



# Technology Assisted Voting

11.00 am, Friday 9 December 2011  
Sheraton on the Park, Hyde Park Room

## NSW State General Election and Clarence by election

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## What will be covered:

1. Background of electronic voting and iVote (10 min)
2. Overview of iVote – the basics!  
– why and how (15 min)
3. A demonstration of iVote by Web (10 min)
4. What made it a success (15 min)  
– from advertising to security
5. Questions? (10 min)

## Background – Other Jurisdictions

- History in Australia
  - The Australian Electoral Commission used a remote electronic voting system for overseas ADF personnel in 2007 and also used a kiosk system for blind or low-vision electors.
  - The Victorian Electoral Commission provided electronic voting at their 2006 and 2010 elections, principally for disabled electors.
  - Elections ACT uses an in polling place system for all polling places, which allowed some 44,000 people to vote in 2008.
  - The Tasmanian Electoral Commission trialled one voting kiosk in their 2007 election.

## Background – Other Jurisdictions (cont...)

- Overseas
  - Estonia conducted the largest remote online parliamentary election so far in 2011 where 140,846 people voted using the internet out of 913,346 electors.
  - Brazil uses voting machines in a large number of polling places.
  - India used over 1 million voting machines in 2004.
  - Switzerland has used a remote electronic voting system.
  - Other countries with some electronic voting experience include; Britain, Ireland, Canada, New Zealand and USA.

## Background – iVote in NSW

- Why Technology Assisted Voting?
  - Interest groups representing electors with a disability or a vision impairment requested accessible and secret voting options.
  - A judicial decision to provide braille ballot papers existed for SGE and still applies for **Local Government Elections**.
  - In March 2010 the NSW Government requested a feasibility report into electronic voting for the NSW State General Election in March 2011:
    - Report tabled in NSW Parliament September 2010
    - Parliament endorsed the report and appropriated funds for implementation
    - iVote legislation passed on 2 December 2010 with an amendment to include electors outside NSW on polling day

# Technology Assisted Voting basics

- What is iVote?
  - Voting over the internet using a standard web browser
  - Voting by phone using a standard handset and DTMF tones
- Who can use iVote?
  - (a) the elector's vision is so impaired, or the elector is otherwise so physically incapacitated or so illiterate, that he or she is unable to vote without assistance,
  - (b) the elector has a disability (within the meaning of the Anti-Discrimination Act 1977) and because of that disability he or she has difficulty voting at a polling place or is unable to vote without assistance,
  - (c) the elector's real place of living is not within 20 kilometres, by the nearest practicable route, of a polling place, or
  - (d) the elector will not throughout the hours of polling on polling day be within New South Wales.

## Technology Assisted Voting basics (cont...)

- Electoral Commissioner must approve procedures – registration, secrecy of ballot, security of systems, scrutiny of ballot papers printed from the virtual ballot box.
- Registering for iVote from 17<sup>th</sup> February 2011
  - Person must be on NSW electoral roll in order to register.
  - Elector can apply by phone or a web browser over the internet.
  - Elector provides a 6 digit PIN at the time of registration.
  - NSWEC confirms application by letter to enrolled address.
  - NSWEC provides an 8 digit iVote Number later, when registration is accepted.
  - iVote Number is delivered by post, plus SMS and email if requested. Electors with a disability may receive by telephone.

## Technology Assisted Voting basics (cont...)

- Using iVote
  - Voting took place from 8am Monday 14<sup>th</sup> to 6pm Friday 25<sup>th</sup> March 2011 (the same as pre-poll period).
  - Elector needed to enter PIN and iVote Number to vote.
  - iVote by Phone follows the Telephone Voting Standard from Electoral Council of Australia.
  - The Legislative Assembly ballot is presented first, followed by the Legislative Council ballot.
  - A voter receipt is provided for votes cast whether accepted by phone or internet.
  - Receipts could be checked from 28<sup>th</sup> March by entering iVote Number on phone or web to confirm vote scrutinised.



# iVote Web Browser Demonstration

SGE 2011 Practise System

[practise.iVote.nsw.gov.au](http://practise.iVote.nsw.gov.au)

Clarence by-election Practise System

[iVote.nsw.gov.au](http://iVote.nsw.gov.au)

## Getting the iVote message out

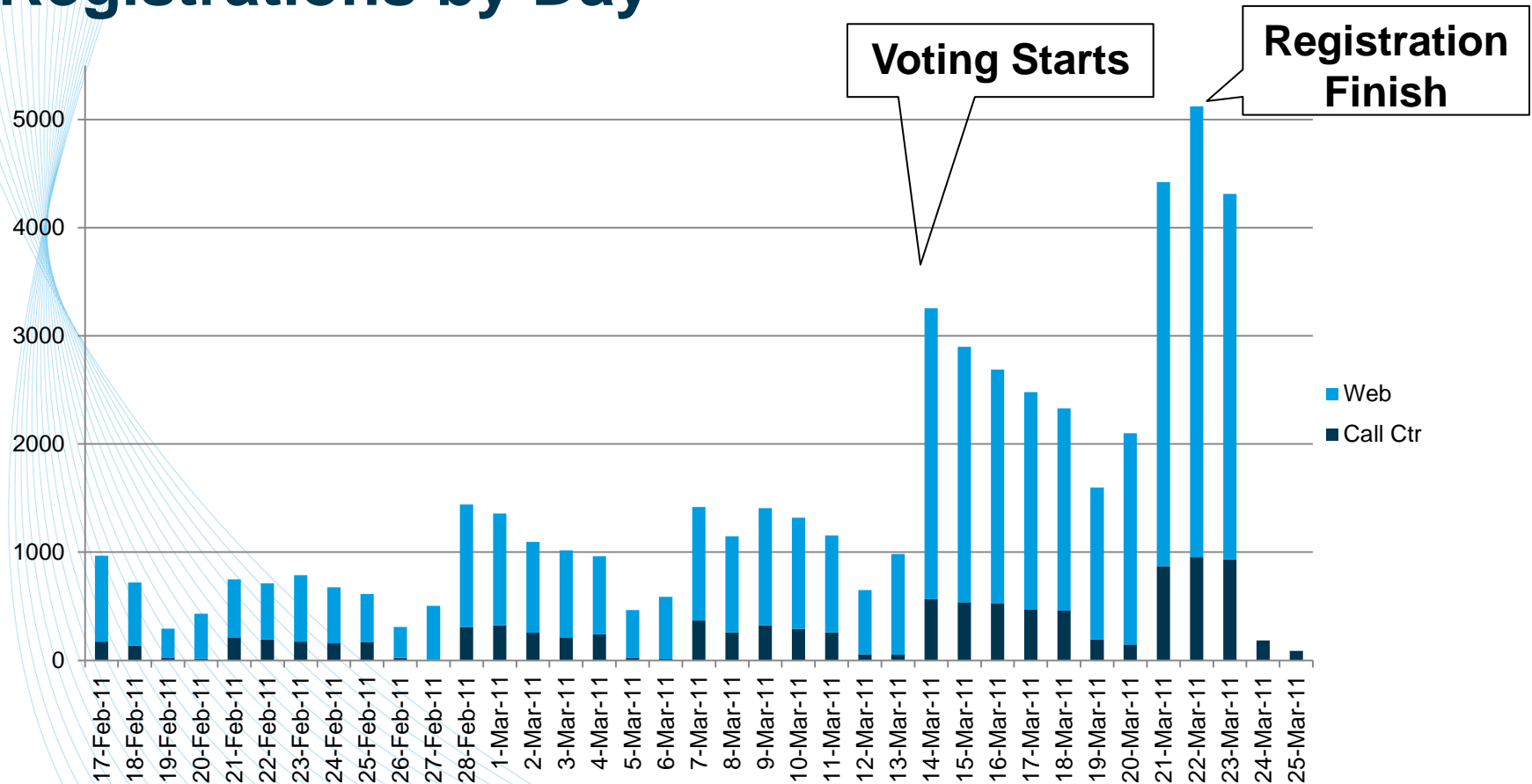
- Promotions directed to target groups including:
  - blindness and disability support groups,
  - direct mail to remote electors,
  - radio advertising on 2RPH, and
  - call-out campaign by Vision Australia.
- Two weeks of print advertising across NSW.
- Internet advertising targeting people outside NSW.
- Facebook, Twitter and YouTube promotions.
- iVote information included in some general advertising.
- iVote posters in Returning Officer offices.
- Information on NSWEC web sites.

# Registrations

Application Ground	Applications			Unique Electors
	Call Centre	Web Browser	Total	
People outside NSW on polling day	7,375	40,074	47,449	47,038
People who are 20km from a Polling Place	419	1,415	1,834	1,830
People with Disabilities	350	1,123	1,473	1,457
People who are blind or have low vision or are illiterate	376	413	789	778
<b>Total</b>	<b>8,520</b>	<b>43,025</b>	<b>51,545</b>	<b>51,103</b>

***Predominantly electors who were outside NSW***

# Registrations by Day



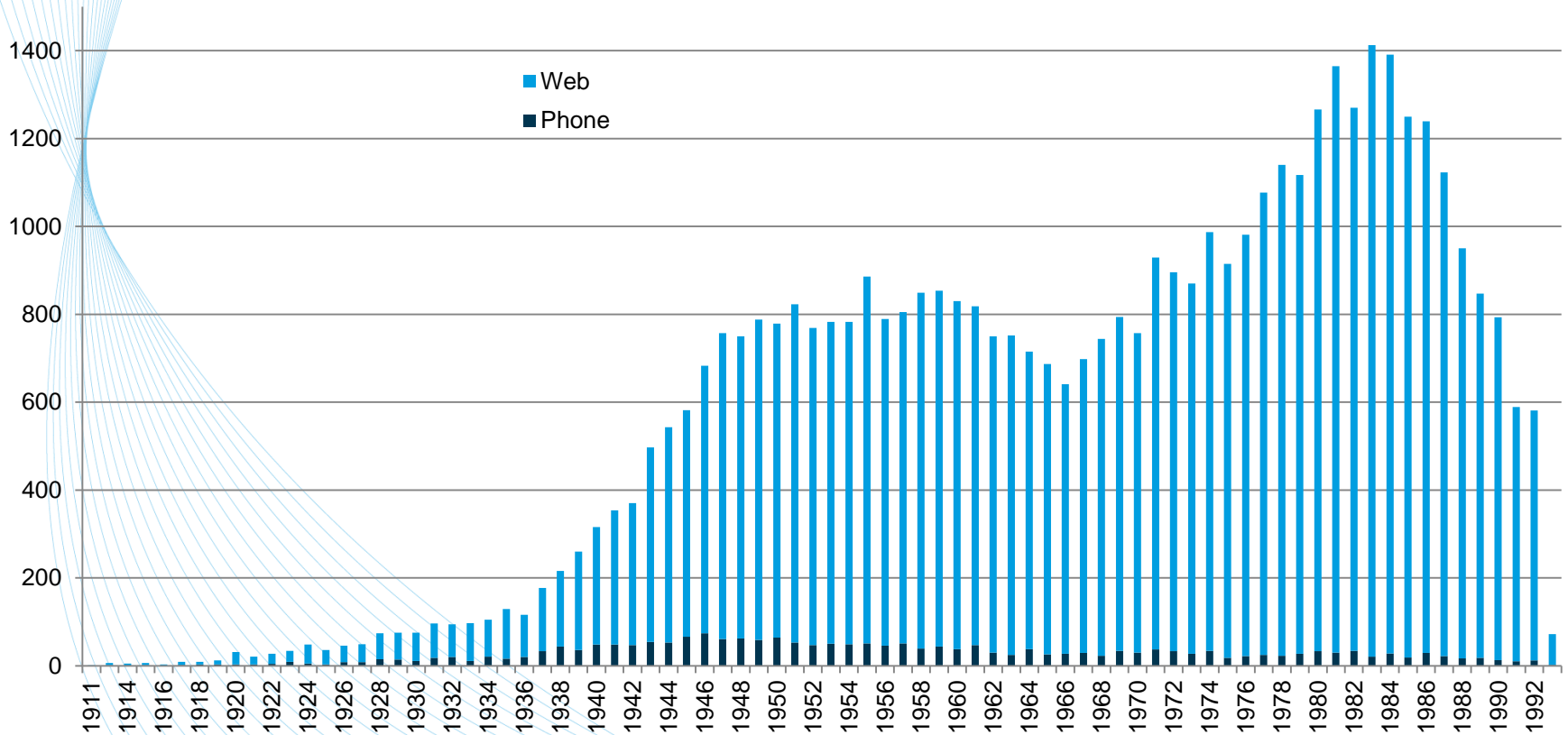
*Most electors register when the election is 'on'*

# Voted

Application Ground	Phone	Web Browser	Total
People outside NSW on polling day	1,780	41,477	43,257
People who are 20km from a Polling Place	101	1,542	1,643
People with Disabilities	160	1,136	1,296
People who are blind or have low vision or are illiterate	218	450	668
<b>Totals</b>	<b>2,259</b>	<b>44,605</b>	<b>46,864</b>

***Vast majority prefer to vote on the internet!***

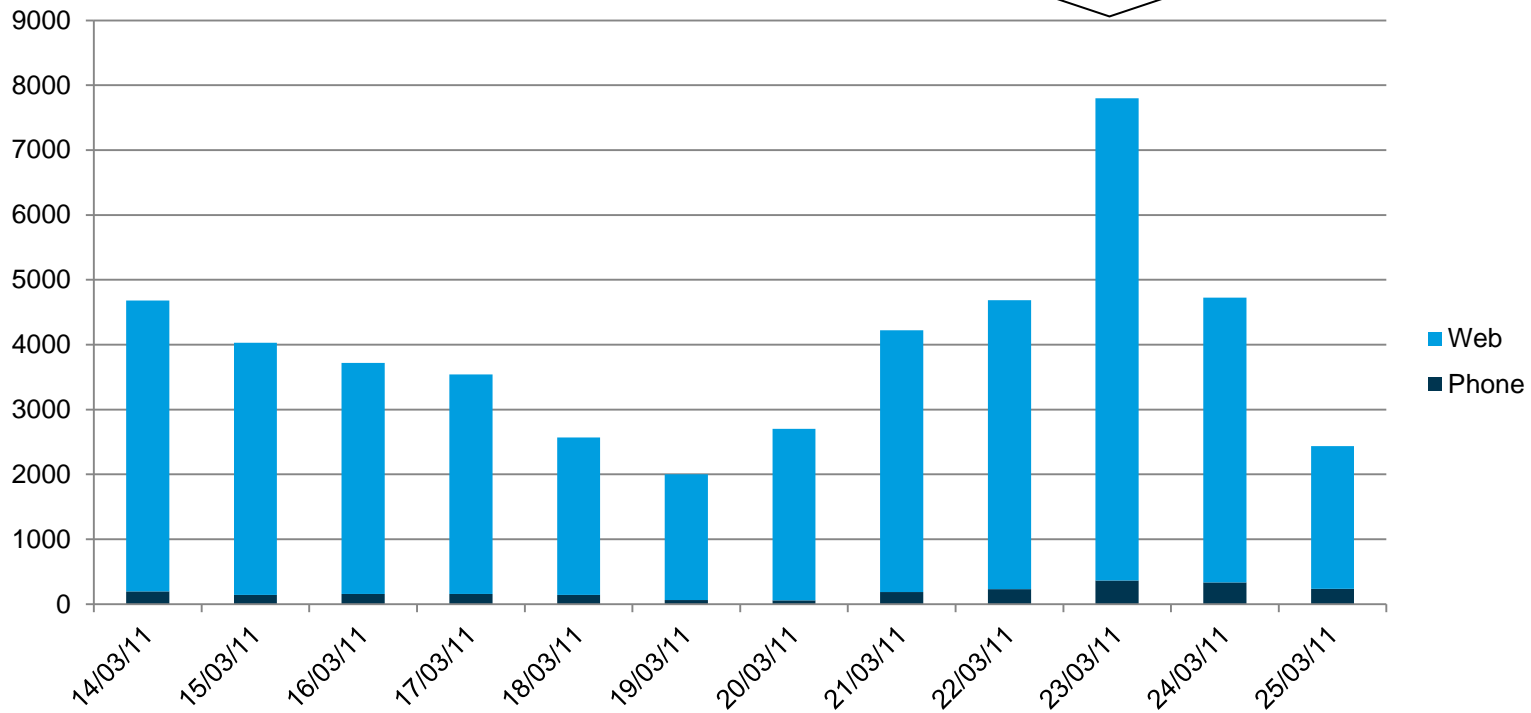
# Voters by Year of Birth



*Internet voting is not just for the young!*

# Votes taken by day

**Close of  
Registration**



***Few people left it to the last minute***

# Security of Remote Electronic Voting

- iVote Integrity
  - Independent development of a test standard.
  - Extensive testing including; intrusion testing and usability testing.
  - Independent code review of critical parts of the system.
  - Extensive system logging and review of logs.
  - Remove individual access to system after “lock down”.
  - Independent audit reports before and after the election.
  - No calls from voters indicating electoral fraud.
- Offence for hacking/tampering
  - The legislation for technology assisted voting introduced offences with a maximum penalty of \$11,000 and 3 years.



# Security Approach

- Registration and Voting Security
  - Limit risk of registration impersonation - every applicant had a letter sent to their enrolled address to verify they had applied for iVote. They were asked to contact NSWEC if they had not applied for iVote (no complaints were received).
  - Limit risk of voter impersonation – A registered elector can only vote once with an iVote Number hence a legitimate voter knows if their vote has been used illegally. An insignificant number of electors requested new iVote number and claimed they were using the correct credentials (most said they lost iVote Number or forgot PIN). Also no electors who registered for iVote and did not vote at all complained they could not vote because their vote was used by someone else.

## Security Approach (cont...)

- Both credentials only held by voter (Two Factor security)
  - PIN Number provided by voter not known to election officials – 6 digit
  - iVote Number provided by NSWEC – 8 digit
- No voter details held online on core voting system
  - Only a hash of the PIN and iVote Number held on voting server to be used for authentication of entered values by user
  - Hashing done using large “salt” to make more difficult to break encryption using brute force approach
- Issued receipt upon completion of successful vote which the elector can use to check their vote has been passed to scrutiny after election closed

## Security Approach (cont...)

- System Security
  - Computer system locked at commencement of election and only Electoral Commissioner and iVote Manager had “keys”.
  - Passwords to electronic ballot box held by 5 trusted people.
  - Quorum of 3 needed to open or close ballot box.
  - Electronic ballot box closed (encrypted) at beginning of election such that the contents of votes put into the box are not visible to anyone. Votes in electronic ballot box are like postal votes inside an envelope
  - Electronic ballot box opening (decrypt) when election closed separating the vote from the voter and allowing vote to be printed.
  - Opening and closing of box witnessed by scrutineers

# Scrutiny

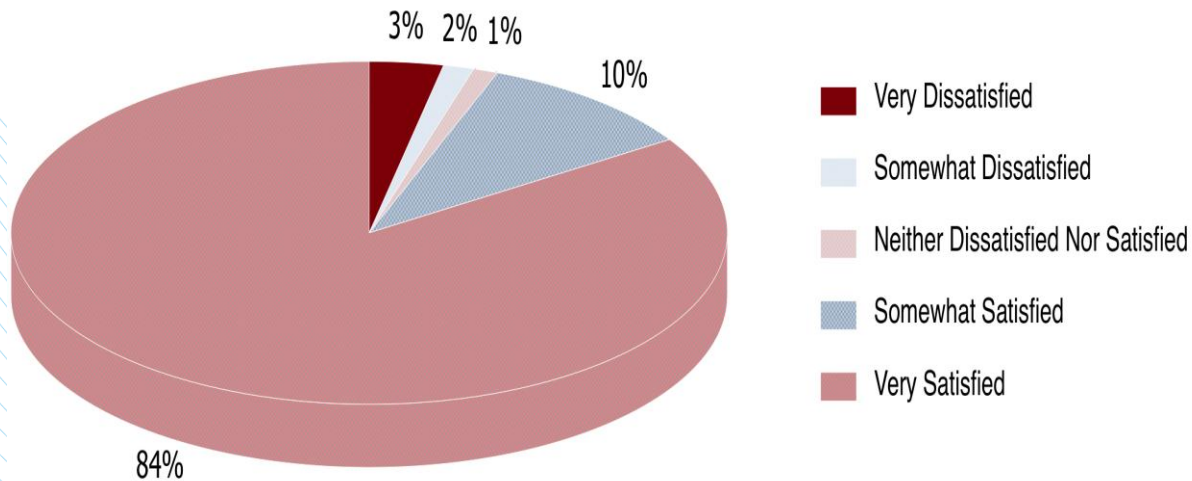
- Paper System
  - Candidates/Parties nominate persons to observe vote counting processes on election night operations in polling place and post election night in Returning Officer offices.
- iVote System
  - System scrutinised by independent software auditors for security and integrity of key software and encryption processes.
  - System tested by independent testing company.
  - Voting system audited against iVote Standard by PwC.
  - Encryption and decryption process witnessed by scrutineers.
  - Ballot Printing and reconciliation process witnessed by scrutineers and reconciled to expected votes from decryption and log file data.
  - Counting of ballots done using standard counting and scrutiny.

## The vast majority of comments are positive

- Twitter:
  - “Kudos to Electoral Commission NSW for iVote system.”
  - “Just voted online in the NSW State Elections. Impressed I can now vote online. Not so impressed at the candidates.”
  - “Still overseas and voted today for NSW election using iVote online. Surprisingly efficient and easy.”
- iVote feedback via email, survey monkey and voicemail:
  - “To let you know the iVote online voting is brilliant. Hopefully we won't need to be overseas to use it next time. Thanks to all involved in providing the service”

# Satisfaction

- Post Election Survey
  - 94% satisfied
  - Main suggested improvement was to extend usage



## Postal Voting vs iVote

- The table below shows performance of iVote versus Postal Vote process.
- iVote has significantly better performance in all aspects of its operation.

Analysis of Overall Voting Failure	iVote		PV	
Registered to Vote	51,103		315,182	
Voted Successfully	46,864		245,295	
Failed to iVote or PV after registration	4,239	8.30%	69,887	22.17%
Vote Rejected at Scrutiny	29	0.06%	13,901	4.41%
Did not vote at the election at all	1,483	2.90%	35,178	11.16%

## Clarence by election Growth

- The table below shows the increase in iVote registrations at Clarence by election relative to Clarence District at SGE 2011.

	iVote Registrations				
	Distance to PP	Other Disability	Outside NSW	Reading Disability	Total
<b>SGE 2011</b>	31	17	520	7	575
<b>Clarence by election</b>	236	80	992	27	1,335
<b>% Increase</b>	761%	471%	191%	386%	232%



## Clarence Returned iVoters

- The table below shows the electors who registered for iVote at the SGE 2011 and either iVoted at Clarence by election or did not return as an iVoter at Clarence. The bottom line shows the % of SGE iVoters that returned to iVote at the Clarence.

	iVote Registrations				
	Distance to PP	Other Disability	Outside NSW	Reading Disability	Total
<b>Voted at Clarence</b>	14	6	114	5	139
<b>Did not return for Clarence</b>	17	11	406	2	436
Grand Total	31	17	520	7	575
% Return as iVote at Clarence	45%	35%	22%	71%	24%

## Future Direction

- The following enhancements are proposed for iVote in the future;
  - Elector verification of preferences.
  - Increased transparency of technology and process.
  - Improve readiness of iVote for by-elections and continual enhancement of voting processes and procedures.
  - Increased promotion of iVote in response to feedback from voters.

# Questions?

More information  
[www.elections.nsw.gov.au](http://www.elections.nsw.gov.au)

## Postal Voting vs iVote

- The table below shows that over 22% of electors who register for PV failed to complete the PV process while the iVote process has a significantly lower failure rate of 8.3%.

Analysis Overall Voting Failure	iVote		PV	
Registered to Vote	51,103		315,182	
Voted Successfully	46,864		245,295	
Failed to iVote or PV after registration	4,239	8.30%	69,887	22.17%

## Postal Voting vs iVote (cont...)

- The table below shows both the high rate of both PV scrutiny failure (4.41%) and PV return failure (17.76%).
  - It is believed that the main reason for the higher PV scrutiny failure is due to the inability of electors to complete their declaration envelopes correctly.
  - The reason for the higher return failure rate for PV is not fully understood but could relate to postal issues and the general reduction in use of postal services by electors.

Analysis of Scrutiny & Return Failure	iVote		PV	
	Count	Percentage	Count	Percentage
<b>Vote Rejected at Scrutiny</b>	29	0.06%	13,901	4.41%
<b>Failed to try/return to vote after registration</b>	4,210	8.24%	55,986	17.76%
<b>Failed to iVote or PV after registration</b>	4,239	8.30%	69,887	22.17%

## Postal Voting vs iVote (cont...)

- The table below shows the relative high rate of overall non-participation by people who apply for a postal vote (11.16%) compared to iVote (2.9%).

Analysis of Participation	iVote		PV	
	Count	Percentage	Count	Percentage
Voted some other way	2,756	5.39%	34,709	11.01%
Did not vote at the election at all	1,483	2.90%	35,178	11.16%
Failed to iVote or PV after registration	4,239	8.30%	69,887	22.17%