommendation on e-voting, recommendation 22.

agents and observers in pilot areas so they also understand the new procedure.

Stakeholder Outreach

Getting the support of key stakeholders will be important to the perceived and actual success of any pilot for electronic voting and counting technologies. Providing access to the technology prior to elections, as indicated above, will be one way of reaching out to key stakeholders. However, additional efforts to inform stakeholders should also be pursued.

Local candidates, party representatives, domestic observers, media and community representatives should be briefed by the EMB on the pilot project at the beginning of the planning process. They will need to be informed about the technology being piloted, the reasons why it is being piloted and the benefits that it is expected to bring to the process.

If stakeholders can be won over to the pilot process, they can be strong supporters of the process, acting as a channel for key voter education information and providing vital mechanisms for feedback on the success, or otherwise, of the pilot project.

Publicity

A pilot project on the use of electronic voting and counting technologies is by nature a very public process. The earlier that the Pilot Project Committee can start to publicize that it will be conducting a pilot, the better. It will be important to communicate to all stakeholders the rationale for conducting the pilot project, locations in which the pilot will take place and the benefits that are anticipated from using electronic technology. It will be especially important to inform those who will be voting in pilot project locations. In line with this policy of openness the Pilot Project Committee may also consider having some or all of its meetings open to the media and those interested. At a minimum it should issue press releases at key points in the pilot project process.

Election Day Support

The piloting of an electronic voting or counting system will likely involve many significant changes in the process of administering elections. Regardless of how good the training and documentation that is provided to electoral officials, there will inevitably be some problems in applying the procedures and training when electoral officials come to use electronic voting or counting systems on Election Day. Good procedures, training and documentation can help mitigate these problems to a large extent, but it always makes sense when making significant changes to a system to make special provisions for dealing with questions concerning the new procedures.

A dedicated, centralized help desk is a good way of dealing with the many questions likely to be raised when implementing the kinds of changes to voting procedures that occur with the introduction of an electronic voting or counting system. The help desk should be available from at least a few days before the conduct of elections to deal with questions that

polling officials may have as they are issued electronic voting or counting equipment.

Having a uniform mechanism for dealing with such questions will ensure that if persistent problems are being encountered the problem/issue will become apparent as early as possible, allowing the greatest time to develop and implement a technical or procedural fix. The help desk also ensures that uniform responses and guidance are given to electoral officials if the same question or problem arises in different locations. All calls and issues raised through the help desk should be logged, and this log of issues and questions will provide important information when the success of the pilot project is evaluated at the end of the pilot process.

In addition, having qualified trainers and technical staff in the field on Election Day to deal with issues on site may be advisable if resources allow. They can provide an on-site human interface with the help desk. However, solutions offered on-site should be in line with what is provided by the help desk, and any issues encountered are reported to the help desk.

The help desk operators must be thoroughly trained in all aspects of the electronic voting or counting system, they must have a detailed helpdesk manual available and a shared log of issues raised and solved. They must have a set method for dealing with issues not covered in manuals and training, which could include a direct hotline to one or more senior election officials authorized to make decisions as required.

Observation of the Pilot Project

The same rights to observe the electoral process should be applicable to any electronic voting or counting technology pilot project.[100] The EMB may have to take additional measures to facilitate and encourage this observation for a number of reasons. First, the conduct of elections using an electronic voting or counting technology will be very different and will require special training for observers, media and political party and candidate agents that wish to observe the pilot. This training will be needed to ensure that these groups understand how the new system works, but also that they understand how it is that they can and should observe the conduct of electronic voting or counting technologies.

Furthermore, as observers, media and political representatives are key stakeholders in the process. Their trust in the system being piloted will be essential and, therefore, they should be actively encouraged to observe. This will build their understanding of the system being piloted and allow them to provide feedback to the Pilot Project Committee during the pilot project evaluation stage.

Mandatory Audit

As discussed earlier, the ability to verify the operation and audit the results of an electronic voting or counting system is an

100 The Council of Europe (2004) recommendation on e-voting requires that observers shall be able to be present to observe and comment on e-elections, including the establishment of the results – recommendations 23 and 56.

emerging standard with respect to electronic voting and counting technologies.[101] The way in which this auditability is provided for will vary depending on the type of electronic voting or counting solution in question (e.g., it will be different for electronic voting systems, electronic counting systems and especially for remote electronic voting systems). The most common way in which auditability is achieved for electronic voting systems[102] is through the use of a voter verified paper audit trail, which can be manually counted as a check against the electronic result generated by the electronic voting machine.

Regardless, an audit mechanism is a way of checking that the technologies worked properly, by comparing the electronic and auditable versions of the results. In addition to checking the operation of the system, this also helps build confidence in the system, more so if the audit is done under the full observation of stakeholders in the process.

For the pilot, therefore, the conduct of audits of the results generated by the electronic voting or counting system should be mandatory.[103] The (paper) audit trail should be manually counted and the results compared to the electronic results generated. Ideally this audit will take place in every location where the technology was piloted. This may not be possible for a larger pilot project. If only a sample of pilot locations are being audited it will be important to randomly select this sample and only make the selection known after the close of polling and counting.

The audit process should be conducted as soon as possible after the pilot. An audit right after the close of voting and counting avoids the possibility or perception of tampering or manipulation before the audit takes place. If an immediate audit is not possible then the sample to be audited should be sealed in a way which would be tamper resistant until the audit can take place. The audit should be fully observable by election observers, the media and political party and candidate agents.

The results of the audit process will need to be interpreted differently depending on the kind of technology being piloted. With electronic voting technologies there should be no differences at all between the result generated from the audit trail and the electronically generated result. If a difference is found then it will be prudent to conduct a recount of the audit trail to make sure that the manual process has not generated a mistake. Should a difference between the manual count of the audit trail and electronic count of votes still persist, even if only by one vote, this will be seen as an indication of some flaw in the operation of the electronic voting machine or the audit trail. Even a small deviation would be a critical concern. Without understanding why the difference had been possible it also could not be known if this

101 Council of Europe (2004) recommendation on e-voting, recommendations 26, 59 and 100-110.

102 Auditability is mainly an issue for electronic voting systems, as electronic counting systems normally use a paper ballot completed by the voter, which naturally provides a paper audit mechanism.

103 This assertion is supported by the Council of Europe (2010) in its E-voting Handbook where it recommends that a paper audit trail should be combined with a mandatory count of paper votes in a small, but statistically meaningful number of randomly selected polling stations, p. 12. This guide is written with respect to actually implementing e-voting systems, but it is equally relevant for the conduct of any pilots using e-voting systems.

flaw could lead to much larger deviations between the electronic result and audit trail result on future occasions. Additionally, even one vote incorrectly recorded is a serious violation of electoral standards and a disenfranchisement of the voter(s) affected.

With electronic counting technologies, the interpretation of differences between the manual recount of the audit trail and electronically generated results are more difficult. Paper ballots are marked in different ways by different voters, and sometimes these voter marks are interpreted differently by electoral officials. The advantage of electronic voting technologies is that they interpret ballot marking in a consistent manner, according to the instructions provided to them. A difference in vote totals through a manual count of the ballots is probably due to the counting machine reading voter marks in a different way than the election official. It may be the election official has made a mistake, or it could be that the difference represents an error in the ballot counting rules provided to the counting machine. This requires an amendment to the counting machine software. Depending on the severity of any error in the ballot counting rules provided to the counting machine, this may have implications, even serious implications, for the results generated by counting machines across the election.

Pilot Project Evaluation

A comprehensive post-pilot assessment of the pilot project is essential. It would not be enough to conclude that polling seemed to go smoothly, if it did. The post-pilot assessment needs to be conducted from the perspective of every key stakeholder in the process. Perceptions of these stakeholders about the use of the electronic voting or counting technologies will be critical to any future adoption of the technology.

This pilot project evaluation needs to collect opinions, at a minimum, from the following stakeholders:

- Voters who used the electronic voting or counting technology.
- Voters who did not use the electronic voting or counting technology.
- EMB staff involved in preparing the electronic voting or counting technology for use.
- Polling staff using the electronic voting or counting technology.
- Election management staff involved in the receipt and tabulation of results.
- Observers (domestic and international).
- Candidates, and candidate and party agents.
- Representatives of other key stakeholders with a specific interest (e.g., people with disabilities if special voting mechanisms are being implemented for such voters).

The results of the pilot project will need to be assessed using many different

The pilot project will offer insight into the ease of setting up and using new technology in a variety of conditions, including polling in remote locations.

methods, from statistical data collected about the use of the electronic voting or counting technology to qualitative analysis of the process from the perspectives of key stakeholders. In terms of statistical measures used to analyze the effects of using electronic voting or counting technologies, the following would be useful:

- *Turnout* — A simple comparison of turnout for pilot project polling stations against the previous electoral turnout in the polling stations is not a good measure of the effect of using electronic voting or counting technologies. The comparison would need to factor in the type of election, as some elections have more turnout than others, and the general trends in turnout for similar polling stations in non-pilot areas. Given such considerations, the turnout experienced at pilot project polling locations can provide some indication of the possible effect on turnout caused by the use of electronic voting or counting technology.

- *Speed of Voting* — In order to fully understand the consequences of using electronic voting and counting technologies it is important to collect data about how quickly voters are able to cast their votes using these technologies. This will have consequences for the logistics and costs of using electronic technologies on a wider scale. If using technologies is faster or slower than the existing system of balloting then this may require or allow changes in the number of voters allocated to a polling station. This data should be collected by polling staff working in pilot project locations.

- *Speed of Results* — The overall time it takes from the close of polls to the announcement of polling station results and the tabulation and announcement of results for the constituency should be monitored. A comparison can be made to the existing system of balloting in order to quantify any improvements in this regard when using electronic voting or counting technologies. If different electronic solutions are being piloted then separate data should be collected and reported for each solution being used.

- *Complaints Received* — The number and severity of complaints received about polling in pilot project areas compared to non-pilot project areas can be seen as a measure of the acceptability of using electronic voting and counting technologies.

- *Number of Blank Votes* — While difficult to interpret, the number of blank ballots cast using electronic voting or counting technologies is an important indicator. The interpretation of this needs to be assessed in parallel with historical statistics data on blank ballots and overvotes (casting votes for more candidates on a ballot than permitted), and also in the context of how many ballots the voter is being presented with. While electronic voting and counting systems can be programmed not to allow overvotes, emerging standards indicate that a blank ballot should be possible.[104] If the number of blank ballots is significantly different from the existing system of balloting, then it is a consequence that needs to be understood. It may be a positive consequence or a negative one.

- *Help Desk Logs* — The number of issues and questions received by the help desk will be an indicator of not only how reliable the electronic voting or counting systems piloted were, but also the kinds of problems that were encountered in using the systems and implementing the procedures written for their use. The analysis of this information may indicate that changes in the solution or implementing procedures would be required if adoption proceeds.

- *Results of the Mandatory Audit* — It is to be hoped that the mandatory audit will demonstrate that the audited results were the same as the electronic results. Should any differences have been found, this fact will need to be carefully considered in the evaluation, and remedial action may be required to fix these discrepancies before proceeding in any way with further piloting or adopting electronic voting or counting technologies.

- *Election Related Violence* — In some countries the electoral process, and especially the counting process, can be tense events. Sometimes tensions lead to election related violence as attempts are made to manipulate the work of polling and counting staff, or perception is rife that such manipulation is taking place. Taking the human element out of the counting process can diffuse these tensions.

104 Council of Europe (2004) Recommendation 13.

Another indicator of the consequences of using electronic technologies could be in the incident rate of election related violence in pilot project locations compared to non-pilot project locations.

But these quantitative measures can only provide so much information about the use of electronic voting and counting technologies. They need to be supplemented by qualitative assessments of the following kinds of issues and questions:

- *Voter Experience* — Were voters aware of the pilot project before attending the polling location? Was sufficient information provided prior to the pilot to enable voters to understand how to use electronic voting or counting technologies? How easy did voters find the electronic voting or counting technologies to use? Did they experience specific problems in using them? Were instructions clear? Were there any issues with activation and ensuring completion of the voting process? Did the voters understand the process of review, confirmation and VVPAT (if there was a VVPAT)? Did the electronic voting or counting solution increase or decrease the need for assisted voting? How could the process have been made easier and clearer? Did the voter cast a vote in all elections (if multiple races were being piloted), if not, then why? What was the reaction of people in marginalized groups such as illiterate and visually impaired?

- *Non-Voter Motivations* — Did some voters not participate in the pilot because of the use of the electronic voting or counting technology, and if so, why? Were potential voters sufficiently well informed about how to use the electronic voting or counting solution?

- *Configuration of Electronic Voting or Counting Hardware* — How comprehensive were the instructions on configuring the electronic voting or counting hardware? How easy was the process of configuration? What specialized skills would be of benefit for those configuring the electronic voting or counting hardware? How might the process of configuration be improved?

- *Polling Station Setup* — How comprehensive were the instructions on setting up electronic voting or counting machines? How easy was the process of setting up electronic voting or counting machines? What specialized skills would be of benefit for those setting up the machines? How might the process of setting up the machines be improved?

- *Polling* — How smoothly did the electronic voting or counting system operate during polling? Were any problems encountered, and if so, what were they? What voter feedback was received about using the electronic voting or counting system? How long did it take on average for voters to cast their ballot using the system? Did voters seem to understand how to use the electronic system or did they often have to seek help from the polling staff?

- *Close of Polls* — How easy were the procedures for the close of polls using the electronic voting or counting solution? How comprehensive were the instructions for the close of polls using the electronic solution? Was the solution able to produce election results efficiently?

- *Tabulation of Results* — How effectively did the process of transfer/transmission of results from the electronic voting or counting system to the central count tabulation take place? Did the procedures adequately provide for the process? Could they have been improved in any way? How did the results tabulation software perform? Were there improvements in the speed, accuracy and quality of results tabulation procedures and outputs?

- *Manual Audit* — How well did the audit trail function? How easy was it to manually count the audit trails? Was the audit trail kept in a way that the secrecy of the vote was maintained both during voting and the manual count of the audit trail?

- *Electoral Roll* — If the electronic voting or counting solution included an electronic version of the electoral roll, how smooth was the process of identification and verification? Was the process faster or slower than using a paper voter list? Was enfranchisement increased/decreased? Were there fewer or more challenges to voter identity by political agents than in comparable previous elections or other polling locations?

- *Logistics* — To what extent did the logistical plan for distribution, security, retrieval and storage of the electronic voting or counting hardware and audit mechanisms hold up? Were there unforeseen problems with breakage, batteries, theft, maintenance, etc.? Was the manpower sufficient in quantity and quality?

- *Security* — Were the security measures related to the use of the electronic voting and counting technology seen as sufficient to protect the integrity and accuracy of the process? Are there recommendations for improvements in these security measures for the future implementation of such technology?

- *Observation of the Process* — What were the opinions of observers and candidate/party agents about the use of the electronic voting or counting technology? Did observers and agents believe that the technology improved the process of balloting and counting? Were observers and agents able to observe key aspects of the process where electronic technologies were used? Did the polling officials demonstrate to the observers and agents that the electronic ballot box was empty at the start of polling, and did this provide a feeling of assurance that this was the case?

- *Comparison to Existing System of Balloting* — To what extent was the use of electronic voting or counting technologies better or worse than the current system of balloting?

This qualitative data about the use of electronic voting and counting technologies in the pilot project can be collected through a number of means. Interviews can be conducted with a sample of the various groups whose opinions will be critical to the assessment — voters, non-voters, staff, observers, candidates and party representatives. A sample of voters can be interviewed as they leave the pilot project locations in order to obtain their immediate impressions of using the electronic voting or counting solutions. In addition, focus groups can be used to explore the opinions of stakeholders to some of the key findings from an initial assessment of the pilot. Focus groups can also be used to try and explore the reasons for unexpected opinions consistently expressed in interviews or to explain anomalous statistical data collected during the pilot (for example, high or low levels of blank ballots or the time it takes to cast a ballot using the electronic voting or counting solution).

All of these means of evaluating the pilot project should be utilized in order to obtain as complete a picture as possible of the operation of the electronic voting or counting technology during the pilot and the reactions of the key stakeholders to using this solution. This evaluation should be written up into a Pilot Project Report covering the process of conducting the pilot project, the conclusions and recommended next steps with respect to implementing electronic voting and counting technologies (Annex 5 shows a sample table of contents for an evaluation report).

The Decision on Adoption

The result of the pilot project may be to adopt a new voting and counting technology system, not to adopt it or to conduct further tests.

The Pilot Project Report will need to be carefully reviewed by the Feasibility Study Committee, if it is different from the Pilot Project Committee. The Feasibility Study Committee may decide to accept, reject or amend the conclusions and recommendations of the Pilot Project Report.

A number of general conclusions and next steps may be reached as a result of the pilot project:

- *Not Proceed with Electronic Voting and Counting Technologies* — It may be decided that electronic voting and counting technologies either do not meet the needs of the elections in question, or they do meet the needs but the benefits to be gained do not justify the expenditure required to implement them or the disruption caused by implementing them. In either case it will be important to clearly identify the reasons why the recommendation is made to not proceed. This will be important in the future. If cost, functionality or ease of implementing the technologies change, then this recommendation can be easily revisited.

- *Additional Piloting* — For a number of reasons it may be decided that a recommendation cannot be made to proceed with the implementation of electronic voting and counting technologies, but also that investigation into their use should not be ended.

  It may be that the original specification developed for the electronic voting and counting technologies was defective or insufficient and the solutions with different functionality or features would be better suited to the electoral environment. It may be that in the

final analysis the electronic voting or counting solutions provided did not properly meet the specification. The pilot project report may conclude that voter education was insufficient or the procedures used during the pilot were not adequate. Any of these conclusions would indicate that the piloting of electronic voting and counting technologies should continue, as long as the anticipated benefits were still justified by the previous pilot findings.

The initial pilot may also have been on a very small scale. Even if the results were very positive it may be decided that before a recommendation is made to move towards full implementation the pilot needs to be repeated, with an expanded scale and scope in order to better test the electronic voting or counting solution. In fact, it makes sense to pilot electronic voting and counting technologies on multiple occasions before moving ahead with a full scale implementation.

- *Adoption of Electronic Voting or Counting Technologies* — If the pilot project was successful, demonstrating that electronic voting or counting technologies worked effectively and delivered significant benefits to the electoral process, then the recommendation may be to proceed with the full scale implementation of the technology. As indicated above, such a recommendation should not be based on a single, small scale pilot, but on the successful conduct of a series of pilots or a single large scale pilot.

"Even where the recommendation is to move towards the full adoption of electronic voting and counting technologies, the recommendation may be to move towards this adoption in a staggered manner."

Should the adoption of electronic voting or counting technologies be recommended, it is still important to recognize that there may be important lessons to learn from the pilot project. Time must be provided so that lessons from the pilot can be properly adapted before the adoption of electronic voting or counting technologies. This may require technical specifications, polling and counting procedures, training plans and voter education schemes to be reconsidered and redrafted. The procurement process will most likely have to start anew; given the potential changes and the larger size of the contract for electronic voting or counting products. Failure to learn from the pilot, however, could have serious implications for the success of the larger scale adoption of electronic voting and counting technologies.

Even where the recommendation is to move towards the full adoption of electronic voting and counting technologies, the recommendation may be to move towards this adoption in a staggered manner, as other

countries have done.[105] Such staggered adoption of electronic voting and counting technologies may make a great deal of sense as it allows for the financial burden to be spread over several budget cycles. However, such staggered implementation may also be problematic as it entails fundamental differences in the way in which voting rights are applied for different voters.

At this stage of the process these recommendations should only be considered as preliminary. In the interests of openness and transparency it is important that these preliminary recommendations be subject to consultation with key stakeholders. The consultation process should be used to explain the details of the pilot project to stakeholders, the conclusions reached and the recommendations being made with respect to the adoption of electronic voting or counting technologies.

It is to be hoped that this consultation process will complement feedback previously received by stakeholders throughout the process, but this may not be the case. Should the opinions of stakeholders be consistently opposed to the recommendations of the Feasibility Study Committee, then the causes and consequences of such disagreement will need to be carefully considered. It would be a brave, possibly foolhardy, EMB that proceeded with adopting an electronic voting or counting solution against the opposition of all or most of the key stakeholders in the process.

Once the Feasibility Study Report has been finalized, after this consultative process, the full report should be made public and the main recommendations issued through a press release by the Feasibility Study Committee.

105 See the example of India. Indian electronic voting machines were first piloted in 1982 in a limited number of polling stations for a by-election and was finally used country wide for general elections in 2004 - http://pib.nic.in/elections2009/volume1/Chap-39.pdf (last accessed on 31 January 2011).

Additional Resources

This list of materials on electronic voting and counting technologies in no way represents a comprehensive list of all of the materials available. However, it represents a good starting point for a good understanding of issues related to the use of such technologies for the conduct of elections.

Braun, N. and Brandli, D. (2006) *Swiss E-Voting Pilot Projects: Evaluation, Situation Analysis and How To Proceed*

Brennan Center for Justice at New York University School of Law (2006) *The Machinery of Democracy: Protecting Elections in an Electronic World*, Brennan Center Task Force on Voting System Security.

Caarls, S. (2010) *E-voting Handbook: Key steps in the implementation of e-enabled elections*, Council of Europe Publishing: Strasbourg

Centre for Human Rights (1994) *Professional Training Series No.2: Human Rights and Elections — A Handbook on the Legal Technical and Human Rights Aspects of Elections*, United Nations: New York and Geneva

Council of Europe (2004) *Legal, Operational and Technical Standards for E-Voting*, Recommendation Rec(2004)11 adopted by the Committee of Ministers of the Council of Europe on 30 September 2004 and Explanatory Memorandum

Council of Europe (2010) *E-Voting Handbook: Key steps in the implementation of e-enabled elections*

Election Commission of Pakistan's (2010) *Committee on the Use of Electronic Voting Machines in Pakistan: Final Report and Recommendation*

European Commission (2006) *Methodological Guide to Electoral Assistance*

European Commission (2007) *Compendium of International Electoral Standards: Second Edition*, European Commission: Brussels

European Commission for Democracy Through Law (Venice Commission) (2002) *Code of Good Practice in Electoral Matters: Guidelines and Explanatory Report*, Adopted by the Venice Commission at its 52nd session (Venice, 18-19 October 2002), CDL-AD(2002) 23 rev

Goodwin-Gill, G. (1994) *Free and Fair Elections: International Law and Practice*, Inter-Parliamentary Union: Geneva

Goodwin-Gill, G. (2006) *Free and Fair Elections: New Expanded Edition*, Inter-Parliamentary Union: Geneva

Government of Buenos Aires (2005) *2005 E-Voting Pilot Project: Preliminary Report of Results*

IFES Applied Research Center (2007) *Challenging the Norms and Standards of Election Administration*

Irish Commission on Electronic Voting (2006) *Second Report of the Commission on Electronic Voting on the Secrecy, Accuracy and Testing of the Chosen Electronic Voting System*.

Joint EC-UNDP Task Force on Electoral Assistance (2010) *Procurement Aspects of Introducing ICT Solutions in Electoral Processes: The Specific Case of Voter Registration*

Krimmer, R. (Ed.) (2006) *Electronic Voting 2006: Overview of Proceedings of 2nd International Workshop*, co-organised by the Council of Europe, ESF-TED, IFIP WG8.6 and E-Voting.CC

Norwegian Ministry of Local Government and Regional Development (2006) *Electronic voting — challenges and opportunities*

OAS (2010) *Observing the Use of Electoral Technologies: A Manual for OAS Electoral Observation Missions*, General Secretariat of the Organization of American States (GS/OAS)

Open Rights Group (2007) *May 2007 Election Report: Findings of the Open Rights Group Election Observation Mission in Scotland and England*.

OSCE (2005) *Challenges of Election Technologies and Procedures: Final Report*, Supplementary Human Dimension Meeting, PC.SHDM.GAL/5/05

OSCE (2007) *Election Observation Handbook: Fifth Edition*, OSCE Office for Democratic Institutions and Human Rights: Warsaw

OSCE (2008) *OSCE/ODIHR Discussion Paper in Preparation of Guidelines for the Observation of Electronic Elections*, ODIHR.GAL/73/08

Pran, V. and Merloe, P. (2007) *Monitoring Electronic Technologies in Electoral Processes: An NDI Guide for Political Parties and Civic Organizations*, National Democratic Institute for International Affairs

The Carter Center (2007) *Developing a Methodology for Observing Electronic Voting*

Tokaji, D. (2004) *The Paperless Chase: Electronic Voting and Democratic Values*, Moritz College of Law, Ohio State University

UK Election Commission (2007) *Key Issues and Conclusions: May 2007 electoral pilot schemes*

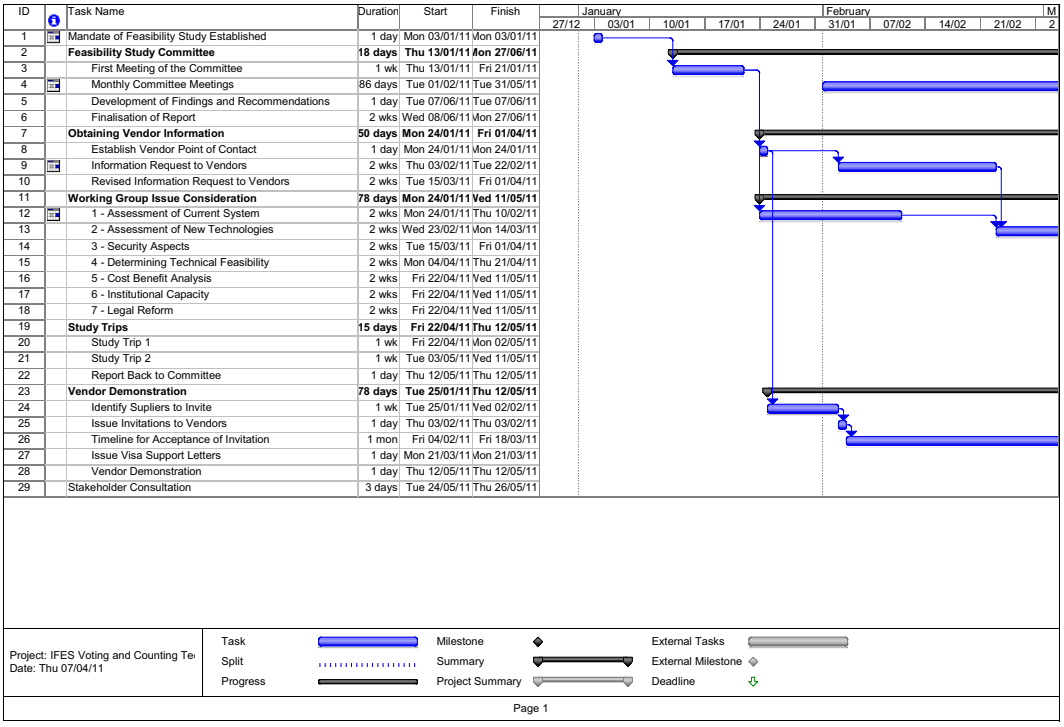
US Election Assistance Commission's (2005) *Voluntary Voting System Guidelines*

Yard, M. (ed.) (2010) *Direct Democracy: Progress and Pitfalls of Election Technology*

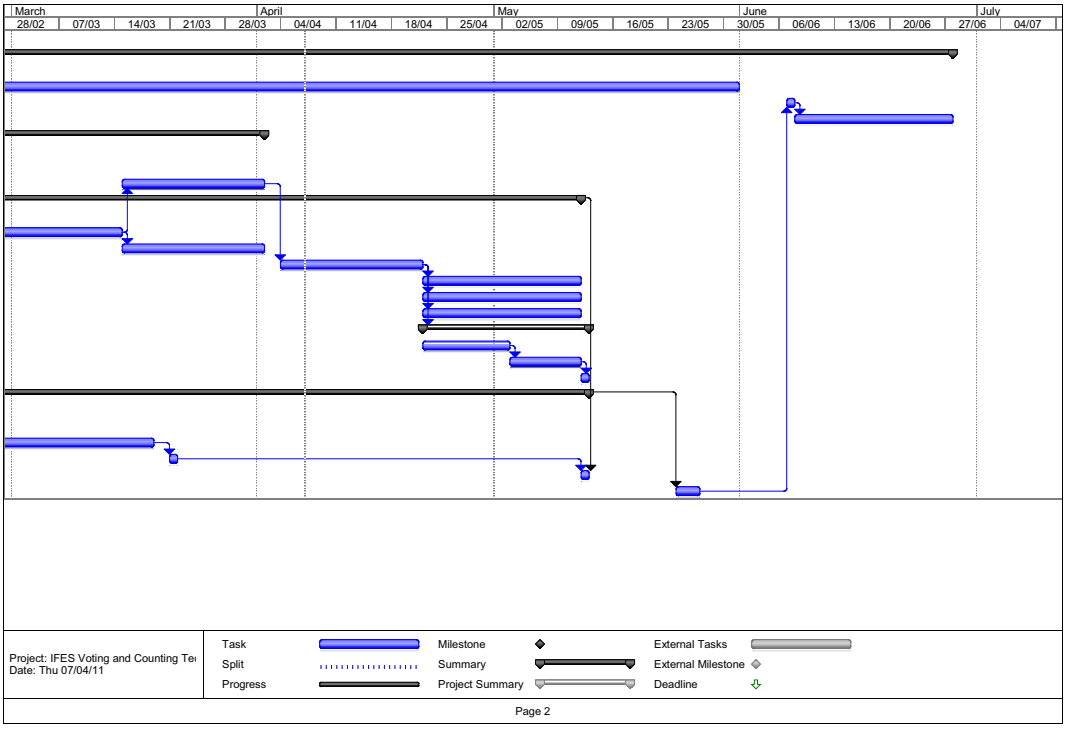
Annexes

Annex 1 - Draft Timeline for Decision in Principle

The timeline will depend a lot on the amount of time that the Feasibility Study Committee and working groups can allocate to the issue. A full-time Feasibility Study Committee will deal with the issue much quicker.



ID	Task Name	Duration	Start	Finish
1	Mandate of Feasibility Study Established	1 day	Mon 03/01/11	Mon 03/01/11
2	**Feasibility Study Committee**	**18 days**	**Thu 13/01/11**	**Mon 27/06/11**
3	First Meeting of the Committee	1 wk	Thu 13/01/11	Fri 21/01/11
4	Monthly Committee Meetings	86 days	Tue 01/02/11	Tue 31/05/11
5	Development of Findings and Recommendations	1 day	Tue 07/06/11	Tue 07/06/11
6	Finalisation of Report	2 wks	Wed 08/06/11	Mon 27/06/11
7	**Obtaining Vendor Information**	**50 days**	**Mon 24/01/11**	**Fri 01/04/11**
8	Establish Vendor Point of Contact	1 day	Mon 24/01/11	Mon 24/01/11
9	Information Request to Vendors	2 wks	Thu 03/02/11	Tue 22/02/11
10	Revised Information Request to Vendors	2 wks	Tue 15/03/11	Fri 01/04/11
11	**Working Group Issue Consideration**	**78 days**	**Mon 24/01/11**	**Wed 11/05/11**
12	1 - Assessment of Current System	2 wks	Mon 24/01/11	Thu 10/02/11
13	2 - Assessment of New Technologies	2 wks	Wed 23/02/11	Mon 14/03/11
14	3 - Security Aspects	2 wks	Tue 15/03/11	Fri 01/04/11
15	4 - Determining Technical Feasibility	2 wks	Mon 04/04/11	Thu 21/04/11
16	5 - Cost Benefit Analysis	2 wks	Fri 22/04/11	Wed 11/05/11
17	6 - Institutional Capacity	2 wks	Fri 22/04/11	Wed 11/05/11
18	7 - Legal Reform	2 wks	Fri 22/04/11	Wed 11/05/11
19	**Study Trips**	**15 days**	**Fri 22/04/11**	**Thu 12/05/11**
20	Study Trip 1	1 wk	Fri 22/04/11	Mon 02/05/11
21	Study Trip 2	1 wk	Tue 03/05/11	Wed 11/05/11
22	Report Back to Committee	1 day	Thu 12/05/11	Thu 12/05/11
23	**Vendor Demonstration**	**78 days**	**Tue 25/01/11**	**Thu 12/05/11**
24	Identify Supliers to Invite	1 wk	Tue 25/01/11	Wed 02/02/11
25	Issue Invitations to Vendors	1 day	Thu 03/02/11	Thu 03/02/11
26	Timeline for Acceptance of Invitation	1 mon	Fri 04/02/11	Fri 18/03/11
27	Issue Visa Support Letters	1 day	Mon 21/03/11	Mon 21/03/11
28	Vendor Demonstration	1 day	Thu 12/05/11	Thu 12/05/11
29	Stakeholder Consultation	3 days	Tue 24/05/11	Thu 26/05/11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Project Summary
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External Milestone
Deadline
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Annex 2 — Decision in Principle Report Table of Contents

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Annex 3 — Suggested Briefing Pack for Feasibility Study Committee

General Documents on Electronic Voting and Counting Technologies

1. Council of Europe (2004) *Legal, Operational and Technical Standards for E-Voting, Recommendation Rec* (2004)11 adopted by the Committee of Ministers of the Council of Europe on 30 September 2004, and Explanatory Memorandum.
2. Council of Europe (2010) *E-Voting Handbook: Key steps in the implementation of e-enabled elections.*
3. The Carter Center (2007) *Developing a Methodology for Observing Electronic Voting.*
4. OSCE/ODIHR (2008) *OSCE/ODIHR Discussion Paper: In Preparation of Guidelines for the Observation of Electronic Voting.*
5. IFES Applied Research Center (2007) *Challenging the Norms and Standards of Election Administration.*

Country Experiences of Using Electronic Voting and Counting Technologies

1. Brennan Center for Justice at New York University School of Law (2006) *The Machinery of Democracy: Protecting Elections in an Electronic World*, Brennan Center Task Force on Voting System Security.
2. Tokaji, D. (2004) *The Paperless Chase: Electronic Voting and Democratic Values*, Moritz College of Law, Ohio State University.
3. Open Rights Group (2007) *May 2007 Election Report: Findings of the Open Rights Group Election Observation Mission in Scotland and England.*
4. Irish Commission on Electronic Voting (2006) *Second Report of the Commission on Electronic Voting on the Secrecy, Accuracy and Testing of the Chosen Electronic Voting System.*

Annex 4 — Example of Weighted Ranking of Vendor Proposals

Sample General Evaluation Criteria

Evaluation Criteria	Minimum Rating	Weighting
Compliance with technical specifications	7 out of 10	50%
Experience of the vendor	5 out of 10	15%
Quality of the project management team	-	10%
Access to source code		10%
Price	5 out of 10	15%

Example of Applying These Criteria

Proposal 1 assessment:

Evaluation Criteria	Rating (out of 10)	Meet Minimum?	Weighted Score
Compliance with technical specifications	7	50%	35
Experience of the vendor	8	15%	12
Quality of the project management team	3	10%	3
Access to source code	0	10%	0
Price	8	15%	12
Total proposal score			**62**

Proposal 2 assessment:

Evaluation Criteria	Rating (out of 10)	Meet Minimum?	Weighted Score
Compliance with technical specifications	9	50%	45
Experience of the vendor	3	15%	4.5
Quality of the project management team	5	10%	5
Access to source code	3	10%	3
Price	2	15%	3
Total proposal score			**60.5**

In this example, although Proposal 2 is the most compliant with the technical specifications for the system, Proposal 1 is ranked higher because of other evaluation criteria.

Annex 5 — Sample Pilot Project Report Table of Contents

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H. Evaluation of the Pilot Project

Project Management Evaluation
Election Management Body Staff Feedback
Statistical Data Collected
Feedback from Voters and Non Voters
Feedback from Other Electoral Stakeholders
Evaluation of Technology Solution Used in the Pilot
Assessment of Anticipated Benefits Resulting from the Pilot Technologies
Assessment of Anticipated Challenges Resulting from the Pilot Technologies
Evaluation of Cost of Implementing the Pilot Technologies

I. Findings of the Pilot Project

J. Recommendations and Next Steps

ELECTION TECHNOLOGY SERIES

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