



# **Swiss E-Voting Pilot Projects: Evaluation, Situation Analysis and How to Proceed**

Electronic Voting 2006 Conference  
Bregenz, 2-4 August 2006



# Overview

1. Introduction

2. Pilot Trials

3. Evaluation of Pilot Trials:

- Benefits to and Effects on Direct Democracy
- Risks and Security Measures
- Cost-effectiveness of e-voting

4. Conclusions



# 1. Introduction

## 2. Pilot Trials

## 3. Evaluation of Pilot Trials:

- Benefits to and Effects on Direct Democracy
- Risks and Security Measures
- Cost-effectiveness of e-voting

## 4. Conclusions



# 1. Introduction

**„E-voting has to be as secure as postal voting“**

Swiss Federal Council in his report on e-voting  
(1/9/2002)

**„It takes decades to develop public confidence...  
but far less time to break it.“**



# 1. Introduction: Definition of E-Voting

Electronic voting - refers to the option of using electronic means to vote in referendums and elections.

- e-voting as an *additional* means of voting
- focus on *remote* e-voting
- including:
  - popular votes (at least 4 times a year...)
  - elections
  - electronic signature of referendums, initiatives and candidate proposals



## 1. Introduction

## 2. Pilot Trials

## 3. Evaluation of Pilot Trials:

- Benefits to and Effects on Direct Democracy
- Risks and Security Measures
- Cost-effectiveness of e-voting

## 4. Conclusions



## 2. Pilot Trials

### Legal provision for the *testing* of e-voting\*:

An e-voting system has to ensure, inter alia, that:

1. only entitled voters may take part in the ballot
2. each voter shall have a single vote and shall vote only once
3. it is impossible for any third parties *systematically* to intercept, alter or divert electronic votes or decisively influence the result of the ballot

\*Articles 27a-27q of the Order on Political Rights



## 2. Pilot Trials

### Legal provision for the *testing* of e-voting\*:

An e-voting system has to ensure, inter alia, that:

4. it is impossible for any third parties to find out the content of the votes cast
5. all the votes cast are taken into account when the votes are counted
6. any *systematic* fraud is impossible

\*Articles 27a-27q of the Order on Political Rights





## 2. Pilot Trials

Date	Canton/Communes	Extent of trial	Nr. of electronic votes (share of all votes as %)
26.09.04	Genf: Anières, Carouge, Cologny, Meyrin	22'137 eligible voters	2'723 (21.8%)
28.11.04	Genf: Anières, Carouge, Cologny, Collonge-Bellerive, Meyrin, Onex, Vandoeuvres, Versoix	41'431 eligible voters	3'755 (22.4%)
25.09.05	Neuenburg	1'732 eligible voters*	1'178 (68.0%)
27.11.05	Zürich: Bertschikon, Bülach, Schlieren	16'726 eligible voters	1'154 (of which 243 by text message) (22.1%)
27.11.05	Neuenburg	2'469 eligible voters*	1'345 (55.1%)

\* Users of the official "Guichet unique" electronic office.



1. Introduction

2. Pilot Trials

3. Evaluation of Pilot Trials:

- Benefits to and Effects on Direct Democracy
- Risks and Security Measures
- Cost-effectiveness of e-voting

4. Conclusions



### 3. Evaluation: Voter Turnout

would:

- young people (increased use of Internet);
- older people (limited mobility);
- Swiss living abroad (lengthy int. mail delivery times); or
- blind / partially-sighted persons

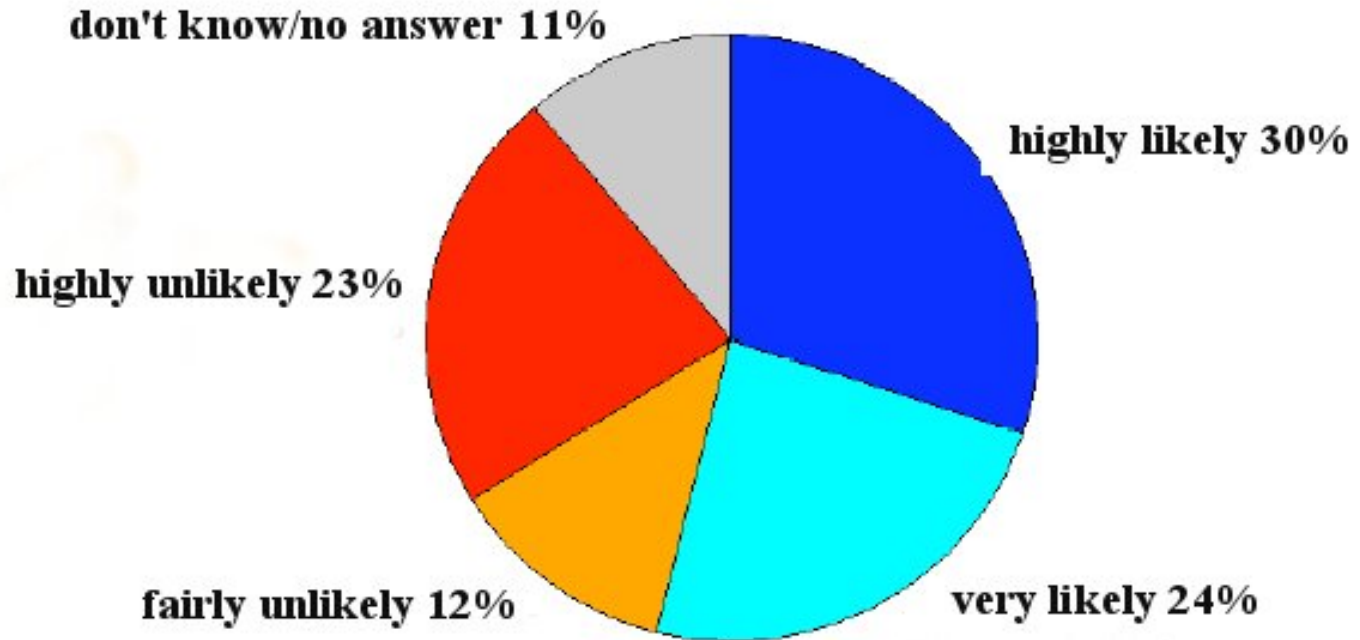
vote more frequently with e-voting?



### 3. Evaluation: Voter Turnout

If it were possible to cast a vote via the Internet today, would it be very probable/rather probable/rather improbable/completely improbable to cast a vote via the Internet?

% of the electorate



Source and copyright: GFS Bern, Vote électronique, 2003/2004



### 3. Evaluation: Voter Turnout

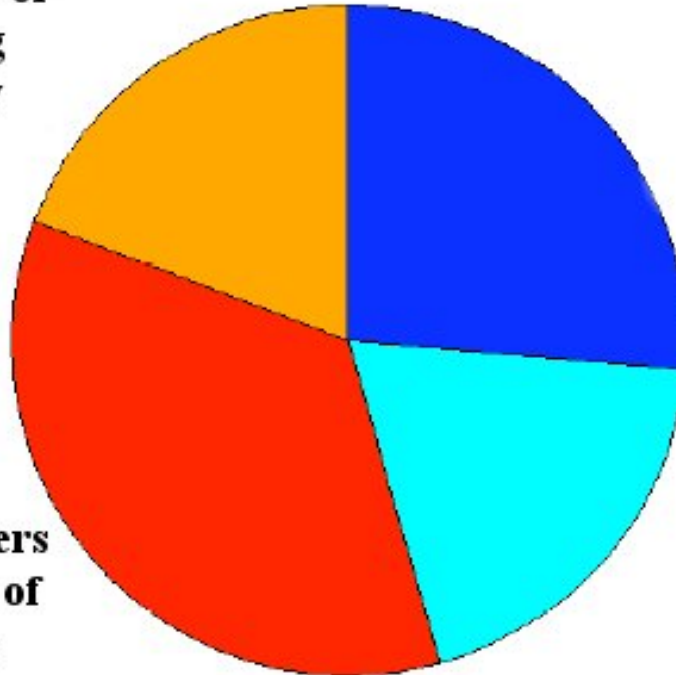
% of the electorate

**Abstainers  
and use of  
e-voting  
unlikely  
19%**

**Participation  
and use of  
e-voting  
likely  
26%**

**Abstainers  
and use of  
e-voting  
likely  
36%**

**Participation  
and use of  
e-voting  
unlikely  
19%**



Source and copyright: GFS Bern, Vote électronique, 2003/2004



### 3. Evaluation: Voter Turnout

conclusions:

- e-voting would primarily *replace postal voting*
- It could attract a small number of abstainers, mainly among *younger people* and voters who do not participate regularly
- It could lead to a *moderate increase* in voter participation



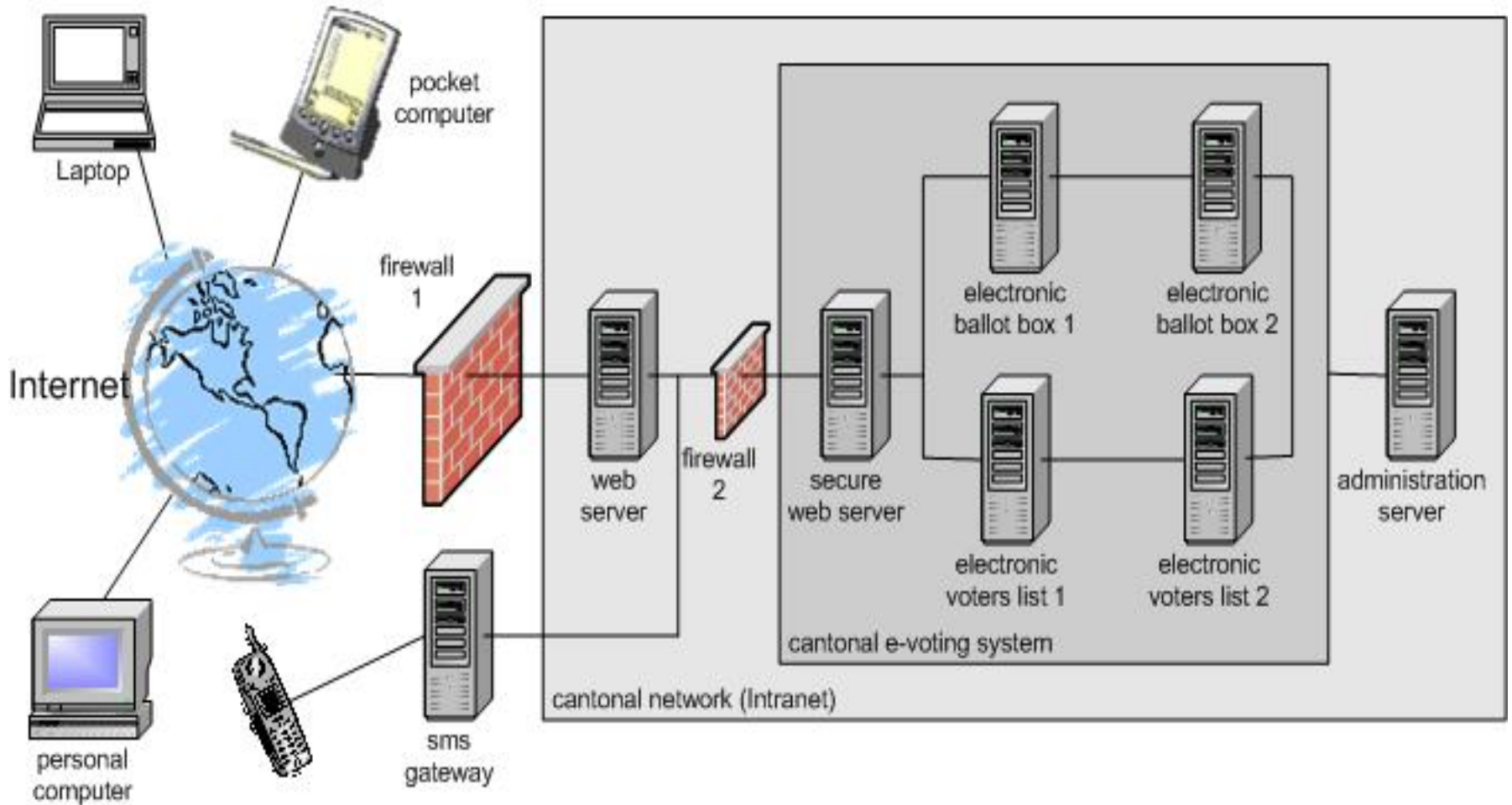
### 3. Evaluation: Risks/Security

Ongoing security depends on being able to maintain control of continually changing threats and risks.

→ Rule out any risks of systematic misuse



### 3. Evaluation: Risks/Security







### 3. Evaluation: Risks/Security

#### **Risk: interception, modification or loss of e-votes**

- several security layers: encryption of each transaction (SSL128), voter is prompted to check the "digital fingerprint" of the server certificate
- system is redundant and protected by firewalls
- altering personal access and identification codes for every Election Day
- frequent refresh of the domain name server during voting period



# 3. Evaluation: Risks/Security

## DNS attack / mass attack

- Protection by special control devices and protocol filters
- in case such an event occurs, operators are alarmed by pager or SMS and an emergency procedure is launched
- if the system has to be frozen the received e-ballots will be saved and the public will be informed to cast votes at polling stations or by mail
- refresh of DNS-Servers



### 3. Evaluation: Risks/Security

**Proof of transaction, but no proof of vote**

e-business / e-banking:

proof of transaction and content is assured

e. g. by receiving the goods one has ordered / by checking account's position

e-voting: the voter gets a notice, that his vote has been cast. BUT he must not be given a proof of its content!!!  
otherwise vote buying could take place



## 3. Evaluation: Risks/Security

### Recounting e-ballots

- What does one recount when a result is challenged?  
The original e-ballot or a paper printout?
  - Paper ballots don't prevent counting errors! It is indeed almost impossible that two manual recounts produce the same result.
  - It is possible to recount the e-ballots and even to do it with different software in order to compare.
- Paper printouts are prohibited in Switzerland (proof of one's choice, secrecy of vote, vote buying...)



### 3. Evaluation: Risks/Security

#### Resistance against e-voting in Switzerland

- informatics specialists are often raising security concerns, others claim that online voting makes "family voting" easier
  - several representatives of political parties have criticised the project, because it may influence political party powers or boost digital divide
- any change in polling methods provokes such debates, but they usually do not reflect the opinion of the majority (lessons learnt from postal voting)



### 3. Evaluation: Cost-effectiveness

- Estimation based on costs of Pilot Trials:  
System for 1 big/several smaller cantons:  
appr. 15 Mio. CHF (incl. 10 years of maintenance)
- assumption: use for 1 Mio. voters: appr. 0.5 CHF / person
- (postal voting: 3.65 CHF / postal vote)



### 3. Evaluation: Cost-effectiveness

Assuming that several cantons operate an e-voting system together, and that those processes which are common to all forms of referendum (such as, for example, the printing of the voting permits, the creation of the voting register, the checking of voting rights etc.) feed into a cantonal or supra-cantonal election and referendum system, the implementation of e-voting would be more cost-effective than postal voting.



## 1. Introduction

## 2. Pilot Trials

## 3. Evaluation of Pilot Trials:

- Benefits to and Effects on Direct Democracy
- Risks and Security Measures
- Cost-effectiveness of e-voting

## 4. Conclusions





## 4. Conclusions

- E-voting is feasible in Switzerland
- Step-by-step approach is still the best way forward: suggestion of Federal Council, to be discussed in Parliament: expansion of trials
- E-voting has only a chance of being introduced if all those involved – voters, politicians and authorities – have a lasting acceptance of and trust in the new procedures.



Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

**Bundeskanzlei BK**  
Sektion Politische Rechte

# Thank you!

nadja.braun@bk.admin.ch