

# Change that Counts

## Review of Australia's Electoral Procedures

- 1. Senate Elections – method of counting**
  - 1.1 Queensland 2007 - the stolen election
  - 1.2 Victorian Senate Election - Hypothetical (Surplus Transfer value)
  - 1.3 Option one: The Wright System - Reiterative counting process
  - 1.4 Option two: Meek method
  - 1.5 Weighted Gregory Surplus Transfer
  - 1.6 Remainders
  - 1.7 ACT and Tasmania - Last bundle
  
- 2. Above the line ticket voting**
  - 2.1 Above the line Ticket Registration
  - 2.2 Optional Preferential ticket Voting
  
- 3. Scrutiny of the electronic ballot**
  - 3.1 Publication of preference data files
  - 3.2 Additional information required to be published
  
- 4. Computerised counting of elections**
  - 4.1 Single member constituencies
  - 4.2 Multi- Member constituencies
  - 4.3 Transcription and data entry of preferences
  - 4.4 Online voting
  - 4.5 Open source code
  - 4.6 Certification of software
  
- 5. Security of electronic data**
  - 5.1 Victorian State election 2006
  - 5.2 Backup of data (legislative requirements)

## **6. Review of the Australian and State Electoral Commissions**

- 6.1 Consolidation of Federal and State Electoral Commissions
- 6.2 Privacy - Limited access to electoral role details

## **Appendixes**

# Change that Counts

## Part 1: Senate Elections – method of counting

Analysis of the 2007 Senate election has highlighted a number of serious issues in relation to the method used in counting the Australian Senate vote

The system currently in use was designed to facilitate a manual counting process whilst it has been modified over the years it is no longer suitable as it produces a number of inconsistencies and distortion in the proportionality of the vote.

Of particular concern are the method of segmentation and the distribution of preferences attributed to excluded candidates and the calculation of the surplus transfer value

With the use and aid of computer technology the continuance of the current system can no longer be justified.

The following principles should apply when considering the issue of how the Senate vote is counted

- Principle 1: Each vote must be treated equally and in the same way.
- Principle 2: The value of a vote should never increase in value disproportionately as a result of the calculation and distribution of surplus votes
- Principle 3: If a candidate is excluded, all ballots should be redistributed and counted as if that candidate had never stood.

*“If we calculate and allocated distribution of shareholders funds and dividends in the way we count the Senate vote there would be a loss of confidence and collapse in the financial system overnight”*

### 1.1 QUEENSLAND 2007 - The stolen election

Analysis of the 2007 Senate Election of Queensland and Victoria has highlighted a number of errors in the way in which the Senate vote is counted.

In counting the vote using the various counting methods it was discovered that the results of the Queensland Senate election did not accurately reflect the voter’s intention and that the Greens candidate Larissa Waters should have been elected.

The reason why she was not elected was due to the distortion in the method and process used in the segmentation and distribution of a candidate's preferences.

This has raised a number of issues of concern as to the accuracy and suitability of the method used in counting the vote.

### **A SIMPLE TEST OF THE SYSTEM:**

***“If you recount the 2007 Queensland Senate vote excluding all candidates except the last seven candidates standing (3 ALP, 3 Lib/NP and 1 Green) and distribute the vote according to existing rules the Greens' candidate, Larisa Waters, would have been elected”***

This simple analysis demonstrates that the outcome of the election had changed as a result of the method of distribution and segmentation in the counting of the vote. Under the current system all other candidates are excluded from the count as the count progresses. In theory if all votes were treated equally and in the same manner the result of the election would also be the same.

### **THE QUEENSLAND ERROR**

The error identified with the Queensland Senate count relates to the method of segmentation and distribution of preferences from excluded candidates. The problem associated with the Australian method of counting the vote has been well known and was the focus of review and consideration by mathematician Brian Meek who devised an alternative means of counting the ballot. (see below)

Ideally there should be one transaction per candidate either a distribution of candidate's surplus or distribution of preferences following a exclusion - without segmentation. This can be achieved by either by introducing the Meek method of counting the vote or alternatively adopting a re-iterative counting process where the count is reset and restarted on every exclusion. The processes repeating until all vacant positions are elected in a single iteration. (see attached information on the Wright system)

With the use of computerised counting system the reiterative count can be readily undertaken with the results of the known in hours, with the use of the Meek method within minutes, following the conclusion of the data-entry process.

The cost of implementing this proposed change is minimal and estimated to be no more than \$10,000.

## 1.2 VICTORIAN SENATE ELECTION - HYPOTHETICAL (Surplus Transfer value)

Analysis of the 2007 Victorian Senate election has highlighted a problem in the way in which the Australian government calculates the "*Surplus Transfer Value*".

Currently the "*Surplus Transfer Value*" is calculated by dividing the value of the surplus vote (Candidate's *Total vote minus quota*) by the number of ballot papers. The problem with this formula is that not all ballot papers attributed to a candidates surplus votes are of equal value. Some votes have full value and others a fraction value. When the current formula is applied votes that hold a fraction of its original value increase in value disproportionately at the expense of full value votes.

The current formula is based on the number of ballot papers as opposed to the value of the vote and was designed to facilitate a manual count at a time when computers technology was not available.

In a hypothetical analysis of the 2007 Victorian Senate count had "*One Nation*" preferred the "*Liberal Party*" ahead of the "*ALP*": the "*Greens*" candidate would have secured an additional bonus value of 7,000 votes which would have elected the Greens ahead of the Australian Labor Party's third candidate "*David Feeney*"

These "bonus votes" and the outcome of the election do not reflect the voter's intention or comply with the principle of "*one vote one value*".

***"ABC Electoral Analyst Antony Green had independently confirmed our analysis of the Victorian Senate count. (See attached extract)"***

## 1.3 OPTION ONE: THE WRIGHT SYSTEM – The reiterative counting process

The "Wright System" named after the late Jack Wright, the author of the book "Mirror of the nation's mind" and former president of the Proportional Representation Society of Australia, is a reiterative linear counting system that is designed as a refinement of the existing system currently in place.

1.4 . On every exclusion of a candidate from the count the ballot is reset and votes redistributed. It is essentially a refinement of the existing system incorporating the *Weighted Gregory Surplus Transfer* method and replacement of the segmented distribution process with a system of reiteration of the count. (a restart reset on every exclusion). All votes are transferred in a single transaction per candidate without segmentation. The process continues until all vacant positions are elected in a single iteration.

(See attached information outlining the Wright System process)

The aim of a reiterative counting process is to ensure that all ballot papers are treated in the same manner and as though any excluded candidate had not stood. (Principles 1 and 3 outlined above)\

## OPTION TWO: MEEK METHOD

Mathematician Brian Meek developed a nonlinear algorithm (known as the Meek method) in order to count and distribute a *Single Transferable Vote - Proportional representation* election. In applying the Meek method to the 2007 Queensland Election it produced the same overall results as the “*Wright*” reiterative counting system which showed that the Green’s candidate, Larissa Waters, should have been elected.

The Meek method would be considered overall as the most accurate of the proposed counting systems in that it fully proportions out the votes. However the Wright system, being a linear process, is easier to follow and monitor and if need be could be undertaken manually. The discrepancy in the two counts is less than 0.05% the overall results being the same.

### 1.5 WEIGHTED GREGORY SURPLUS TRANSFER

The weighted Gregory Surplus Transfer method is essential in order to ensure the compliance of the “One vote one value principle” It is based on the proportional value of each vote and not the number of ballot papers allocated to a candidate.

The Western Australian State Government, concerned at the distortion in the value of a candidates surplus transfer value, has adopted the "Weighted Gregory Surplus Transfer method" where a candidate’s Surplus Transfer value is calculated by dividing the total value of a candidate’s vote by the value of the surplus (Candidate’s Total vote minus quota) and then multiplying the result by the value of each vote to be redistributed.

The Victorian State Parliament in considering this issue has also recommended that the "Weighted Gregory surplus transfer method" be adopted.

The Federal Parliament Joint Standing Committee of Electoral matters failed to address this issue.

The adoption of a weighted Surplus Transfer value best fulfills the requirements of Principle 2 outlined above the cost of implementing this change would be less than \$5,000.

### 1.6 REMAINDERS

With the use of computer based technology it should be possible and desirable that the remainders of any division remain with the value of the vote attributed to a candidate. This may become a deciding factor in a close election where two or more candidates are tied and a decision needs to be made which candidate should be excluded. This is of greater significance in smaller based electorates such as Local Government where ideally the same system should apply.

The retention of remainders is minor change in the source code and should cost no more than \$5,000 to implement. It would significantly simplify the source code and transaction processes used in the electronic counting of the vote.

## 1.7 ACT AND TASMANIA - Last bundle

The Australian Capital Territory and Tasmania use what is known as the modified Hare-Clark “*last bundle*” method of distribution (as advocated by the Proportional Representation Society of Australia)

Whilst the system uses the “Weighted Gregory Surplus Transfer” method, it never the less is equally flawed as the Australian Senate system, as it also uses a segmented distribution counting process.

Under a *last bundle* counting system only the last segmented transfer of ballot papers is distributed and transferred to continuing candidates. The distribution of a candidates surplus should not be determined by the *last bundle or parcel of votes received*. Every vote that has contributed to a candidate’s election should be equally considered in the transfer of a candidate’s surplus with each vote maintaining its proportional value as the count progresses.

The *last bundle* process should not be considered as an option for Australia’s future electoral system.

Like the current Australian Senate system the last bundle system was designed to facilitate a manual count and in the process there was a trade off on the proportionality and accuracy of the count. It does not accurately reflect the voter’s intentions. The *last bundle* process does not treat all votes equally or fairly.

The *last bundle* process is also used by the Australian labor Party in its internal elections.

The *last bundle* should play no role in the 21<sup>st</sup> century where computers can undertake the counting system more accurately and proportionally (subject to the quality of the data recorded).

Tasmania and the ACT should also reconsider their current electoral practices by abandoning the *last bundle* counting system, relegating it into the museum and history books as is the case with the typewriter and telex machines and adopt the Wright system or the Meek method of counting the Single Transferable Vote.

# Change that Counts

## Part 2: Above the line ticket voting

### 2.1 ABOVE THE LINE TICKET REGISTRATION

Each party/group should be able to register up to three tickets (as opposed to just two) and that the registered party/group should be able to nominate the percentage allocation of above the line votes for each ticket.

The current limitation of two tickets with each ticket carrying the same weight is too restrictive. A party/groups should have the opportunity to allocate preferences proportionally to the level of support they recommend and not restricted to applying equal weight to each ticket

### 2.2 OPTIONAL: PREFERENTIAL TICKET VOTING

Optional preferential voting should not apply to above the line ticket votes. Registration of tickets should require that preferences for all candidates be allocated. Optional preferential voting should only apply to below the line voting

### 2.3 PREFERENTIAL VOTING ABOVE THE LINE

Consideration should be given to the option of allowing voters to cast a preferential vote above the line where the distribution of preferences would be allocated to each candidate in order of groups allocated preference without the need to vote below the line.

# Change that Counts

## Part 3: Scrutiny of the electronic ballot

### 3.1 PUBLICATION OF PREFERENCE DATA FILES

Elections in Australia are no longer open and transparent. The use of electronic counting system has limited the opportunity for independent review and scrutiny of the elections which in turn undermines public confidence in the electoral process.

The Australian Electoral Commission took three months to provide and publish a copy of the detailed election results. Copies of the detailed preference data file related to the Australian Senate elections should have been readily available to scrutineers and subject to independent analysis with certified copies of the data-files being published as part of the procedures for the declaration of the poll.

Without access to this information it is impossible for results of an electronic count to be properly scrutinised. Scrutineers need access to copies of the preference data-files in order to independently verify the correctness and validity of the elections results. Access to the data-file also allows independent analysis that may highlight potential errors that otherwise would go undetected.

Recommendation that legislation be modified to ensure that copies of the electronic data file recording voters preference is readily made available to scrutineers on request and that a certified copy of the data-files be published as part of the declaration of the elections procedures and without delay.

### 3.2 ADDITIONAL INFORMATION REQUIRED TO BE PUBLISHED

In addition to the reference data files and polling booth results the Australian Electoral Commission should also be required to publish the polling place returns including the total number of ballot papers issued for a given electorate, the number of postal, absentee pre-poll and section votes issued and returned. This information should be published prior to the formal distribution of preferences and within 24 hours of the close of the poll or receipt of outstanding ballots.

It should be possible based on the information provided to determine the number of ballot papers that are still outstanding or have not yet been included in the count. The information published should be able to be readily tallied with the detailed polling place returns including the number of registered voters who had been issued ballot papers. Currently this information is not readily available. With the use of the internet there is no reason why this information can not be published.

# Change that Counts

## Part 4: Computerised Counting of elections

### 4.1 SINGLE MEMBER CONSTITUENCIES

There is no merit or justification in conducting a transcribe preference computerised electronic count for single member electorates. In terms of man hours there is no real benefit, any perceived benefit only comes at the cost of the scrutiny of the ballot. It is impossible to properly scrutinise a date-entry counting process. Even more so without an independent double entry checking process. The use of a random quality check is insufficient in a close election. With the potential absence of a pre-sorting of ballot papers into primary votes and access to the detailed preference data files the ability to scrutinize a data-entry process is severely limited.

In a manual counting process scrutineers have increased opportunity to verify the count and distribution of preferences the counting of a single member electorate is not complex and does not warrant the use of a transcribed data entry process.

### 4.2 MULTI- MEMBER CONSTITUENCIES

In multi-member constituents there is some justification and merit in undertaking a computerised counting process but it must be undertaken in such a way that it does not detract from the ability to properly scrutinise the conduct of the election. A computerised counting system can facilitate a more accurate distribution of preferences and calculation of the result of the election without the need to maintain or introduce distortions in method of counting as currently exist

### 4.3 TRANSCRIPTION AND DATA ENTRY OF PREFERENCES

In transcribing ballot papers preferences it is important that ballot papers are pre-sorted according to the primary vote prior to data-entry in order to facilitate a proper and coordinated scrutiny of the count. Whilst it is possible to record and count the vote without pre-sorting it severely limits the ability to scrutinise the data-entry counting process.

By ensuring that copies of the preference data files are readily made available to scrutineers any recount can undergo analysis and be compared with the previous data. This should be able to be undertaken independently by scrutineers and not solely reliant on electoral office staff.

### 4.4 ONLINE VOTING

With the introduction of online voting where there is no transcription the issues of concern change with greater emphasis on data security, however access to the detail preference data files is still required.

#### **4.5 OPEN SOURCE CODE**

As part of Australia's commitment to maintaining an open and transparent electoral processes consideration should be given to open sourcing software codes used in the counting of the elections results as is the case with the Australian Capital Territory

#### **4.6 CERTIFICATION OF SOFTWARE**

All process and software used in the conduct of the election must be properly certified to meet all relevant ISO standards.

All software used in the collection and counting of votes must undergo a detailed and comprehensive review and certification process. Details of the certification should include all modules and be published in full, as a matter of course. The certification should not just be a statement that the software has been certified but must include details results and examinations undertaken as would apply to an airline safety check and subject to independent scrutiny

Review of the Victorian State Electoral Commission certification indicates that then software has not been fully certified or tested.

# Change that Counts

## Part 5: Security of electronic data

### 5.1 VICTORIAN STATE ELECTION 2006

Review of the 2006 Victorian State election has highlighted a number of serious concerns related to the security of electronic data with reports that Electoral officials had access to the electronic data files prior to the close of the polls. Evidence given by the Victorian Electoral Commissioner, Steve Tully to the Victorian parliament has indicated that electronic data files had been accessed by Commission staff in the absence of scrutineers. Whilst the number of ballots involved in the “electronic trial” was minimal it does highlight the need to ensure that proper process and protocols are in place to ensure that the electoral process has not been compromised and that data can not be accessed prior to the close of the poll

### 5.2 BACKUP OF DATA (legislative requirements)

The Victorian Commission failed to undertake backup of the preference data-files pertaining to the Western Metropolitan Legislative Council electorate.

The Victorian Electoral Commission, when requested, were unable to provide copies of the preference data-files pertaining to the preliminary count. Evidence given by the Chief Commissioner Steve Tully to the Victorian Parliament indicated that the data files had been destroyed and the data recorded had been overwritten. No backup made. The commission no longer has copies of the data transcribed during the primary count. As a consequence the results of election and the process undertaken could not be independently verified or reviewed. It is unknown if this was an oversight or a deliberate attempt to avoid scrutiny.

It does raise serious questions pertaining to the quality of professional services of the Commission's data management.

The Australian parliament needs to ensure that similar mistakes are not repeated

# Change that Counts

## Part 6: Review of the Australian and State electoral commissions

### 6.1 CONSOLIDATION OF FEDERAL AND STATE ELECTORAL COMMISSIONS

Australia has over seven electoral authorities each one essentially duplicating resources and cost associated with the conduct of election in Australia. Millions of dollars are wasted as a result. Each electoral authority investing millions of dollars in developing systems and software that essentially does the same as that provided by the Australian Electoral Commission.

The Australian Government in association with the State governments should initiate a review of current electoral commissions in existence with the view of establishing one independent electoral authority throughout Australia . Each state and the federal Government would appoint one representative to the board of commissioners of the new central authority.

The Australian electoral role is currently administered by the Australian Electoral Commission with additional input from local councils in respect to municipal elections.

### 6.2 PRIVACY - LIMITED ACCESS TO ELECTORAL ROLE DETAILS

There is growing concern as to the security and rights of privacy to the Australian Electoral Roll particularly access to the private enrolment list. Access to the electoral roll should be restricted and only be used in relation to voting at elections not for administrative purposes. State Authorities should have limited access only and no access to the silent voters list. Issuing of votes and documents to registered silent voters should be undertaken by the Australian Electoral Commission only.

2007 Australian Senate Election

# Change that counts

Joint Standing Committee on Electoral Matters ([JSCEM](#))

1. [Submission](#) to the Australian Parliament - JSCEM
2. Supplementary Submission - [The Wright System 'Rules and procedures'](#)
3. Supplementary submission - [Change that Counts](#) (pdf) Powerpoint Slide show
4. Supplementary submission - [Change in the Queensland Senate Results](#)
5. Wright System - [Queensland Senate Count Summary Results](#)
6. [Meek's method](#) - Queensland Senate Count by David Hill
7. Queensland Senate Count [comparison summary sheet](#)
8. Copy of Antony Green's Analysis and supplementary submission to the [Joint Standing Committee on Electoral Matters](#) titled "[Problems with the Senate Counting System](#)" (pdf 23k)

9. [Reply to Antony Green's misleading statements](#) to the JSCEM (23 July 2008).

The Chairmen and Members  
Joint Parliamentary Committee - Electoral Matters Committee  
Victorian State Parliament

*Legislative Council*

Adem Somyurek, Committee Chairperson,  
[adem.somyurek@parliament.vic.gov.au](mailto:adem.somyurek@parliament.vic.gov.au)  
Candy Broad [candy.broad@parliament.vic.gov.au](mailto:candy.broad@parliament.vic.gov.au)  
Peter Hall [peter.hall@parliament.vic.gov.au](mailto:peter.hall@parliament.vic.gov.au)

*Legislative Assembly*

Christian Campbell [christine.campbell@parliament.vic.gov.au](mailto:christine.campbell@parliament.vic.gov.au)  
Michael O'Brien [michael.obrien@parliament.vic.gov.au](mailto:michael.obrien@parliament.vic.gov.au)  
Robin Scott [robin.scott@parliament.vic.gov.au](mailto:robin.scott@parliament.vic.gov.au)  
Murray Thompson [murray.thompson@parliament.vic.gov.au](mailto:murray.thompson@parliament.vic.gov.au)

Submission August 27, 2007

by

**Anthony van der Craats**

*Senior Systems Analyst*



- *Life-Member of the Proportional Representation Society of Australia*
- *Member of the Australian Labor Party (Victoria) 1978 – Present*
- *Past executive member of the Australian Labor Party – Local Government Forum (Victoria)*
- *Past Member of the Australian Labor Party – Local Government Policy Committee (Victoria)*
- *Former secretary/research officer to the Honourable Evan Walker, Leader of the Government in the Victorian Legislative Council and Member for Melbourne Province*

***Copy of correspondence Glenda Frazer (VEC), dated November 24,  
concerning Electronic Voting Kiosk data***

----- Original Message -----

**From:** [Glenda Frazer](#)

**Sent:** Friday, November 24, 2006 8:37 AM

**Subject:** Late update to results

A late update to all regarding the votes taken at our 6 E Centres and Melbourne Airport. Each centre mentioned will be taking votes for all Districts in the State, additionally each of these centres will be counting all votes taken on election day. After analysing the number of voting centre results entered last night for 1st prefs (District and Region) and 2 CP we have realised that everyone could be waiting around all night for what would be dribs and drabs that we do not anticipate would make an impact on the result. Because of this we have decided that we will **not** be entering these small results on election night. These will be entered on Sunday during the day.

Many apologies for those people who I have misinformed this afternoon, as I said this is a late change. We do not anticipate large numbers of votes from these centres. I will keep in touch with progress reports.

Regards – Glenda