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of Democracies

Technology in Elections – Best Practices in Using Digital Tools and Platforms in the Community of Democracies

Report to the Community of Democracies' Working Group on Democracy and Technology by Mr. Septimius Parvu

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Abbreviations

AC - Automation coordinator

AEP – Autoritatea Electorală Permanentă / Permanent Electoral Authority

API - Application programming interface

ARO - Assistant returning officer

BEC – Biroul Electoral Central / Central Electoral Bureau

BMD - Ballot marking devices

CMS - Case management system

EC - Elections Canada

EIS – Election information systems

ECI - Election Commission of India

EMB – Election Management Body

EMS - Election management systems

FLO - Field liaison officers

CEC – Central Election Commission

CISA - Cybersecurity and Infrastructure Security Agency

DEC – District Election Commission

DEO - District Election Officer

DRE - Direct Recording Electronic

FEC – Federal Election Commission

GIS - Geographic Information System

INE - El Instituto Nacional Electoral / National Electoral Institute

KDD - Norwegian Ministry of Local Government and Regional Development

Mol - Ministry of Interior

NEC – National Election Commission

NDE - Norwegian Directorate of Elections

OTP - Open time password

PEC – Precinct Election Commissions

RIA - Riigi Infosüsteemi Amet / Information System Authority

RO – Returning officer

SAO – State Audit Office

SSB - Statistisk sentralbyrå / Statistics Norway

SEO – State Election Office

STS – Serviciul de Telecomunicații Speciale / Special Telecommunication Service

TSE - Tribunal Supremo de Elecciones / Superior Tribunal of Elections

USSD - Unstructured Supplementary Service Data

VVPAT - Voter Verifiable Paper Audit Trail

PCOS - Poll Count Optical Scanners

I. [An overview of technology in elections](#)

Elections in recent years have been fertile ground for introducing new technologies and states managed to successfully test and implement new voting methods or systems to administrate their electoral processes. The Covid-19 pandemic was a moment of reflection on the possibility to include new technological facilities within the electoral process and some states that organized elections in 2020 and 2021 passed amendments to existing legislation or implemented additional tools to support already existing processes.

Even though the introduction of technology in elections is appreciated for its positive effects, including transparency, more efficient processes, or facilitation of public participation, it also raises concerns due to the inherent risks related to security or a low level of understanding of the technical process, which could provide an open space for disinformation. States are concerned regarding potential cyber security issues and balance between the opportunities and the risks. Some studies or tests run by governments related to certain voting methods or electronic tools used in elections led to the conclusion that the introduction of new instruments could be too expensive or lead to high vulnerabilities. Elections, as one of the fundamental pillars of democracy need to remain secure and ensure integrity and trust. Failures in organizing elections, counting votes or announcing results could lead to serious disruptions, with long term effects. Therefore, even though using technology is an attractive trend, it also remains a topic of debate.

Patterns regarding the use of technology within the electoral process can differ. Configurations are diverse and can be connected to the institutional, historical and legal culture of the country, political will to implement new methods, available resources, but also the willingness of the voters to adopt certain methods. Decisions of national constitutional courts have also modeled their implementation. While some states developed complex and strong integrated tools for the electoral administration and political finance oversight bodies, others decided to use a rather limited number of digital tools, in different stages of the process. The architecture and technology of the solutions can be different, some states opted for software-based applications, while other use web-based platforms. In some cases, mobile applications have been developed for the use of the external stakeholders. Ownership, security procedures, inter-institutional collaboration can also differ from case to case.

Some states transformed their voting process by introducing Internet voting and electronic voting machines, while the majority of voters continue to use the traditional paper ballot. Estonia is quoted as the best success for Internet voting, while Norway¹ did not pursue its full implementation. Lithuania introduced Internet voting in its legislation before the 2020 parliamentary elections, but it was not implemented in practice so far. Costa Rica does not use electronic voting to full extent, although it performed several tests². Finland documented and publicly discussed the introduction of Internet voting, but it was not implemented, while electronic voting in polling stations was tested starting with 2005 and its development has not been continued³. The Romanian parliament discussed several legal

¹ Limited tests were run during the local election in 2011 and parliamentary election in 2013. The tests were discontinued due to lack of broad political support. Read more about [Internet voting trials](#)

² La Nación, „TSE descarta el voto electrónico para el 2018 por su alto costo”, 2018.

³ See [Electronic voting in Finland](#)

proposals to allow voters to cast ballots online, but none of them were approved; limited pilots were implemented with members of the military.

While Internet and electronic voting received more attention in the past years, the electoral processes comprise a high number of steps in which technology can be integrated, including voter registration, candidate registration, election day operations, tabulation and results, mandate allocation, as well as ensuring electoral justice. An increasing number of states have implemented digital tools for political finance reporting and disclosure or for the registration of political parties. Digital tools are used both for the internal operations (the management of elections) and for the external side (relation to the media, citizens, observer groups and other relevant stakeholders).

Reasons to use technology in elections

Reasons for states to use technology in the electoral and political processes can also be diverse. Some institutions use different types of platforms or other electronic tools to improve the efficiency and transparency of their procedures (election management or information systems), as well as to introduce traceability mechanisms for all the steps of the process. Other states introduce technology to improve the quality of public services and to provide voters and other participants to the electoral process with the possibility to interact with the main components of the electoral framework such as registration or election results in an easy and fast manner.

Some states aim to automate their internal and external procedures and to reduce the financial and time resources needed for certain operations. The introduction of electronic tools is also used to facilitate the participation of the persons with disabilities in the electoral process or can foster the implementation of alternative voting methods, including in times of crisis such as the Covid-19 pandemic. Electronic platforms can become an efficient tool to increase the capacity of the electoral administration and to provide better training support. Moreover, they can be intensively used for the education and information of the general public. Digital tools can be a powerful leverage for the external stakeholders (media, civil society organizations, civic groups) to ensure meaningful observation of the election process.

Another reason could be related to the need to increase voter turnout, although there is limited success in this field. Estonia engaged more voters from the existing pool rather than increasing the overall turnout⁴. A study regarding the voting patterns in Geneva canton shows that the turnout can be affected, but when it comes to specific groups, such as the abstainers and occasional voters⁵. The Norwegian pilot also concluded that the participation was not increased⁶. However, platforms aimed at facilitating the active registration of voters could provide a certain boost to the number of participants to the electoral process. Finland's documentation process has shown that the effects of increasing participation are rather insignificant; however, it has also illustrated that the digitalization of elections may reform the mechanisms of participation to include a wider range of stakeholders, with different backgrounds.

⁴ Tove Wigartz, "[Does internet voting in Estonia affect voter turnout?](#)", 2017

⁵ Adrien Petitpas, Julien M. Jaquet, Pascal Sciarini, "[Does E-Voting matter for turnout, and to whom?](#)", 2021. The study covers over 30 ballots, between 2008 and 2016.

⁶ Read more about [Internet voting trials](#)

The introduction of technology can facilitate the efficient organization of elections and the activity of the electoral administration between the electoral periods. However, the use of digital tools is not necessarily a way to solve fundamental issues of the institutional and legal framework and their efficient and transparent use is strongly related to the independence and capacity of the electoral bodies, as well as to the political will to allow their development and use. New tools could improve already existing robust processes and could enhance their efficiency, transparency, and public trust.

There is no universal reason to use technology, which is also related to the profile of each state. Introducing new instruments should align with the local social, political, economic, and legal culture. Each government or election management body (EMB) should analyze the need to introduce specific tools and test them before integrating them into the electoral process. What could be helpful in one country, where citizens have high trust in the electoral administration and technology, may not work well in another country with a lower technological profile or strongly divided society, economic, and legal culture.

What are the uses of digital tools?

The report defines the digital tools and platforms as electronic instruments used to prepare and organize different steps of the election cycle, to manage the activity of the election administration, as well as to ensure reporting and oversight of political finance, and to facilitate political participation. The tools can be developed with different technologies and architectures and can be part of an ecosystem or function independently.

New voting technologies refer to the “use of information and communication technologies for casting and counting votes, typically including electronic voting machines to cast votes, in-polling station ballot scanners, and Internet voting.”⁷ However, the report will not advocate new voting technologies but will briefly describe some experiences.

Below please find a list of tools and platforms used by the election administration in different steps of the electoral and political process⁸:

Step of the process	Scope
Legal framework	<ul style="list-style-type: none"> • Online consultations with stakeholders • Online legislation portals
Planning and implementation	<ul style="list-style-type: none"> • Ensuring the management of the electoral geography – limits of constituencies and polling districts – including Geographic Information Systems (GIS)⁹ and address management systems

⁷ ODIHR, “[Alternative voting methods and arrangements](#)”

⁸ See [IDEA International Electoral Cycle](#). A range of tools used in elections is also available in the [Elections and technology section](#) of ACE Project

⁹ [Geographic Information Systems \(GIS\) have the role to](#) “store, analyze, and visualize data for geographic positions on Earth’s surface. GIS stands for Geographic Information Systems and is a computer-based tool that examines spatial relationships, patterns, and trends in geography.” Furthermore, “GIS mapping produces visualizations of geospatial information. The 4 main

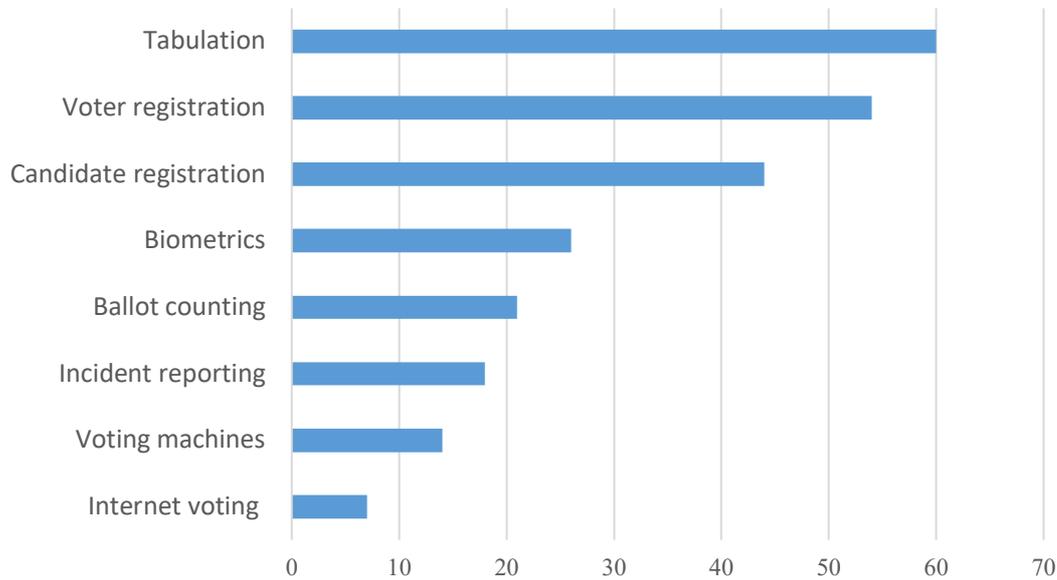
	<ul style="list-style-type: none"> • Registering basic information on electoral commissions and polling stations (names, contacts, addresses and others) • Allocating (recruiting) members of election commissions or other stakeholders involved in organizing elections • Delivering electronic or paper voting cards to voters • Managing employees and salaries • Developing and testing/auditing electronic systems used in elections • Preparing the overall electronic infrastructure for the electoral process • Facilitating procurement procedures • Creating inventories of goods used in elections and tracking them down
Training and education	<ul style="list-style-type: none"> • Providing online training and education for voters • Providing information and guidance for political parties and contestants • Providing online courses for election administration • Testing the capacities and knowledge of the election administration • Ensuring training on dedicated topics for the representatives of political parties or contestants • Preparing courses for observers
Voter and candidate registration	<ul style="list-style-type: none"> • Maintaining or developing the centralized electoral register • Allowing for active voter registration • Providing online platforms that allow voters to search for their polling station and registration status • Registering candidates • Raising online support signatures for elections and referenda • Developing platforms for registration of observers • Preparing ballot design • Gathering and managing complaints
Election campaign	<ul style="list-style-type: none"> • Registering and publicly displaying campaign events or other types of materials produced by contestants • Reporting tools on media and social media activities • Providing digital reporting tools for campaign finance • Countering misinformation and disinformation • Gathering and managing complaints

<p>Voting operations and election day</p>	<ul style="list-style-type: none"> • Verifying voters in electronic voter lists (elections information systems, election management systems, electronic poll books) / Ensuring the possibility of voters to vote in any polling station during early voting or election day • Ensuring electronic voting in polling stations or internet voting • Facilitating the registration of voters for homebound voting or other alternative voting means • Ensuring transparency during voting (activity of the election administration) • Registering and publishing turnout in real time • Facilitating counting and tabulation • Supporting the election commissions to calculate and verify the arithmetical integrity of counting • Audio-video recording of the counting process • Gathering and managing complaints • Gathering feedback from participants to the electoral process
<p>Providing information about results and distribution of mandates</p>	<ul style="list-style-type: none"> • Centralizing results and verifying their integrity • Ensuring the preliminary and final results in real time on web platforms • Calculating the allocation of seats • Gathering and managing complaints
<p>Post-election</p>	<ul style="list-style-type: none"> • Allowing the collecting of electoral data in order to produce reports and statistics • Reflecting the activity of the EMB between elections • Developing open data repositories
<p>Political process</p>	<ul style="list-style-type: none"> • Registration, de-registration and management of political parties • Digital reporting tools for political party finance

Who uses digital tools?

A study highlighting the activity of EMBs from 72 states, published in 2020¹⁰, shows that 11 reported not to use technology at all, while most of them included tools on tabulation, voter registration and candidate registration. Voting machines and Internet voting were used by the lowest number of states.

¹⁰ Leontine Loeber, [“Use of Technology in the Election Process: Who Governs?”](#), 2020



The areas in which technology is used, percentage of EMBs. Source: [Loeber \(2020\)](#)

The study also illustrates that in most cases, when discussing independent EMBs (as distinct entities from the government), the technology is owned by the body (around 80%). In contrast, in the departments within the government, the ownership is distributed almost equally between the EMB, central government, and private companies.

The International IDEA, an intergovernmental organization providing electoral support and research, provides a comprehensive database regarding technology in elections¹¹. Several statistics illustrate that:

- In 50 cases, biometric data is used in voter identification at polling stations.
- 17 states use direct recording machines, 12 use internet voting systems, nine implemented optical mark recognition or optical character recognition systems, and four use electronic ballot papers.
- 87 states allow registration confirmation through an online interface, while 22 have the option of verification by mobile phone.
- In 79 of the cases, voters can verify their assigned polling station using an online interface, while in 25 examples, a mobile application is available.
- 101 states use electronic tabulation systems for official election results, and 50 states publish results in machine-readable formats.
- 22 states use open-source software¹² for election administration.
- 83 states publish political finance reports online, while in most cases, the data is not machine-readable.

¹¹ See International IDEA [ITC in elections database](#). The number of replies per questions can differ, but the numbers could be reported to an average of 175 states

¹² According to the [Open Source Initiative](#) "Open source software is software that can be freely used, changed, and shared (in modified or unmodified form) by anyone. Open-source software is made by many people, and distributed under licences that comply with the Open Source Definition"

The institutional arrangements can be different from one state to another, which may affect how technologies are developed and used. In some Community of Democracies Governing Council states, elections are organized by independent EMBs that are not part of the government (i.e., Mexico, Lithuania, Romania, Canada, Georgia, Estonia). In others, the EMBs are part of the government (i.e., Norway, Finland, Italy), while a third category refers to the mixed model¹³. Election management bodies can coordinate with different institutions to obtain data, perform an audit (state audit institutions, universities, other providers of audit), or provide security, such as cybersecurity agencies, external providers, computer emergency response teams, and law enforcement agencies. For political finance, in some cases, the EMB is responsible for oversight (i.e., Mexico, Lithuania, Canada, Costa Rica), while in others, the administration is performed by other institutions such as audit offices (i.e., Georgia, Finland) or ministries and agencies; there are also mixed cases (i.e., Romania).

About the study

The report aims to map and detail the use of technology by participating Governing Council member states in their electoral processes and highlighting the means through which transparency and integrity are ensured. A questionnaire was distributed to all GC members to map the main instruments that electoral administrations use in their activity. The goal was also to identify interesting technological achievements in the process of election administration by members to be shared and possibly recommended for implementation, with necessary adaptation. The questionnaire also focused on essential topics such as observability, testing, resources, and lessons learned.

The information presented in the current report is drawn from replies to the questionnaire (Canada, Costa Rica, Estonia, Georgia, India, the Republic of Korea, Lithuania, Mexico, Romania, and the United States of America), specific technical questions (Norway), interviews (Costa Rica, Estonia, Georgia, the USA) and public sources including official websites, manuals, or legislation (in all cases mentioned in the report). Observation reports from ODIHR, OAS, or national organizations were useful to assess the tools and the general framework. The information is not exhaustive and has the purpose of digital mapping tools and platform models. The interlocutors have reviewed the respective sections.

The report is structured starting from the phases of the electoral process, and it does not extensively cover alternative voting means such as internet and electronic voting. The selection of states depends on responses to the questionnaire, the existing public information, and the availability of tools in specific countries. In some cases, more detailed information may be covered for one member state. For others, only a few of the stages are described more in-depth. Furthermore, some member states use election information systems (e.g., Canada, Costa Rica, Estonia, and Georgia); therefore, an overall description of the system is presented in the second chapter, while the detailed aspects of the specific modules are covered in other chapters, according to their function.

The report does not describe technical specifications or the architecture of each platform in detail but covers functionalities, development process, potential downsides, and opportunities. Furthermore, it does not provide an

¹³ See International [IDEA database on Models of Election Management](#).

extensive analysis of the legal and institutional frameworks and does not aim to evaluate how elections are run in different states. Some details could not be disclosed due to their sensitivity and to protect confidentiality. For such evaluations, we recommend reports published by ODIHR, GRECO, or other international organizations that monitor elections.

But, in the end, the report is about good practices and tools that can inspire other stakeholders. It aims to present instruments that can help the authorities organize and implement the electoral process and facilitate the participation of political parties, candidates, citizens, media, or civil society organizations. It is interesting to see that some typologies of tools have already been adopted in neighboring countries or regions. Not all the tools presented in the study can be applied in all nations, as the implementation of a new method depends on the country's political, cultural, and economic profile. It also is related to the capacity of the EMB, the willingness of the political parties or candidates to adopt such tools, and many other factors.

The states' experiences included in the report are somewhat diverse, as some use more technology, while in other cases, the development and implementation of tools are in a more incipient stage. And while all the different instruments described in the study can serve as models and good practices for other states, some have been in use for several years and have demonstrated that they are robust and efficient.

No electronic tool is perfect and there is always space for improvement in terms of design, transparency, usability or security. Even for some of the instruments that have been described in the report could exist external monitoring reports with recommendations for improvement. In discussing a **good practice**, the aim is to target tools that had an effect on the electoral process in that specific region or state, that ensure a high level of security and public trust, are properly regulated and in line with international standards, and are developed and operated in a transparent and inclusive manner.

The election management systems are rather diverse and operate a wide range of services in each country. Although not an EMB, the Norwegian EVA covers most of the stages of the election process and constantly adapts according to the needs of its users. The Canadian authorities developed the EC Connex based on previous feedback from election officials. The ENCORE application developed by the Election Commission of India covers the wide range of stages of the election process and provides helpful tools to political parties, candidates, and citizens (see, for example, the Voter Helpline app).

In terms of voter registration and verification, one of the most complex systems is the Romanian SIMPV, which has been used since 2016 and has proven its efficiency in significantly reducing the potential cases of multiple voting and enhancing transparency in terms of results.

Adopting online digital tools for political finance has become widespread, and many robust and efficient platforms are mentioned in the study. Estonia, Canada, Mexico, and the US have developed online platforms for extensive and user-friendly political finance disclosure. One of the aspects that makes the Lithuanian information system efficient

is its connection with different databases, which allows it to perform extensive checks. The subsidies simulator developed by the TSE is a unique tool that enables users to calculate the potential public funding.

Even though the report does not cover the electronic voting tools extensively, it highlights the e-voting pilot in Krtsanisi, which was implemented in Georgia in 2021, and some shifts in technology used in the US. The Estonian example remains the best-known electronic voting system in terms of Internet voting.

The field of tabulation and results is probably the best covered in the report. All the countries use some method to allow the rapid publication of preliminary and final results. The Romanian SIMPV and SICPV create a transparent environment for counting and publishing results. The Preliminary Electoral Results Program (PREP), developed by the Mexican National Electoral Institute, provides solid solutions for centralizing preliminary results within a short timeline. The Costa Rican radiofrequency system is interesting as it allows the tracking of election materials during the final steps of the election process.

The use of open data is a tendency in most of the states covered by the study. The NEC has developed a dedicated portal for data on elections, while the INE set up an atlas, which covers a wide range of electoral information. The gender database of the Georgian CEC is relatively rare and can be tagged as a good practice.

In its final chapter, the study underlines some of the essential steps of implementing electronic platforms or any other tool, with references to good practice examples. As security is probably one of the most pressing issues, the study highlights the activity of the Cybersecurity and Infrastructure Agency (CISA) 's activity, which provides federal support for election officials.

Institutions covered by the study

This section provides an overview of the institutional frameworks of the member states in the study:

<p>Canada</p>	<p>Elections Canada (EC) is an independent, non-partisan agency that reports directly to Parliament and is mandated to organize federal general elections, by-elections or referenda. EC utilizes technology for outward (to support voters, political entities, other stakeholders) and inward-facing services (internal operations in fulfilling its mandate). Most tools are developed internally and if products are externalized, federal policies and regulations on government procurement apply. Please note that this section refers only to the tools used by Elections Canada and not by all the EMBs that organize elections in Canada.</p>
<p>Costa Rica</p>	<p>Tribunal Supremo de Elecciones (TSE) is the central election management body in Costa Rica. The institution implemented a series of platforms and online tools that are used throughout the electoral process, but also to administer its activity. Some of the platforms work independently, while others are integrated and communicate to exchange data.</p>



Estonia	<p>The National Election Commission (NEC) oversees the electoral management and issues decisions regarding the legal framework, manages candidate registrations, receives complaints, and validates the results of elections. The State Electoral Office (SEO), which was established in 2017, is in charge with the operational preparation and implementation of elections. Among other responsibilities, it supervises and trains election officials, organizes Internet voting, and develops and manages technical solutions.</p> <p>The Political Party Funding Supervision Committee supervises the legality of obtaining and spending the finances of political parties, as well as the by election contestants.</p>
Georgia	<p>The Central Election Commission of Georgia (CEC) is an independent administrative body organizing elections for the President of Georgia, Parliament of Georgia, municipal representative body - Sakrebulo, municipal executive bodies, as well as referenda and plebiscites. The CEC is the supreme electoral body and controls election commissions at all levels and ensures uniform application of the election legislation nationwide. Party and campaign oversight is performed by the State Audit Office (SAO), which audits activities of political parties and candidates, monitors administrative violations, adopts instructions, and has the right to request information from administrative institutions and the banks.</p>
India	<p>The Election Commission of India (ECI) is the autonomous constitutional authority which is responsible for administering elections to the Lok Sabha (Parliament), Rajya Sabha (Council of States), State Legislative Assemblies in India, and the offices of the President and Vice President in the country. 27 State Election Commissions are vested with powers of superintendence, direction and control of the preparation of electoral rolls and the conduct of all elections to the Panchayats (local assemblies) and Municipalities in the State. The report covers the activity of the ECI.</p>
Lithuania	<p>The Central Election Commission (CEC) is the permanent supreme state institution that organizes elections and institutions for the parliament (Seimas), President of the Republic, municipal council, EP elections and referenda. The CEC is also in charge with oversight of political finance.</p>
Mexico	<p>The Federal Electoral Institute (IFE) created in 1990, was transformed into the National Electoral Institute (INE), this change occurred as part of the electoral reform of 2014, as an autonomous body and one of its objectives if to</p>

	<p>homologate standards for Federal and Local elections. INE has developed various IT systems to support different stages of the election process¹⁴. Systems are used for organization and administration of elections, training, oversight of political parties and election campaigns, as well as tabulation and publication of results.</p>
Norway	<p>The Norwegian Ministry of Local Government and Regional Development (KDD) is responsible for the overall organization and conduct of elections. The Directorate of Elections (NDE) is an agency of the ministry that has the operational responsibility for organizing elections (including managing EVA) and advising municipalities and county authorities, which are responsible for the practical aspects of the conduct of elections. The National Election Committee (NEC), composed of representatives of parliamentary political parties, is appointed to hear complaints related to candidate lists, the conduct of elections or election results and to allocate compensatory seats.</p> <p>Statistics Norway (SSB) has the task of receiving and arranging the reports from political parties, as well as publishing the information on its website.</p> <p>The Political Party Act Committee (PPAC) is an independent body which can control and sanction every possible breach of the financial provisions in the Political Party Act and attached regulation. It has five members appointed for 6 years. The leader has competence as a judge. The PPAC is equipped with a professional expert panel, that consists of up to four members who are certified auditors or accountants. The PPAC can impose administrative sanctions, such as formal warning, withholding of state grants (full or partly) and confiscation (full value of illegal gift).</p>
Romania	<p>Elections are organized by the Permanent Electoral Authority (AEP), which also performs oversight on political finance. During the electoral period, the AEP is part of the Central Electoral Bureau (BEC), which is the supreme decisional body. The Court of Accounts verifies the activity of political parties that receive subsidies.</p>
Republic of Korea	<p>The National Election Commission (NEC) manages presidential elections, as well as elections for the National Assembly and heads for local government and local councils, national referenda, but also other types of elections. The NEC ensures the management of entrusted elections (heads of some cooperatives), residents' referenda (important decisions at municipal level),</p>

¹⁴ See www.ine.mx/servicios-ine

	<p>recall votes (requests by residents to remove heads of local government and council members as a result of illegal or unfair activities) and can manage party (primary) elections, to nominate candidates for public elections. Technologies used for these types of elections differ.</p>
<p>United States of America</p>	<p>In the US, elections are managed by state and local government authorities, while each state can decide upon the type of technology to use. The Cybersecurity and Infrastructure Security Agency (CISA) provides advice and services to election officials and private partners to secure the electoral infrastructure. Furthermore, the Election Assistance Commission (EAC) serves as national clearinghouse and resource for provision of information and review of procedures regarding the administration of federal elections (read more about the roles of these bodies in the section dedicated to <i>Ensuring security and credibility</i>). The Federal Election Commission (FEC) is the independent regulatory agency charged with administering and enforcing the federal campaign finance legislation that has jurisdiction over the financing of campaigns for U.S. House, Senate, Presidency, and the Vice Presidency. Furthermore, the Federal Voting Assistance Program (FVAP) ensures that Service members, their eligible family members, and overseas citizens are aware of their electoral rights and have the tools and resources to exercise them, from anywhere in the world.</p>

II. [Election information systems and tools that cover several stages of the election process](#)

Electronic tools and platforms can be combined into integrated systems or used in separate instances, and they do not communicate directly. This section covers some of the integrated systems that aggregate different modules referring to the stages of the election process. Election information systems (EIS) or election management systems (EMS) can cover various phases of the process from voter and candidate registration, boundary delimitation, voting procedures, complaints, tabulation, and results. Some of their components are described in detail in the dedicated sections. This section also covers some instruments which are not critical election information systems but are used in several stages of the electoral process.

Canada

The **EC Connex** serves as the case management system (CMS) for HQ operations and, during the election cycle, enables returning officers (ROs), assistant returning officers (AROs), automation coordinators (ACs), and field liaison officers (FLOs) to manage records from creation to closure. Officials have access to the EC Knowledge Base, where staff and other employees can find content and procedures needed to resolve inquiries, complaints, and requests from field staff. The system also allows the near-time monitoring of records as they are processed. The

system includes several functions for case management and IT Support requests, Special Requests, and Candidate Nominations.

Candidate nominations can be processed and accessed through the nomination module of the EC Connex platform, which allows the detailed verification of the nominations and enables EC to generate ballots and publish the information on the EC website. If nominations are submitted by candidates electronically through the Political Entities Service Centre - PESC (*see chapter on political finance digital reporting tools*), data will be accessible in EC Connex, while if it delivered manually, election officials have to register it in the system. Returning officers must thoroughly validate candidate nominations in the system and can reject nominations.

The management system is utilized by the staff of the Elections Canada HQ, who provide support and services to field staff in five contact centres. The system has been used since 2020, replacing the former system - HelpVision - and is built on the Microsoft Dynamics 365 platform. The introduction of the platform was a response to the feedback contained within the 42nd General Election Evaluations report¹⁵, consultations with election administrators, and subject matter experts.

- Field Support Network – dedicated to the election administration - field liaison officers (FLO), returning officers (RO), assistant returning officers (ARO), additional assistant returning officers (AARO), and some office staff (SPSs, ACs, FOs, and SAs).
- Public Enquiries Unit – serves the general public, candidates, political parties, media, and election officers that do not work in an election office.
- Alternative Voting Methods/Special Voting Rules
- Operations Complaints and Incidents Unit
- Payment Inquiry Line¹⁶.

EC also maintains the Field Personnel Intranet (RODS) to support the work of field personnel both during and after an election. The platform is a hub for different tools and supports and is accessible by login from an EC device. Staff can access field communications, information about events, and their webmail through the platform. It also hosts an information centre that contains detailed information on different aspects of the electoral process. Outside elections, input on issues such as pre-election assignments, new projects, and consultations on potential modernization initiatives are noted on the platform. RODS also enables staff to access a variety of digital tools to support their work through the RO Toolkit, including but not limited to:

- Event+ – An aide-mémoire and all event-related communications tools – all communications are posted here to reduce the high number of emails.
- ECDocs – A repository where officials can find information and resources (manuals, guides, forms, checklists) to perform their duties.

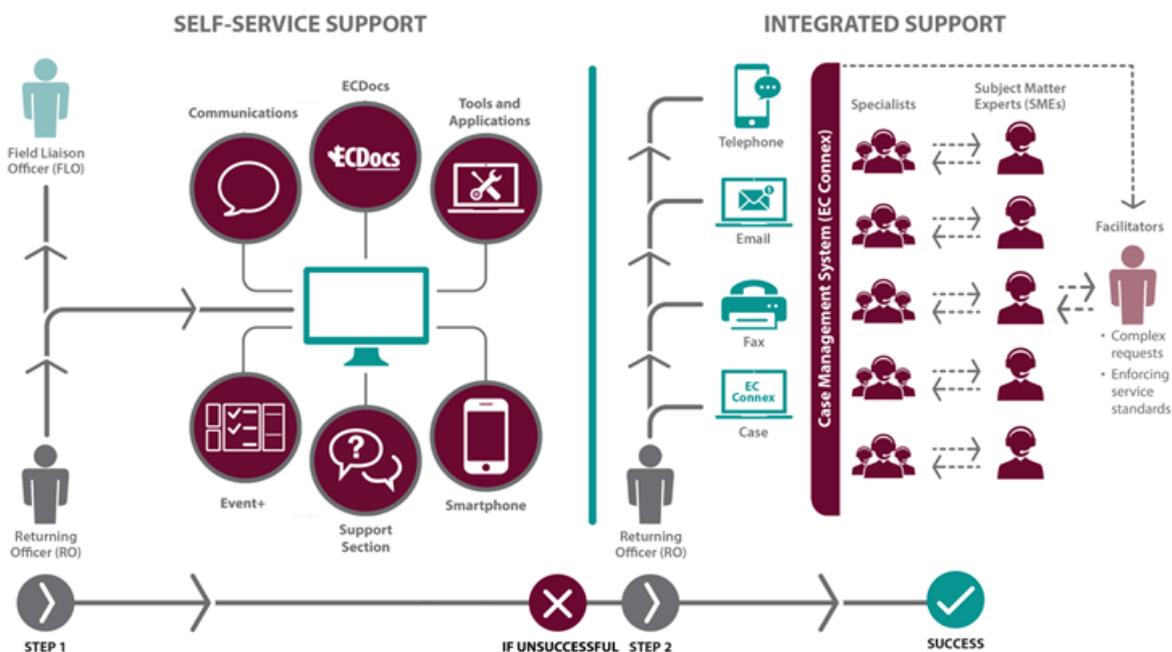
¹⁵ EC publishes [reports after all federal elections](#). The reports also include sections with conclusions from feedback drawn from the election administration involved in the process.

¹⁶ Read more [on EC website](#).

- Field Assignments Management Tool (FAMT) – Publishes mandates for field assignments, allows for tracking of approvals, payments, and working hours, advises EC when completed, and submits claims for compensation.
- GEOExplore – This allows browsing geographic data and printing polling division maps.
- Voter Feedback and Incident Monitoring System (ICBMS) – Logs and tracks accessibility feedback from voters.
- Statistics and Analytics Tool (STAT) – Web-based reporting tool used to present a wide range of event-related data.
- iSites – Management of polling sites.
- Recruitment Management System (RMS) – Helps RO offices with recruitment activities, including selecting candidates, screening, and assignments.
- Supply Management System by Intranet (SMSi) – Managing election materials and orders.
- Virtual Training Centre – Training of election administrators and online hub for learning materials.

The CEO Dashboard is an internal reporting tool used to support daily briefings on crucial indicators regarding the status of the general election to the Chief Electoral Officer (*also see Voting Operations*).

Field Support Model



Source: [Elections Canada](https://www.elections.ca)

Costa Rica

Tools used by Costa Rican authorities cover most of the stages of the electoral process and refer to voter and

candidate registration, political finance (reporting of party and campaign finance, reporting the use of propaganda materials, simulator of state contributions, and others), voting operations (including radiofrequency systems to manage the documents), tabulation and publication of results (transmission of voting results, digitalization of protocols, visualization for the TSE and the general public). According to the TSE, the development of some tools has been part of the Institutional Strategic Plan 2019-2024, referring to the organization and arbitration of elections, strengthening the civil registration service, and increasing the democratic culture. Some integrated tools are presented below, while others are detailed in their relevant section throughout the report.

The **Electoral Information System** (*Sistema de Información Electoral - SIE*) is a system used chiefly for elections that provides services in several areas of interest and is composed of several modules:

- Accreditation of Representatives of Political Parties (*fiscales*) and National Observers – a public list of accredited *fiscales* is published on the website for each political party¹⁷ participating in elections
- Expenses Settlement – *see chapter 6*
- Platform for Services¹⁸
- Request for Transfer Electoral for Voting Abroad- *see chapter 3*

The system has internal (such as the user administration) and external modules, where beneficiaries can access various services mentioned above. Political parties that want to access services have to fill in a form at the TSE and lodge it to the Electoral Register department to receive the credential for login; users are created in the internal user administration module. The cross-sectional module allows the Electoral Programs Department to manage the configuration, permissions, and users of the SIE modules.

The SINCE system provides support to develop the National Electoral Register (*Proceso de Cierre de Padrón Electoral*) and includes information regarding citizens' data to other systems - *See more about this tool in chapter 3*.

Specific systems are used to register the participants in the election process, including candidates and their representatives, observers, and media. In the chapter dedicated to voting operations, see more about the **International Observers Platform and the Information System for Journalists and Mass Media Technicians** (SIPTM).

In developing some of the tools, the TSE performed certain studies on topics such as cloud computing, feasibility study for the procurement of mobile phones and mobile phone plans for transmission of results, and market consultation. The electronic platforms' documentation and source code are not available to the public. According to the TSE, the restriction is based on security.

A series of improvements or new developments are underway. These include:

- Platform for the administration of data on researchers and specialists in the area of democracy and elections.

¹⁷ <https://www.tse.go.cr/2022/fiscales.html>

¹⁸ <https://www.tse.go.cr/2022/serviciospartidos.html>

- Automatization of the Documentation Management of the TSE General Secretariat.
- Modernization of the work of the members of the JRV (vote receiving boards) on the day of the election.
- Management and Control of activities of Political Parties on Public Sites.
- Unification of databases for the Registry of Political Parties.
- Financing of political parties - Liquidation of expenses of the Political Parties.
- Management of Electoral Queries and Complaints.
- Social network data visualization and analysis tool for political-communicational discussion and decision-making.

Estonia

Estonian authorities developed the *Valimiste infosüsteem* – **VIS**, a web-based election information system with modules for registering candidates, managing voting operations, determining results and turnout, and sharing relevant information to the public. The system is used for elections and referenda. VIS is also used for the counting of ballots and the publication of results on the official webpage.

The State Electoral Office (SEO) is the contracting authority for the development and the system's primary user. The Information System Authority (RIA) ensures development and organizes its administration and hosting.¹⁹ Vendors make developments through procurement. The system is also audited in terms of procedures by the Ministry of Economic Affairs and Communications. Estimative costs of developing the system were two million EUR, and the operation costs are approximately up to one million EUR per election.

The system has the purpose of mediating between commissions, processing data on candidatures, voting, and election results, enabling electronic submission of data, and preparing data for publication²⁰. During electoral periods, the system can be used by up to 5000 electoral institutional stakeholders and candidates that can number up to 15,000 in local council elections²¹. The preparation for the information system usually starts three months before the elections; however, the system may be used a few weeks after the elections. The system is pre-tested, and members of the election commissions can participate in such tests.

VIS includes contestants' details, constituencies' data, electoral commissions, turnout, and voting results (including advance and Internet voting). The information in the system is mainly populated by election commissions and foreign diplomatic missions organizing elections. However, it is also interlinked with other databases, such as the population register and the commercial register, which include data concerning members of political parties. VIS is also used for tabulation, while the protocols with the voting results are completed and signed in VIS.

The system has been developed since 1999 and is constantly updated. A series of legislative amendments were put into practice in 2021, including the introduction of electronic voter lists, changes in voting periods, and the possibility to submit candidature documents electronically. An updated version of the system, VIS3, was developed

¹⁹ In 2018, the NEC [underlined](#) that the RIA should play a central role in the development of the online platform.

²⁰ See [law on Statutes of the Election Information System](#)

²¹ Read more about the [development and management of the election information system](#)

in 2018 by the RIA (the institution that also manages the cybersecurity component during elections). Some of the changes accommodate legal amendments introducing electronic voter lists and the possibility to vote through the Internet on election day²².

Members of election commissions, other delegated stakeholders, members of the National Electoral Committee (NEC), or persons who organize voting in diplomatic missions can log in with a certificate enabling digital identification (ID card or mobile ID). The activity of the users is logged.

The Mobile ID allows using a phone as a secure digital ID to access electronic services or sign documents. The electronic ID card is used by all Estonians and enables the user to access various digital services, including Internet voting, medical records, tax claims, and other services. The chip carries embedded files and uses a 384-bit ECC public key encryption²³. A unique mobile card can be requested from a mobile phone operator.

Data from the VIS can be provided with the consent of the chief processor to subjects of data processing, as compliance to access to public information requests or the Institute of Statistics. The law prescribes different levels of security during the voting period, during the preparation of elections, and between elections.

Procurement procedures are part of updating the electronic electoral systems used in Estonia. Feasibility studies are part of the public procurement procedures. The SEO has dedicated human resources that are part of the developing process of the systems as advisers, supervisors, and system analysts. More than half of the administrative staff is involved in developing all systems.

The RIA consulted the lower-level administration through a questionnaire while planning the system update. The SEO distributed to municipalities a questionnaire after the 2021 elections, which included questions about the electronic voter lists. SEO provides online training for every city, and a manual is also available.

Georgia

In 2011, the Election Administration of Georgia (EA), within the framework of the EU and UNDP Election Support Project, created an innovative **electronic program for managing the electoral process** focusing on managing and monitoring election operations. For the successful development of this direction, the CEC received the "International Election Award." The Election Administration of Georgia won the election management nomination at the award ceremony in Puerto Vallarta, Mexico.

The system supports the work of the election administration to carry out its activities effectively, to plan and implement election processes, exchange information, and coordinate with all levels of the election administration, to effectively manage human resources, including timely voter turnout, data transfer, timely publication of election results. In 2012, the program was first used for the Georgian Parliamentary Elections. Since then, several works have been done to refine and improve the program.

²² RIA, "[Cyber Security in Estonia 2021](#)" report, p 26.

²³ Read [more about e-ID](#)

The electronic election management system includes various types of election information, namely: information about registered voters, election districts and polling stations, candidates, party lists, election officials, local and international observers, representatives of the press and mass media outlets, complaints, summary protocols, voter turnout, members of district and precinct election commissions, persons participating in educational programs, gender statistics, legal acts of the District Election Commission.

The information from the system is made available to the public through various websites. The portal is available to the staff of the CEC and other parties involved in the election process. Some of the public websites are described in different chapters of the study.

To improve the management of the election process and to meet the current needs, an electronic platform was created by the structural units of the CEC.

India

The ECI has developed an ecosystem consisting of 20 web and smartphone applications and covers all the process stages, from registration to publication of results²⁴. According to the ECI, the development of new apps – and especially the ones for mobile phones – had played an important role in elections and provided better personalization, facilitated the transmission of information, and included in the electoral process mobile instruments such as cameras, contact list access, Geographic Navigation System, phone calls, accelerometer, compass and the ability to work offline, which brought extra accessibility and user-friendly apps for citizens and election officials. The development of tools increased the interoperability and data sharing between departments, as well as transparency. The integration of the software facilitates the upgrade or development of new tools that users or the general public expect. Furthermore, some of the applications replace fragmented applications, which had a lower efficiency.

The business rules and processes being followed by the State Election Commissions for maintaining the electoral roll and conduct of the election are different from that of ECE, and therefore the replication of IT applications/tools used by the ECI is not possible without these applications being customized or redeveloped to meet the requirement of different SECs.

While a range of tools is used for different stages of the election process, the **Enabling Communications on Real-time Environment (ENCORE)** plays a central role of candidate and elections management system, allowing Returning Officers (RO) to process candidate nomination, affidavit, Voter turnout, counting, results and data management. Several components are part of the ENCORE system:

- Candidate Nomination Application - provides candidates with the possibility to file their candidatures online, digitize the affidavit and deposit the requested security by online payment – *see more details about the application in chapter 4.*
- Scrutiny Application – used by returning officers to scrutiny the nominations filed by candidates – *see more*

²⁴ A comprehensive list of applications, with their descriptions can be consulted in [“The Compendium of ICT Applications for the Conduct of Elections”](#), published by ECI, 2020. Also consult the dedicated section on the [ECI website](#).

details about the application in chapter 4.

- Nodal App – facilitates the approval by Nodal Officers of requests to organize events, rallies, shows, and other activities submitted by political parties and candidates. The application replaces the previous decentralized system and permits institutions such as the fire, education, police, environment, or CPWD department to issue NO objections to requests by providing certificates. Submissions can be made through the online portal <https://suvridha.eci.gov.in/>. The app is accessible by one-time password and phone number. The app was released in 2019.
- Index Card – is an application that processes the final statistical report of the election. Data is reconciled with the printed records, validated, and verified by Ros and the Chief Electoral Officer of the State, and afterward, it is published on the website – *see more details about the application in chapter 7.*
- Counting – assists election officials in counting votes, monitoring the process from end to end, and declaring results by Ros.

The ENCORE Admin app is used by decision-makers (ECI officials, CEO, DEO, and RO) to manage and observe personnel's deployment, track deficiencies, and monitor the election turnout. The app illustrates real-time events, incidents, and cVIGIL cases while notifying the responsible officers for each event through notifications.

Most web applications are developed in PHP-Laravel framework (LAMP) (the Web/API component), with SSL security protocols and AES-256 encryption. Also, they allow different types of notifications, including pushers, SMS, and e-mail. For Android applications, the Core-Java programming language and the Android Studio system software were used.

Lithuania

The Lithuanian Central Election Commission manages the electoral process through the web-based Information System (VRK IS). The system is owned and managed by the CEC, but it is operated on private servers and developed by private companies²⁵. Data is provided by several institutions, including the State Enterprise Center of Registers (Population Register, Addresses Register, Legal Entities Register), Tax Inspectorate, and other bodies handling social registers.

The system is composed of several subsystems:

- Voter List Management – ensures voter lists management and on election day voter verification, electronic data exchange among polling stations, and providing the possibility for voters to vote at any polling station of the same constituency.
- Election Organization – hosts registers (elections, parties, members of commissions, observers, representatives, candidates, account of working time and salaries of members of lower-level commissions) and seat allocation for members of parliament, municipal councils, and European Parliament.

²⁵ ODIHR [2020 report](#), Parliamentary Elections, 11 October 2020, p. 9

- Election Day Data Transmission (Election Wizard) –identifying arithmetical errors in counting and submitting results from manual counting in PECs directly to the CEC website.
- Political parties and political campaign financing control – political campaign, political party financing, and monitoring information management processes.
- Electronic public services subsystem (Voter Page).
- Data publication – data on elections, progress, and results.
- Administration module – management of user rights, parameters of subsystems, jobs generation (create voters list, generate candidate data for publishing and others), administration of the electronic journal of an election.
- Training and certification for voters, observers, and election commissions.
- Complaints and notifications – manages submission and administration of complaints at all levels of commissions.

The CEC manages several internal and external websites and platforms: www.vrk.lt (CEC public website), www.rezultatai.vrk.lt (results webpage), www.rinkejopuslapis.lt (voter page. - public website with login section that provides a broad range of services for citizens and political parties), org.rinkejopuslapis.lt (an internal website providing electronic services).

The Voter Page portal²⁶ provides a series of services, including:

- Identifying and changing the allocated polling station
- Apply for voting at home and register to vote abroad
- Collect signatures for candidates and political parties, as well as for referenda
- Electronic journal of events
- History of participation in elections
- Reminders and schedule of events
- Election data, including results, candidates, political finance, and others
- Map of boundaries of election districts
- E-services: submission of e-documents and receipts, signatures collected for a nominated candidate.

During election day, all polling stations are required to use computers and printers to use the VRK IS. The connection to the system is Internet-based. However, some of the modules are accessible in offline mode.

²⁶ See a description of the portal [on the CEC website](#) (Lithuanian only).

External vendors developed the platforms. The CEC uses public procurement provisions regulated by the Law on Public Procurement. The Law on Management of State Information Resources sets requirements for updating information systems. CEC issued decisions to control the development and functions of the IS.

The system's functioning is ensured by the Information Technology Unit of CEC during the organization and conduct of elections, while different units in the CEC are responsible for managing data in their subsystems. Units participate in the analysis and testing phases of the development of their subsystems and can contribute with recommendations to improve their functioning.

The National Cyber Security Center maintains cyber security management, and its safeguards include "monitoring for malicious activities, security clearance of personnel [...], contingency planning, separation of access and duties, and logging all activities, which provides for accountability. Safeguards against system failure include a business continuity plan (prepared by CEC and tested by the vendor), backup and archiving, both in line with the national regulations and international standards." ²⁷ The NSCS also monitors the websites of political parties. The physical security of the system in CEC and the external provider is ensured through an alarm system, access control system, security blinds, and video camera surveillance.

External contractors perform security compliance assessments and cyber security testing every year. The state information system technical specifications, regulations, and safety regulations are public, while the source code is unavailable. CEC provides public documentation regarding procurement. Before the 2020 parliamentary elections, a test was organized for the county and precinct election commission, and no cyber-attacks were recorded.

Norway

Norway has established the *Elektronisk Valgadministrasjonssystem* - **the EVA election administration system**²⁸. The system is used by counties, municipalities, the Sami parliament, and the National Electoral Committee to administrate elections and is managed by the Norwegian Directorate of Elections (NDE). The development was started in 2010 by the Ministry of Local Government and Regional Development (KRD) and was fully used by 2013. Today, EVA is used by all municipalities when preparing for the election, during the voting period, and for transmitting results.

The NDE uses the system to assist municipalities and county-level authorities in organizing elections. Its use is free of charge, but the municipalities have to cover costs related to hardware, scanners, licenses, and human resources. Beneficiaries have been consulted in its development and are currently involved in adapting it to electoral needs.

²⁷ ODIHR [2020 report](#), Parliamentary Elections, 11 October 2020, p. 12

²⁸ Read more about EVA on the [website of the NDE](#). A thorough description of the system can be found in the Official Norwegian Report (NOU) 2020: 6, "[Free and secret elections — New Election Act](#)", p. 289

The evaluation of the 2021 parliamentary elections found that the municipalities and counties are very satisfied with EVA²⁹. The system is not mandatory according to the legislation but is widely used. An official report³⁰ with proposals for a new election act published in 2020 recommends that such a system be regulated to make it mandatory and provide for more security and predictability. In its 2017 observation report for the parliamentary elections, ODIHR noted that "[...] its many functionalities, ease of use and availability to municipalities at no cost have led to its universal adoption. Election officials at all levels were highly complementary of the system, emphasizing that it helped to organize their work, to meet deadlines, and to correctly and consistently follow Procedures."³¹

EVA covers several parts of the electoral process, starting with the registration of list proposals, electronic marking of the voter lists, ballot scanning, and ending with election results processing. However, EVA is not only a case management or filing system. The system comprises three components: EVA Admin, EVA Scanning, and EVA Results.

- The Admin module is a web-based application that includes the registered voters and is used to register cast ballots. The parties' list proposals are registered in the system and approved or rejected by the electoral committee.
- EVA Scanning is utilized by authorities that want to use the scanning module, based on their assessment, to scan ballots. Around half of the authorities use the tool installed on local machines. Authorities can buy equipment and services for installation and assistance from a list of qualified providers approved by the NDE.
- The results module allows municipalities and counties to report results published on the official website www.valgresultat.no.

The NDE provides access to the system to two persons in each municipality, county authority, and the Sami parliament. The municipalities, counties, and Sami parliament are responsible for giving further access to their key personnel necessary for the electoral process, while access is restricted according to attributions. Access is also provided to the Ministry of Local Government and Regional Development³², which acts as the secretariat for the National Electoral Committee. The NDE has access to the system and the information that the users have introduced.

Most data are made public, except for the electoral register and the election results before the closing of polls on election day. Municipalities produce a paper copy of the electoral register for public scrutiny, which remains available for the public in specific locations (such as town halls or public libraries) until election day.

²⁹ See the [“The 2021 election conduct survey and evaluation of the Norwegian Electoral Directorate's services in the 2021 election”](#), available in Norwegian

³⁰ NOU 2020, p 295

³¹ ODIHR [Election Expert Team Report](#), Parliamentary Elections, 11 September 2017

³² According to [the Norwegian legal and institutional framework](#), the ministry plays the overall responsibility to organize elections and for the electoral system and electoral rules, while the NDE ensures the operational coordination at state level. Municipal electoral committees and county electoral committees are responsible to organize elections in their specific constituencies.

The Norwegian National Security Authority performs security and penetration tests. The NDE has implemented several security measures, including monitoring and registration of traffic, monitoring of logged actions, control of persons that have access and revocation of credentials, and pass by ID portal with secured credentials (BankID, BuyPass, and others). Moreover, essential information contained in the system can be verified from other sources, as used ballots are kept and archived by county authorities. Furthermore, according to Norwegian authorities, several layers of testing are in place: "legality testing, automated functional testing, integration testing, performance testing, and vulnerability[...] testing."³³

The system documentation and its source code are public and available online³⁴, while the databases are not public. The documentation does not include all the details, but it reflects the concept, while the more detailed information about the electoral process is available in the official election portal. The source code reflects instructions on how the application performs its tasks. Similar documentation is provided for EVA Admins, Eva Scanning, and EVA Results. The public versions are from 2019 and will not continue to be updated.

Also, the process is open to observation by accredited observers in all stages, including voting, counting, results verification, and the calculation by the NEC of the seats in the parliament. The meeting of the NEC and their documents are open, while the technical solution is not available to the public.

The NDE provides online and offline training, and e-learning courses' implementation is explored. The Norwegian authorities provide comprehensive explanations in Norwegian and English about the tools mentioned above used in the process and how they are operated. The NDE trains the key personnel in the municipalities and counties. The municipalities and counties are responsible for teaching their personnel, i.e., election employees, during voting and counting the ballots. The NDE offers some training material that the municipalities and counties can use in their local trainings.

Romania

The **Information System for Monitoring Turnout and Preventing Illegal Voting (SIMPV)** is a comprehensive system that allows the verification of voters, prevention of multiple voting, real-time display of turnout, verification of protocols, and tabulation. The system has the following functions:

- Facilitates the verification of fulfillment of conditions needed to vote.
- Marks cases in which identification data of voters have already been registered in the system (potential multiple voting).
- Marks cases of persons who do not have the right to vote or are under restrictions.
- Marks cases in which voters cast ballots by post.
- Marks situations in which the identification documents are expired.
- Highlights the position of the voter in the voter lists.
- Ensures the capture of electronic signatures for voters abroad.

³³ [EVA – the electronic election administration system](#)

³⁴ See [online code and documentation](#)

- Generates supplementary electronic voters lists for polling stations organized abroad.
- Transmits messages to the election administration and other institutions.
- It is used to record the vote counting operations.
- It is used to verify if the correlations in the protocols are correct, generate protocols in electronic format, allow electronic signature based on digital certificates provided by the Special Telecommunication Service, and transmits the data at the central level.
- Is used to photograph the paper protocols and upload them to the central system.

The SIMPV was implemented for the first time in 2016. However, the Permanent Electoral Authority (AEP) successfully tested a software application in partial parliamentary elections in 2010 and 2011 with computers. In 2010, a pilot program³⁵ was implemented to verify voters' identity and protocols and swiftly centralize results. The program was Internet-based, with the possibility to verify data by SMS. A call center was available for verification of atypical situations. After voting ended, the system allowed data input from protocols in a form that verified the control keys and transmitted data to the Central Electoral Bureau³⁶. Hourly turnout was reported, and gender aggregated data was collected.

- The SIMPV is composed of several components:
- the Central informatic system – servers for databases and computer apps, communication equipment, cyber security protection equipment. The system is hosted by the Special Telecommunication Service (STS)³⁷ and can be accessed by representatives of the AEP, other nominated persons, and members of the Central Electoral Bureau.
- Computer application for verifying the right to vote (ADV) – computer program developed by STS, as requested by the AEP.
- the technical support center – call center for computer operators, technical dispatches, and STS intervention centers. STS provides technical support, the AEP for electoral operations, and the Statistics Institute for the protocols.
- the communication infrastructure – equipment used to ensure access of tablets to the central system.
- the informatic terminals, provided by STS (tablets), in polling stations and for special polling stations dedicated to postal voting and phones distributed to chairs of election commissions. Phones allow chairs of polling stations to communicate with the upper-level election commissions or the call center and access the service providing additional unstructured data – USSD.

The system is developed by the STS, as requested by the AEP. The STS performs several tasks, including updating the ADV, installing tablets, and creating (with the AEP) the technical and testing plan. The AEP develops

³⁵ "Pilot project on the computerization of polling stations". See AEP 2010 and 2011 annual reports, <https://roaep.ro/legislatie/wp-content/uploads/2019/01/Raport-AEP-2011.doc>, <https://roaep.ro/legislatie/wp-content/uploads/2019/01/Raport-AEP-2010.doc>

³⁶ The Central Electoral Bureau is set-up for each election and dissolved after final results are published. The Permanent Electoral Authority is part of the BEC together with representatives of political parties and magistrates

³⁷ The STS is the central specialized body which organizes, leads, conducts, controls and coordinates the activities in the field of special telecommunications for the public authorities in Romania and for other users provided by the legislation.

procedures aiming at securing the use of the SIMPV, securing the apps and databases to prevent illegal access, ensuring data usage logs, securing communications, and protecting personal data.

The AEP, with the support of the STS, organizes training sessions for computer operators and specialized personnel that handles the tablet (which are not part of the election commission, except for polling stations abroad); the AEP selects them by filling in written applications. Computer operators are responsible for using the tablet and participating in testing sessions. Access to the system is ensured by authentication data provided by the STS (name and password), transmitted in sealed envelopes.

The use of SIMPV is regulated by primary legislation and decisions of the AEP and BEC. The regulations describe the operating principles and step-by-step procedures, access to the system and data, selection, and allocation of operators.

Verification of voting rights and prevention of potential multiple voting had a visible deterrence effect. The use of SIMPV has brought significant transparency to the voting and counting process. The tablets are also used to record the counting procedures and can be used by law enforcement in their investigations if suspicions regarding the fairness of the process occur.

Some politicians, following electoral losses, contested the use of SIMPV, and certain media outlets inaccurately reported about the role and the utilities provided by the SIMPV. In this sense, statements were made that the system is used to count the ballots or to establish the votes. A parliamentary commission was also set up in the parliament to investigate the use of the SIMPV, and hearings were organized. The report concluded that the system did not affect the results, and the main issue mainly was related to the insufficient training of the electoral staff.

III. Voter registration, electronic registers and voter verification

Members states use various solutions to secure voters' active and passive registration and verify their participation in the election process. Most states use passive registration, as the information is automatically drawn from various population registers. However, solutions that allow voters to register for out-of-constituency voting or alternative voting methods such as early voting, postal voting (out of country and in-country), and voting with the special ballot box are used. Romania facilitates the online registration for postal voting used for out-of-country voters in parliamentary and presidential elections, Lithuania allows voters to register for out-of constituency or homebound voting, and Hungary allows voters to register online for out-of constituency (including out of the country) or homebound voting.

Also, most states allow voters to verify their allocated polling station online. Some states show details such as the limits of the polling districts (Lithuania), while others display pictures of the buildings (Estonia). In some states, smartphone applications have been developed to support voters to register, search their polling stations, verify their registration status, or view results.

Canada

Elections Canada uses various tools to support online voter registration, registration for special ballots, and maintaining voters' lists. The **National Register of Electors**³⁸ is the permanent database of registered persons aged 18 or older qualified to vote in federal elections and referenda. The Register was created in 1997 and is updated by federal, provincial, and territorial administrative and electoral data sources. The Register produces voter lists, which election workers use during voting. Registered Canadians receive a voter information card, which provides information about the voting procedures. Furthermore, registered voters can opt out of the Register.

The **Online Voter Registration Service** enables electors to register to vote and update their information. Registration can be done based on uploading required ID documents. Electors living abroad can register to be included in the International Register of Electors. A Special Ballot Online Application is available for voters in Canada and abroad to apply for special ballots. Voters living in Canada can use it during an election, and voters abroad can apply at any time to be added to the International Register of Electors. Every voter on the International Register of Electors is automatically sent a special ballot kit by mail during an election³⁹.

Elections Canada uses the **REVISE** web-based application to maintain the voters' lists and administer voting by special ballot. At the beginning of an electoral event, the data about voters held by Elections Canada is transferred to REVISE. The Preliminary List of Electors (PLE) is constantly updated during the revision period to finalize the Official List of Electors (OLE), used for voting operations. The application also holds the geographical data that relates electors' home addresses to polling divisions and places.

Transparency and privacy are regulated by the Privacy Act and the Canada Elections Act. The latter established how voter lists could be shared and used. Furthermore, the Guidelines on Use of the Lists of Electors⁴⁰ explain what information can be shared with members of the Parliament, political parties, and candidates, when and how they are authorized to use it, and what safeguards should be in place. The policies and directives of the Treasury Board of Canada Secretariat (TBS) are also applied.

Costa Rica

The General Directorate of the Civil Registry within the TSE manages the Electoral Register and prepares the voter lists. Provisional lists are ready six months before the elections and publicly displayed, while voter lists are printed one month before the elections.

When applying for an identification card, the register includes a person's photograph and a fingerprint scan. The legislation states that the identity of the voters is verified during the election day against the paper voter lists provided for polling stations by presenting the identity card. The voter lists contain the names of the voters, photographs, and the numbers of the polling stations to which they are assigned. Even though the Electoral Code

³⁸ Read more about [the National Register of Electors](#)

³⁹ Read more [about voting registration](#) and [applying to vote by mail](#)

⁴⁰ See the [Guidelines for Use of the Lists of Electors](#)

permits electronic voting if the TSE determines they are reliable and secure, a printed list is still required to audit the electronic voting.

The **SINCE** system supports developing the National Electoral Register (*Proceso de Cierre de Padrón Electoral*). The system also provides information to other platforms, such as the one used to assign polling stations (*Asignación Centros 1020* – developed using Java 1.8), and allows voters to find their allocated polling station and consult their registration status based on their ID. The system is also used to review and validate the changes which are made as a result of the registration of data from citizens (for example, changes of address) and to ensure the control of resolutions – decisions - coming from the Electoral Comptroller's Office, which makes up the monthly verifications and closings for the elaboration of the National Electoral Register. The monthly verifications regarding the changes in the data on citizens are done automatically. However, certain decisions need to be taken due to field verifications.

Out-of-country voters can register to vote through a web-based form⁴¹. The registration comprises a photo of the voter, signature, and the verification of the fingerprints. The registration system is part of the *Sistema de Información Electoral (SIE)* – see chapter 2 of the report. The system allows Costa Rican citizens to carry out the electoral transfer process electronically and to indicate their address outside the country to be registered in the specified location to cast their vote abroad.

A voter that would like to register needs to follow these conditions:

- To have a valid ID.
- To access the TSE website, the section Electoral transfer to vote abroad.
- The voter needs to read instructions and fill in a series of required data such as identification number, place of residence, or ID expiration date. The user has to insert the number of the ID.
- Upload three digital photos with a white background: one of the faces (without objects that prevent their correct identification), another of the signature, and the last one must show the fingerprints of the index fingers. The fingerprint mark can be obtained by using an ink pad, a marker, a pen, or other similar instruments that can help the user mark the fingerprints on paper that will later be photographed.

Voters can check their registration status on the TSE website. The facility allows consulting the voting place of citizens, as well as its location on a map. Additionally, it displays information about the candidates registered in the constituency. For the 2022 parliamentary elections, voters can find their registration data by scanning a QR code situated on the provisional lists of voters located at the offices of the Fuerza Pública (see chapter IV).

Political parties have a platform (*Consulta Padrón Partidos Políticos*) (developed in Visual Basic 6.0) that allows them to request access to the Electoral Register.

⁴¹ See [Solicitud de Traslado Electoral para Voto en el Extranjero](#), which is part of the Electoral Information System (SIE). Watch [a video explanation](#) of the registration process.

Estonia

Voter registration is passive, based on the population register. The **e-population register** (www.rahvastikuregister.ee) is managed by the Ministry of Interior (the data controller) and the IT and Development Centre within the Mol (data processor) and is the common self-service portal for population register services.

A voter must have the address registered; if they do not have a residential address, they can apply in writing or electronically. Estonia introduced electronic voter lists starting in 2021 (see VIS)⁴². Their introduction is viewed by the election administration as a positive aspect, as it changed the workload in polling stations and is convenient for voters who have more possibilities to choose between the polling stations. Electronic voter lists include names, personal identification codes, addresses, constituency, and information regarding the issue of ballots. Voter lists are not public.

Registered voters receive election information sheets that can be electronic or paper-based. The sheet provides information about conditions to vote and electoral rights and is not mandatory to participate in elections. For parliamentary elections, the sheet is sent electronically to voters with an e-mail address registered in the data portal of Estonia (eesti.ee) or entered in the population register. Voters can also check their residential data on www.eesti.ee portal. Citizens can log in to the portal with an ID card, Mobile ID, Smart Card, or EU eID. A helpdesk is available for citizens to verify if they are registered.

During the voting period, polling stations are equipped with computers provided by the SEO. Voters are verified in VIS according to their identification numbers. Their electoral rights are confirmed in the electronic voter lists, and a signature is provided on a dedicated list upon receipt of the ballot paper; the system is also used for the advanced voting period. In the advance voting period, the VIS allows election commissions to print envelopes with the identification data of the voter.

In case of system failure, the ballots are introduced in envelopes, marked with the name and identification number registered in the system as soon as possible. VIS is also used to record requests for homebound voting; voters can request to be registered by phone, while municipal election commissions enter data into the system.

Georgia

The CEC is responsible for creating and processing the unified list of voters. According to Article 31 of the Organic Law of Georgia “Election Code of Georgia,” the unified voter list is updated during the non-election period four times a year based on information provided by the relevant agencies and during the election period at the request of the CEC.

Parties registered for elections, voter initiative groups, and observer organizations have the right to view the public version of the unified voter list in electronic format. The voter can check the data about themselves and the persons registered at their address through the website: <https://voters.cec.gov.ge>. The portal displays their data,

⁴² See [manual for the election commissions](#), p. 30

registration address, polling station (where they can vote on the voting day), and geographical coordinates.

India

India's electorate comprises some 910 million voters, the largest number of voters in the world, as much as the combined electorates of 36 other democracies⁴³.

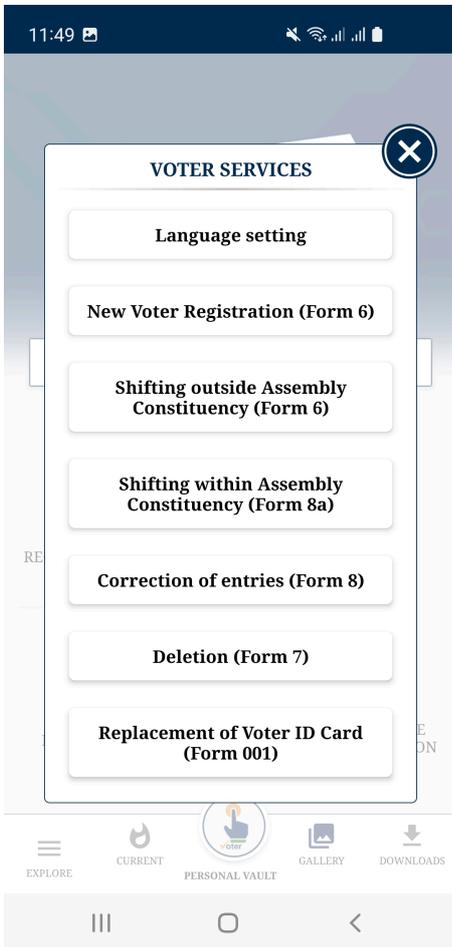
Registering new voters, keeping registries updated, and constantly performing operations is a challenging task. The ECI has several applications in place that performs these tasks during the electoral process.

Voters have several options, including registration and interrogation of data by web portal, application, SMS or toll-free number. The latter is universal across India and available in 22 languages. Operators can register complaints; all state and district offices are connected to the National Grievance Services Portal, which is a centralized portal that gathers complaints from a high range of subjects and allows relevant authorities to respond⁴⁴.

The **Voter Portal** - <https://voterportal.eci.gov.in/> - allows users to search their name in the electoral registry based on the Electors Photo Identification Card (EPIC) number or other personal details and facilitates the registration of new voters, perform corrections, and migrate data inside or outside the constituency. Voters can submit forms and upload documents through the corresponding application and there is no requirement to provide printed documents. The portal displays the status of the application; online login is based on user account which can be created on the website.

⁴³ The Hindu, [World within a country: The size of India's electorate in four charts](#), 2019. See [ECI statistics for 2019](#)

⁴⁴ ECI, [National Grievance Services Portal](#)



Voter Helpline App - registration options

Additionally, the **Voter Helpline Mobile App** (Android and iOS) provides a range of services for citizens' registration, including verifying their name, polling station, details of the voting card or the election schedule. If the voter already has a card, the application can scan the barcode directly to access the information. A voter can submit forms for registration, migration of data or correcting the information. The documents are transmitted to the relevant Electoral Registration Officer for decision.

A rather rare option provided by the EMBs to voters is easy to use registration for persons with disabilities. The ECI developed the **PWD App** (iOS and Android)⁴⁵ to respond to the need of ensuring a wider participation for voters with visual, hearing impairments or other disabilities. Users can search their names and voter IDs and have the possibility to mark themselves by describing the impairment. Among other requests, voters can request for wheelchairs during the voting process. Users can also register by calling 1950 or using the app to receive a Voter ID card at their address. The application allows for the audio reproduction of lists of candidates in the ballot sequence.

Another dedicated system allows personnel of the Armed Forces of the Union, Armed Police Force of a State serving outside that state, other relevant personnel, or diplomatic personnel to register. The **Online Service Voter Registration Portal**⁴⁶. Before introducing the system, the registration was manual and burdensome. The voter has to identify the relevant constituency. The voter can fill in a form online or download it from the website and delivers it signed to the Record Office or nodal

officer. Through the online system, the District Election Officer assigns the Assembly Constituency to the Service Voter, then the form is processed by the Electoral Registration Officer. Their names are registered in the last part of the electoral roll. The data of service voter is maintained by ECI and the request for registration is submitted by the Record Officer. Alternatively, a voter can register as general elector at the place of posting if it's a peace posting and has to request the removal as service voter.

The processing of voter registration and management is done through the **Centralized Software for Electoral Roll Management and Form Processing (ERONET)**⁴⁷, which connects all 29 states and standardizes the forms processing, the database scheme and template for voter lists printing. ERONET is used to process requests, update the Electoral Register, allocate polling stations according to family information, migrate voters from one constituency to another based on EPIC numbers and process offline requests.

⁴⁵ ECI, [PWD App](#)

⁴⁶ ECI, [Service Voters' Portal](#)

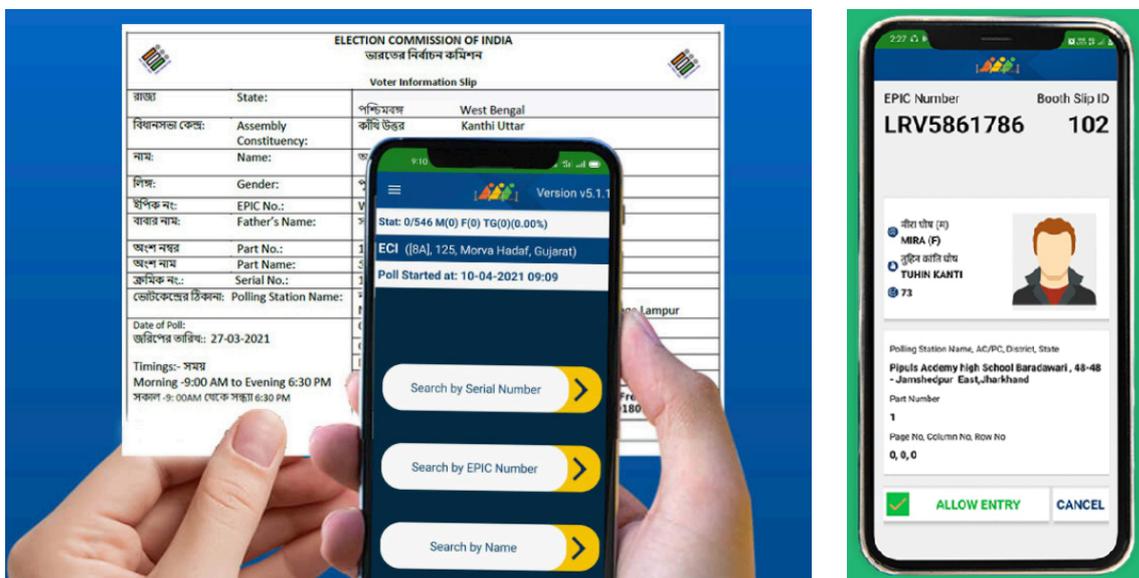
⁴⁷ ECI, [ERONET login](#). Read more about [ERONET](#).

The system is built using .Net Framework technology and was released in 2008. It is connected to the National Voters' Service Portal – www.nvsp.in, where various forms can be submitted (e.g., apply for voter card, apply for corrections) or queries performed (view details of polling booths, constituency, relevant registration officers), apart from the above-mentioned applications. ERONET can be accessed by ECI, all Chief ROs, DEOs, EROs and polling station officers. It supports 11 languages, while voter lists can also be printed in several languages.

During the election day, election officers can verify the identity of the voters through the **Booth App** application - <https://boothapp.eci.gov.in/>, which is integrated with the ENCORE system. The app is not used nation-wide and has been piloted or implemented in several constituencies. The tool allows for the faster identification of voters and can prevent multiple voting, but also generates data such as turnout. It is available with specific functionalities to Booth Level Officers (BLO), polling officials, presiding officers and sector magistrates. The app was developed with Core-Java for Android app development, while the web dashboard/API involve REST Based API using Laravel framework (LAMP).

Verifications can be done by serial number, EPIC number (Voter card number) or name. The app scans the encrypted QR codes from the Photo Voter Slips (printed or digital) at the reception of the polling station and displays the profile of the voter. The voters are marked in the system and the information is transmitted to the ECI central server encrypted (AES 256 CBC); data is displayed in real time for ROs. A potential case of multiple voting starts a loud alarm.

One very important feature, which can be quite useful when having a high number of electors showing up to vote is the queue information system, which shows voters that would like to cast a ballot if there are queues before visiting the polling station; the information is sent to the Voter Helpline. The app is also used to record the start and end of polling and incidents, which can alert responsible authorities. At the same time, data processed by the app is used for displaying real time voter turnout. It is also connected to the sector magistrates that handle the EVM / VVPAT Inventory Management and can replace machines that are not working.



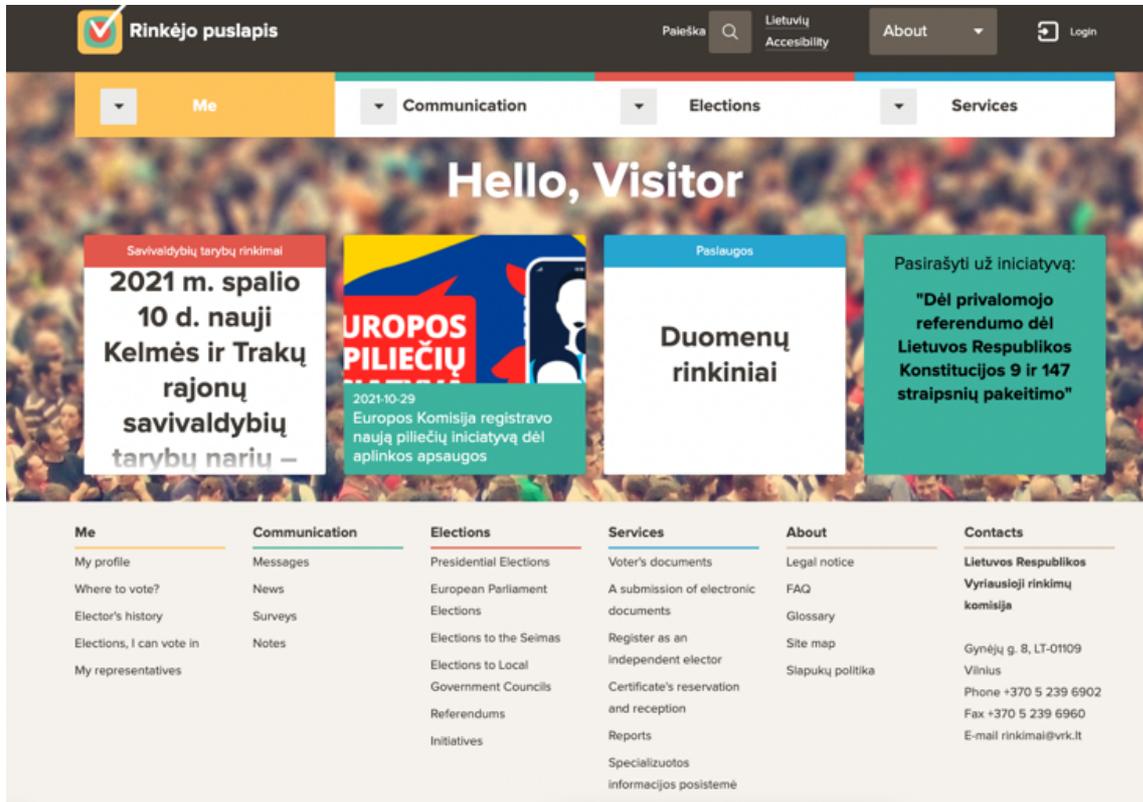
Booth App, [source](#)

The voter turnout during the election day is displayed in a different application, used since 2019, which is called **Voter Turnout App (Android and iOS)**⁴⁸. It is only for consultation by citizens and media and does not allow for use input. Data is compiled from the input of the Returning Officers/Assistant ROs in the ENCORE portal. The estimated voter turnout is published every 2 hours, while at the end of the day the detailed information is published.

Lithuania

The web portal www.rinkejopuslapis.lt allows users to obtain information about elections and operate changes related to their statute. The portal targets several types of stakeholders such as voters, candidates, and members of the electoral commissions. The platform allows voters to consult their personal data and upcoming elections, data about polling stations, voter history (elections or referendums in which the voter has voted, based on the presence in a polling station or registration of an envelope), possibility to contact elected officials or possibility to sign for a referendum. Voters can also receive news, support candidates or view election reports. The system also provides access to several services such as voter registration (i.e., for homebound voting), receive voter certificates or access data about previous elections. A public training module is also available⁴⁹. A visual walkthrough guide can be consulted on the website⁵⁰.

Voter page



Rinkėjo puslapis Palaikyk Lietuvių Accessibility About Login

Me Communication Elections Services

Hello, Visitor

Savivaldybių tarybų rinkimai
2021 m. spalio 10 d. nauji Kelmės ir Trakų rajonų savivaldybių tarybu nariu –

EUROPOS PILIEČIŲ
2021-10-29
Europos Komisija registravo naują piliečių iniciatyvą dėl aplinkos apsaugos

Paslaugos
Duomenų rinkiniai

Pasirašyti už iniciatyvą:
"Dėl privalomojo referendumo dėl Lietuvos Respublikos Konstitucijos 9 ir 147 straipsnių pakeitimo"

Me	Communication	Elections	Services	About	Contacts
My profile	Messages	Presidential Elections	Voter's documents	Legal notice	Lietuvos Respublikos Vyriausioji rinkimų komisija
Where to vote?	News	European Parliament	A submission of electronic documents	FAQ	Gynėjų g. 8, LT-01109 Vilnius
Elector's history	Surveys	Elections	Register as an independent elector	Glossary	Phone +370 5 239 6902
Elections, I can vote in	Notes	Elections to the Seimas	Certificate's reservation and reception	Site map	Fax +370 5 239 6960
My representatives		Elections to Local Government Councils	Reports	Slapukų politika	E-mail rinkimai@vrk.lt
		Referendums	Specializuotos informacijos sistėmė		
		Initiatives			

⁴⁸ See the [Voter Turnout App](#).

⁴⁹ <https://mok.rinkejopuslapis.lt/moodle/>

⁵⁰ See user manuals [here](#).

The platform allows users to receive information electronically. The login to the private part of the platform is done by the VIISP (www.epaslaugos.lt), the electronic government gateway, a portal for administrative and public electronic services. Users can login with bank ID or with electronic identification (mobile devices, identity card and scanner or USB storage or card and scanner).

The **ABRIS electronic voter identification system** is used to verify and mark voters on election day, to approve requests and to produce reports. The system allows election officials to cross the voter off the voter lists when she/he arrives at the polling station. Also, voters who have voted in advance are marked in ABRIS after polling stations are closed. A register is used for voting in advance. Voting in advance register shares information with ABRIS and Election Wizard – *see chapter on tabulation and results*.

Advance voting centers and polling stations are equipped with workstations provided by municipalities, while standards are set by CEC decision. For parliamentary elections, voters can vote in any polling station in their constituency if the electronic system works and can also vote outside the constituency, by presenting a proof of residence and filling in a request form.

For advance voting and special types of voting (homebound, in hospitals, in social facilities) a personalized certificate is printed by officials and accompanies the ballot envelope; the sheet is presented at the voter's location by the election commission. A voter is allowed to vote multiple times during advance voting and only once during the election day and only the last vote cast is taken into consideration. The data related to certificates used by voters is registered electronically by the end of the day. Some commissions use hand scanners to scan barcodes from sheets, while others introduce the information manually. Data is updated daily on advance voting statistics on the CEC website.

Norway

Norwegian authorities use the EVA system in several stages of the electoral process (*for a comprehensive description of the system see section chapter 2*). For the preparation phase of elections, authorities enter data about language variant for ballots and polling cards, constituency structure, representatives and if the municipality will use an electronic voter register.

The Central Electoral Register is based on data from the Population Register and Tax Administration and the data is transferred to municipalities through EVA. Based on the available information, polling cards are produced. Voters can verify if they are registered at municipalities, but no online platform is available.

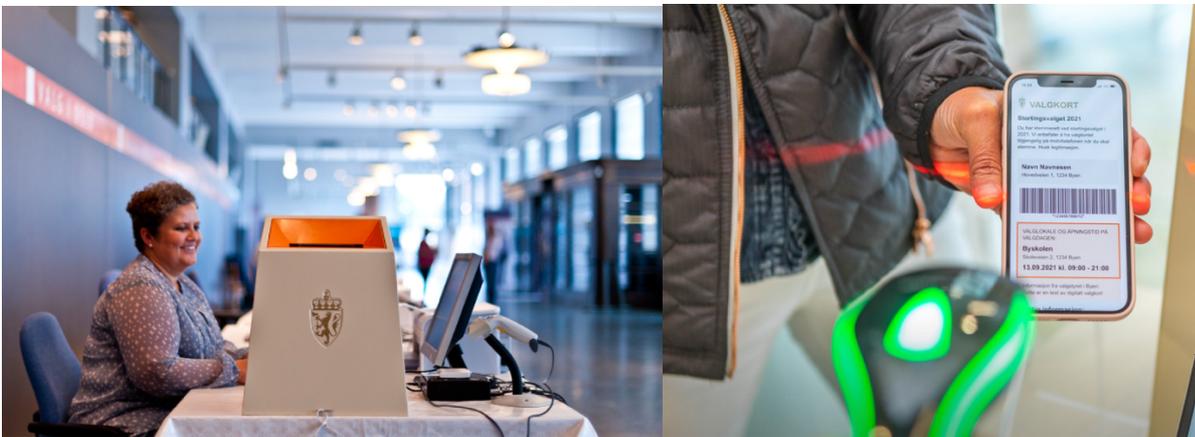
Electronic registers on election day were introduced in 2016 by a legal amendment, but tests to cross off voters electronically were also performed in 2011, 2013 and 2015. At the 2015 election, 27 municipalities participated, and the pilot scheme included about 1.7 million eligible voters. However, electronic registers were used by all municipalities during the advance voting from 2013.

Electronic registers are used by all municipalities during the advance voting period, and it is possible to vote in any municipality. On election day it is possible to vote in another polling district within the same municipality and if

paper lists are used, a certain procedure must be followed. Municipalities can search for voters in the system, for the entire country and can approve ballots cast in their municipality. Voters registered in the municipality are crossed off the register⁵¹ and introduce the ballot in the ballot box after it has been stamped by a returning officer, while voters from other municipalities get their ballot stamped by a returning officer, and then introduce it in an envelope placed with the polling card in an external envelope and expedited to the relevant municipality, where the voter is registered. The system allows the printing of polling cards. Electronic voter lists are used by most municipalities on election day; the rest of municipalities have to print the lists from EVA after the advance voting period and before the opening of the polling stations. In 2021, 38 out of 356 municipalities did not use the online register⁵².

In case of electricity or internet breakdowns or failure of the system, a procedure similar to out of constituency voting is in place, meaning that the voter places the ballot in an envelope, which is approved and placed in the ballot box when communication is restored. Previous experience shows that the alternative works, but “in the event of prolonged interruption of communication, it will be very a time-consuming procedure and could lead to queues.”⁵³

The NOU official report recommendations point out that all municipalities should consider introducing electronic electoral registers on election day, but municipalities that use them should have very good back-up plans and contingency procedures.



Voting equipment. [Source](#)

The NDE is tasked with distributing polling cards, which an informative tool for the voter, as it includes information about the right to vote and polling station. The card has a barcode (see figure above) that indicates the position in the voter list or paper voter lists which can be scanned by the electoral worker. In 2019, authorities in 18 municipalities distributed polling cards in electronic format to voters, as long as they had updated or confirmed their

⁵¹ According to [the legal framework](#), “If voters who have already been ‘crossed off’ in the electoral register show up, they are still allowed to submit a vote. However, such votes are put to one side and handled by the electoral committee in the electoral count.”

⁵² See NOU 2020, p 291.

⁵³ NOU 2020, p. 295.

contact information during the last 18 months and not expressed an option against digital communication. A paper polling card were printed if the ballots were transferred to another municipality.

The Ministry approved a new provision in the Election Regulations in 2020, which stipulated that polling cards would be sent electronically to voters registered in the electoral register, residing in Norway, with the exception of Svalbard and Jan Mayen. The provision applied from the 2021 parliamentary election. The Ministry continued the exemptions that applied for the pilot scheme and therefore some voters can still receive a paper version of the polling card⁵⁴.

Electronic polling cards are distributed through a digital mailbox ("Digipost" or "e-Boks"), while those who do not have a digital mailbox receive their polling card through an internet portal for digital dialogue between business, private individuals, and public agencies. Citizens can notify authorities through the common contact register that they want to receive decisions and other documents containing important information in paper format; under these circumstances, the card is sent in paper format.

Republic of Korea

General registration is passive. The heads of the Gu/Si/Gun (a level of the election administration) prepare the voting list for each precinct based on the resident registry and the register for domestic residence, which includes non-Korean citizens (for local elections). Active registration can be required in some cases. To cast the ballot for the National Assembly, voters must register for homebound, shipboard⁵⁵, and overseas voting. Registration can be done in writing or by post to the head of the relevant Gu/Si/Gun commission. Registration is not needed for early voting. Voters' lists include information about the name, address, gender, and date of birth of the valid voters registered as residents in the district. A computerized system automatically prepares the voter lists.

The integrated voters' list is "a single compiled voters list that combines all voting district voters lists nationwide into one computerized system."⁵⁶ The integrated voters' list marks whether voters cast their ballots during the early voting. A ballot for the relevant constituency is issued according to the results of the voter list verification. Polling stations are equipped with ID verification terminals and ballot paper printers. Therefore, a voter cannot cast a ballot multiple times, as the early voting is marked on the voter lists during the election day.

Voters can verify the voters' lists online⁵⁷ and can also check the voter lists in person at the place designated by the head of Gu/Si/Gun government. Electronic or paper copies of the general voters' lists or the homebound and overseas voter lists should be provided to political parties or candidates by request.

Romania

⁵⁴ See [Prop. 67 L \(2020–2021\). Amendments to the Election Act \(assistance when voting\)](#), pp. 21-22. A pilot was conducted in 2019, in 18 municipalities. Voters, who were registered in the electoral register of the selected municipalities and who were not registered in the Contact and Opt-out Registry, received electronic access to the polling card, through the website of the NDE.

⁵⁵ The shipboard system is done through a fax server and satellite and has been used since 2012. It is used for presidential and parliamentary elections.

⁵⁶ NEC, "[Introduction to the Electoral and Political Systems of the Republic of Korea 21st National Assembly Elections](#)", 2020

⁵⁷ <https://www.nec.go.kr/site/eng/03/10301060000002020070601.jsp>

The Electoral Register, managed by the AEP, is a tool designed to administer processes such as registering voters, allocating them to polling stations, creating voters lists, and allowing voters to verify their registration status and find the assigned polling station (www.registrulelectoral.ro). The data in the Register is fed from the population registry, managed by the Directorate for Persons Record and Databases Management, while for the citizens with registered residence abroad, the data is provided by the General Directorate for Passports. The flow of information is constant, while transfers can be even more frequent during the electoral period. The Electoral Register IT infrastructure also comprises the polling stations register, administration of electoral experts – chair and vice chair of the polling station election commission - and computer operators handling the SIMPV (see below and chapter 2).

Active registration is required only for voters with registered residence in another country that intend to vote for presidential and parliamentary elections by postal voting. Voters are removed from the permanent voter list and registered only on the particular permanent voter list for voting abroad. The website www.votstrinatate.ro is available for voters who have to input specific data to request the voting package and additional information that certifies their residence.

Printed voters lists are generated from the Electoral Register. For out-of-country voting, electronic voters' lists are used in presidential elections, and voters can sign to receive a ballot on the tablets used for SIMPV.

During the election day, the **Information System for Monitoring Turnout and Preventing Illegal Voting (SIMPV)** (*read more details in chapter 2*) is used to verify voters and publish statistical information. The system draws its data from the centralized Electoral Register, the permanent, special, and complementary lists used in elections, the Register of polling stations, and the Register of voters that opted to deliver postal voting ballots to the dedicated polling stations and the lists of persons that are under restrictions. The data is used during the voting procedures to process and verify voters.

Polling stations in Romania and abroad are equipped with tablets managed by computer operators, selected by the AEP by competition, and appointed by a computerized system through drawing lots. While for elections in Romania, a single tablet is used, for polling stations organized abroad, more tablets can be distributed; in polling stations abroad, members of the election commission can also act as operators. The software used – ADV - is developed by the Special Telecommunication Service (STS), which also provides for the communication infrastructure, call centers⁵⁸, and training, together with the AEP and ensures security measures. Video and written tutorials are also offered to the members of the election commission and the operators⁵⁹.

The **computer application for verifying the right to vote (ADV)** is used to check personal identification numbers based on the machine-readable ID (data can also be input manually) and informs the commission if the voter is allowed to cast a ballot if there are restrictions imposed. At the same time, the chair of the commission takes the decision regarding the exercise of voting.

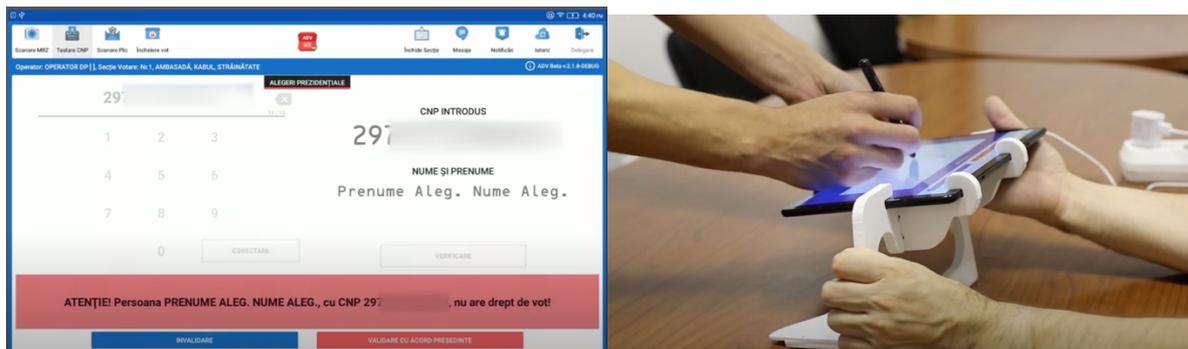
The number of potential incidents has significantly decreased since 2016, when the system was used for the first

⁵⁸ Several call centers are available, providing technical support, assistance for electoral operations, assistance for filling the protocols. Calls are recorded.

⁵⁹ See the [tutorials](#) for the 2020 elections

time, and the experience has shown that the use of SIMPV had a discernible deterrence effect. Law enforcement agencies are automatically informed through the interface about such incidents, and criminal investigations begin. A warning of potential multiple voting does not forbid the voter to cast a ballot as verifications of signatures on printed voter lists are performed; the voter is allowed to cast a ballot only after signing an affidavit acknowledging potential criminal deeds.

The failure of the system does not halt the continuation of voting. If the terminal is functional, but the connection is interrupted, voters can be registered offline by scanning their IDs; if it is not functioning, the commission registers them on printed lists. Special protocols are used to mark the technical issues and dysfunctions; the USSD service can also verify personal identification numbers through the phones provided by STS while returning information in real-time. The procedures are described correctly in the primary legislation and in decisions published by the AEP, which refer to each type of situation, responses from the system, and steps to be taken.



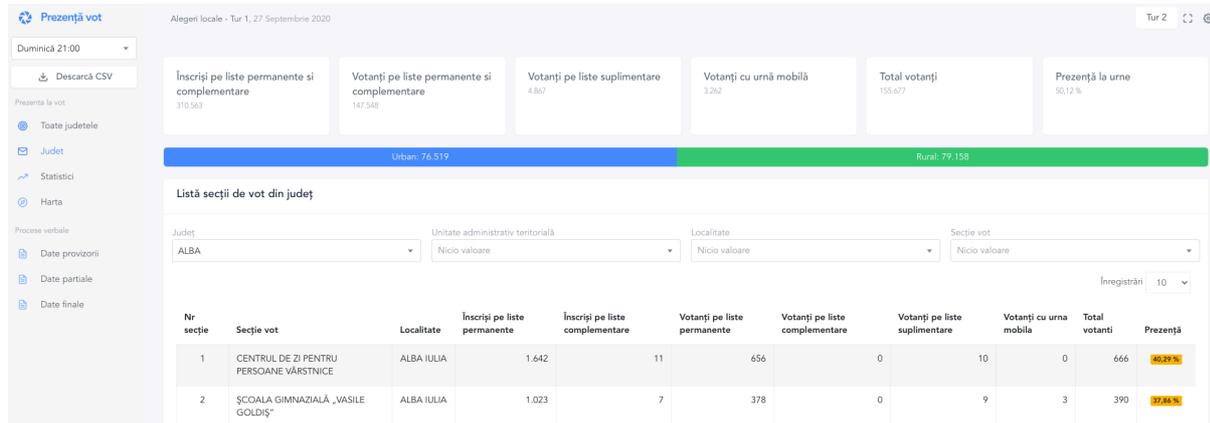
ADV application (left) and electronic voter signature (right), Source: [STS video instructions](#)

The tablets are also used to scan postal voting envelopes received in Romania⁶⁰ or in embassies and to register voters that cast ballot within the specified deadline, three days before the election day. This procedure allows the AEP to inform voters whose envelopes did not reach the polling stations in time to be registered and allow them to vote in a polling station. The regulations were improved, as in the 2016 elections voters did not have this opportunity.

The real time turnout is published on the public platform, which is under the coordination of the AEP, <https://prezenta.roaep.ro/>⁶¹. The website illustrates the number of registered voters, number of voters, turnout and statistics about gender and environment (rural or urban). Intermediary and final protocols are published (see *section on tabulation and results*). Data can also be downloaded in csv format.

⁶⁰ For each 10.000 voters that register a dedicate special polling station for postal voting is set-up. So far, the maximum number of polling stations opened in Romania was three. Furthermore, voters can opt to return the envelopes to embassies

⁶¹ The results for the previous elections are archives and can be found on separate links, such as [2019 EP elections](#) or [2016 parliamentary elections](#)



AEP turnout and results website

The USA

As mentioned before, in the United States, state and local authorities organize elections, which receive federal support to ensure the security and integrity of the electoral process.

In terms of voter registration, there are several general trends to be observed:

- State voter databases are used to maintain registration records and export voter lists utilized during the election day, either in paper or electronic format. The Help America Vote Act (HAVA) of 2002 introduced the obligation of states to develop computerized statewide voter lists, including the name and information, as well as unique identifiers for each voter; the automated lists serve as official registration lists for the conduct of all elections for federal office.
- Most state registration platforms are integrated or connected to other agencies that provide information on voter registration, such as motor vehicle licensing agencies and others required by the National Voter Registration Act (NVRA) of 1993.
- Most states provide online registration options⁶².. Online registration is available in 42 states and the District of Columbia⁶³ as of July 2021. In most cases, the validation is made by comparing the data provided in the registration form with the information provided by the person when registering for a driver's license or other state-issued identification cards. The introduction of online registration increased significantly, considering that in 2012 only 13 states provided such services⁶⁴. Systems were built both by internal IT staff or externalized to vendors. Some of the early adopters noted savings in costs for registration, while in 11 of 13 states, the average price to develop the tool was \$240,000⁶⁵. Some online

⁶² Voters can register by mail to vote, update their name, address or register with a political party by using the [National Mail Voter Registration Form](#), developed by the US Election Assistance Commission. State registration forms or templates developed by the voter registration designated agency can also be used.

⁶³ [See Online Voter Registration](#)

⁶⁴ NCSL, [“Then and Now: Growth of Online Voter Registration”](#), 2016. Arizona was the first state to introduce online registration, in 2002

⁶⁵ The Pew Charitable Trusts, [“Understanding Online Voter Registration”](#), 2014

registration platforms offer accessibility in English and other languages, including Spanish, Chinese, Vietnamese, Japanese, Hindi, or Korean.

- In many cases, local election organizers use electronic poll books to check voters in polling stations or other voting places. In some cases, voters can be registered during the election day. In the 2020 elections, 38 states reported using e-poll books in at least one of their jurisdictions, and 16 states and territories and the District of Columbia used e-poll books in all their jurisdictions⁶⁶; in 12 cases, testing or certification is required by statute, in 10 instances by administrative regulation or guidance, while in 17 states is not required. Introducing the use of electronic poll books is one of the most significant technological trends in the US election.
- Some states allow the integration of voter registration systems with nongovernmental online registration support platforms.
- States provide online platforms⁶⁷ that allow voters to verify voter registration statute or polling place, including services such as early voting or election day polling place locations and opening times, the status of the absentee application or ballot, the location of Mail Ballot Drop Box or contact information of the state and local administration. Several states also provide samples of ballots. Data can be displayed in various formats, including interactive maps, lists, or search forms that require information such as name, date of birth, address, or social security number.

IV. Registration of political parties and candidates

Member states developed tools that facilitate the registration of political parties and candidates. These tools permit gathering support signatures, verify the signatures, verify the list parity, and collect information to be used in other stages of the election process.

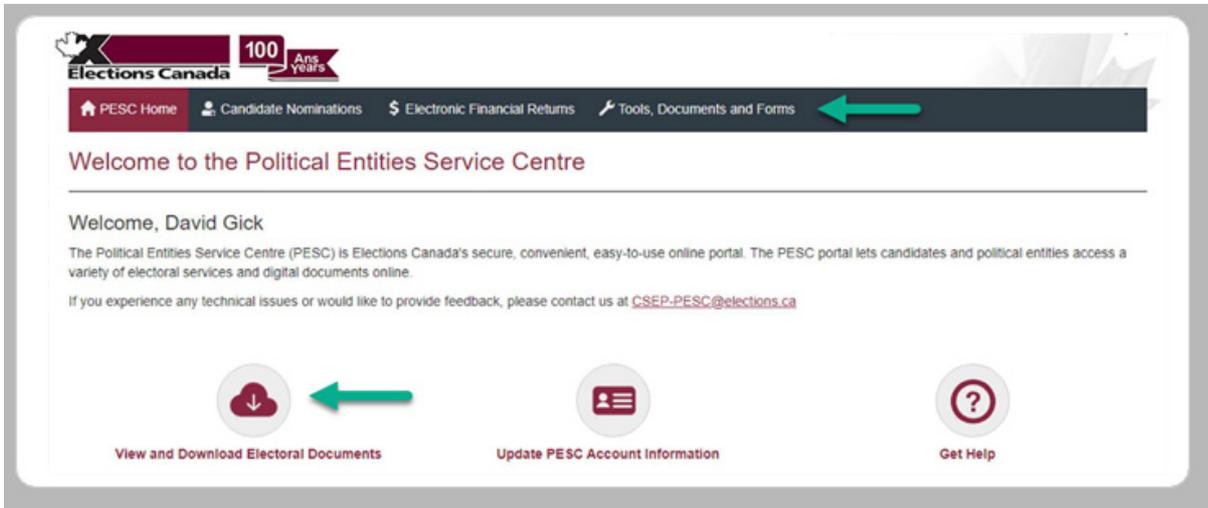
Canada

In Canada, political parties and candidates can use **the Political Entities Service Centre (PESC)**, an online portal that provides access to various services and digital documents, including registration and nomination. The portal includes services that allow users to complete and submit an online nomination (the Nomination Paper can also be filed offline), access electoral materials, and submit candidate financial returns. Accounts can be created in the PESC portal. The registration process has to be initiated by the potential candidate, while other operations can also be delegated to official agents, auditors, or delegates. Some documents needing signatures must be printed and uploaded to the portal⁶⁸. The validation or rejection of candidatures by Returning Officers is performed in the case management system, EC Connex.

⁶⁶ U.S. Election Assistance Commission, [Election Administration and Voting Survey 2020](#), p. 26. See a list of [functionalities of electronic voter books](#).

⁶⁷ The full list of resources is available on [EAC's website](#).

⁶⁸ Read more about Elections Canada [tools for candidates](#) .



Elections Canada, [PESC](#)

Costa Rica

The TSE of Costa Rica provides the **Register of political parties** platform that manages the registration of political parties and provides an automated framework to execute several tasks. The web-based system allows the institution to register the political parties, supervise assemblies, ensure candidate registration, provide access to political parties to the registration information, and assigns a place to political parties on the ballots, based on a lottery. The data is used for other processes such as tabulation and publication of results. The Programmatic Files utility is a conversion tool that supports the Electoral Programs Department in processing the information of the candidates provided by the political parties in Excel format and generates the XML file required by the Results Visualization System (RVS) to load the information in the programmatic files.

The TSE also provides a validation form to verify the alternation of candidates, which allows political groups to make queries to validate the parity and alternation in their lists of candidates.

Estonia

The **Estonian elections information system (VIS)** facilitates the electronic registration of candidates, which is a new option available to political parties, election coalitions, and independent candidates⁶⁹. Candidates can register in several ways: on paper at their local government office, via an electronic medium (USB), via e-mail, or online. The latter was used for the first time in the 2021 local government elections—those performing the registration log in using their ID card or Mobile-ID before proceeding to the required actions.

⁶⁹ See the [registration guidebook](#) for political competitors (Estonian only).

Registration takes place in three stages during a meeting of the Electoral Commission. This meeting is public, and its timing is announced on the website of the city or municipality in question. The political parties, election coalitions, and independent candidates or their representatives are also informed of the time and place of the drawing of lots at the meeting.

First, the candidates' documents are reviewed. Such documents include notifications of authorized representatives, applications to register candidates, the individual applications of candidates to stand for election, and the electoral district lists of the candidates of political parties or election coalitions for every electoral district for which candidates are submitted for registration. When using the elections information system, automated inquiries are made from the Population Register, and a candidate's data are then displayed. When an individual is entered into the system, it is automatically checked whether they meet the requirements set out in law. If a candidate's registered place of residence is not in the same city or municipality in which they are standing, they cannot be entered into the system. Once an application to stand for election has been filled in and signed, an independent candidate or representative can submit registration documents. Election coalitions and political parties must also fill in and sign lists of candidates. Once the papers have been reviewed and checked, a decision is made (but not yet formalized) regarding whether to register the candidates. A separate decision is made regarding this if a candidate cannot be registered.

Next, the drawing of lots is conducted, preferably during the same meeting, based on which the candidates are then issued with registration numbers. Lots are first drawn among political parties and election coalitions and then among independent candidates. Lots are removed using slips of paper that bear the names of the parties, coalitions, and independents. Each slip is placed separately in an identical, unmarked envelope, and these envelopes are then shuffled. The person who draws the lots is a member of the Electoral Commission appointed by the commission, who may not be the commission's chairman. The person who draws the lots is not permitted to be in the room during the preparation and shuffling of the envelopes.

Upon drawing the lots, they randomly select one of the envelopes, open it and read out the name of the election coalition, political party, or independent candidate written on it. The slip of paper is also shown to those present. The results of the drawing of lots determine the order of the political parties, election coalitions, and independent candidates. This order is entered into the election information system, which generates registration numbers for the candidates.

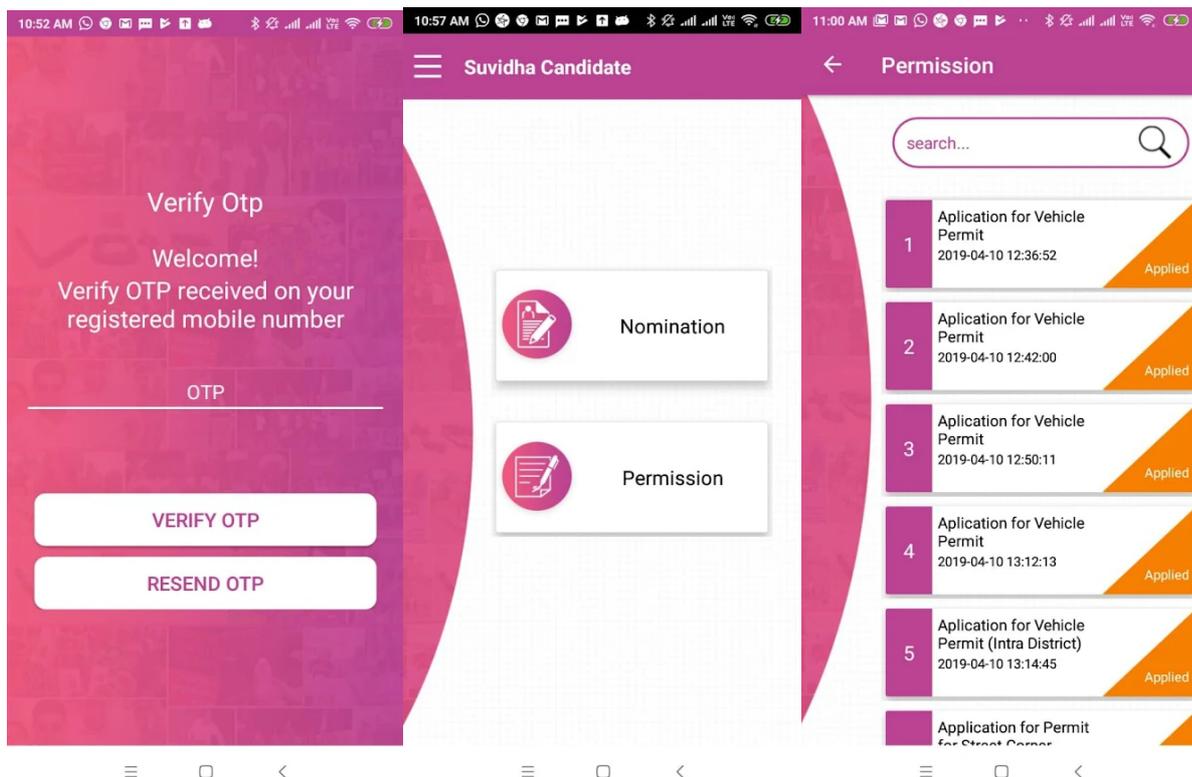
In elections, every candidate is issued a personal registration number upon registration. These numbers start from 101. The numbers are first allocated to the list of the political party or election coalition drawn first. Likewise, the first independent candidate to be given a number is the candidate who was drawn first. The first independent receives the number directly following the last registration number allocated to a political party or election coalition candidate.

Lastly, the decision of the Electoral Commission regarding the registration of candidates is formalized. The registration numbers of candidates are marked in the decision regarding the registration of the candidates. The Electoral Commission informs the political parties, election coalitions, and independent candidates of the decisions that have been made.

India

The **Political Parties Registration Tracking Management System (PPRTMS)**⁷⁰ was launched in January 2020. Applications are received by ECI and digitized. Each application receives a unique number, which can be used to follow its status. The applicant for political party registration is informed by email and SMS regarding the status, while the information can be verified using OTP verification and the mentioned number; all the stages of the application are accessible to the applicant. The data is not public for other applications.

Another application used by ECI is the **Candidate Nomination Application (part of ENCORE)**, which provides candidates with the possibility to file their candidatures online, digitize the affidavit and depositing the requested security by online payment. The data input in the application then provides data to the Candidate Affidavit Portal, Voter Helpline Portal/App and the PWD app, EVM stock requirement, counting data and results display. The total number of candidates is used by EVM Management Software for finalizing the requirements of EVM/VVPAT machines. Returning officers can generate reports based on date, gender, category, party or candidate.



[Suvidha Candidate App](#)

Currently, registration is not a fully e-nomination process. The application generates a printable filled-in form with a QR code for submission to the Returning Officer. Each nomination receives a unique number. As the application is

⁷⁰ ECI, <https://pprtms.eci.gov.in/>

filed successfully, the candidate can follow the status of the scrutiny in the portal or by using an app developed by ECI, called Candidate Suvidha⁷¹. The use of this tool was especially helpful during the COVID pandemic.

Candidatures are validated in the **ENCORE Scrutiny application**, which allows each Returning Officer to verify and accept or reject the candidatures, as well as to assign symbols to validated candidates. The information registered through nominations is then displayed for public consultation on the candidate **Affidavit portal** <https://affidavit.eci.gov.in>, including data on the candidates' assets, finances, and liabilities, as well as a pdf copy of the affidavit.

Lithuania

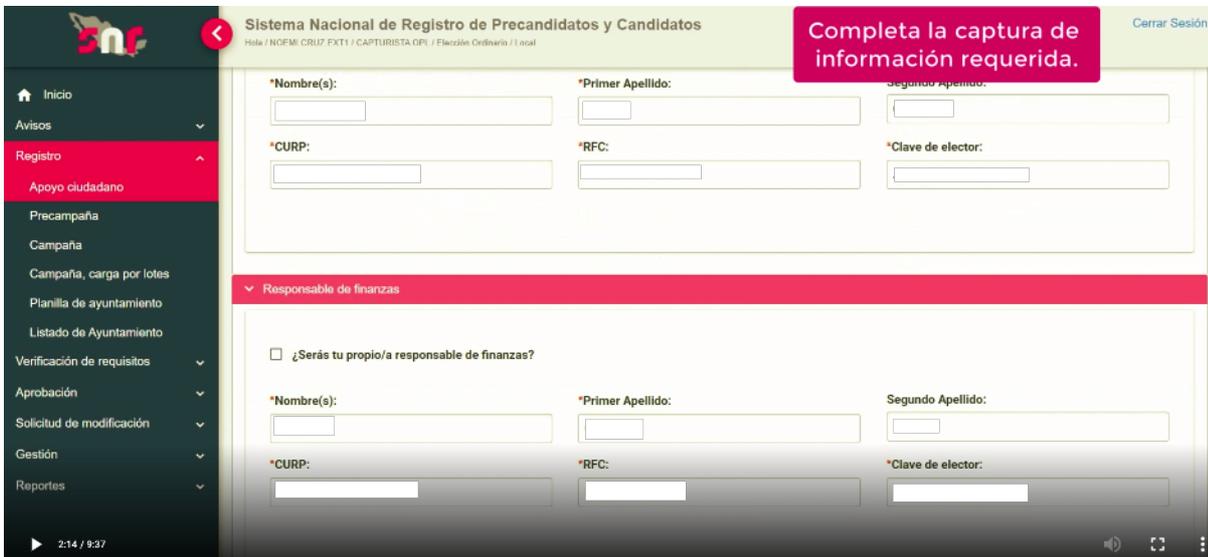
The **electronic information system developed by the Lithuanian CEC** provides the possibility to political parties and candidates to raise signatures through the Voter Page Portal. Signatures can also be raised for national referenda and civil initiatives. *Read more in chapter 2*

Mexico

The INE holds a **National Registry System for Pre-candidates and Candidates**⁷², which is used to register, concentrate and consult data from pre-candidates and candidates, as well as to perform any changes in the lists. Access of political parties in the platform is done by introducing a user and password. The system is administered and updated by the Inspection Technical Unit within the INE. Interested participants that intend to engage in local or federal elections have to register their personal data, information about the supporting civil organization (if the case), information about the financial representative and to upload documentation about the supporting legal entity. The system allows to input data, but also to edit existing information. Data from the system is distributed to other system for activities related to political finance and election campaign – *see the chapter on digital tools for political finance*.

⁷¹ The app is accessible in [Google Play Store](#) and is called Candidate App.

⁷² <https://candidatosnacionales.ine.mx/snr/app/login>



[INE website, help section](#)

V. [Voter information and election administration training](#)

Election management bodies use different tools to inform voters and other participants to the election process about registration procedures, voting operations, complaints or about tabulation and results. Some EMBs provide training materials for the electoral administration, but also for political parties on how to use digital tools, such as electronic reporting tools (i.e., Canada, the US⁷³). In some states, the materials are displayed as training courses or videoclips (i.e., Romania), while in others dedicated structured online modules have been developed (i.e., Lithuania). The Covid-19 pandemic boosted the activity of some states that increased their online training portfolio due to physical limitations.

Electronic tools and platform can be used for a range of purposes in all stages of elections:

When?	What?
Before the elections	<ul style="list-style-type: none"> - Verify if a voter is registered and request registration or modifications - Verify the polling station where a voter is registered and change it, if the case - Find out contacts of polling stations and members of commissions, for procedural matters (i.e., registering for homebound voting) - Find out about the registered contestants and their political programs

⁷³ See Elections Canada, [Political Financing Training](#); [FEC trainings](#)

	<ul style="list-style-type: none"> - Broadcast the sessions of the election commissions - Promoting democratic values - Inform about voting procedures or related to advance voting or election day voting - Inform voters about the security of the process, including how technologies work, protection of personal data - Combat mis- and disinformation
During election day	<ul style="list-style-type: none"> - Voter turnout - Partial and final results - Broadcast the sessions of the election commissions - Polling results - Most of the objectives in the previous step
After election day	<ul style="list-style-type: none"> - Allocation of mandates - Conclusions about elections - Activity of the EMB

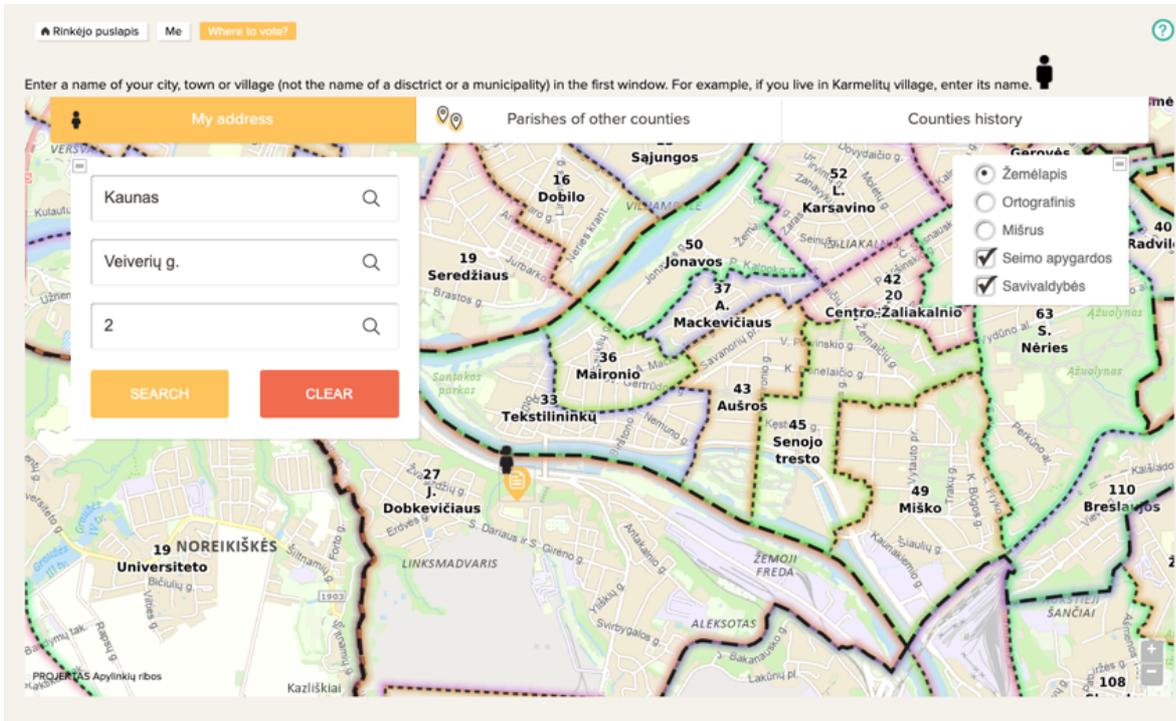
Electronic verification of voter status and identification of polling stations

Most of the countries included in the study allow for electronic verification of voter registration status and identification of polling stations. The Electoral Register in Romania has an external interface, on www.registrulelector.ro, which allows users to search for their designated polling station by introducing their personal identification number and family name. A login free interactive map of polling stations is also available.

The **Voter Information Service**,⁷⁴ provided by Elections Canada, displays information about the electoral district, including list of candidates (with contacts), locations of advance voting and election day polling sites, a map of the electoral district and contacts of the local offices of Elections Canada. Searches can be done by a range of criteria, including postal code, candidates, electoral district name or maps. Past results are also available. Any person can check online if she or he is registered to vote.

In **Lithuania**, voters can search for their voting station and view a map which displays the boundaries of the polling districts. The map also displays polling stations in other constituencies and historical maps of other districts. For each polling station the address is displayed, together with contact data and accessibility information.

⁷⁴ [Voter Information Service](#). A voter can verify the status of the voter registration with the [Online Voter Registration Service](#)



[Where to vote](#)

In the U.S., state and local election authorities maintain websites to support voter information and education and these platforms include a wide range of services such as:

- Voters can verify their registration status and polling site location.
- Request a mail-in/absentee ballot.
- Track mail-in/absentee ballot status, including Uniformed and Overseas Citizens Absentee Voting Act (UOCAVA) ballots, track provisional ballot status.
- Check voter-specific ballot information.

REVISE AQUÍ DÓNDE LE TOCA VOTAR

LISTA PROVISIONAL DE ELECTORES



- 1 Escanee el código "QR".
- 2 Digite su número de cédula tal y como aparece en su documento de identidad.

101110111

(No digite guiones ni espacios en blanco)

O ingrese al sitio web del TSE
www.tse.go.cr

RECUERDE

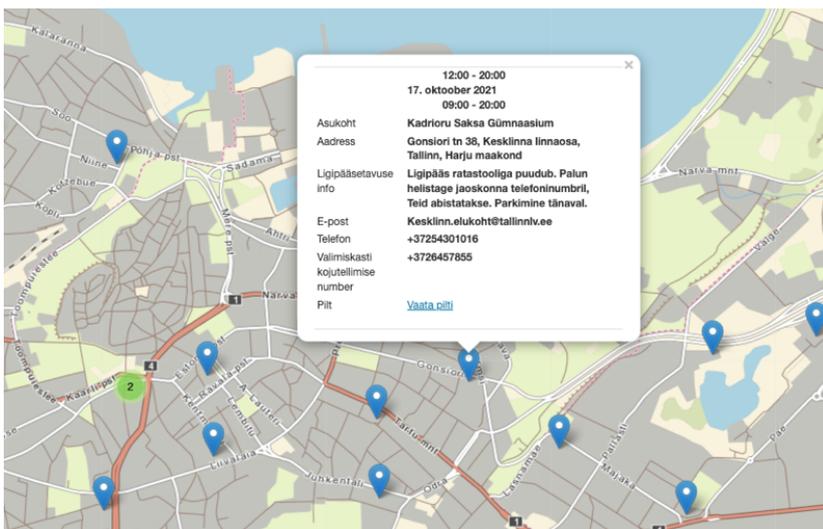
- Si necesita cambiar su lugar de votación hágalo a más tardar el **5 de octubre de 2021**, en alguna de las sedes regionales del Tribunal Supremo de Elecciones o en sede central.
- En caso de **CONSULTAS** puede comunicarse a los teléfonos 2287-5772, 2287-5773 o 2287-3122.



For the 2022 parliamentary elections, **Costa Rican** voters can search where they are registered to vote by scanning a QR code, situated on the provisional lists of voters, located at the offices of the Fuerza Pública. The users are redirected on the website www.tse.go.cr/dondevotar, where they must input an identification number, as included in the identity document, and the system will provide the information⁷⁵.

The TSE website offers the possibility of voters to verify their registration status and voting place. Information can also be requested by 2020 telephone number or SMS.

The TSE has developed the #VoterInformedCR smartphone application⁷⁶ that allows users to consult several types of information regarding the electoral process. A voter can read information about the candidates, check the allocated polling station, forward complaints, consult frequent asked questions, read provisional and final results, or consult the electoral calendar. The app is developed using C#.NET – IONIC.



Estonian voters can search for their polling stations on an interactive map - <https://isk.valimised.ee/>. The map illustrates the location of polling stations, their working hours and contacts of the commission. For some polling stations, pictures of the buildings housing polling stations are provided.

⁷⁵ TSE [press release](#). A [video guide](#) is available on the website.

⁷⁶ See the [2020 #VotanteInformadoCR application](#)

In **Georgia**, voters can check the addresses of polling stations according to the election districts on the website www.map.cec.gov.ge. The platform includes data such as the number of voters (by gender), the number of polling stations with ramps and easy adaptations for persons with special needs, according to which the voter can get detailed information about the available polling stations, including a photograph. The portal also contains information about the members of the district and precinct election commissions throughout the country.



Elections:

October 2, 2021 Self-Government Elections



36 Borjomi

სარჩევნო ოლქი

36 Borjomi Back >>

Number of voters in the unified list:

26684

(Female - 14298 | Male - 12386)

(According to the data of 02.10.2021)

Number of precincts:

31

Detailed information on precincts

View the location of precincts on the map

Number of adapted precincts:

0

Number of ramp areas:

3

District members

36 Borjomi - precincts

Precinct number	City / Community	Name	Location	Address	Map	Number of voters in the unified list (according to the data of 02.10.2021)	Simple. Adapt.	Ramp	Picture	Floor	Precinct members
1		Charkhistskali	Former House of Culture	Tori st. # 6		1115 Women - 633 Men - 482				1	Precinct members
2		Vashlovani	Free space	D. Agmashenebeli st. 12		1078 women - 592 men - 486				1	Precinct members
3		Of the city	# 6 Public School	Rustaveli St. # 55		1258 women - 701 men - 557				1	Precinct members
4		Of the city	# 3 Public School	Rustaveli St. # 97		770 Women - 467				1	Precinct members

www.map.cec.gov.ge, Google Translated

The ECI developed the **Voter Helpline App** (iOS and Android)⁷⁷ for the use of **Indian voters**. The application has quite an extensive range of modules and options allowing voter to search their names in electoral rolls (barcode scan, EPIC id, personal details), submit requests for registration and update of voter data, download their digital photo voter slips, lodge complaints, consult profiles of candidates and see real time results or other news. The app also allows voters to take and post selfies during the election day. Statistically, the application has been downloaded 25 million times and 54 million searches were performed. Some educational sections are also comprised within the Helpline app. The app is developed with Core-Java (Android) and Swift (iOS), while it uses Laravel framework (LAMP) for the API REST. Login is based on open time password (OTP).

Mexico allows citizens from abroad to register via an online system in the List of Voters Residing Abroad⁷⁸. Also, a public webpage allows citizens to verify if they are members of a political party⁷⁹.

During the voting period, citizens can verify the geographic scope in which they are located to determine the specific location of corresponding box to cast their vote (Check the location of the corresponding box in the Locate your box) - <https://ubicatucasilla.ine.mx>.

Information and education for voters and election administration

Some EMBs have developed sections on their website where they fight disinformation regarding the use of technology in elections. In the US, CISA combats rumors or fake news with reasoned and detailed explanations through the Rumor Control section⁸⁰.

Elections Canada developed several websites to provide information about elections, civic engagement and increase accessibility. The agency's main website provides detailed information for voters and other stakeholders on a broad range of electoral issues. During a federal general election, the website is reformatted to reflect the circumstances of an ongoing election, with up-to-date information on the election cycle including information on when, where, and how to vote. The website addresses the general public, but also specific categories such as young voters, indigenous citizens, or persons with disabilities⁸¹.

The Inspire Democracy website (www.inspirelademocratie.ca) reflects the activities of this Election Canada's program that works with stakeholders to reduce barriers to electoral participation. It provides tools for engaging with communities that face more barriers than others when it comes to registering and voting, working at the polls or being a candidate in a federal election, including: First Nations, Métis, and Inuit electors, electors with disabilities and new electors, including youth and new Canadians.

⁷⁷ [ECI, Voter Helpline App](#)

⁷⁸ [Consult the Registration System to Vote from Abroad](#)

⁷⁹ See section on [INE website](#).

⁸⁰ www.cisa.gov/rumorcontrol

⁸¹ Read more about [Election Canada outreach to voters](#).

The Elections and Democracy website (www.electionsanddemocracy.ca) provides resources and tools for learning, teaching, and engaging about federal elections and democracy. The platform hosts a wide range of resources that can be used in the educational process.

The ECI uses the Systematic Voters' Education and Electoral Participation - **SVEEP portal**⁸² to engage voters in electoral education. The website contains useful information for a voter, forums, quizzes, manuals, tutorials and provides a facility for voters to share photographs during the polling day.

VI. Preparation and management of voting operations

A range of tools and platforms are used for organizing and managing voting. They have been described in a more comprehensive manner in other sections of this report, including integrated election information/management systems, voter registration or preparation of tabulation and results.

During advance voting and election day, the election administration may use digital tools for some of these following purposes:

- Verifying and registering voters (electronic poll books) and ensuring data exchange between polling stations
- Printing ballots for voters
- Receiving and solving complaints
- Monitoring electoral violence
- Transmitting live figures about voter turnout
- Ensuring communication with the lower-level election administration bodies
- Assessing the voting process and gather feedback
- Auditing the voting process and monitor potential security issues such as external attacks or internal vulnerabilities
- Ensuring electronic and Internet voting
- Ensuring transparency of the electoral process: broadcasting EMB meetings, publishing decisions

Management and registration of equipment

⁸² ECI, [SVEEP portal](#)

Indian voters use electronic voting machines to cast their ballots, which means that a rather challenging task is to transport and register each movement of the machines. The preparations can start from six months to a year before voting, depending on the type of elections and includes a large-scale planning exercise to move the EVM/VVPAT. The machines are moved from the manufacturer to different warehouses. The web application to manage the inventory and to ensure randomization of equipment was released in February 2019 and is called **EVM Management**



Sending/ Receiving of units
via scanning in EMS app

= [EMS main component](#)

System (EMS)⁸³. The systems cover several stages of the process: marking First Level Check OK (moved to the Strong Room) and Not OK (moved to Repair Room), first and second randomization, Marking and Unmarking Election Petition and receiving units back in the system after counting.

Two steps of Randomization of Ballot Unit, Control Unit, and VVPAT are performed, in the presence of political parties. The first one is performed at district level to allocate them Assembly Constituency-wise, while the second is done for each polling station, at the Returning Officer level, in the presence of candidates or their representatives. The process is used to ensure neutrality in regard to the machines that are actually used for polling. The application is used for all the Assembly elections and bye-elections. In 2019, it handled 84,34,422 transactions in 90 days, while handling 70,01,489 machines.

The web app is complementary to a mobile app, which is used to scan the barcodes from the equipment and was released in March 2019. Each entry and exit from the system are marked through the barcode.

The login to the web app is based on OTP verification. The dashboard contains a module to scan allocated units, which is selected by the verifier. The number of units decreases as they are scanned.

⁸³ ECI, [EVM Management System \(EMS\)](#)

Management of election commissions and observers

Costa Rica

The TSE developed the **International Observers Platform** (Windows client and webform), which allows to register and update the information regarding observer organizations, international observers, and delegates (*Delegados de Atención a Observadores - DAO*). The system also allows keeping the record or history of the participation of observers and delegates in the different electoral and consultative processes organized by the TSE.

For the media, a different platform is used, the **Information System for Journalists and Mass Media Technicians (SIPTM)**, that allows registering and keeping updated the information on the mass media, as well as relevant journalists and technical staff that cover the electoral and consultative processes, as well as the activities of the TSE. The platform also allows the registration of scheduled protocol events. The system allows to print reports from the Photographic Register of the Costa Rican Press and the Foreign Press's Photographic Register, in order to verify the identity of the journalists and technical personnel⁸⁴.

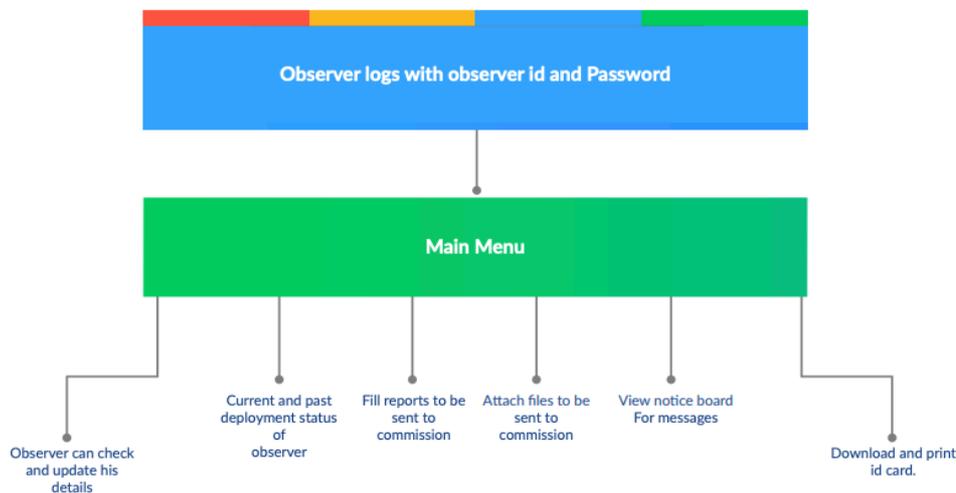
Furthermore, national observers and representatives of political parties (*fiscales*) are accredited through the **Sistema de Información Electoral – SIE** – see description in chapter 2.

India

The election process can be monitored by different types of observers, including general, police or expenditure observers. For their registration, management and to provide resources, the ECI has developed the **Observer Portal** - <https://observerseci.eci.nic.in>. The portal allows observers to verify and correct their personal information, including bank details for remittance and local mobile number on which they are updated by the commissions through SMS. Observers can download their cards from the website. Also, the deployment details are available, and the platform offers the possibility to fill/upload reports. The notice board displays information or instructions sent by the ECI. On the other hand, the ECI can monitor their deployment status and review the filed reports.

The Sqlserver 2008R2, .net 4.5 Framework technology was used to develop the portal. Login is based on user – observer code – and a password (the same, at the first login), which is changed at the first login.

⁸⁴ The TSE uses an [Identity Verification System](#), which allows the comparison of finger prints with data registered in the database of the Tribunal, based on the identity card number. If the fingerprint matches, the photograph of the person is displayed.



Observer portal flow, [source](#)

Mexico

The National Electoral Institute of Mexico (INE – Spanish Acronym) uses a number of tools for the electoral training, management of the election commissions and election materials. The Electoral Supervisors (ES) and Assistant Electoral Trainers (AET)⁸⁵ are managed through a series of tools that facilitate the online registration and validation, selection process, to keep the record of the work they perform, as well as the disseminate the call for recruitment and the selection process in different stages (examination and interview). A quality control of recruitment and follow-up tool allow to monitor the progress of different activities carried out as part of the recruitment process. Another one is dedicated to tracking the information regarding resignations, promotions and contract terminations presented by the ES and AET after the recruitment and assignment. “Meet your Assistant Electoral Trainer” allows citizens to identify the AES that can visit them. A series of systems facilitates the organization of ES and AET work in identifying citizens for election commissions and the training activities, which take place in two stages.

The INE has implemented seven mobile applications that have been developed and are in use for supervisors, councils, and boards:

- **Advance of 1st Stage App** - allows to have in less time the information generated during the first stage of training. In addition, the workload in the District Boards regarding the registration of information in the computer system in its web version is considerably reduced.
- **Appointment and Training App** – allows users to obtain the information in a timely manner to identify possible lags and correct the strategy implemented in order to guarantee the integration of polling stations.
- **Application for electoral supervisors** - used to register the information of the verification and follow-up of the activities related to the visit, notification, and training of designated citizens.

⁸⁵ ES and AET are selected by public call and assist district councils and boards by performing different tasks including: training citizens to be part of the election commission, setting up polling stations, reception and distribution of election materials, carry out district counts, providing information on e-Day incidents and others.

- **Electoral Day Drills and Practices App** - allows users to record information about the development of the Electoral Day drills and practices that are carried out during the second stage of electoral training.
- **Verification of Electoral Training Activities App** - this application is responsible for recording the information of the verification and follow-up carried out by the Members and Counselors of Local and District Boards to the tasks developed in the first and second stage of training.
- **App for Information System on the development of the Electoral Day (SIJE)** - Serves to gather information on the progress of the installation of polling stations and the incidents that may occur during the Electoral Day.
- **App for Tracking Electoral Packages** - Used to record the tracking information for electoral packages before and after Election Day.

The INE also uses an application - **Mobile Device Management System** - to distribute mobile devices in the District Electoral Boards and the State Electoral Boards, as well as their respective assignment to the Electoral Supervisors and the Assistant Electoral Trainers.

The **Performance of Polling Site Officers** system is used to record statistical information on the performance of the activities of Polling Site Officers and information about the closing of the polling stations, while the **Substitution of Polling Site Officers** allows the registration of Polling Site Officers who cannot develop their duties the day of the Electoral Process.

For electoral organization, the INE introduced technology to provide a range of services, from registering observers, managing the activity of the electoral commissions and materials:

- **Electoral observers** – allows the registration and management of the Electoral Observers and the training for accreditation, as well as to record the activities they perform.
- **Local and District Electoral Councils sessions** – keeps control of the sessions held by the local and district councils, including information about officials, attendance records, items on the agenda, agreements and resolutions.
- **Board Sessions** – keeps control of the sessions held by the District Electoral Board and State Electoral Board, to determine the number of polling stations, locations, planning visits to gather information necessary to set-up polling stations or approval to set-up polling stations.
- **Registration System for Applications, Substitutions and Accreditation of General Representatives and before Polling Site Officers of the Political Parties and Independent Candidates** - is used to register and validate the information about representatives of political parties and independent candidates before the polling officers. The system crosslinks with other systems, in order to avoid the duplication of data and generates documents for the accreditation of representatives.
- **Documents and Electoral Materials of the State Electoral Authorities** - systematizes the activities regarding the review, validation, adjudication and production of the electoral documentation and materials.
- **Collection mechanisms and chain of custody** - keeps control and monitors the activities of collecting electoral documentation from polling stations at the end of the electoral process, to guarantee its delivery to the headquarters of the competent bodies.
- **Monitoring of Electoral Packages** - registers the monitoring of the electoral packages from the warehouse until their return to the same place.

The Database generation system facilitates the management and download databases, in text format, of the different institutional systems which are described in the report.

Electronic Voting

Electronic voting is not covered by the current report, as it requires its own analysis, taking into consideration the numerous specificities. However, as an overview, some states introduced either internet voting or use electronic machines. Estonia is the most developed example of internet voting. The **Internet Voting System (EHS)** was implemented starting with 2005 and allows remote voting in all types of elections. The system is well integrated with the Estonia national technological framework and voters can vote (advance voting) by computer with their ID cards or mobile IDs. Voters can change their vote multiple times and since 2021 the internet vote can be changed with a ballot paper including on election day. The system is developed and managed by the State Electoral Office, which ensures the testing of the system, producing risk assessment and processing the electoral results.

Mexico uses Internet voting for citizens abroad. The **Internet Electronic Voting System for Mexicans residing abroad (SIVEI)**⁸⁶ allows citizens residing abroad to cast their vote. Voters have to be registered in the Nominal List of Voters Resident Abroad (LNERE) and they receive instructions by e-mail. Voters can use SMS or QR Code authentication in order to define a password and login the system. After casting a ballot, the voter received a receipt, with a code, which allow to verify that the vote has been stored. SIVEI was developed through a public procurement procedure. The INE is working to extend electronic voting at national level and for out of country voters. All the tools used by the INE, with the exception of the Internet Electronic Voting System for Mexicans residing abroad (SIVEI) have been developed in-house.

Other countries opted for electronic voting with machines. A range of equipment is used during the voting process in the US:

- Direct Recording Electronic (DRE) with a Voter Verifiable Paper Audit Trail (VVPAT) - votes are recorded electronically, but there is a paper back-up.
- DRE without a VVPAT - votes are recorded electronically.
- Ballot marking devices (BMD) (no internal memory is available and only mark ballots without tabulating votes).
- Optical or digital scanners are used to tabulate ballots marked by hand or by a marking device. Scanners and ballot marking devices are the most frequently used in the 2020 elections⁸⁷.

Many states that use postal voting utilize mail ballot processing equipment that can refer to machines that scan envelopes and extract and sort ballots.

One of the most important developments in terms of technology in the US is the phasing out of paperless machines. Estimates show that for the 2020 elections more than 90% of the voters cast a paper ballot or with a machine that

⁸⁶ Read [the instructions for voters](#) for the 2021 elections.

⁸⁷ U.S. Election Assistance Commission, [Election Administration and Voting Survey 2020](#), p. 24.

provided this option⁸⁸. If smaller jurisdictions may not have had introduced machines that allow paper-based voting, in more populated ones, the trend is visible.

States use a wide range of post-election tabulation audits to ensure that voting equipment is function as intended. In the recent years, eleven states have passed legislation requiring or allowing Risk-Limiting Audits (RLA), while others are planning to introduce such measure. The RLA is a post-election audit that looks at the tabulation process, by using a random sample of ballots to examine if the original outcome is the correct one. An open-source software (ARLO) has been developed by the nonprofit organization Voting Works and is used in 10 states⁸⁹.

Furthermore, the EAC developed since 2005 **Voluntary Voting System Guidelines (VVSG)**, a set of specifications and requirements used to test voting systems in order to determine if they meet required standards (functionality, security, accessibility) and provides with the Testing and Certification Program⁹⁰. In February 2021, a new version of the Guidelines (VVSG 2.0) was published, which have not been used for testing yet. The VVSG 2.0 are part of a framework under the Voting System Certification Program, including VVSG 2.0 Principles and Guidelines, Requirements, and Testing and Certification Program Manual. The purpose of the Guidelines is to “allow for an improved and consistent voter experience, enabling all voters to vote privately and independently, ensuring votes are marked, verified and cast as intended, and that the final count represents the true will of the voters”. The current version focuses on some of the following issues:

- Cybersecurity – election systems should be air-gapped from the voting system
- Integrity – evidence trail or regular audits, including risk-limiting RLAs, compliance audits, and ballot-level audits
- Ballot secrecy – preventing the information on voter to be carrier through the voting system and introduction of two factor authentication for critical voting operations
- Cryptographic protection and system integrity requirements, including risk assessment and supply chain risk management, secure configurations, and system hardening, exploit mitigation, sandboxing, and runtime integrity.

Electronic counting pilot in Georgia

The Georgian CEC has piloted the introduction of technology in the voting process in several electoral years, to simplify the electoral procedures and increase the efficiency of the process. Tests were performed starting with 2018, when the technology was tested for the by-elections of the municipal council of Zugdidi and included three polling stations. Trainings and voter education campaigns were organized. According to the CEC, the implementation of the project was well received by voters.

The second pilot was organized in 2019, for the municipal council by-elections in Tkibuli and Tskaltubo municipalities. The pilot covered two electoral districts and eight polling stations. Electronic results matched with the manual

⁸⁸ ODIHR, United States of America General Elections, 3 November 2020, [Limited Election Observation Mission Final Report](#), p 35.

⁸⁹ [Read more about ARLO.](#)

⁹⁰ Consult [here](#) the new version. Read more about the [Testing and Certification Program](#)

counting done by the election officials. The first two tests were implemented in partnership with the Canadian Delian Project nonprofit organization.

A third, electronic e-voting pilot with Poll Count Optical Scanners (PCOS) was implemented during the 2021 local elections. The CEC implemented the project in the Krtsanisi district (Tbilisi) on a number of 31 polling stations. The pilot was performed in October 2021, for both rounds of the local elections. A number of 62 machines were available, two for each polling station, for each of the rounds. An agreement was signed with Smartmatic International Holding BV, which provided the counting machines, the software and technical assistance.

The Center for Electoral Systems Development, Reforms and Training provided training for the members of the PECs. An informative campaign was organized for the voters regarding the steps of the process. A mock election was organized on 22 September and poll workers, as well as political party representatives participated in the process as voters. The simulation was also observed by a variety of stakeholders.

A single ballot was used, divided into three segments, for Proportional, Mayoral, and Majoritarian Elections⁹¹: the first contained information about the names of the parties, the second data on candidates to municipality and the third one information regarding the candidates nominated for election in the majoritarian constituency. Voters could mark their option in each of the section.

The ballot paper includes a special barcode and individual QR code for protection and used during the counting process. The ballots had to be introduced in the ballot box, which has the machine installed. Ballots from the mobile ballot box are introduced at the end of the voting day in the ballot box by the staff of the PEC. Votes were counted both automatically and manually.

According to the procedure, voting could continue without the use of the machines, if the case occurred. In three precincts the increased size of ballots due to the printing procedures determined the continuation of voting in a traditional manner. No major challenges were reported during the two rounds.

The CEC applied a questionnaire to 583 voters, across all the polling stations. The majority of respondents showed a positive attitude regarding the introduction and further extension of the pilot.

⁹¹ CEC [resolution 858/2021](#) described the voting procedures



[Electoral Systems Development, Reforms and Training Center](#)

VII. [Tabulation and publication of results](#)

Tabulation involves a series of processes that take place after the end of voting and that lead to the centralization of information in order to announce results. This section reflects both components of the electoral process together, as frequently they are connected in terms of technologies which are used.

Canada

The **Event Results System** (ERS) application is used by Returning Offices (RO) to capture poll-by-poll results during an electoral event. The application has two functions: to enter the preliminary results and to enter the official results following the validation process by ROs. During the election night, up to five workstations are set up in the office of the returning officers to enter results called from advance polls and the ordinary polling stations into ERS. Data is entered by the clerk for each polling station and checked by verifiers that give the approval for certification. Once certified, the results are automatically transmitted to the ECHQ, to the elections.ca website and to the media. As the data is transmitted, the system also generated a report called the *summary of votes cast*, which is cumulative and can be distributed to the media and contestants. The summary is printed automatically after five polls are certified or more frequently in certain cases. Officials are required to check for anomalies in the system before closing the ERS during the night of elections.

Results are published on the Elections Canada website⁹². A series of contingency measures, such as the telephonic reporting of results are in place if the electronic reporting fails. Data on latest results and reports of candidates who received the most votes can be downloaded in txt format (tab-delimited format). A status of the ridings that finished counting is displayed on the website and updated constantly⁹³.

⁹² See [September 20, 2021 Election Results](#)

⁹³ Elections [Canada, Election Results](#)

Counting is manual and Elections Canada does not use machines in the tabulation process, while other jurisdictions in Canada use such tools. Within a few days of the publication of results, returning officers must validate the counts submitted by polls and the results are published on the website. In seven days of the validation of results, the returning officers declare the winners and return the writ of election to the CEO. Elections Canada then publishes the official voting results.

Costa Rica

The **RFID - Sistema de Radiofrecuencia**⁹⁴ is a system that permits the traceability of the electoral process, including materials (ballots, voter lists) and personnel that manages them.

The system, introduced for the first time in 2010 includes both web applications and hardware components, such as radio frequency readable tags and equipment to scan them. It comprises several modules, which helps tracking and registering data electoral materials:

- 1) General administration – general information such as defining users or IDs of the handheld.
- 2) Document control – allows officials to control that the content of the electoral package (*tula – see below*) is correct and complete.
- 3) Material packaging control.
- 4) Visitor control – registers the observers or other stakeholders that are allowed to observe the process. Note that the transportation and receiving process can be observed.
- 5) Statistics by zones – statistics regarding the registration and arrival of the electoral packages
- 6) Materials entry module – registers the check-in of materials.

The system ensures traceability of both the pre- and post-election electoral material, as well as the people involved in the counting process. The system uses radiofrequency (tags), the labelling, identification and localization of materials used at the end of the electoral process. The electoral materials are marked with chips that have unique identification. The bags are transported from polling stations to the TSE and each of the bags is marked and scanned when they arrive at the TSE where the final steps of tabulation and results publication take place. The use of radio frequency labels does not reflect the content of the bags (which are also sealed), but controls where the bags are and how they arrive at their final destination.

The system is developed and functions based on several technologies, including Visual Studio 2010, C# programming language, Motorola EMDK for .NET v2.8, SQL Server 2012 (for the web application), Visual Studio 2008, C# programming language and SQL (Handheld application) and Visual Studio 2008 Business Intelligence (for reports). For the 2022 elections, the TSE did not procure new handheld equipment, but it could be the case for future elections, due to the need to keep up with the technological developments.

⁹⁴ According to [FDA](#) the Radio Frequency Identification (RFID) is "a wireless system comprised of two components: tags and readers. The reader is a device that has one or more antennas that emit radio waves and receive signals back from the RFID tag. Tags, which use radio waves to communicate their identity and other information to nearby readers, can be passive or active. Passive RFID tags are powered by the reader and do not have a battery. Active RFID tags are powered by batteries. RFID tags can store a range of information from one serial number to several pages of data. Readers can be mobile so that they can be carried by hand, or they can be mounted on a post or overhead. Reader systems can also be built into the architecture of a cabinet, room, or building."



Source: *TSE Costa Rica, 2018*

The use of the system enhances the transparency, the number of officials involved in the process, the speed and precision of the centralization of electoral documents and strengthens the possibility to track where the materials are and who manages them.

For the tabulation process, the TSE collects information through a data transmission system (**Transmisión de Datos**) that provides possibility to use both web (Visual Basic.net) and Android-based smartphone system. The solutions support the process of transmission of preliminary results on the day of the election. The first option involves the use of call centers, where representatives of the election commissions transmit the data resulted from the tabulation.

Both solutions comprise four modules:

- 1) User administration.
- 2) Capture of results.
- 3) Generation of results snapshots, and
- 4) Reports - Follow-ups, Printing of snapshots during the Solemn Session, Messages in revision).

The tool allows registering the votes obtained by the political parties in each of the polling stations and from this data to generate periodic snapshots and publish preliminary results. Only the capture of results module is available for all users, while the others are used only by the TSE.

The TSE uses other modules of the system that allow, among others, to consult information about tabulation regarding specific zones; register logistical requests, such as resources needed for a polling station or generate different types of reports.

As electoral materials are received by the TSE, the protocols are scanned and digitized with a dedicated application (*Digitalización de certificaciones de actas*), which allows the digitization of the protocols and later their consultation through the Results Viewer System. The quality of the protocols is verified by TSE officials. Protocols have barcodes; however, they have not been used so far for scanning. The web-based application (*Escrutinio Presidencial y Municipal*) manages the registration of the final count of the votes cast in each polling station and corresponding to a specific election, while a visualization application, Results Viewer System (*Visualizador de Resultados Web*) ensures the visualization of the provisional and definitive results.

The internal web-based application **Dashboard Magistrados** (open page application, Vue 2- Javascript) displays preliminary results in real time to the TSE magistrates. The tool displays the progress of data transmission, as well as the results obtained from the election commissions. Results are displayed on a web platform that illustrates provisional and final results⁹⁵. Scanned protocols are also available.

Estonia

Ballots are counted on the evening of election day, after 8 PM. Paper ballots are counted twice, the first time by the voting district committee, while for the second time are recounted by the rural municipality or city election committee. Any differences are corrected on the system. The SEO ascertains the results of Internet Voting after 8 PM on election day, in a public session. Final ascertaining of votes is done by the National Electoral Committee and the procedures are public⁹⁶.

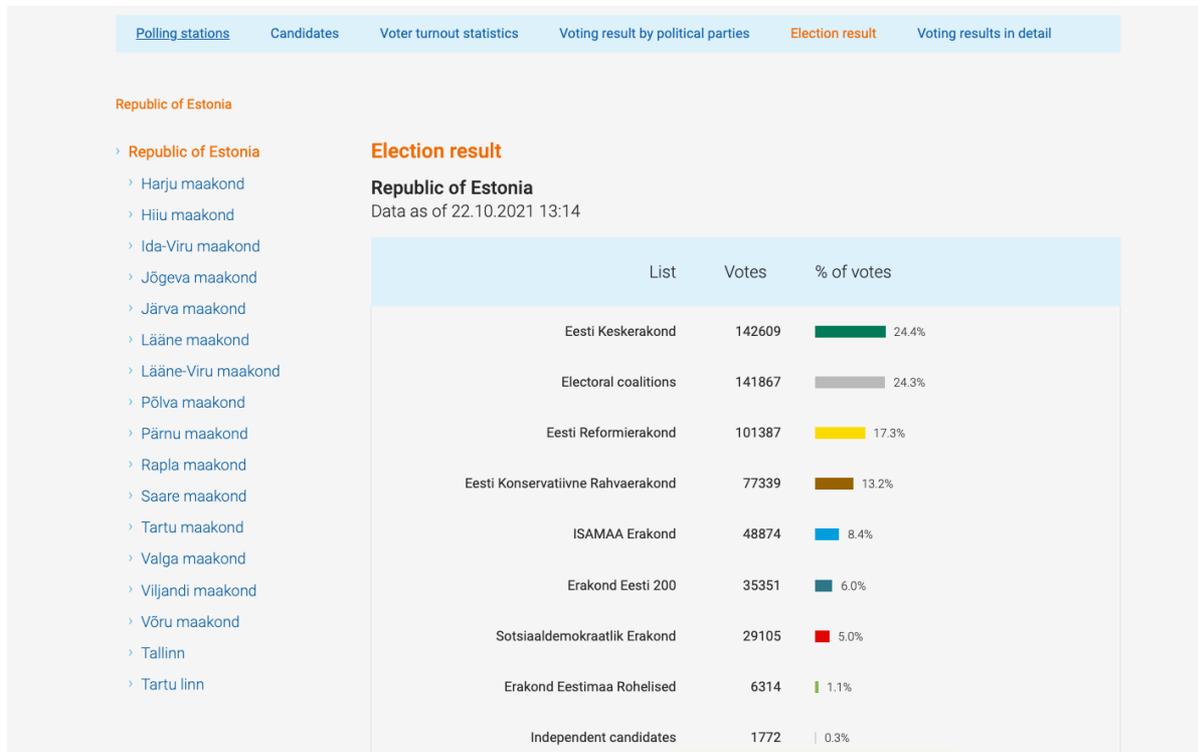
Elections results are published with the support of the VIS on the www.valimised.ee website⁹⁷. VIS is used to introduce data by members of polling commissions in order to be centralized. Digital signatures are used to validate data. The platform also includes a historical archive, dating to 1992, that illustrates detailed voting and elections results, distributed mandates, and the elected members. The results are displayed by constituency and contestant. Overall results are published, including total of voters, registered voters, valid and invalid ballot papers, and voters voting with alternative methods (home, advance, Internet).

During the voting period, data regarding turnout is published constantly, while for the advance period, the number of Internet voters is centralized at the end of each day, after the end of the voting program. The portal illustrates historical statistics on turnout in table and graphical means, specific statistics on Internet Voting, and features and open data section which allows to download results in XML machine readable format that can be used free of restrictions, according to User license Creative Commons 4.0. The portal is available in Estonian, Russian and English.

⁹⁵ [TSE historical results](#).

⁹⁶ More details are available [here](#).

⁹⁷ See [the full archive](#)



[Results page for the 2021 local elections](#)

Georgia

The CEC ensures computer processing of polling results received from the District Election commissions. Upon completion of the voting, the DECs scan the summary protocols of the polling results provided by the PECs and upload them to the electronic election management system. The uploaded information is processed at the results processing center. After double submission, the information is made public together with the summary protocols on the public website <https://results.cec.gov.ge>. Preliminary results by precincts in xls format are also posted on the CEC website. The results website is available in English and Georgian.

Information on election results by year is also available on the CEC website⁹⁸.

India

The ECI released the **ENCORE Counting app**⁹⁹ - <https://encore.eci.gov.in> - in March 2019 used by returning officers to digitize the votes, tabulate data and produce reports. The app draws data from the Candidate registration app. The workflow is linear, step by step, in order to help RO to fulfill the tasks in the specific order. After the data on electors and contestants is pre-checked, the ROs start the counting module by setting up the scheduled number of rounds – the rounds are set up one day before the counting day. EVM votes are entered Table wise for each polling station and a recording of votes (Table wise Recording of Votes) is printed after each table, verified, and validated.

⁹⁸ See [archive of results](#)

⁹⁹ See [the presentation](#) and technical requirements of the app

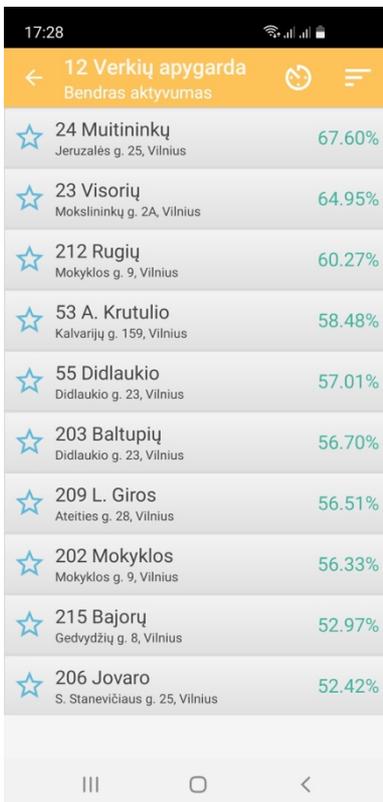
A tabulating of Trends/Results and Round Declaration Form is printed and signed after round completion. Data can be corrected, if needed. After finalizing the EVM votes, the postal votes are introduced and ROs declare the results. Data is verified against physical records and published. The system generates different declarations which are used by ROs. Results can be published directly from the app. when the process is finished.

The users can login by password and a 4-digit PIN, generated upon first login. The session times out after 10 minutes of inactivity. The app uses SSL and AES-256 encryption. Testing is provided for ROs before the scrutiny, for the entire process, both on demo and live server.

Results data is made available on <https://results.eci.gov.in>. The website was visited by 812 million users in a single day during the 2019 parliamentary elections. The results are also displayed through the Voter Helpline and Pwd App. Thirdly, the **Result Trends TV** is another manner to display results in real time, by installing panels outside the counting centers and in public spaces. Only ROs involved in elections and registered in ENCORE in their state, district or constituency can customize the display of data.

Index card (PHP-Laravel framework (LAMP)) is another online module of the ENCORE system, which is used by the ROs after counting to register details about elections in the constituency: voters, candidates, parties, votes, results, returned candidates etc. The data inserted by the Ros is verified by the Chief RO and the ECI Statistical Division. The app highlights inconsistencies in the data. Based on this information, a number of 34 statistical reports are generated and published on the ECI website: Highlights of Elections, Party performance, Constituency Voter turnout, Lists of Candidates, Seats obtained by parties and others.

Lithuania



12 Verkių apygarda Bendras aktyvumas		
★ 24 Muitininkų Jeruzalės g. 25, Vilnius		67.60%
★ 23 Visorių Mokslininkų g. 2A, Vilnius		64.95%
★ 212 Rugių Mokyklos g. 9, Vilnius		60.27%
★ 53 A. Krutulio Kalvarijų g. 159, Vilnius		58.48%
★ 55 Didlaukio Didlaukio g. 23, Vilnius		57.01%
★ 203 Baltupių Didlaukio g. 23, Vilnius		56.70%
★ 209 L. Giroso Ateities g. 28, Vilnius		56.51%
★ 202 Mokyklos Mokyklos g. 9, Vilnius		56.33%
★ 215 Bajorų Gedvydžių g. 8, Vilnius		52.97%
★ 206 Jovaro S. Stanevičiaus g. 25, Vilnius		52.42%

The **Election Day Data Transmission** (Election Wizard) component of the election information system is used for identifying arithmetical errors in counting and submitting results from manual counting in polling stations directly to the CEC website. The software is also used to register preferential votes and recounts.

The information regarding the results of the tabulation is filled in by polling station commissions in electronic format. District commissions fill in data in case of recounts. Data in the protocols must reconcile, otherwise it cannot be printed. The printed protocol is signed by the members of the polling station and a digital version is also transmitted to the upper-level election commissions. Protocols are marked with hash codes, which are used to crosscheck the data from the electronic and printed versions.

Lithuania provides real-time election results through the webpage www.rezultatai.vrk.lt and API (JSON open standard file format¹⁰⁰). Results are introduced in tabular format on webpage www.rezultatai.vrk.lt, including voter turnout and results for postal voting and can be downloaded in csv format. The profiles of the candidates are displayed. Historical data since 2016

¹⁰⁰ See example [here](#). A manual on using the API is available [on the CEC's website](#).

is available. API is used by media and other news broadcaster. The CEC also put in use a smartphone application illustrating the constituencies, voter turnout and results of elections¹⁰¹.

Additional data on election results, turnout and preferential voting is available on CEC's platform¹⁰² www.rinkejopuslapis.lt and can be downloaded in several formats, including doc, pdf or xls.

Mexico

The INE **Quick Counts** system provides information of the voting results in the polling stations selected in the sample, which allows the Quick Count Technical Advisor Committee (CORTECOR) to prepare statistical estimates to inform citizens of voting trends¹⁰³. Results are published in intervals (minimum and maximum number), which represent the ranges of values in which the potential result can be found.

Preliminary and non-final election results are processed through the **Preliminary Electoral Results Programme (PREP)**. After the closing of voting, the election commissions count the votes and fills in the protocol - Voting and Counting Acts (AEC) and signs the document. The identification data is verified and photographed with the PREP Casilla App and sent to the Center for Reception of Images and Data (CRID).

The electoral package, including the protocols, is received at the Data Collection and Transmission Centre (CATD). The date and time of collection are printed on the document. In the third step, the officials conform that the protocols have a QR code and that it matches their identification data. The documents digitalized with PREP Casilla or at the CATD are processed through the Monitor System for Capture of Digitized Minutes (MCAD). The data is verified through the Terminal Record Capture System (TCA), where two different officials receive the documents and verify it through the system. If the data is confirmed, they are published, if there is any difference in the capture, they are sent to a third official for resolution, while if there are differences between the three captures, the verification of the protocols is sent to the Verification Center (CV) for the final decision¹⁰⁴.

Each protocol can be verified through the unique integrity/HASH code, which represents a method to identify the digitized document. The HASH code allows users to verify if the document has been tampered with, has been manipulated and if it is legitimate¹⁰⁵.

Data from PREP can be consulted on the website of the INE. The database can be downloaded, and its context is explained in a well-documented manual. The PREP protocols are available to be consulted on computer or phone.

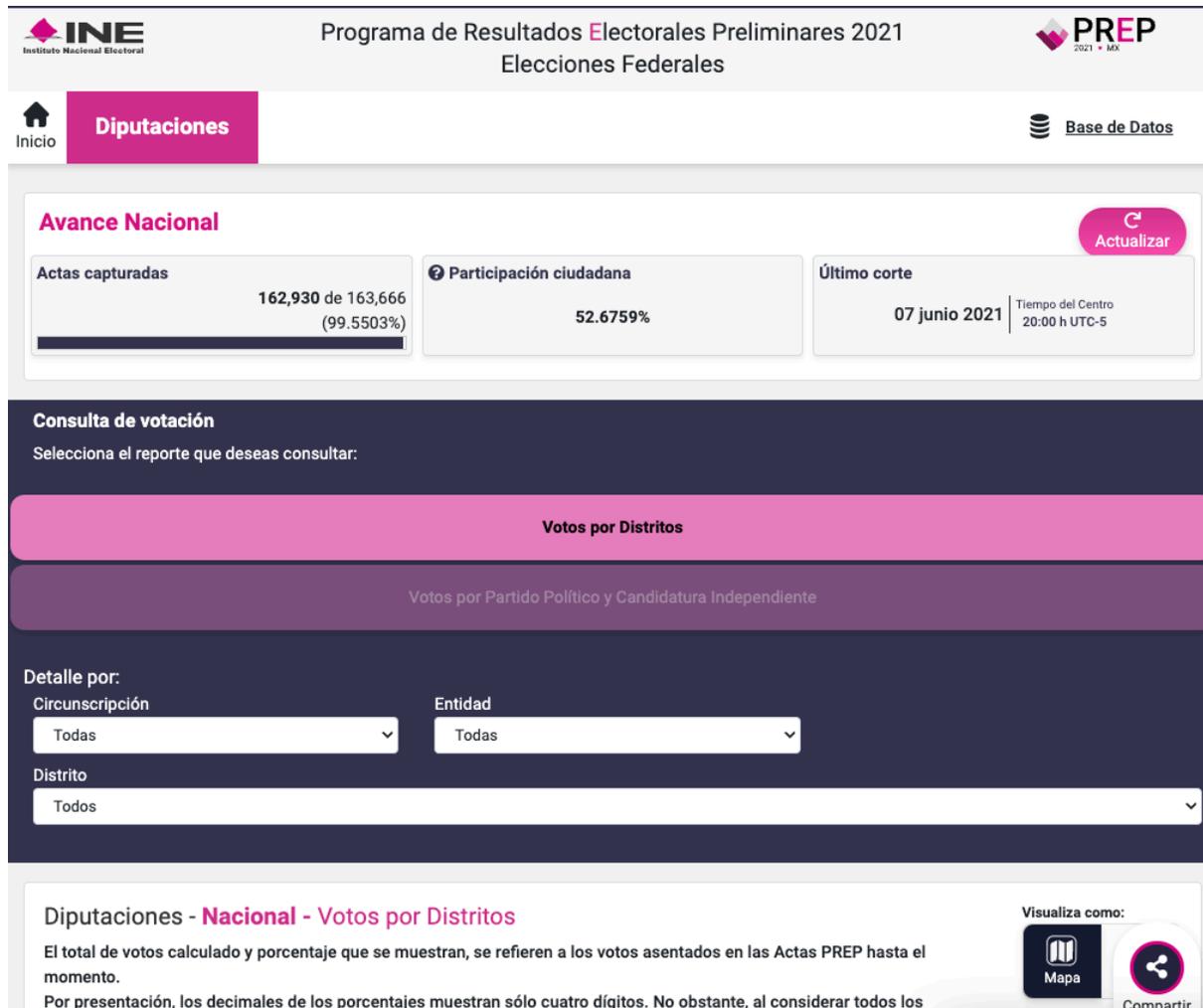
¹⁰¹ <https://apps.apple.com/lt/app/rinkimai/id1158712678>

¹⁰² See data on [CEC's website](#).

¹⁰³ Read more [about quick counting](#) and [quick counts for the 2021 elections](#).

¹⁰⁴ The functionality of the system is described on [INE's website](#) (available in Spanish).

¹⁰⁵ See [here](#) how to verify the authenticity of a protocol.



INE Instituto Nacional Electoral

Programa de Resultados Electorales Preliminares 2021
Elecciones Federales

PREP 2021 • MX

Inicio **Diputaciones** Base de Datos

Avance Nacional Actualizar

Actas capturadas	Participación ciudadana	Último corte
162,930 de 163,666 (99.5503%)	52.6759%	07 junio 2021 Tiempo del Centro 20:00 h UTC-5

Consulta de votación
Selecciona el reporte que deseas consultar:

Votos por Distritos

Votos por Partido Político y Candidatura Independiente

Detalle por:

Circunscripción: Todas

Entidad: Todas

Distrito: Todos

Diputaciones - **Nacional - Votos por Distritos**

El total de votos calculado y porcentaje que se muestran, se refieren a los votos asentados en las Actas PREP hasta el momento.
Por presentación, los decimales de los porcentajes muestran sólo cuatro dígitos. No obstante, al considerar todos los

Visualiza como: Mapa Compartir

INE website, 2021 Federal elections

The PREP is audited by an external entity, in the 2021 election, the Metropolitan Autonomous University was responsible of this review, it also reviewed the IT system and the technological infrastructure, evaluated the integrity of the information processing and generation of results, and analyzed the vulnerabilities. The first version of the PREP has been in force since 1991, when the transmission was done by fax, while in 1997 the transmission was first done by Internet. In 2000, the system allowed 28 media outlets to broadcast the information. In 2015, the images of the tally vote official sheets were published, which allowed external stakeholders to compare the data with the images. In 2016, phones were used to digitalize sheets from polling stations (with an application called PREP Casilla), which shortened the times to publish the preliminary results.

The dissemination of data, images and databases is the task of the Institute, together with official distributors. For the 2021 elections, the use of PREP ended on Monday, after the election day, at 8 PM, central time, while the publication of results started at 8 PM on the election day.

The PREP Technical Advisory Committee provides advice on the system and is composed of six experts in Statistics/Data Science, Information and Communication Technologies, Operations Research or Political Science that also have knowledge in election matters.

The **Register of tally vote official sheet** is used to capture, consult and, if necessary, modify the data obtained from the tally sheets from the polling stations to announce preliminary information of the null votes and those valid received by contestants. For the votes cast by voters residing abroad, the INE uses an application that captures the results from the polling stations and creates tally sheets from each federal entity.

The **tallying system** (Municipal, District, State and by Circumscription) records the results obtained from the sum of the cross-checked tally vote official sheets and/or from the recount of the polling stations. The application provides the final results of the elections.

The computed results, consisting of the sum of the results contained in the AEC of the polls in an Electoral District or a Constituency to obtain the final results of the election. Data for 2021 elections can be published on <https://computos2021.ine.mx>.

Norway

EVA (*see chapter 2*) includes two components for tabulation and results, respectively EVA Scanning and EVA Results. Ballots are counted manually or by scanners, and the electoral committee uses the system to approve the counts or reject ballots¹⁰⁶. Furthermore, the system is used to report to the media and record the county process in the municipality. Advanced votes in envelopes must be validated before they are counted and if they are rejected, the reason should be mentioned in EVA. All approved and rejected ballots are accounted for in the municipalities' election protocol.

Norway uses paper ballots, and the voting takes place manually. All votes are counted manually in the preliminary count. The final count can be done either manually or with scanners. 53 per cent of the municipalities used scanners in the final count in 2021 – although these represent a high share of the votes. Results from both machine count and manually count are registered in EVA.

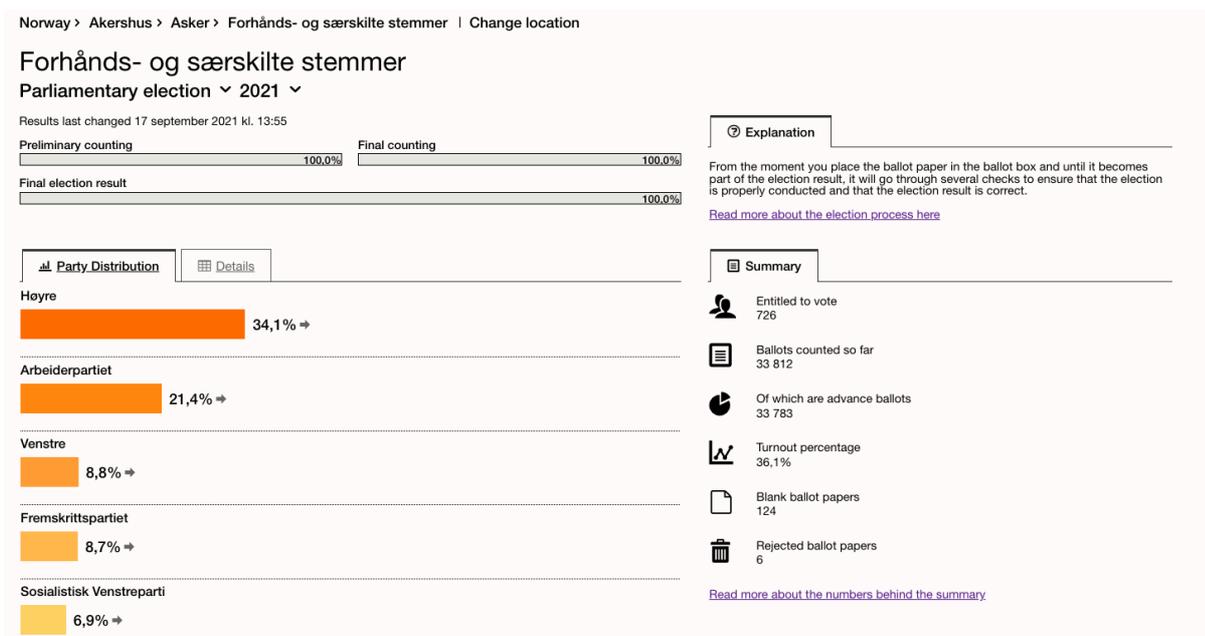
EVA Results transmits the data to the media and publishes it on www.valgresultat.no. EVA also uses the information to calculate forecasts. The first forecast is published when the polling stations close and is continuously updated as the votes are counted. The results on www.valgresultat.no switch from forecast to actual counted votes approximately 5 hours after the polling stations close.

¹⁰⁶ According to answers received from the Norwegian authorities, "Rejected ballots can for instance be a ballot paper with no stamp or a ballot paper where it is impossible to understand what the intention of the voter is. The main category of rejected votes in Norway is ballot papers without a stamp." In order for a ballot paper to be approved, it must be stamped by a returning officer.

EVA calculates the seat distribution and returning of candidates based on the election results. Record books with counting and results are generated from EVA and signed by electoral commissions and county electoral commissions.

The web platform www.valgresultat.no shows results at national level, but also on electoral district/county, municipality, and constituency level (may vary depending on election type). Statistics on voters, ballots and turnout are displayed. After the municipalities and counties have processed and approved the protocols, the protocols are available for download in pdf format, while centralized information can also be downloaded in csv format. API is also available¹⁰⁷.

The 2021 ODIHR Needs Assessment Mission Report for the Parliamentary Elections notes that “All ODIHR NAM interlocutors expressed confidence in the integrity of optical scanning, noting the manual controls in the counting and tabulation processes.”¹⁰⁸



[Norway Results page](#)

Republic of Korea

Voting is based on paper ballots, although electronic voting with touch screen machines was implemented in entrusted and private elections since 2006 and internet and mobile voting was tested since 2011 in private elections. In regular elections for public office, voters use a stamp to mark their option, which is later used in scanning ballots.

¹⁰⁷ See [results webpage](#)

¹⁰⁸ ODIHR [Needs Assessment Mission](#) report, Parliamentary Elections, 13 September 2021.

In elections for the National Assembly, counting is performed in counting centers, organized at Gu/Si/Gun election commission level. Optical Ballot Counting and Sorting Machines are used to assist sorting ballots by candidates and political parties, by reading the sign of the marking device and its location. Counted ballots are bound in bundles and the tally sheets for counted ballots are prepared, together with sheets for ballots that need to be treated individually (invalid, for example), which are reviewed manually. Security is maintained by blocking the connection to external networks and encrypting the public key¹⁰⁹.

A second step involves the verification of each bundle of votes for incorrectly inserted ballots and for the number of votes by using the Ballots Examining and Counting Machine by naked eyes. After the counting reports are checked, the counting report, counting sheet and ballots are transmitted to the Commissioners' Inspection Section, which inspects the number of obtained votes by political party and candidate. After the Chairperson announces the number of votes by political parties and candidate, the Recording and Reporting Section oversees the report and provides the results to the media and counting centers. Counting results are placed on Bulletin Boards for Counting Report within the counting centers.

Counting situation boards are situated in counting centers and anyone who is interested can verify the elections results in real time. Also, the results are posted on the NEC website in real time. Results are also distributed to the media and observers that can also take part in the counting process. The Voting and Counting Reporting System allows to release real-time results in public.

The NEC website provides a range of information of recent and historical election related statistics including voter turnout and election results¹¹⁰. General election results and statistics are also available to download in .xls Format¹¹¹. The data is structured according to education, age, gender or political parties and constituencies.

Romania

As illustrated in the section dedicated to voter registration, SIMPV includes a component that allows election commissions to introduce the data resulted from the voter lists and counting procedures in a dedicated form and verify its arithmetical integrity. If the results are not correlated and the control keys are not closed, the system does not allow to finalize the protocols and a decision of the county election commission may be necessary. Counting is performed manually, while SIMPV is used to transmit the provisional voting results electronically, for centralization. Apart from introducing the data manually, commissions should photograph the protocol with the tablet and upload it in the system. However, the paper protocols are the source for tabulation and announcing results.

The election administration also uses a second system, developed by the Special Telecommunication Service, for tabulation. The **Information System for Centralizing Protocols (SICPV)** facilitates the centralization of provisional, partial, and final data to the official webpage <https://prezenta.roaep.ro> as protocols are approved and uploaded into the system. SICPV provides for the digital signature of documents and is based on SSH/HTTPs security protocols.

¹⁰⁹ NEC, “[ICT-Combined Voting and Counting System](#)”, 2015.

¹¹⁰ <http://info.nec.go.kr/> and http://info.nec.go.kr/main/main_previous_load.xhtml, available only in Korean.

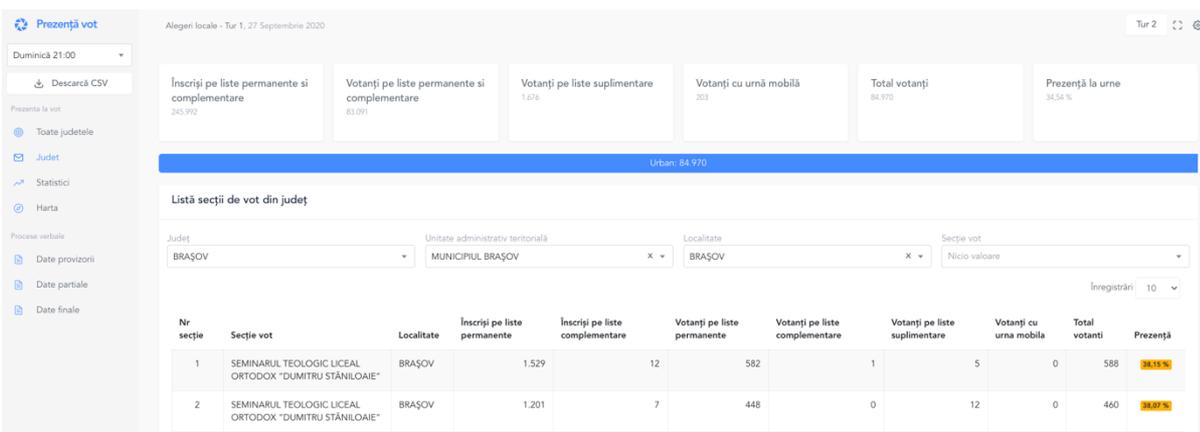
¹¹¹ See the [Election Statistics section](#), also available in English.

Data from SIMPV are automatically transmitted to SICPV. The system displays automatically on the public webpage information results from the verification of correlation of data from the original protocols and their photographed versions by the county election commissions. Provisional data is published for each polling station, together with the photo. Provisional data is verified at the level of county election commissions, based on the original protocols and the validated data is published as partial data. Final results are published as the data is approved by the BEC. Procedures regarding the process are regulated by the Central Electoral Bureau and the AEP.

The members of the BEC and the technical auxiliary personnel of the AEP and Statistics Institute have real time access to the SIMPV and SICPV databases duplicates, as well as to the logs of the machines on which they are run, within the computers situated on the premises of the BEC. Political parties can nominate experts that have visualization and interrogation rights of the databases and logs, through limited user rights. Civil society organizations can also nominate experts to observe the process and access the above-mentioned information. AEP ensures the conditions for security audit for both applications, while political parties can also request to audit them. For SICPV, the AEP provides to contestants and civil society organizations, the web source code, java client source code to connect peripherals, as well as migrations and seeders to create and initialize databases. For the mandate distribution apps, the source code can be requested.

The SICPV is developed by the Special Telecommunication Service (STS), as requested by the AEP. For the 2020 parliamentary elections, the system was developed 15 days before the E-day and tested by the AEP and Statistics Institute, while the final version was certified by the AEP five days before the elections.

The data processed by SICPV is also used by the applications for the distribution of mandates. Each type of election has its own algorithm and institutions that have to allocate mandates can differ, such in the case of the local elections, where the lower-level administration is in charge.



Nr secție	Secție vot	Localitate	Înscriși pe liste permanente	Înscriși pe liste complementare	Votați pe liste permanente	Votați pe liste complementare	Votați pe liste suplimentare	Votați cu urna mobilă	Total votanți	Prezență
1	SEMINARUL TEOLOGIC LICEAL ORTODOX "DUMITRU STĂNILOAIIE"	BRAȘOV	1.529	12	582		1	5	588	38,15 %
2	SEMINARUL TEOLOGIC LICEAL ORTODOX "DUMITRU STĂNILOAIIE"	BRAȘOV	1.201	7	448	0	12	0	460	38,30 %

[Romania election result page, 2020 local elections](#)

The USA

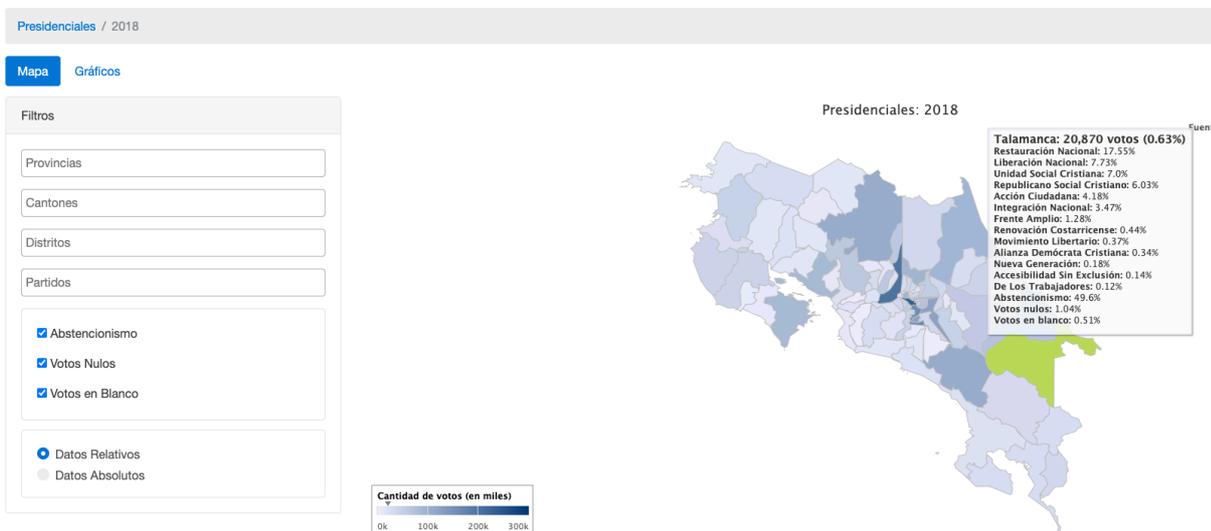
The practice in the US is rather diversified, depending on state and local election organizers. States use **Election Night Reporting Systems (ENR)** to display preliminary results through web-based applications. Some of the solutions

are provided by the external vendors. Public websites display information in different formats including visual (maps) or search engines, while some allow for data download in xls. or csv. The practice for tabulation and announcing of results can be very different, depending on the voting methods (electronic or paper based) and can include diverse methods to centralize the information (i.e., transporting the USB memory sticks from machines to the election offices). However, the final results may take days or weeks, after election officials take into consideration postal and provisional ballots and undertake the canvassing (and audit if the case) and certification steps.

Electoral databases – data on results and participation

Several states have developed historical databases that illustrate results or voter turnout, and which provide for visual illustration or download of information on a range of formats. Examples of such databases have been presented on the sections on voter registration and verification or regarding tabulation and voter results.

Since 2005 the TSE developed an **Electoral Atlas** in partnership with the Institute of Social Research of the University of Costa Rica - <http://atlaselectoral.tse.go.cr> - focusing on voter participation. The platform displays data on results of elections, turnout, contestants, as well as disaggregated data on gender participation. The data is available for all types of elections starting with 1953 until 2020 and is displayed in graphical or map format. Data can be downloaded in .xls file and charts can also be downloaded in photo or pdf format. The platform is developed with Ruby on Rails, which is an open-source software.



Electoral atlas, [Source](#)

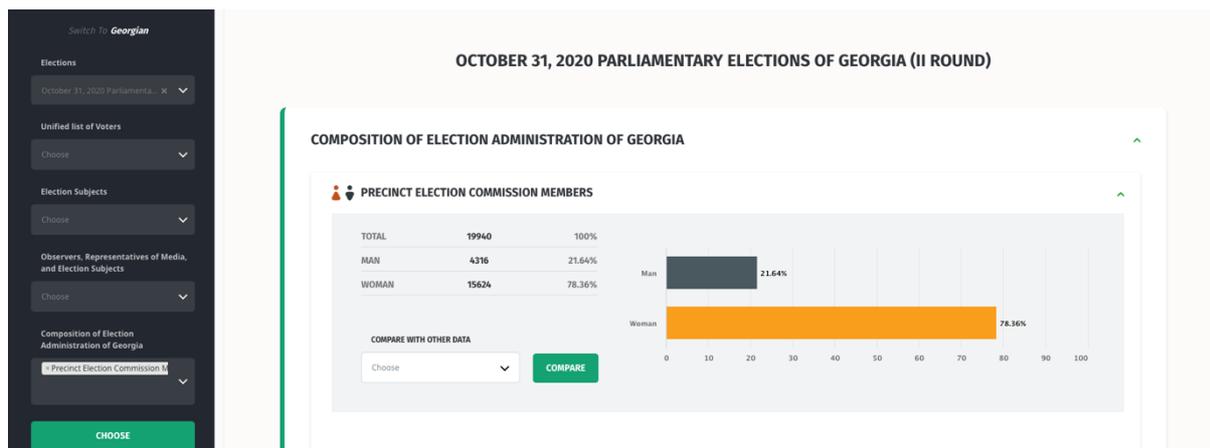
The National Electoral Institute of Mexico has developed an **Electoral Atlas**¹¹² with results from 1991, including results, turnout, and gender related statistics. Data is available for download in .csv format. Also, the Electoral

¹¹² See the data related to the [System to Consult Statistics for the Federal Elections](#)

Cartography and Geography¹¹³ section provides maps which are used for the distribution of citizens with the right to vote, within the national territory and for other services of the Institute.

Also, the INE provides a data visualization section dedicated to information regarding the results of census and the voter turnout between 2009 and 2018¹¹⁴. Data is disaggregated by gender, age, urban/rural.

The Georgian Central Election Commission has launched a **website reflecting gender participation in elections** - <https://genderstatistics.cec.gov.ge>. According to the elections held, the platform includes the following information: voter lists, election subjects, observers/representatives of media and election subjects, composition of election administration at all levels. Data are available according to the 2014 to 2021 elections. The data is displayed in table and graphic format and can be downloaded in .xls format. The platform also allows the comparison of several types of indicators. The website is available in Georgian and English.



V. Complaints

Costa Rica

In Costa Rica, electoral stakeholders can call 800-Electoral, which is a telephone service to file complaints or ask questions. The service features a web platform (ASP.net 4.0, Visual Basic.NET Framework 4) that facilitates the registration of incidents reported by telephone by the election staff. Within the platform a control of the provided solutions, follow-up, and closure of incidents are carried out; it has the ability to generate statistical reports for media and for internal use.

Georgia

¹¹³ Consult the section on [Electoral Cartography](#)

¹¹⁴ See the database on [INE's website](#).

The legal framework was amended and new provisions regarding complaints have been adopted for the 2021 local elections. According to the amendments, all the complaints to DEC and CEC can also be submitted electronically. The amended legal framework allowed the development of an electronic register of persons (proxies) entitled to submit complaints on behalf of political parties or civil society organizations/observers.

In order to use the electronic system, the party or the observer organization has to apply to the CEC to obtain a username and password. The request must include data including the name of the user; user identification code; phone number; e-mail address. Persons are eligible to file complaints electronically after the party is registered for elections or the observer organization is granted such status by the DEC or CEC. The proxies are registered by the applicant entity in the system.

A submitter could decide over the type of complaint, either electronically or on paper, to the electoral commissions. A limited timeframe was imposed for the electronic registration. The user has to change the password at the first login in order to be able to use the system; if the password is not changed, the user will not be able to login.

The web-based platform¹¹⁵ was planned by the IT and legal departments of the CEC. The website contains three sections: complaints, history of complaints and register of proxies – persons that can file complaints in the name of the party or observer organization. Complaints cannot be filed anonymously. After filling in the mandatory data (name, identification number, name of applicant, contact information and the commission to which the complaint is addressed to), the user has to upload an electronic copy of the complaint, in .pdf format (other formats are not allowed). Links can also be introduced in the form. After submitting the complaint, the system will automatically generate a complaint number, which means that the complaint has been successfully registered. The complaints submitted to the CEC are registered by the case management department of the CEC Secretary. If the complaint is received by the DEC, the complaint is registered by the commission's secretary. The platform includes an additional button that allows user to upload other complaints in case of errors.

The users can check for the status of their complaints, which can be in process, registered, unidentified, with issues or completed. The results are delivered electronically when the user is logged in. The web-based complaint register (portal) includes scans of all complaints and consecutive decisions.

India

The Citizen Vigilance - **cVIGIL** application¹¹⁶ (Android and iOS) was tested for the first time in 2018 and 2019 and currently is used in some states. The app empowers citizens to report violations of the Model Code of Conduct such as bribery or campaigning outside the official period and providing proof. During the 2019 parliamentary elections, a number of 142,250 complaints were received. Out of the 99% which were verified, 80% proved to be correct, which is a significant increase compared to the previous statistics (20-25%).

The application allows user to capture photos, audio, or video footage in real time (preloaded materials cannot be used). The app provides a geo-tagging feature when the camera is turned on. Complaints are assigned to field units

¹¹⁵ CEC [complaints web platform](#)

¹¹⁶ ECI, [cVIGIL](#)

that have a GIS-based mobile app called cVIGIL Investigator, which guides its members to the location. The field report is sent to the relevant returning officers that takes a decision. If it is correct, it is uploaded in the National Grievance Portal of the ECI for further action, while the citizens are informed in 100 minutes about the status. Anonymous reporting is allowed.

The complaints are accessible to the ECI, Chief Electoral Officers (through the **cVIGIL Monitor App**), District Election Officers, Returning Officers, flying squads and Police, who investigate violations of the election legislation. District Electoral Officers and ROs use the **cVigil Decider App** /Dashboard to follow all complaints in real time and to decide (drop/decide/escalate) upon the cases that are sent by the Investigator/field unit. Observers use the **cVIGIL Observer App** to follow the cases falling under their jurisdiction. Furthermore, the location of the teams (based on Google Map API for GIS capture technology) on the field can be seen by Chief Electoral Officers, ROs and the ECI in the **cVIGIL portal**. Apps and their manuals are available online¹¹⁷. One of the essential roles of geolocation was the timeliness of registering the violation, to provide proof for future indictments.

The **MCC¹¹⁸ Relaxation & Violation Portal** is an extended web portal of cVIGIL, launched in 2019 (parliamentary elections) and used to make violations data available. The portal includes all important violation cases, notices issued, and decisions taken by the ECI. Login is done by username (mobile number) and password/ One-time password (OTP). The source of complaints can be a written, from cVIGIL, 1950 service, media or others. Complaints can be initiated and solved at different levels:

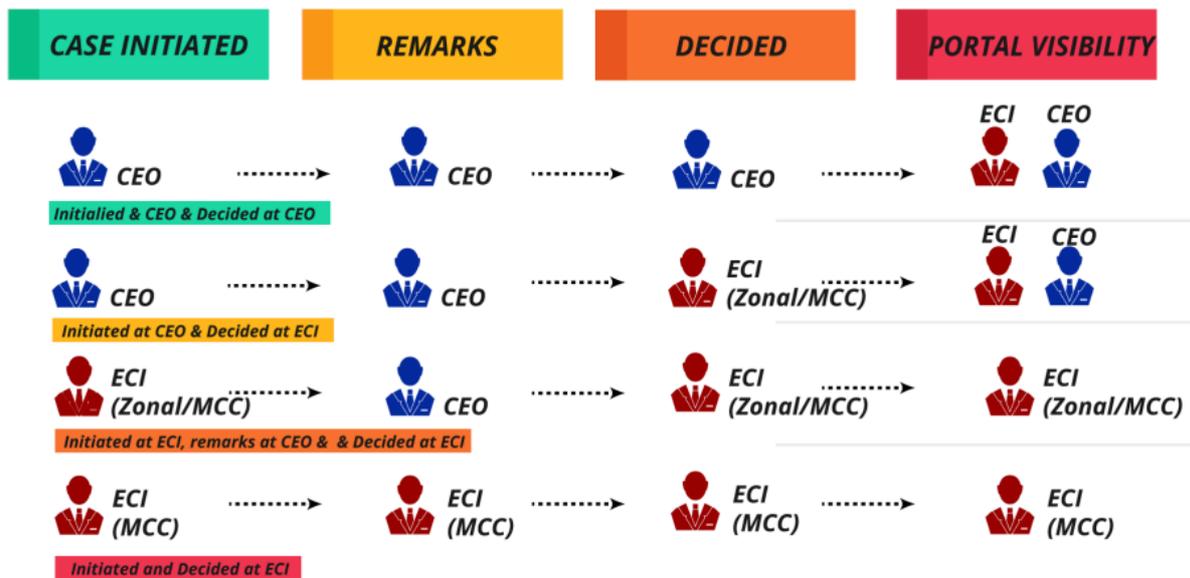
- Initiated at State level and decided at state level
- Initiated at State Level and Decided at ECI Level
- Initiated and decided at ECI level

Central ministries, state government ministries or departments can lodge the Model Code of Conduct relaxation requests and receive clearance online.

¹¹⁷ <https://cvigil.eci.gov.in/theme/user-manual.html>

¹¹⁸ MCC stands for Model Code of Conduct, a set of guidelines for political parties, campaigners and candidates.

MCC VIOLATION



MCC violation logic / [Source](#)

VI. [Digital tools for political finance and campaign disclosure](#)

Use of technologies in reporting and oversight of political finance has increased in the past years and can become a mechanism that help to impulse transparency. The use of such tools has a number of advantages that can provide support to political parties, oversight institutions, but also to external stakeholders that observe the process such as the media or organizations that monitor the electoral process, as well as citizens. Such tools can have several purposes:

- To facilitate reporting in a comprehensive and unitary manner for political finance and election campaign finance in close to real time.
- To allow oversight authorities to control and publish the data in a more organized and shorter time compared to paper reporting (which is not necessarily excluded by the use of online platforms).
- To display data in real time for public use, for citizens, media or organizations that observe elections
- To create open data repositories that can be reused for broader analysis.
- To allow for a more transparent fundraising.

There are several models of architecture and reporting. In terms of architecture, some states use software-based applications (US, Mexico, Canada, the UK), while others use web-based reporting systems. Regarding publication procedure, authorities may choose to publish the entire information without verification (followed by oversight), to post partial information or to publish data after a certain period of verification. Taking into consideration the purpose of such platforms, to enhance transparency, it is desirable to provide access as soon as possible to essential data, taking into consideration the limitations of the legal framework and the personal data protection regulations.

Although most of the tools are used for reporting and oversight, platforms may also be used for fundraising. In the case of the Republic of Korea, the Political Support Center (www.give.go.kr) can also be used to raise funds by credit cards, cash, and points-system.

However, the use of electronic tools represents only a part of the process to increase transparency and should be accompanied by independent and efficient institutions, as well as clear and functional regulations that can determine the institutional and legal framework needed to ensure proper oversight. In other words, the use of technology does not replace the active and efficient work of the institutions.

A number of states are using electronic reporting systems for some years, together with disclosure websites. They are rather diverse in terms of displaying the information and providing visuals to the public. One such example is the disclosure website of the US Federal Election Commission (FEC) - www.fec.gov/data, which provides access to information on raised and spent funds, loans and debts, filings or reports, candidates, committees and provides the possibility to extensively browse data online or to download it.

Some member states, such as Lithuania or the Republic of Korea, contribute to the informational context of the election campaign and use their websites to upload information about the candidates, their personal and professional profile, or their campaign promises. The display of such information may depend on several factors, including local culture or historical and political background. The Korean NEC uses the Policy and Pledges Informing/Reminder System, which is a platform that illustrates the policies and pledges of candidates¹¹⁹.

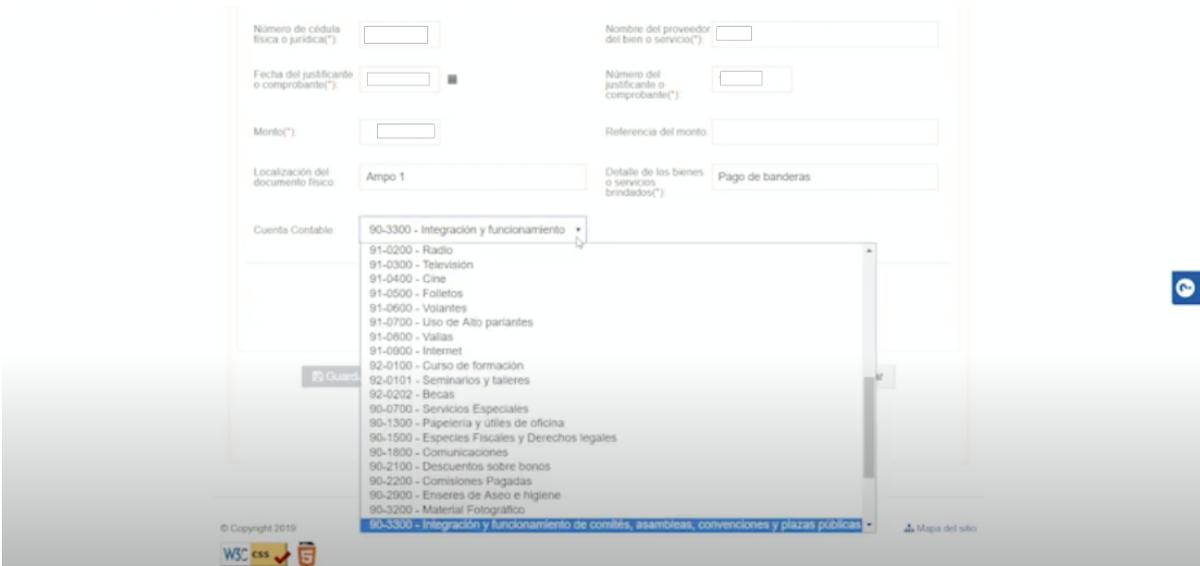
Costa Rica

Costa Rica's Tribunal *Supremo de Elecciones* offers a range of tools for reporting, for political parties and candidates, but also for the use of the general public. The General Directorate of Electoral Registry and Financing of Political Parties is the most important department that ensures the management of elections and includes three divisions: the Coordination of Electoral Programs, the Registry of Political Parties, and the Department of Financing to Political Parties.

The political finance module of the **Electoral Information System (SIE)** facilitates the registration of data for settlement of expenditure for political parties through the electoral services platform¹²⁰ - see *chapter 2*. Users can request access to the platform of electronic service for political parties through a form directed to the TSE.

¹¹⁹ See the section [here](#), for the 2022 elections – available only in Korean.

¹²⁰ [Servicios para Partidos Políticos](#)



Source: *TSE video presentation, 2020*

The control of political expenditure for advertising application (*Control de Gastos de Publicidad*) allows registering the information corresponding to the advertising expenses incurred by the interested parties in a referendum.

The TSE developed an application for **reporting of contributions for political parties** (*Contribuciones de los partidos políticos*) made by national and legal persons, as well as by foreigners. The public website section on contributions and donations¹²¹ displays contributions made to political parties by national, legal, and foreign persons in .xls format. The TSE provides a web API to extract data on contributions, including political parties, period, and amount of the contribution.

During the electoral period, **Public Plaza** supports the management of public events organized by political parties¹²². A web-based request form assists the members of the executive committee of a political party to request the permission to organize electoral activities such as rallies, pickets, fairs, caravans, parades. The form feeds a system that ensures the management of permits, including a statistical reporting module. A public page processes the activities and provides reports regarding the requests made by political parties.

The **Simulator of state contributions** (*Simulador de la contribucion estatal*) provides the possibility to calculate costs for reimbursements for political parties. Calculations are made based on expected number of votes received, settled expenses or unrecognized expenses. The data is illustrative, as the final value could depend on the results of the oversight.

¹²¹ https://www.tse.go.cr/contribuciones_partidos.htm

¹²² Read more about the authorization and publication of public activities on [TSE website](#)



Simulador de la Contribución Estatal

Contribución estatal 2021 - 2022: ₡19,790,922,360.00

Monto del financiamiento anticipado: ₡2,968,638,354.00

Resolución N.º 0669-E10-2021 emitida por el Tribunal Supremo de Elecciones

[Guía de Usuario Descargar](#)

Variables de Entrada			
(*) Votación esperada (%)	###	Emisión de Certificados Serie A (₡)	#####
(*) Gasto liquidado (₡)	#####	Emisión de Certificados Serie B (₡)	#####
(*) Gasto no reconocido (%)	###	Emisión de Certificados Serie C (₡)	#####
Financiamiento anticipado (₡)	#####	Emisión de Certificados Serie D (₡)	#####
(*) Porcentaje de organización (%)	###	Emisión de Certificados Serie E (₡)	#####
(*) Porcentaje de capacitación (%)	###	Multas, embargos y otros cargos (₡)	#####
Campos Obligatorios (*)			
Borrar Datos		Simular	

[Simulador de la contribucion estatal](#)

Canada

Elections Canada runs the **Political Entities Service Centre (PESC)**, a secure online portal designed for candidates and political entities to readily access a variety of services and digital documents. Reporting is done through the **Electronic Financial Return (EFR)**, which is a wizard-based software tool that can be downloaded by creating a free account¹²³. The tool allows the users to import data from a spreadsheet. The EFR can also be submitted electronically through the PESC.

The EFR can be used by political parties and candidates, contestants, and other entities (registered associations, third parties) for a series of financial reports. The tool is available both in English and French. A series of comprehensive video¹²⁴ and detailed written instructions is publicly available.

Elections Canada also hosts a public webpage that allows any user to access information about the contributions, financial returns (including for third parties), fundraising events and other reports¹²⁵. A search engine with multiple options is available. For donations, the public sections include name of donors, partial address, recipient, date, as

¹²³ <https://csep-pesc.elections.ca/>

¹²⁴ Election Canada, [EFR \(Electronic Financial Returns\) Videos](#) and [instructions](#)

¹²⁵ <https://www.elections.ca/content.aspx?section=fin&&document=index&lang=e>

well as the contribution. The portal allows the display of both submitted and reviewed data. Contributions to candidates from 1993 to present are also available in a section dedicated to open data.

Home > Political Financing > Search for Contributions

To begin your search, please select one or more political entities and at least one other search criteria.

Search Criteria

Political Entity - mandatory: Select All Political Entities

Candidates
Leadership contestants
Nomination contestants
Registered associations
Registered parties

Political Party: Select All Parties

Alliance of the North
Animal Protection Party of Canada
Bloc Québécois
CFF - Direct Democracy Party
Canada Party

Candidate/Contestant Name ⓘ

Last Name: First Name:

Return Status: ⓘ

Data as submitted
 Data as reviewed/amended

Advanced Search Criteria

Advanced Search Criteria

Contributor Name

Last Name: First Name:

Type of Contribution:

All Monetary Non-monetary

Province/Territory:

All provinces and territories

Contribution Amount Range

From: To:

Type of Contributor: Select All Types

Individuals
Corporations
Trade unions
Unincorporated Associations

Contribution Date Range

From: yyyy-mm-dd To: yyyy-mm-dd

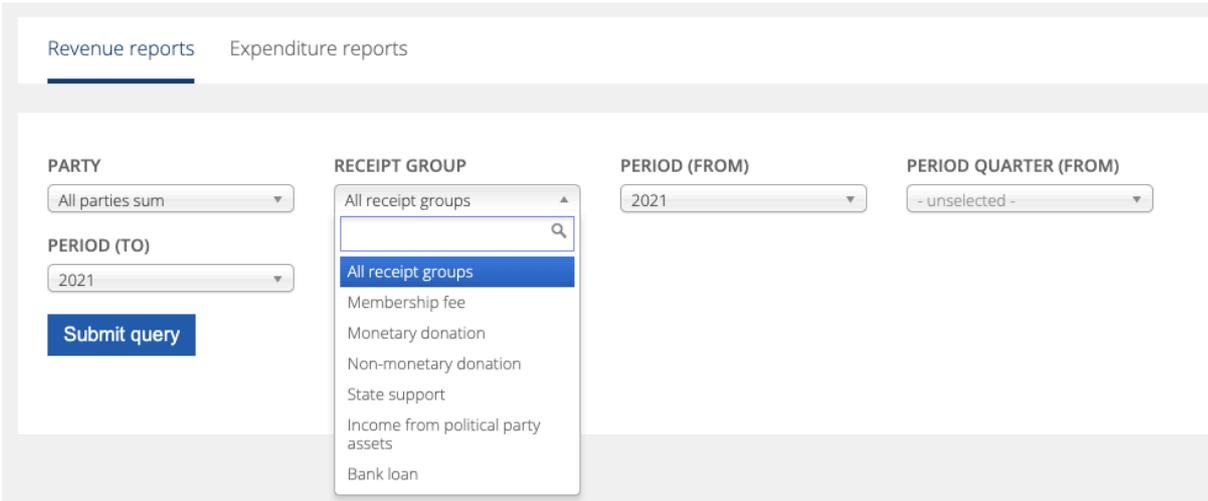
Elections Canada [political financing portal](#)

Estonia

The Political Parties Act entered into force in 2013 requiring political parties to report on their income, while an amendment in 2014 political parties have to report all political, labor and administrative expenses, according to categories set in the law. All election coalitions and independent candidates must submit an election campaign report and all political parties must also submit a periodic income and expenditure report. The Political Parties Financing Surveillance Committee is in charge with oversight.

The website www.erjk.ee displays the quarterly reports on revenues and expenses of political parties, allows queries on revenues and expenses for political activities and displays detailed lists of expenses for candidates in elections. The queries for revenues and expenses can be done based on an extensive list of filters, including party, type of donation/expenditure, period, or name of donor. For donors, the name and date of birth are displayed. For election campaigns, the platform also displays a list of expenses, including their destination, number, amount, and date.

The website was developed after consultations with political party leaders and treasurers while developing its system¹²⁶. The online reporting by political parties is mandatory.



Estonia political finance reporting portal. [Source](#)

The Estonian system requires political parties to upload data through a dedicated web page, www.erik.ee/is. The authentication is done by ID Card, Mobile ID or Smart ID through the TARA state authentication system, well fitted in the national digital infrastructure. Data can be uploaded by a person who has received the rights and is registered to login into the system. Reports can be modified, but the history of all reports is displayed in the system. Data can be uploaded as csv format or manually.

Cross-references are made with other databases, including population registries according to social security numbers to verify the authenticity of the persons that donate and business registry to check for the legitimacy of the legal persons. It is possible to make queries to tax registries for annual revenue and expenditures declared to the state, in order to compare the income¹²⁷. The portal does not display sensitive data such as the personal identification code but displays the date of birth.

The data displayed is presented in a unified format and allows export in CSV format. Moreover, several comparative visuals are embedded in the portal allowing for comparison between several years and political parties. A guidebook on how to use the reporting portal is available in Estonian¹²⁸.

Georgia

¹²⁶ International IDEA, [“Digital Solutions for Political Finance Reporting and Disclosure”](#), p. 16.

¹²⁷ International IDEA, [“Digital Solutions for Political Finance Reporting and Disclosure”](#), 58. See [Instructions for use of the information system](#)

¹²⁸ See [Information system operating instructions](#) (available in Estonian).

The Office runs two separate platforms which have been developed with the support of the Council of Europe at <https://monitoring.sao.ge/en> and fms.sao.ge. The first one is used for the publication of data, while the second one is used by political parties to submit their reports after their registration. The collected data covers both annual reports of the political parties and information on election campaigns.

Being first developed in 2016 the need for the platform had been dictated by the demand for more public information and the legal framework. The platforms are owned and updated as necessary by the SAO. The institutions ensure the operation of the platforms with the internal IT personnel and provide security within their security policies and programmes. The source code of the platform is not public.

Political parties are allowed to submit financial reports and other information both in paper and electronic (electronically signed) forms. For submission, political parties log in to the FMS Admin (Financial Monitoring Service) to report based on permission from the SAO. The system allows to import data from spreadsheets¹²⁹. After the information is uploaded in the system, the SAO assigns a verification their status.

Political parties ought to submit the following reports through the FMS platform:

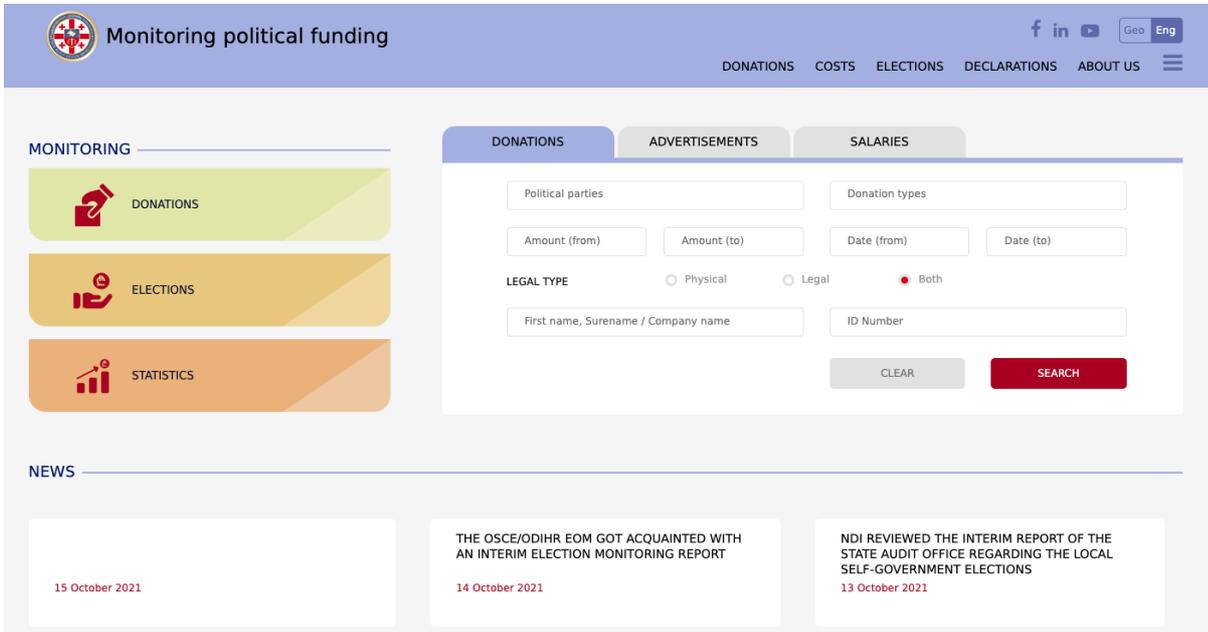
- Donation or membership fee declaration.
- Information about cash outflow transactions from the bank account.
- Information on the pre-payment of political advertising.

This system is connected to other civil electronic registries. For this purpose, the SAO signed a Memorandum with the Data Exchange Agency and the National Agency of Public Registry for the use of an integrated civil registry in the platform. The electronic reporting platform thus enables the validation of personal data of donors from the reports through cross-checking with the Civil Registry.

The website includes statistics about income (public funds, targeted, donations) and expenses (advertising, salaries, and business trips), reports on elections in .xls and .pdf formats and annual statements. A search engine for the donors, including filters that allow to select by name and personal identification number is available, while search results can be downloaded in csv or .xls. Statistics are also presented in a visual format. They have also been recently upgraded to provide better information for users.

According to the SAO, “the development of platforms has enabled faster and more efficient information publication process” and “the platform contributes significantly to the transparency of political party finances, as well as reporting on political activity.” The COVID-19 pandemic has not affected the functionality of the current tool. Currently future development plans are not envisaged.

¹²⁹ Jones, Samuel. *Digital Solutions for Political Finance Reporting and Disclosure*, Practical Guide, Sweden: International IDEA, 2017, p. 89.



[Source](#)

Lithuania

The **Political parties and political campaign financing control module** is operated by the Central Electoral Commission (CEC) and is a component of the VRK IS. The system covers both campaign finance and annual party reports that are filed through the system. The CEC allowed a two-year transition period before online reporting became mandatory¹³⁰.

The e-reporting tool allows authorization via e-government gateway and can be used by political parties and participants to the election campaigns to report, but allows access to media, auditors and ensures monitoring capacities for the CEC and other oversight institutions. One of the main objectives of the platform was to provide a tool that would facilitate the collection of data for an easier analysis.

As the system is part of the national e-infrastructure, it communicates with data from other systems, such as the Register of Residents, the Registry of Legal Entities, and the registry regarding member of political parties to perform verifications.

The legislation establishes that CEC together with the State Tax Inspectorate under the Ministry of Finance creates conditions for the political party treasurers during the election campaign to check in the information system whether the donor meets the legal requirements (identity, source of donations) and the CEC is responsible for the proper functioning of the information system. Financial representatives of the competitors can check if donors have the

¹³⁰ International IDEA, [“Digital Solutions for Political Finance Reporting and Disclosure”](#), p. 44

required nationality characteristics and if the donation threshold has been reached (10% of the donor's annual income). The same requirement is applied to party membership fees.

Since 2020 a very similar requirement is applied to candidates own funds (20% of the candidate's annual income and declared funds).

Electoral contestants are required to submit through this module the donations for the election campaign in 10 days after receipt; for political party financing, membership fees cannot be used until they are reported in the system. When a contribution from a natural person is registered, the name and personal ID and surname of that specific person has to be filled in the system. Responses to queries are received in a few minutes. By pressing a *check* button, the data of the donor will be filled in automatically and information on disability to donate (not citizen or not resident, depending on election) will be given if the data is correct. Incorrect data is not submitted to the CEC. After verification and submission, the data is published on the website and accessible to the public (in Lithuania, donations over 12 EUR are published).

The system also facilitates the exploration of data from three sources – participants of the political campaign (reports), media (reports) and monitoring groups (contracted by the CEC) – that allows the CEC to find matches and differences, as well as to evaluate risks related to political expenditure. Also, it supports the institution to identify undeclared expenditure and hidden advertising. A part of the task is performed manually by the staff of the CEC. For example, data on Facebook paid Ads could be introduced manually in the system, which allows the oversight body to compare if there are different figures for the same entry. Data is also introduced from the Ad Catcher¹³¹, a platform that was used by the CEC to gather information about irregularities related to advertising in the election campaign, including through anonymous reports.

The web platform features a series of user manuals and explanatory videoclips on how to use it¹³². Some of the featured topics include: how to record political expenses, how to enter bank statements, how to register funds received for the election campaign etc.

Public data is available at www.rinkejopuslapis.lt/ataskaitu-formavimas. The website contains information about records of political campaign, funding reports, lists of donors, contracts, reports on political advertising and bank statements or contracts and invoices. Also, reports on political advertising and reports containing the findings of the auditors are available¹³³. The platform allows exports in a wide range of formats, including doc, pdf, xls, or csv.

Mexico

Instituto Nacional Electoral (INE) audits national and local political parties, coalitions, candidates, national political groups and organizations. The INE uses for inspection several systems¹³⁴:

¹³¹ See here [the Ad Catcher](#).

¹³² <https://www.vrk.lt/finansavimas>

¹³³ <https://www.rinkejopuslapis.lt/ataskaitos76>

¹³⁴ <https://fiscalizacion.ine.mx/web/portalsif//sistemas-de-fiscalizacion>

- The *Sistema Integral de Fiscalización - Comprehensive Inspection System (SIF)*¹³⁵, which is the web-based system where political parties and independent candidates register their income and expenditure. The system allows users to attach the supporting documentation for operations, generating accounting reports, expense distributions and the automatic generation of the citizen support, pre-campaign and campaign reports as well as quarterly and annual reports of the ordinary operation.
- **The National System of the Register of Pre-candidates and Candidates (SNR)** – see chapter on candidate registration.
- **The National Registry of Providers**¹³⁶, which has the purpose to manage, concentrate and consult data of national individuals or legal entities that sell, lease or provide goods or services onerously to political parties and independent candidates.
- **The System for Monitoring of Spectacular and Print Media (SIMEI)** helps to detect advertisements placed on public highway and facilitates the search for advertising and propaganda in printed media of national and local circulation, to compare with the reports of the pre-candidates, independent candidates and political parties and coalitions.

As the National Registry for Pre-candidates and candidates (SNR) is approved, automatic access is generated for the SIF. Candidates receive login information, user, and password, in their SNR mailbox, which they have to use for login. National political parties have to nominate financial officers (*responsable de finanzas*) that can operate changes in the system, which in turn can nominate other roles in the system. Data can be entered manually or uploaded from existing file and the system cross-checks with information from other institutions such as the Financial Intelligence Unit and National Bank and Monetary Commission¹³⁷.

The SIF contains a series of modules. For example, the module on contracts (*aviso de contratacion*) allows users to register certain contracts used for the campaign. The system includes several additional catalogues related to accountancy and contributors. Reporting in the system is limited according to the election campaign deadline. A help center, including frequent asked questions and manuals, is provided.

The INE developed several tools to implement its prerogatives in regard to media:

- The **Comprehensive System for the administration of time of the State** - administration of the radio and television times assigned to political parties and independent candidates, from the creation of the guidelines to the verification of compliance.
- **News Monitoring** – used to monitor and analyse the information of radio and television programs, in accordance with the catalogue approved by the General Council of INE, know the time allocated and the treatment granted to each political party and independent candidate.
- **System of Guidelines, Control and Monitoring Materials** - administration of the times of the State for transmission of the messages of the political parties, coalitions, independent candidates and electoral authorities on radio stations and television channels during the electoral process and the ordinary period.

The political finance disclosure website illustrates the entries of contestants during campaign and precampaign. The portal shows information on the latest elections, but also historical data and allows users to see in a summarized

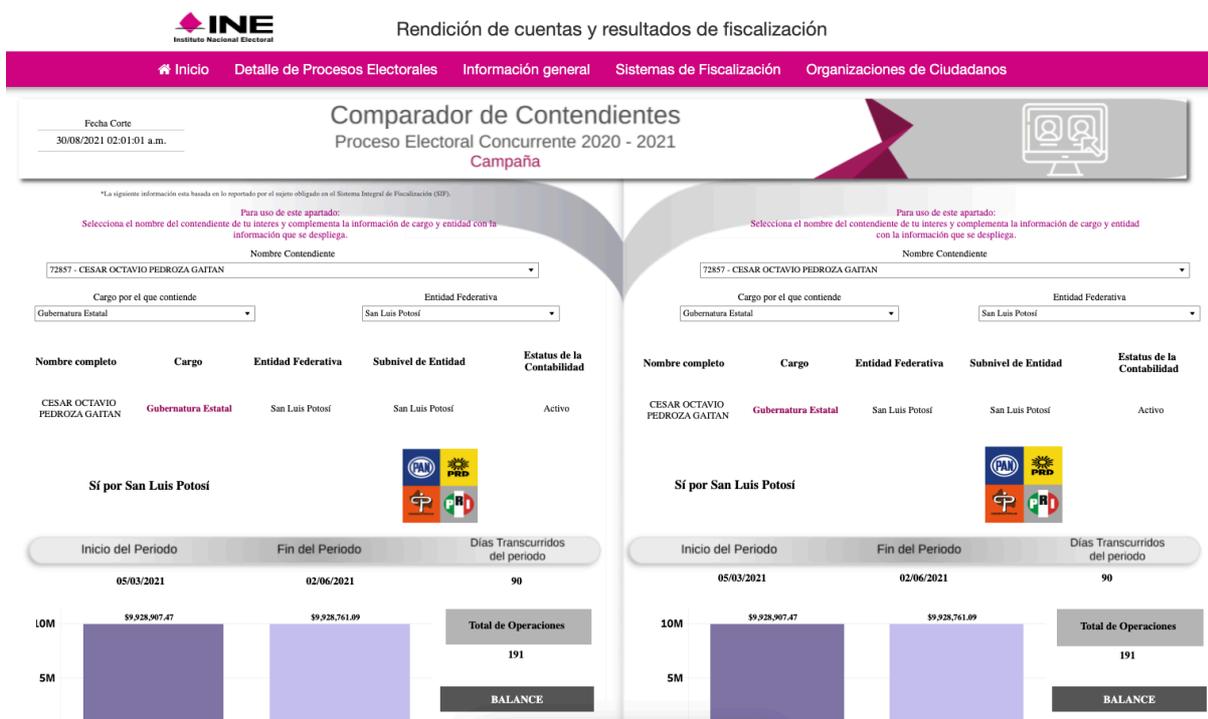
¹³⁵ <https://secretariadefinanzasrsp.com/sif/>

¹³⁶ <https://rnp.ine.mx/rnp/app/loginProveedor?execution=e1s1>

¹³⁷ International IDEA, “[Digital Solutions for Political Finance Reporting and Disclosure](#)”, p. 90

format the incomes and expenses of candidates, summary of contracts, agenda of events, data on income and expenses for pre-campaign.

The high number of embedded filters allow users to search information easily. The INE also uses the Tableau software in order to illustrate the data. Reports including list of operations, income and expenditure by category and events calendars, published since 2014 are available for download in xls format. The online platform features an option that allows users to compare the activity of contestants¹³⁸.



Comparison between candidates, 2021 elections. *Source.*

Users can browse or download the media monitoring results, which include reports of the SIMEI¹³⁹, helping to detect advertisements placed on public roads, in printed media of national and local circulation. A list of verification results is available. Search is facilitated by a high number of filters including candidates, entities, types of materials and others. The information can be downloaded in xls.

Norway

The web site www.partifinansiering.no was initially established in 2007, according to the Law on Political Parties and was renewed in 2018-2019. The legislation required the development of a central register for reporting to “collate the information concerning the party and party unit’s reports and make this available to the public in an appropriate

¹³⁸ https://fiscalizacion.ine.mx/web/portalsif/comparador_campana_pec_2021

¹³⁹ See for example <https://transparencia2020-2021.ine.mx/>

manner, for example by electronic means¹⁴⁰. The website was developed by the governmental institution County Governor Shared Services (*Statsforvaltarens fellestenester*), which is primarily a support body for the County Governors in Norway that has the purpose to develop and operated digital services for the public.

Political parties that are subject to transparency procedures report to Statistics Norway. The platform displays annual donations, election campaign contributions and accounting data. For party finance, all political parties are required to submit annual full reports, except those whose total income during the year is less than NOK 12,000, public grants excluded, by June 1. For election campaign, contributions in excess of NOK 10,000 received in the period 1 January and until Friday before election day, as well as membership fees must be reported. Electronic reporting is not compulsory, but the majority of political parties use the system.

The website is designed in order to allow external stakeholders to use data and make their own research. The website allows exports in numerous formats such as .csv, .xls and .json and includes visual representations of data, that allow for the visual interpretation of the information on annual donations. The platform is also available in English.

General data on elections, but also data on political finance and electoral contributors can be downloaded from the portal of the SSB¹⁴¹, in xls and csv portal.

The party portal - www.partiportalen.no - developed by the County Governor of Vestland, can be used by political parties to apply for state subsidies and submit annual reports and electoral contributions. The portal is also used to get updated contact information on all party units in Norway, which are approximatively 3000 and as a place to find relevant information for the party units according to their obligations according to the Political Party Act.

Political parties have to be registered in the Political Party Register to apply for subsidies and update their bank information and details. Only registered party organizations, including affiliated subordinated units at local and regional level, can apply for state grants. Necessary bank information has to be confirmed annually or when changes emerge. The portal allows political party units to login by electronic ID and submit forms through the Altinn platform¹⁴².

Representatives of the political parties are assigned with roles in the platform, which allows them to report according to their level of authority. New persons that have roles in the platforms are admitted by someone who already has the same role or by an approved contact person of the party unit which holds a higher position in the hierarchy of the political party. For example, a new contact person of a municipality unit can be approved by an already certified/ approved contact person for the regional unit.

Statistics Norway (SSB) has the task of arranging the reports, as well as collecting and publishing the information. The institution performs audit/control of the report data regarding logical errors and missing data in the questionnaire. Where SSB identifies issues, a request for additional information or the correct data is sent. However, SSB does not correct or exclude information without the approval of the reporting unit. According to the Political

¹⁴⁰ See the [Political Parties Act](#)

¹⁴¹ [Statistics Norway, Funding of political parties](#)

¹⁴² See more on www.altinn.no – “Altinn is an internet portal for digital dialogue between the business community, private individuals and public agencies. Altinn is also a technical platform, which public enterprises can use to create digital services.”

Party Act the deadline for reporting is 31 May of each year and the data is usually published in the platform in August.

Romania

The Romanian legislation included major amendments in 2015. Among the amendments, political party reporting requirements have been adapted in order to facilitate the publication of data in electronic data. The legislation established that the financial officers of political parties are required to submit the documents and reports in electronic format. Political parties are required to submit certain documents and reports for the yearly deadline (April) in electronic formats; the list includes donations, membership fees or loans over certain thresholds, as well as loans resulted from electoral periods.

The AEP is in charge with the oversight of political and campaign finance. Since March 2019, the AEP has operated an online portal, www.finantarepartide.ro, which coagulates the annual reports on party finance, the income and expenses reports for the election campaigns, as well as audit reports, decisions of the AEP (for example, allocations of subsidies), declarations of contestants or lists of materials.

The website allows for partial export of data in machine readable formats, such as .xls or .doc. The development of the website represents a visible improvement from the previous period, although the publication of information in open data formats can be further improved.

This issue is caused by both the low number of political parties that report despite existing requirements, but also because some political parties¹⁴³ do not follow the electronic reporting requirements.

The AEP has developed an internal electronic reporting tool, called **the Fiscal Register of Political Parties**, which aims to facilitate the fulfillment of reporting and transparency obligations of political parties. Currently, the application manages the reporting of monthly income and expenditure from subsidies, as well as general fiscal and management data on the political party. The application was developed by the AEP, in-house, through the Department for the Informatization of electoral processes. Each political party can add access, see the history of the edit actions of the local branches and export data. Actions such as political fusions can only be processed by the AEP administrators, which can delete, add, or edit data for political parties and their branches. The AEP administrators can also track the alterations produced in the database. The application provides an external API for political parties to create their own applications.

Re-use of data on political finance

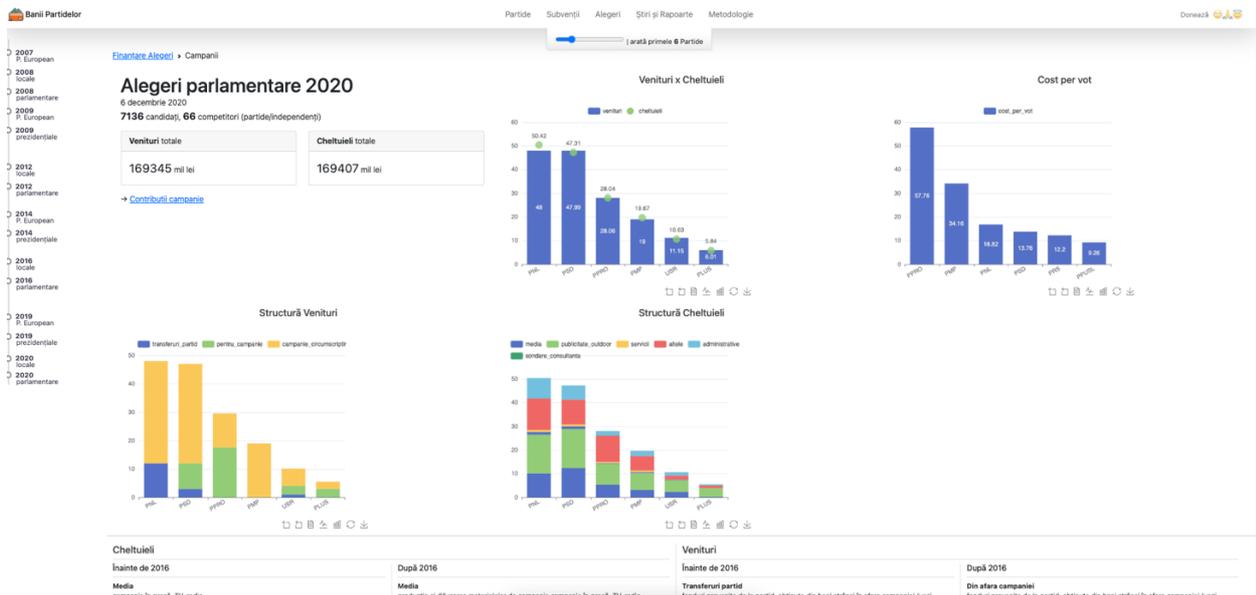
Civil society organizations or academics use or process the information published by authorities or political parties to develop their own platforms. In several member states alternative platforms have been set-up and are either complementary to the ones developed by the EMBs or audit institutions or fill in for such need. Opening data and

¹⁴³ Independent reports [published by Expert Forum](#) have shown that 32 political entities out of 189 registered political parties followed the legal requirements in 2020 and publish the obligatory information regarding income and expenses.

providing access to information gathered through reporting tools is important in order to provide more transparency, increase access of observers and provide alternative perspectives to the public. As not all states publish extensive information or provide online platforms with search engines and graphical interpretation (in some cases, EMBs may avoid interpreting the data), offering access to external stakeholder that sometimes have more autonomy in producing reports could boost a better oversight over political finance. Further, sometimes the platforms illustrate the information in a complementary manner, which could also be of use for the EMBs, in their oversight activity.

In Estonia, the Liberal Citizen Foundation (Salk) developed a website - <https://rahapada.salk.ee/> - illustrating contributions to political campaigns in a visual manner, which also allow to search according to political parties or name of donors.

In Romania, Expert Forum developed a comprehensive platform including all the available information on contributions and expenditure on political finance, including real time monitoring of subsidies. The www.banipartide.ro platform covers political party and campaign finance from 2006 to 2021 and provides data in searchable, tabular, and visual formats. All the processed data is available for download.



www.banipartide.ro

In the US, the www.opensecrets.org platform, developed by the Open Secrets non-profit provides a comprehensive resource for campaign contributions, lobbying data and analysis available for the US political scene. Sunlight Foundation developed the Influence Explorer – www.influenceexplorer.com – a website dedicated to campaign finance, lobbying, earmark, contractor misconduct and federal spending data in the US. The website reflects real time data and provides records to download in bulk.

VII. Introducing new digital tools: principles and good practice

This section gathers relevant information and good practices, as well as essential principles, for introducing new digital tools or platforms. The walkthrough is also based on experiences shared by the EMBs, audit offices or cybersecurity institutions in GC member states. It could be considered as a minimal tool to plan this process and to avoid some of the risks and vulnerabilities that other organizations and institutions have faced.

Planning

When planning the implementation or modification of a tool or platform, the first step should be to clearly identify the problem, which it would resolve and the need to which it responds. Based on this, its aim needs to be very well defined and detailed, as the overall purpose of such tools cannot be fundamentally changed, even though adaptations are likely to happen. Even though modules can be added later, a clear planification of the objective and logic is essential.

Most of the platforms need constant upgrade, in order to reflect the current legal, security and technical necessities of the election administration. For some EMBs, the pandemic provided an unintended reason to add functionalities or adapt the existing electronic instruments. Periods between elections are optimal moments to upgrade or modify the system; however, a reasonable period of time should remain before the start of the electoral period in order to allow for testing, training, and information of the target public. Taking into consideration the political and decisional status, the EMB could aim for more ambitious modifications when there is a high level of consensus and can focus on smaller ones when it is lacking. However, sometimes, changes have to take place in a short time, due to unpredictable causes, such as the Covid-19 pandemic (*see the last section*) or due to last minute legislative amendments.

Identifying and treating **risks and opportunities** to reach the objectives from an initial phase may support the implementation of the project, as they could be prevented and avoided in later phases, and it could also contribute to the improvement of the tool.

However, if the risks and disadvantages in implementing new technologies may be too significant, the authorities could halt a new project. Some examples related to the implementation of internet or electronic voting illustrate this case.

The developments should be **planned for the long term or could be part of a long-term strategy**. In some cases, governments or EMBs have a digitalization strategy, while in other states the development of new digital tools comes rather from dissipated initiatives.

Also, the adoption of any kind of tool or system should be considered in the context of the entire electoral and political process, as it may have an impact on multiple steps. For instance, Elections Canada is working on a Digital Strategy for the next eight years, which aims to:

- Increase access to reliable data and to understand the needs of the citizens and inform the business decisions.
- Its services and tools meet the needs of users and can be accessed virtually by all users.
- EC processes and systems are reliable and responsive to its needs.
- EC is an authoritative source of information for the electoral process stakeholders.

The strategy aims to develop EC's external service (voter information, on-line registration, voting services and the political entity portal), as well as its internal ones, envisaging to improve electoral event and data management, as well as analysis services.

Public trust is an essential prerequisite. If citizens do not trust institutions, including EMBs, parliament, political parties, audit institutions, it is difficult to believe that the introduction of a digital tool could change their opinions. On the opposite side, it could make the situation even more difficult, as citizens will probably expand their lack of trust in the newly introduced platforms or voting methods. One of the essential conditions for which Internet voting works in Estonia is the broad public trust in institutions and political parties. To ensure trust, such instruments should always be available, and any issue should be clearly explained. The reliability of the system builds trust in different kinds of stakeholders.

One of the responding institutions highlighted that “it is necessary that any introduction and use of new technologies provide certainty, trust and transparency among the different actors that will operate, consult and analyze them.

For this reason, the main recommendation is that any new implementation should be accompanied by a great dissemination campaign that allows the most complex technical elements behind it to be brought closer to anyone, the constant accompaniment of the actors in each phase of implementation and operation, including political parties, nurture the activities that are executed and improve confidence in them.”

Consultations with diverse stakeholders are beneficial for a better design of the platform. It is not important only to consult with other agencies (cyber security, data providers, developers), but also with the civil society, academia, media, and the general public, as the user experience and public trust are a key element. The target users are also an important category of stakeholders to be consulted. For example, political parties should be consulted and involved if a political finance web platform is to be developed for political finance reporting. If political parties do not agree with to use such tools or platforms, its development may be hampered. Out of country voters could be consulted regarding the introduction of a new voter registration tools. Open data experts and academia could be questioned before developing a data repository.

Consultations based on sociological methods are useful to get a better sense of the needs. Questionnaires, feedback forms or focus groups with different kinds of stakeholders could provide a better impression of how the tool will work. Consultations with institutions that already implemented such tools or with international organizations that hold experience (International IDEA, ODIHR and others) could contribute to the better development of the product.

Monitoring reports from national and international organizations could also provide a good starting point to better understand how the activity could be improved. According to some consulted EMBs, analyzing and having a clear overview of the already used technologies constitutes a good starting point: and the main focus of this report is to provide such examples. Documenting the steps could support the process and give confidence.

The development process depends on a wide series of factors, including political, institutional, and technical ones. **The development plan** should consider any limitations or prerequisites that may hamper the proper development of the project, including time, human capacity, budget, cultural and societal aspects, availability and expansion of IT networks, political will, institutional mandate and independence, enforcement capacity and others. Human and financial resources are probably two of the key elements that could be taken into consideration. The introduction of new digital tools could impact the capacity of the IT and security departments or could involve the need to train experts and members in the polling stations (for example, for the voter verification systems). In some cases, EMBs are not properly prepared for such changes, as the current staff is not well enough prepared or is insufficient. According to the ECI, developing national capacity building in managing and maintaining technological solutions is one of the key recommendations. Therefore, one important aspect is to map the resources and the possibilities to increase them in order to implement a new project.

A feasibility study could provide evidence on what is doable and what is not, taking into consideration a wide range of factors, as well as what architecture and technology could be used. The responses to the questionnaire illustrate that member states use a variety of architectures, programming languages or physical machines in the process. Therefore, each initiator needs to explore various variants to find the proper one. According to the ECI, the decision-making process should include “feasibility studies, needs and security assessments, and evaluation of other factors in making an informed decision”.

While planning, **a mapping of available information** that can feed the system or that would be required should be performed. The detailed and correct mapping of the existing and envisaged information is essential in order to develop the architecture of the platform. This may also be an important topic when it comes to introducing legislative amendments: if the legal framework does not require an entity (for example, a political party) to declare or report certain data, the use of the platform may be limited. If political parties do not use the same form, the development of an electronic reporting and disclosure platform may be hampered.

The lack of existing or limited databases could limit the possibility to enhance the processing capacity of the EMBs. If databases come in different formats or are very limited, could be difficult to be included in the election process without further processing. **Interoperability** is an essential aspect, as data needs to communicate in order to power up a platform or an electronic tool. For example, if two databases that process information about citizens would not work if they were not connect by a common nominator, such as the personal identification number of the specific person.

In most cases **the amendment of the legislative framework** is necessary to introduce the use of technology. Without the sound regulation of such tools, their implementation may not be properly adopted, while enforcement could be limited. Loopholes in the legislation could represent a risk in implementation and use. New provisions should take into account international standards and good practice regarding elections, but also the national constitutional requirements¹⁴⁴. There is a wide range of standards, which also depends on the membership of different countries to a number of international organizations.

The Council of Europe has adopted in February 2022 the **Guidelines on the use of information and communication technology (ICT) in electoral processes**, which defines key conditions for the implementation of technology and provides new insights on the topic.

The text is available on the [CoE website](#).

The legislation should cover the institutional mandate and collaboration with other institutions (for security reasons, to transfer data and other functions), technical parameters, sanctions, appeal procedure, transparency and access to information, open data regulations, personal data protection, cybersecurity, audit, and others. The legislation needs to cover the manner in which the introduction of a new system or tool can modify the already existing procedures: deadlines for registration or complaints, documents requested for certain procedures or personal data provisions.

The legislation should clarify the roles of all stakeholders in running such a project, while responsibilities should be assigned, communicated, and understood throughout the organization.

Furthermore, primary legislation and internal provisions of the EMB should regulate the security procedures of the tools or platforms. For example, Costa Rica approved in 2020 security policies for the development of systems and implementation of the technological platform. Lithuania CEC elaborated decisions regarding the functioning and security of information system, while also implementing national regulations on the update of information systems.

Legislation can be initiated by the EMB or by other institution, such as the Government or Parliament, which may have different limits of understanding the electoral and technical process. **Several EMBs underlined the importance of the institution working with the legislator.** A strong political opposition to such projects may hamper their functionality, as the legislator may refuse to elaborate legislation in time or limit the funds. Underbudgeting could seriously affect the proper use of technology in elections.

The pandemic has shown that some states that organized elections in 2020 initiated the introduction of new voting methods or technologies, without the necessary time for testing and sometimes with scarce regulations. The introduction of new tools should include consultations with all specialized stakeholders that should also contribute in writing the legislation. Even in unpredictable situations, transparency and proper regulations should be part of the implementation process.

¹⁴⁴ For a comprehensive analysis on the legal requirements see Ardita Driza Maurer, “Digital technologies in elections”, <https://rm.coe.int/publication-digital-technologies-regulations-en/16809e803f>, 2021. Also consult [CDL-AD\(2019\)016-e](#) Joint Report of the Venice Commission and of the Directorate of Information Society and Action against Crime of the Directorate General of Human Rights and Rule of Law (DGI), on Digital Technologies and Elections, adopted by the Council of Democratic Elections at its 65th meeting (Venice, 20 June 2019) and by the Venice Commission at its 119th Plenary Session (Venice, 21-22 June 2019).

The legal framework on digital technologies could be fluid, due to the frequent change of technology and unexpected events. Therefore, the constant adaptation of the legislation should be envisaged, as organizing voting with new technologies, but with outdated legislation may be challenging.

Piloting new tools, even without a full legislative framework in place, could support the introduction of new technologies, as it could show limitations, risks, and advantages. Furthermore, it could produce solid arguments in states with low political will to introduce technology or where the public trust is rather limited.

Regarding the **development process**, the Agile method could provide a useful insight. As opposed to the waterfall method, which involved the sequential implementation, the Agile method “takes a different approach. You do all these things - gathering requirements, planning, designing, building, and testing - at the same time. You start small in the discovery and alpha phases. You research, prototype, test and learn about your users’ needs before you start building the real service in the beta phase. You only go live when you have enough feedback to show your service works for your users and meets their needs. You continuously learn and improve to build a service that meets user needs.”

Technical principles

The implementation of new digital tools could involve the procurement of technical equipment, software licenses, servers for hosting and processing data, hiring external vendors to provide services or expertise to run the development projects. While some EMBs choose **to develop the tools in house** (e.g., Canada, Costa Rica, India, Mexico, Romania) **or in partnership with other state-owned institutions** such as telecommunication services, cybersecurity institutions, statistics offices etc. (e.g., Romania), in other cases **one or more providers were contracted for running the project**, building the infrastructure, ensuring its maintenance and security, or providing hosting. The Swedish Information Election System is developed mainly by authorities, the Lithuanian one in collaboration with a private company, while in Estonia several private companies are involved; the Finnish system is similar to the Estonian one. In the Romanian case, some tools are developed in-house, by the AEP IT Department, while others are developed through public procurement (i.e., the Electoral Register) or in collaboration with the Special Telecommunication Service.

In India, most platforms were developed in-house, while the ECI is the owner of the source codes and databases. The IT applications/tools have been developed over long period as per specific functional requirements of ECI for different purposes. Modifications are carried out by an in-house team, while for the registration system is performed by an external government organization who developed the system. The applications are hosted on governmental servers. Feasibility studies were performed by ECI with officials in the states, which are final users. Platforms are made to support open data principles and to ensure transparency. These electronic instruments were developed to meet significantly different requirements and therefore the manpower and resources required for development, deployment and maintaining of these applications are different for each application, varying from project to project.

The involvement of private vendors in the development of a system provides advantages related to experience, capacity and already developed and tested tools that can be easily translated into the institutional and legal

framework of the specific country. The later could frequently be cheaper than building new tool from nothing. However, it can represent at the same time a series of risks, starting from personal or political interests of vendors, low capacity of the state to ensure full responsibility or coercion against the company or the development of certain tools that can create dependency of the state from that specific company, in terms of additional developments of the applications. A company may develop a product in a way in which it needs specific knowledge to update it. In any case, the EMB should perform a thorough verification of the specific vendor and service provided before signing in. And, lastly, the final responsibility for the success of the project and the integrity of the electoral process belongs to the authority.

Transparency and observability are key principles. EMBs should state clear conditions related to the publicity of documentation, source code and essential information about how the platforms work. Transparency should be a transversal principle, from one end to the other of the process. Some private providers may be less inclined to publish the source code of a product or to disclose essential information regarding the documentation and use of a certain platform, which hinder the credibility of the electoral process. All these aspects may be decisive in ascertaining the fairness of the elections and the results¹⁴⁵.

States should ensure competitiveness and transparency of the procurement process, in order to avoid direct contracting or any other type of exception that may raise questions regarding the integrity of the acquisition and its future development. Any kind of potential conflict of interest or incompatibility in the process should be prevented. Several states mentioned that they use national procurement rules, while the procedures are publicly available. Some institutional experiences show that the procurement process needs to be very well planned, as procedures may be prolonged and can hamper the implementation deadlines, which in many cases may be short.

The **source code** and the **documentation** should be made available. If in some cases, the source code is sensitive, at least a minimal description of the platform and its functions should be available. Norway displayed the source code and the documentation of the EVA system publicly. However, in some cases the public display of the entire or part of the source code could raise security risks. In any case, the legislation could allow interested parties to request the draft or final application for testing. Furthermore, in several states, the legislation establishes a deadline for delivering the final version of the application that cannot be changed. In Romania, electoral authorities allow political parties to request the SICPV application and they also can have representatives in the BEC that observe how the application functions; access for civil society organization is rather newly legislated.

¹⁴⁵ There are several observation manuals published by international organizations that cover the essential parts related to the observability of the process: ODIHR, ["Handbook for the Observation of New Voting Technologies"](#), 2013; The Carter Center, ["The Carter Center Handbook on Observing Electronic Voting"](#), 2012; OAS, ["A Manual for OAS Electoral Observation Missions"](#)

The electronic tools or platforms should be **auditable or expertised**. Apart from the institutional audit, the electronic instruments could also be audited by external stakeholders, such as independent experts. The reports of the civil society should also represent a source of information highlighting issues. In Estonia, the documentation about the Internet voting system is made public together with the source code and is accessible on www.valimised.ee. All the electronic systems are audited, and the public procurement process is also public.

One of the responding EMBs highlighted that “it is essential to have quality controls that allow establishing a standard at a technical level, for this reason, it is necessary that, according to the tool or new technology that is being implemented, it is subjected to tests, audits, exercises and drills that prove their reliability. Likewise, for example, including the political parties in the execution and/or monitoring of these tests and drills strengthens their knowledge of the computer tool and with it the certainty and trust that is deposited.”

The electronic system should be traceable, and an activity log should be in place in order to monitor all entries and modifications made in the system. The user creating system should be secure, but flexible at the same time. Non-institutional user accounts can be created by request (for example, by sending a form to the EMB) or by requests through a website, where the user generates a username and a password. In some cases, users can login with ID cards or electronic identification (Estonia, Finland, Lithuania, Norway). In the case of political finance reporting, administrators can be nominated by political parties, and they are in charge in creating other accounts (Romania). However, users could be requested to update the information on a recurrent basis, in order to confirm that they are still nominated by the specific political party to represent, or the political party could be requested to confirm the nominations (Estonia). Levels of access should be very well regulated and strong security measures against illegal access should be provided.

One of the scopes for using digital technologies **is to process the data faster and to make its interpretation easier**. In some of the cases mentioned in the report, EMBs connect data from different registers in order to register and verify voters, reports of political parties, candidates or to publish results. In Estonia, Finland or Georgia, verifications are performed regarding donations and the names of the donors are crosschecked with information from the population registries. In Lithuania, both the CEC and political parties can perform verifications regarding the donors, as the online system is connected to the relevant database that provides information. In other cases, data could be checked against assets and interest declarations, data from financial intelligence units, in order to simplify the oversight activity, which would be difficult to do through a manual process. However, a balance should be kept between oversight and privacy and data protection.

Furthermore, EMBs could publish automatic analysis based on the information comprised in the databases, which could increase transparency; data could also be used for internal analysis, to improve the activity of the different departments in the EMBs. However, introducing such mechanisms involves political will to legislate, capacity to process the data and inter-operability within the databases of different institutions.

The development of an electronic platform is a good opportunity **to open data** that could be used to improve the electoral process, but also other fields of government. Platforms could allow the general public, journalists,

researchers, and any other interested stakeholder to export and re-use the data. Open data standards state that authorities should provide data, which is open (open for all, without a specific request), in a timely and comprehensive manner, accessible and usable (for example, machine readable, free, in an open license such as Creative Commons), comparable and interoperable, with the purpose to improve governance and public engagement and to ensure inclusive development and innovation¹⁴⁶.

According to the Open Election Data Initiative, set-up by the National Democratic Institute¹⁴⁷, several principles should be taken into consideration:

- Timely
- Granular
- Available for free on the internet
- Complete and in bulk
- Analyzable
- Non-proprietary
- Non-discriminatory
- License Free
- Permanently Available

Examples of good practice regarding the use of open data have been provided in the report, on a broad range of topics.

EMBs could provide data on:

- Polling stations: number, polling districts, contacts, statistics about allocated voters, accessibility of voters
- voter registration statistics per constituencies, gender, age
- Candidates: numbers, name of contestants and other relevant data the election administration collects (gender, age, profession, geography)
- Political party registration: registered and de-registered political parties, contacts, list of central and local offices, names of management
- Observers: numbers, lists of organizations
- Turnout: disaggregated by constituency and polling station, gender, age
- Elections' tabulation and results: number of participants, number of registered voters, invalid votes, early voting, postal voting, data disaggregated by constituency, contestant
- Complaints and resolutions: number of complaints, lists of complaints and resolutions
- Management of the EMB: employees, salaries, contacts
- Activity of the EMB: decisions, live meetings
- Gender in election: in election administration, contestants, elected officials
- Political finance: income and expenditure of political parties and contestants, activities of political parties and contestants, sanctions and enforcement of sanctions, reimbursements for elections, allocation, and use of subsidies
- Election security and integrity: results of pilots, audits, documentation

¹⁴⁶ [International Open Data Charter](#), open data principles

¹⁴⁷ Open Election Data Initiative, [open data in elections](#)

Open data may generate some risks, including privacy, errors, or publication of unverified data. Therefore, EMBS “must proactively disclose and communicate any limitations of the open data they provide, as far as possible in advance to avoid misunderstandings that may arise. In addition, together with the release of data, ethical use of the data provided should be promoted. Where data is preliminary or partial, this must be clearly explained. Most importantly, the EMB must be highly responsive to complaints, requests for corrections and feedback from the public, political parties and others.”¹⁴⁸

Apart from open data, websites could provide easy access public through **an application programming interface (API)**¹⁴⁹ The US FEC allows users to extract political finance data through an API. Norway’s result platform www.valgresultat.no allows interested parties to extract data through a similar feature.

The Republic of Korea developed an open data portal, including information in results, candidates, advance polling and election day polling space, advance voting results, counting place information, winner information, political party policy information and electoral campaign information¹⁵⁰. NEC provides an OpenAPI, which is a “linkage program that collects election-related information such as candidates, elected candidates, political parties, and election days in real time and provides them in a certain format so that users can easily and easily develop and utilize their applications.” Open API is free to use. The election information system provides linked open data (LOD). The service ensures access to data through the URI assigned to the data in the system, while each election, candidate and campaign has a unique URI. SPARQL can be used to perform queries online, while the Browsing Service provides for the possibility to explore various types of information based on the structure built within the information system. Conceptual descriptions of the information are available in the National Election Information Ontology¹⁵¹.

¹⁴⁸ IDEA International, “Open Data in Elections Why It Is Needed and What Can Be Done to Make More Progress”,

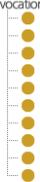
¹⁴⁹ <https://www.ibm.com/cloud/learn/api>. An API “enables companies to open up their applications’ data and functionality to external third-party developers, business partners, and internal departments within their companies. This allows services and products to communicate with each other and leverage each other’s data and functionality through a documented interface. Developers don’t need to know how an API is implemented; they simply use the interface to communicate with other products and services.”

¹⁵⁰ <http://data.nec.go.kr/provide.do>

¹⁵¹ <http://data.nec.go.kr/spec/index-ko.html>

LOD Browsing

owl: Thing elect election
campaign promises Precinct Election
Type the Commission justified
vocational education candidates



1,310 instances



number	URI	designation	see more
One	http://data.nec.go.kr/resource/Ppldg_15801	Leading the 4th Industrial Revolution with Smart City Seoul	+
2	http://data.nec.go.kr/resource/Ppldg_15802	We will create a balanced and prosperous Seoul	+
3	http://data.nec.go.kr/resource/Ppldg_15803	We will make Seoul without gaps.	+
4	http://data.nec.go.kr/resource/Ppldg_15804	Seoul takes care of	+
5	http://data.nec.go.kr/resource/Ppldg_15805	We will advance peace on the Korean Peninsula through exchanges between Seoul and Pyongyang.	+

One 2 3 4 5 > >>

LOD [Browsing module](#), Google translate

Some states have implemented or are planning to use technologies such as **blockchain** or **cloud computing**. However, this seems to be a field that need further exploration. Blockchain¹⁵² could be used in certain steps of the electoral cycle, including voting. The Korean NEC plans to develop a block chain-based online system¹⁵³.

The Romanian AEP implemented in 2020 blockchain technology for the Computer System for monitoring turnout and prevention of illegal voting (SIMPV) and the Information System for Centralizing Protocols (SICPV). The information was recorded in real time, in clear and HASH type (fingerprint of data) and was made public at <https://voting.roaep.ro>, a website which allowed the real-time or subsequent verification of the integrity of relevant data recorded in SIMPV as well as in SICPV.¹⁵⁴ For information included from the SIMPV regarding voter turnout, the system generated the HASH for each record to allow its later verification. Information for SICPV was collected during the input of data regarding protocols in the system; at the same time the HASH fingerprint for each record is generated to allow the later verification.

The application used to visualize the blockchain included:

- A homepage (<https://voting.roaep.ro>), containing the list of the latest blocks, statistics regarding the data loading into blocks and a snapshot of the data in the buffer zone before they are closed in a block.
- A page with details of a block and the list of included transactions.
- A page with details regarding a transaction.
- A page with different maps illustrating the activity in real time.

¹⁵² A [blockchain](#) "is a type of distributed data container that is usually, but not always, intended to be collectively owned and operated by a group of independent and mutually distrusting organizations acting as peers, without any leader or central authority. In a blockchain-based election the blockchain serves as a distributed ballot box holding the voted ballots, though it is sometimes used to hold other information as well."

¹⁵³ The government [approved](#) a pilot for a blockchain-based voting system through the NEC that can be used by more than 10 million people. Also [see the dedicated website](#)

¹⁵⁴ See [the AEP press release](#) regarding the use of blockchain

The data enclosed were also accessible through REST web services (API interface) returning data on blocks and information relevant to transactions related to a block.

However, there are opinions that the use of blockchain could violate the secrecy of voting, security, understanding of the system by relevant stakeholders and others¹⁵⁵. Clouding computing can also bring issues such as privacy, security, auditing or tracking of potential frauds. Although the use of technologies that can ease the organizing and voting process may be tempting, in the end, the security and privacy of the vote should remain the main preoccupation.

Good practice regarding usability

The developer and manager of the tool or platform should keep in mind that the target group may be less familiarized with using computers or phone applications and therefore **assistance should be provided**; all electronic instruments should be person-centered. Supporting documents (templates) and manuals should be available, in different formats, including written and video. Frequent asked questions could be posted on the website and a call center or information center should be developed to reply to questions during the electoral process and outside this period.

Any kind of electronic platform, either web or software based should follow the principles of **user experience**, for both internal and external users. According to the United States standards¹⁵⁶, “user experience (UX) focuses on having a deep understanding of users, what they need, what they value, their abilities, and their limitations. It also takes into account the business goals and objectives of the group managing the project. UX best practices promote improving the quality of the user’s interaction with and perceptions of your product and any related services”. The United Kingdom Government published a Service Manual,¹⁵⁷ which illustrates the characteristics the web platforms should follow in order to provide good service. The Web Content Accessibility Guidelines cover a series of recommendations on how to make the web more accessible to persons with disabilities¹⁵⁸.

The platforms should be usable, useful, desirable, valuable, accessible, credible and findable. Technology is implemented to respond both to the needs of the state authorities, but also to simplify the actions of the final users. Therefore, the implementation process should take into account that the web platform, application or integrated system should not be only useful, but also easy to use, information is easily categorized and mapped, friendly and should be constantly improved based on constant feedback.

If the platform includes searches, the filters should be diverse and detailed enough (i.e. United States, Canada, Estonia, Finland political finance reporting websites). In the case of results webpages, for example, users should be able to choose different views, based on constituency, contestants, timeline and others. If a database is rich, but the final user cannot consult the information, transparency is reduced. Furthermore, data could be comparable (see Mexico and Finland financial reporting portals). Statistics and visual interpretation of the data helps users to better

¹⁵⁵ Ardita Driza Maurer, “Digital technologies in elections”, 2021, p. 51

¹⁵⁶ Read more about [User Experience Basics](#)

¹⁵⁷ See the [UK Service Manual](#)

¹⁵⁸ [Web Content Accessibility Guidelines \(WCAG\) 2.1](#), 2018

understand the process. However, the task of intercepting the data could lead to a subjective display which can affect certain stakeholders; therefore, the data should be displayed objectively. Furthermore, users should be able to display data in several formats, including visual, tabular and to download it.

Traceability of data increases security and credibility. Voters could verify if their vote will be taken into consideration if advance voting registration is published (Lithuania) or if results detailed by polling stations are available in short time. Furthermore, if the original document (protocol, report) is available, together with the open data, the information could be compared (Romania results page). Data should be carefully stored, and users should be explained how their information is being used and what are their rights regarding this topic.

Products can be tested both with staff of the institution or from other organizations, but also with external stakeholders. Meetings with journalists are useful to better understand their needs, to obtain news or to get data regarding results from the EMB during election night. Consultations could take place with political parties, to improve and facilitate the reporting process. Furthermore, platform should be accessible to persons with disabilities and should provide access to minority groups in different languages.

One of the advantages of online platforms and electronic tools is that they can process data in a much shorter time than it would involve to process paper-based information. The tabulation process could take more time without a tool to verify the counting results and to ascertain the results. Therefore, **electronic tools should also provide information to the public and media in a short time**. Although the legislation may regulate that the data should be verified published being published, some data could be displayed. There are several examples in the report illustrating the application of the principle, including real time turnout during election day (Romania), advance voting at the end of the day (Estonia, Lithuania), preliminary and final reports (in several countries, including Romania, Lithuania, Estonia, Norway, Finland, Mexico, and others) or political finance reports.

In the end, **assessment** is one of the essential steps of the process, to review if the implemented measure is positive or needs to be improved. The EMB should set success indicators and constantly evaluate the success of the platform. For example, it could verify if the political party reporting process became faster and more transparent. Or if the introduction of electronic voter lists reduced the time to elaborate lists and to check voters, as well as the risk of multiple voting. Furthermore, on the medium and long term, a key element is to “review the efficiency, sustainability, maintenance and overall impact on the electoral process over time” (ECI).

Evaluations can be done using¹⁵⁹:

- Digital analytics (i.e., Google Analytics).
- Feedback forms. The Georgian CEC¹⁶⁰ implemented a visible feedback option on its website. The NEC allows users to comment and to rate the quality and content of the website¹⁶¹.
- Financial information to evaluate the costs.
- Forms applied to members of election commissions to evaluate the results of implementing a voter verification tool during the election day.
- Call center data to verify the level of understanding of the members of election commissions regarding procedures and technical aspects of a system.

¹⁵⁹ UK [Service Manual](#)

¹⁶⁰ [See rating module](#)

¹⁶¹ [See Website improvement opinion](#)

- Number of inquiries regarding the use of a newly introduced financial reporting tool.
- Analyzing comments in the application stores for Android or iOS.

The benefits of technology can be seen in a series of examples presented above. The electronic polling books allow voters to cast ballots in advance in any polling station and reduce the risk of fraud. The introduction of the SIMPV in Romania reduced the risk of multiple voting significantly and the times used by election commissions to verify the eligibility of a voter. The use of digital tools that support the tabulation process and allow the publication of results in close to real time ensures transparency. Reporting platforms for political finance increase the integrity of the electoral and political process.

According to the Costa Rican TSE, the use of technology facilitated “the implementation of best practices within our institutional work, allows us to provide services and technological products that meet the needs of citizens, offering the same electoral processes in a scalable, effective and efficient way, achieving better results and preventing negative effects as part of the process of continuous institutional improvement”.

At the same time, risks have to be put in the balance. Some states stopped pilots on electronic voting or concluded that their current digital tools have to be updated in order to respond to the current security needs.

Ensuring security and credibility

One of the most important elements is ensuring **security and credibility of the tool**.¹⁶² The entire system and data contained within should be subject to the utmost secure conditions, especially if we talk about elections and the impact that such attacks could have on the credibility of the results and the democratic balance. There is a broad field of threats that can occur which can include¹⁶³:

- Denial-of-Service (DoS) attack which floods the website with traffic in order to make the network or the machine inaccessible to users; SQL injections; DNS hijacking etc.
- Malicious software that brings viruses or other kind of application that can infect the system.
- System or database hacks - there are examples of voter databases being hacked and sold or posted online – or alteration of voter lists or electronic verification systems.
- Creating fake websites to steal data; phishing/spear-phishing attacks – fake messages intended to steal data or install malware.
- Exploiting of services managed by third parties.
- Exploiting remote - access web interfaces.
- Direct threats against the actual hardware such as theft of machines.
- Issues may also be determined by the faulty development of a product and lead to exposure of data or essential components of the system.
- Phishing or spear phishing

Furthermore, threats could also come from the staff, which takes part in the organizing of the electoral process and could include data leaks or divulging protected information to external stakeholders. The security procedures should

¹⁶² See the [“Compendium on Cyber Security of Election Technology”](#).

¹⁶³ Consult a comprehensive list of issues in the [Compendium on Cyber Security of Election Technology](#), p 16.

also be extended to third parties that receive and use the data, including political parties. In one case, a political party uploaded the voter lists received on an unsecured server and exposed sensitive data¹⁶⁴.

Threats could also be caused by the usage of unsecure equipment. Purchasing dedicated equipment to be used only for electoral purpose could increase the security of the process, even though it may increase its costs. Romania uses tablets for the SIMPV system which are not involved in any other process and are constantly replaced, to keep the process secure.

Also, digital interference is also directed against political parties or contestants, which could also lead to indirect leaks of information. A survey published in 2019 showed that political consultants considered hacking and foreign election interference, as well as the use of disinformation as two of the main issues for the US 2020 elections¹⁶⁵. Taking into consideration the dimensions of the use of online disinformation during the electoral processes, EMBs should also take into consideration efficient mechanisms to provide reliable information about the use of technology and to combat the potential fake news distributed by external stakeholders.

The Council of Europe Budapest Convention on Cyber Crime, Guidance Note on elections, recognizes that “Disinformation operations, as experienced in particular since 2016, may make use of malicious cyber activities and may have the same effect. Domestic election procedures may need to be adapted to the realities of the information society, and computer systems used in elections and related campaigns need to be made more secure”¹⁶⁶. Furthermore, an effective criminal justice response may deter election interference and reassure the electorate regarding the use of information and communication technologies in elections”. Therefore, **ensuring the proper investigative measures and sanctions against election interference** is a key mechanism to prevent and disrupt the potential undermine of elections.

A **sound intervention and contingency plan, continuous testing and constant updates** should be on the priorities list. Annual or more frequent reviews and tests should be performed, depending on the system. Tests could be performed before each election process, with involved staff (general repetitions), but also with external stakeholders.

Some of the measures which are taken by the Romanian AEP regarding the security of the applications include:

- Hosting the equipment related to central IT systems in a TIER III data center.
- Secure transmission of data from tablets to the servers of the central computer system.
- Prevention of infection with potentially harmful software: updates, security patches, IDS / IPS solutions or communications filtering solutions specific to each component.
- Use of digital certificates for user authentication and signing of documents and data transmitted, dedicated administration network using SSH / HTTPS secure protocols.

¹⁶⁴ Gary Wright, [„Breaches, Leaks and Hacks: The vulnerable life of voter data”](#)

¹⁶⁵ Sean J. Miller, [„Consultants Mostly Optimistic on Industry’s Future, But 2020 Worries Loom”](#), 2019

¹⁶⁶ Council for Europe, [„T-CY Guidance Note #9 Aspects of election interference by means of computer systems covered by the Budapest Convention”, 2019](#). The Convention provides the framework to allow cooperation between states to counter-act such violations.

In the US, the **Cybersecurity and Infrastructure Agency (CISA)**, the lead federal agency responsible for national election security, is working with the state and local election administration, as well as with vendors, to ensure the security of electoral technology. Since 2017, the infrastructure used to administer the national elections was designated by the Department of Home Security (DHS) as critical infrastructure, including among others the voter registration databases, IT systems to manage elections, voting systems, storage facilities, polling stations and others. In this context, federal agencies can provide support state and local officials in matters related to election security. In its activity, CISA collaborates with a number of Federal agencies, CSOs, academia, media, and social media companies, as well as cybersecurity agencies.

CISA developed the #Protect2020 Strategic Plan¹⁶⁷ as a national call to action that includes a wide range of services for general public and local officials in more than 8000 election jurisdictions. The plan includes several key objectives, related to election infrastructure, campaigns and political infrastructure, focusing on building capacity, provide assessments and services and facilitate informational exchange. Another pylon addresses the electorate, through making voters understand and evaluate threats, building awareness and facilitating information sharing. The last pylon refers to warning and response and covers the previous groups, aiming to provide intelligence to the election community about potential threats.

Within the Last Mile initiative, CISA worked with states to create and distribute election security related products and tailor them to the needs of the users. Beneficiaries of the program were the local and state authorities, coordinating bodies, election technology vendors and candidates or political party committees, as well as voters. Among other products, CISA developed the Election Security Planning Snapshot posters, illustrating measures authorities can take to strengthen security and the Election Day Emergency Response guide. Both posters have been customized for specific jurisdictions.

CISA organizes trainings, evaluation sessions and provides with resources for different stakeholders, as well as over 600 services, including Risk and Vulnerability Assessments, Remote Penetration Testing, Validated Architecture Design Reviews, Phishing Campaign Assessments, Cyber Hygiene.

A dedicated department, the Mis-, Dis-, Malinformation (MDM), works to popularize the risks targeting elections and infrastructure. Resilience Series is a project through which risks of fake information are explained using graphical fictional stories. A Mis-, Dis- and Malinformation Toolkit was prepared for election officials in 2020 and a series of election infographics regarding postal voting and election results was produced¹⁶⁸.

The Elections Infrastructure Information Sharing and Analysis Center (EI-ISAC) supports the cyber-security necessities of the sector and provides assistance, training, and services to election officials (monitoring, incident response and remediation etc.) and is open to membership to all state, local, tribal, and territorial governments. EI-ISAC is hosted by the non-profit organization Center for Internet Security, which provides tools and best practices for election officials.

¹⁶⁷ CISA, „#Protect2020 Strategic Plan”, 2020. An extensive list of resources provided on the [dedicated webpage](#).

¹⁶⁸ See [CISA's Resilience Series Graphic Novels](#), the [Election Mis-, Dis-, and Malinformation Toolkit](#) and the [Election Infographic Products](#)

CISA provides officials with guidebooks such as “A Handbook for Elections Infrastructure Security” or “A Guide for Ensuring Security in Election Technology Procurements”, while a database of good practice in cybersecurity can be consulted¹⁶⁹. The Election Infrastructure Assessment Tool allows election bodies to assess their election infrastructure focusing on voter registration and pollbooks, election management systems, results reporting systems, as well as devices used vote capture and tabulation¹⁷⁰. During the election day, CISA and EI-ISAC host the National Cybersecurity Situational Awareness Room, a portal that allows for quick information exchange and access to CISA’s activity.

CISA collaborates with the Election Assistance Commission on some topics related to security. The two institutions released the Election Risk Profile Tool (www.cisa.gov/election-risk-profile-tool) that allows election officials to understand and mitigate the cyber risks they are facing.

Collaboration on election security also takes place within the Election Infrastructure Subsector (EIS) Government Coordinating Council (GCC), which gathers state and local election officials and federal partners to share good practice and information to prevent and counter threats to election infrastructure. The Election Infrastructure Sector Coordinating Council (SCC) advances security and emergency preparedness regarding infrastructure, through the collaboration between infrastructure owners and operators represented in the Council. The SCC also represents an interface with other private critical infrastructure sectors, as well as with the DHS, EAC, state, local and tribal governments and the EIS GCC.

Unexpected changes: the effects of the COVID-19 crisis

Sometimes, a crisis can determine an unexpected change in the activity of the election administration. The COVID-19 pandemic influenced the way states use technology and, in some cases, determined either the adaptation of existing tools or the adoption of new ones. Factors such as short deadlines, limited resources, limited capacity to legislate according to good practice, lack of political and public consensus determined the technical developments in the past two years. The Republic of Korea was one of the first countries to experience organizing the elections. However, the NEC was able to utilize the existing platforms and tools without significant changes.

Romania organized local and parliamentary elections in September and December 2020. Although discussions about internet or electronic voting have been put on the political and public agenda, they did not reach a result. The AEP developed a new platform that supported political parties and candidates to gather signatures from supporters.

In Costa Rica, the pandemic led to the adaptation of some procedures and components of the platforms. Technological upgrades were also involved, including expansion of Internet link bandwidth, virtual control of the assemblies of political parties, procurement of licenses for virtual meetings, for training of polling station members and electoral assistants, implementation of QR codes to review voter lists, polling station members to verify the corresponding vote receiving board.

¹⁶⁹ See more on [CIS website](#).

¹⁷⁰ Center for Internet Security, [Election Security Self-assessments](#)

In the US, some states implemented an online mail-in/absentee ballot request tool or online voter registration systems for the first time. The pandemic proved a good opportunity for experience exchange between state and local authorities, which adopted tools that were already in use in other parts of the US.

To respond to the anticipated high number of demands for special vote by mail ballot, Elections Canada developed a dedicated voter registration platform, while a similar one was developed for the voter living abroad.

In Estonia, effects were rather reduced, to the already existing technological developments.

The possibility to vote online maintained the voter turnout at a similar level compared to the one before the pandemic. The Internet voting method was the safest method to vote and was used by 46.9% of the voters.

The Lithuanian CEC has been implementing the information management system for a long time; therefore, no special measures have been implemented. However, the existence of the system supported the CEC in its activity. The institution finished the development of the remote training subsystem in 2021, which will provide support to organize in an easier and safer manner trainings for voters, organizers, candidates, and other stakeholders.

The existing tools allowed the Mexican INE to continue its work, without developing new tools. The INE focused on the existing tools and their use was extended in order to allow remote work through videoconferencing software or text communication.

The COVID pandemic determined the Indian authorities to introduce new methods and instruments in the election process. Such examples are the Online Nomination and e-Affidavit applications to reduce the interaction. The main challenge was to motivate political parties to adopt the online systems.

A starting point for dialogue

The report features a variety of tools that are used by some CoD member states in different stages of the electoral process. While some of them are described more generally, the report also highlights several tools and platforms which can be considered good practices for a variety of reasons and underlines their development mechanisms and processes. It is important to note, that these type of tools and platforms are rarely static, with their adoption and update constantly changing and requiring the full attention of the managing institutions, including constant dialogue with the stakeholders to improve them and make sure that they are in line with international standards. Therefore, this report should be considered as a starting point for understanding some of the tools and the principles on which they are based on and not necessarily as a full technical up-to-date guidebook.

Not all the instruments mentioned in this study are applicable for all situations, as they need some prerequisites such as the independence, integrity and proper capacity of the managing institution, openness of the public and willingness to use them, as well as a strong institutional framework to provide checks and balances, security and build trust for the public. An efficient tool which is highly contested by the public may be problematic for the electoral process. An electronic tool or platform would not necessarily solve systemic issues such as corruption, politicized institutions, lack of digital knowledge of the citizens or others. However, if used wisely, it can improve the process for stakeholders, ensure inclusion, increase the transparency, and increase efficiency. Therefore, their adoption should be a thorough and balanced decision, based on consultations and consensus, tests, proper analysis

to understand if they fit the current situation or if any institutional or legislative changes must be undertaken before implemented.

The report introduces a plethora of tools that could be better explored through dialogue and exchange of experiences amongst Member States of the Community of Democracies and beyond.