



BC-STV VOTE COUNT SIMULATION 2

This document uses pictures and text to demonstrate how an election in an electoral district might look under BC-STV. Each page represents one stage of the vote-counting process.

* * *

The first step is to count all the valid ballots (all ballots that clearly indicate at least a first preference) and determine the electoral quota – the number of votes needed to get elected.

In this simulation, there are 4 MLAs to be elected, and there were 100,000 valid ballots cast.

To calculate the electoral quota, a formula is used that divides the total number of valid votes by the number of MLAs plus one, then adding one to that number. This formula (known as the Droop quota) provides for the lowest possible number of votes needed to win, while making it impossible for too many candidates to be elected at any stage of the counting.

In the case of our model election, the electoral quota is as follows:

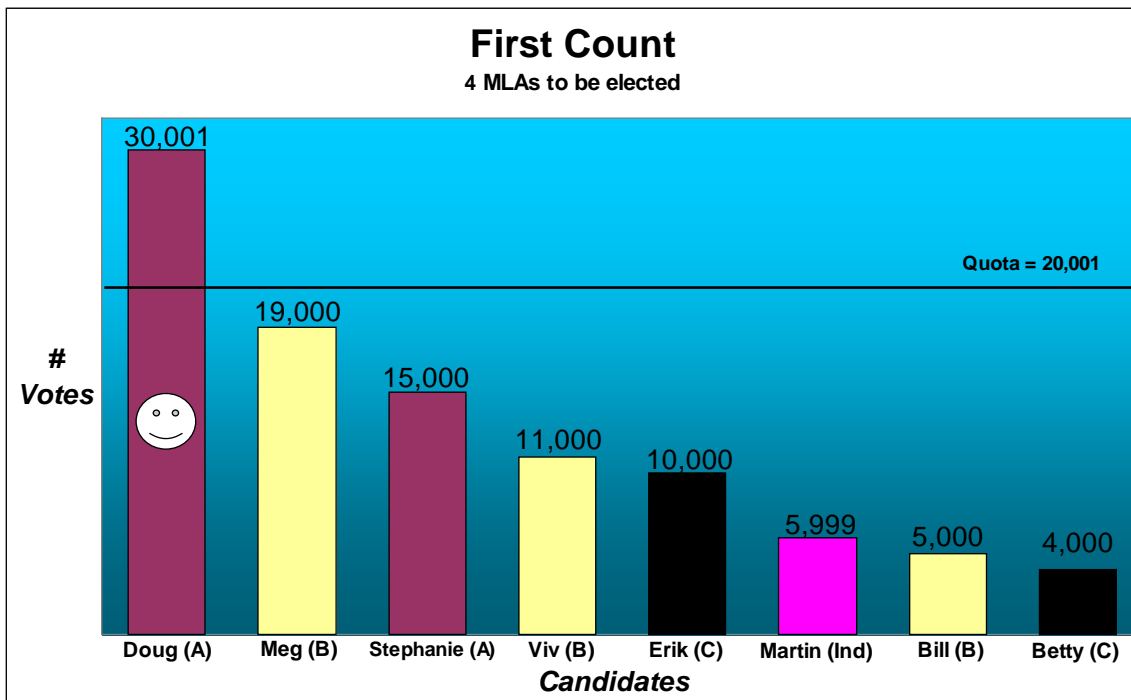
$$\frac{100,000 \text{ votes}}{(4 + 1)} + 1 = 20,001$$

So to be successful, a candidate needs to receive 20,001 votes.

The candidates in this electoral district are as follows:

<u>Party A</u>	<u>Party B</u>	<u>Party C</u>	<u>Independent</u>
Doug	Meg	Erik	Martin
Stephanie	Viv	Betty	
	Bill		

Referendum Information Office
BC-STV VOTE COUNT SIMULATION 2



After the first count, only Doug has received enough votes to be elected. He also received 10,000 more votes than he needed, meaning he has a surplus of votes.

The next step is to transfer Doug's surplus votes to the second choices of all 30,001 voters who voted for him.

How does this transfer work?

Under STV, the people who voted for Doug as their first choice still have part of their ballot "left over" – that is, there was more than enough support to elect Doug, so a portion of those votes are still available to be used. That remaining portion (known as the "transfer value") will be transferred to those voters' second choices, based on a formula that divides the number of surplus votes by the number of total votes.

In this case, everyone who voted for Doug would have their vote transferred to their second choice at the following value:

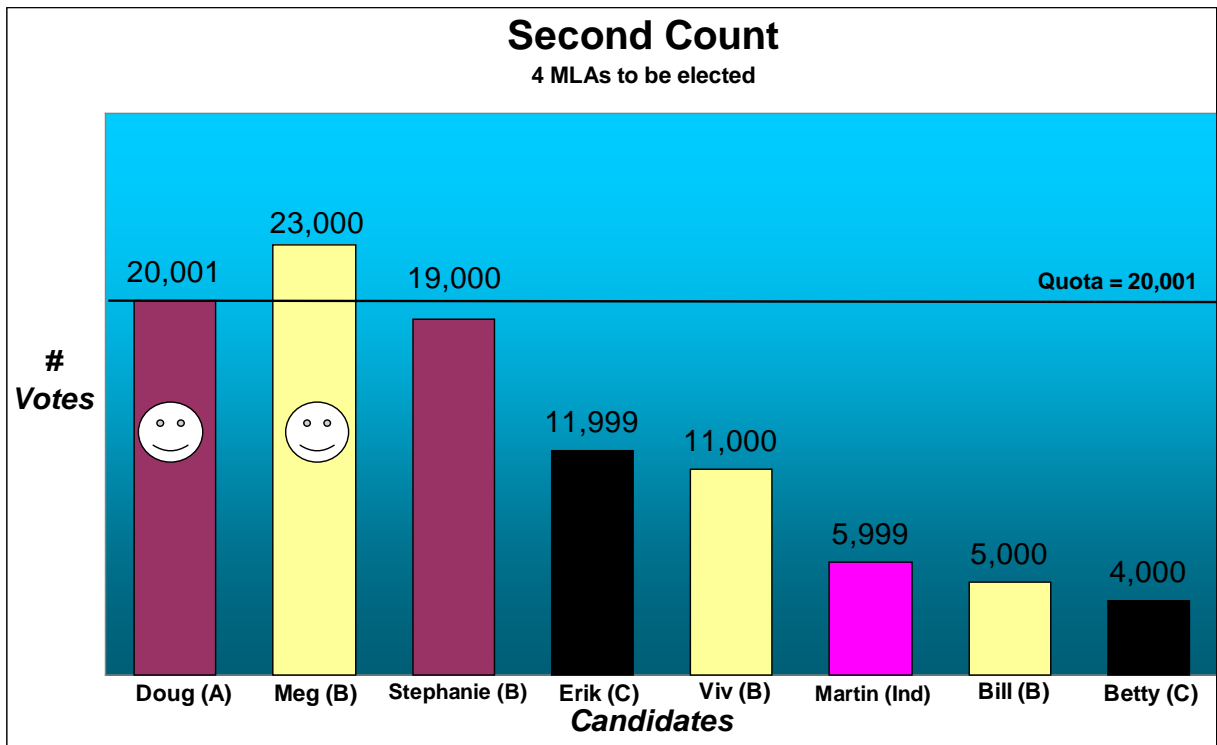
$$\frac{10,000 \text{ (surplus votes)}}{30,001 \text{ (total votes)}} = 0.3333 \text{ (transfer value)}$$

Why a fraction of a vote?

What this formula does is ensure that all of Doug's voters have their second choices examined and transferred (rather than just randomly picking 10,000 of them), but only transferring the number of actual votes of Doug's surplus. It's a way of fitting 30,001 voters' preferences into a "package" of 10,000 votes.

next....

Referendum Information Office
BC-STV VOTE COUNT SIMULATION 2



Approximately 40% of Doug's supporters put Meg and Stephanie as their second choice, and the other 20% put Erik. So Doug's 10,000 surplus votes are transferred like this:

4,000 to Meg 4,000 to Stephanie 1,999 to Erik

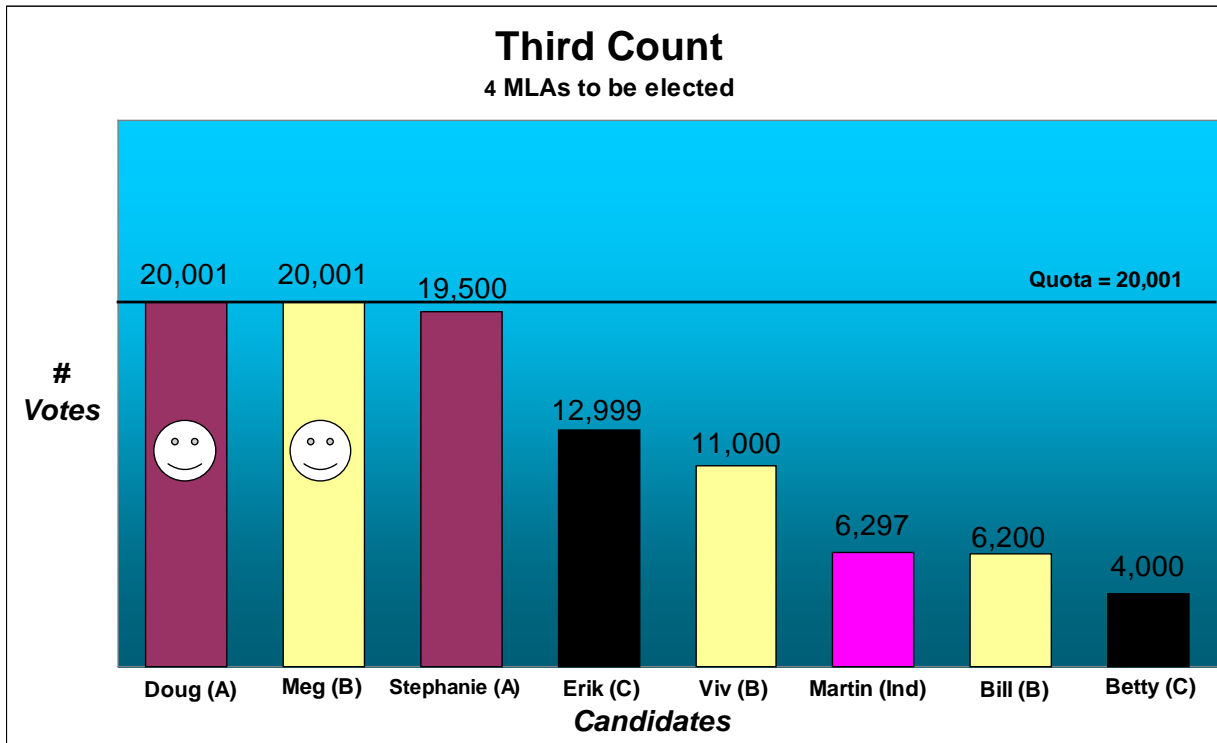
If the value of the votes being transferred is not a whole number, it is rounded down to the nearest whole number. That is why, in this example, Erik does not receive a round number of 2,000 transfer votes.

After this transfer, Erik has moved ahead of Viv, and Meg has been elected. Meg also has a surplus of 2,999 votes. Now those 2,999 votes will be transferred to the remaining candidates, in the following way:

- The 19,000 first-choice votes Meg received will be transferred to those voters' second choices at a value of 0.1304 (or 2,999 divided by 23,000). As you can see, the transfer value for these votes is lower than the transfer value of votes from Doug in the first count, because Meg has a smaller surplus than Doug did.
- The 4,000 second-choice votes that Meg received from Doug will be transferred to those voters' third choices at a value of 0.0434 (or 2,999 divided by 23,000 times 0.33). This is because those votes were already a fraction of a whole vote when they were transferred to Meg.

Referendum Information Office
BC-STV VOTE COUNT SIMULATION 2

next....



Here's how Meg's 2,999 surplus votes were transferred:

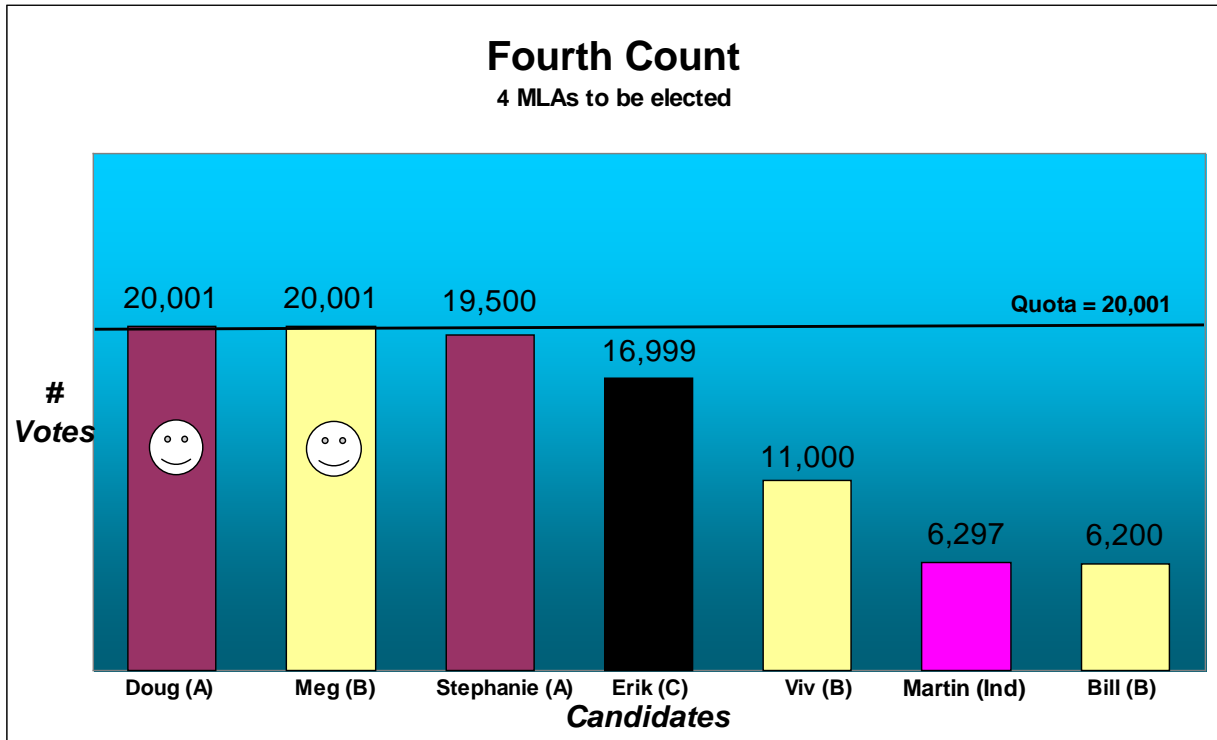
1,200 to Bill 500 to Stephanie 1,000 to Erik 298 to Martin

Again, because fractions of votes can't be transferred, one less vote overall is transferred to the other candidates.

After this round of counting, no one else is elected. This means that for the next count, the candidate with the fewest votes (Betty) will be dropped from further counting and all of her votes will be transferred to the remaining un-elected candidates at full value.

next....

Referendum Information Office
BC-STV VOTE COUNT SIMULATION 2



In this count, all 4,000 of Betty's votes go to Erik, who is a candidate for the same party as Betty.

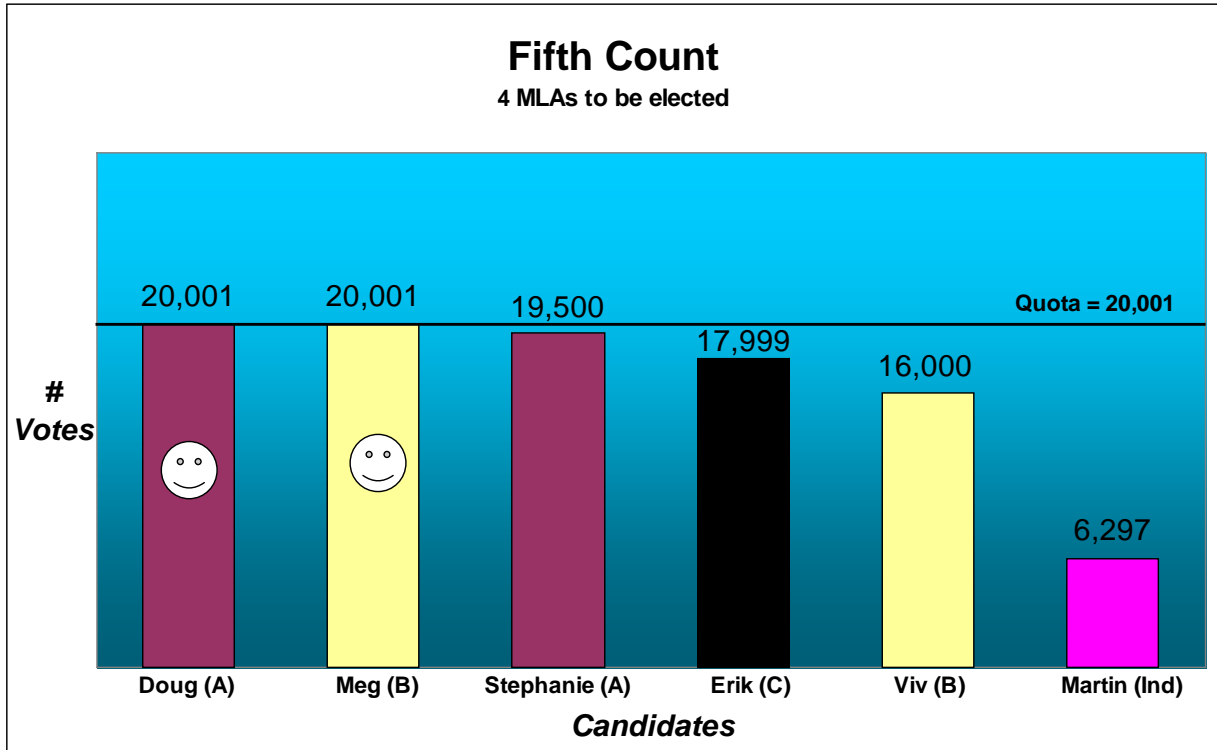
Why are these votes transferred at full value?

These votes are transferred at full value because they have not contributed to electing a candidate, unlike the surplus votes that were transferred from Doug and Meg. If Betty had received surplus votes before she was dropped, those votes would have been transferred at the transfer value they had when received by Betty.

After this count, there are still no further candidates elected, so now Bill will be dropped from further counting and his votes transferred at full value.

next....

Referendum Information Office
BC-STV VOTE COUNT SIMULATION 2



Here's how Bill's 6,200 votes were transferred:

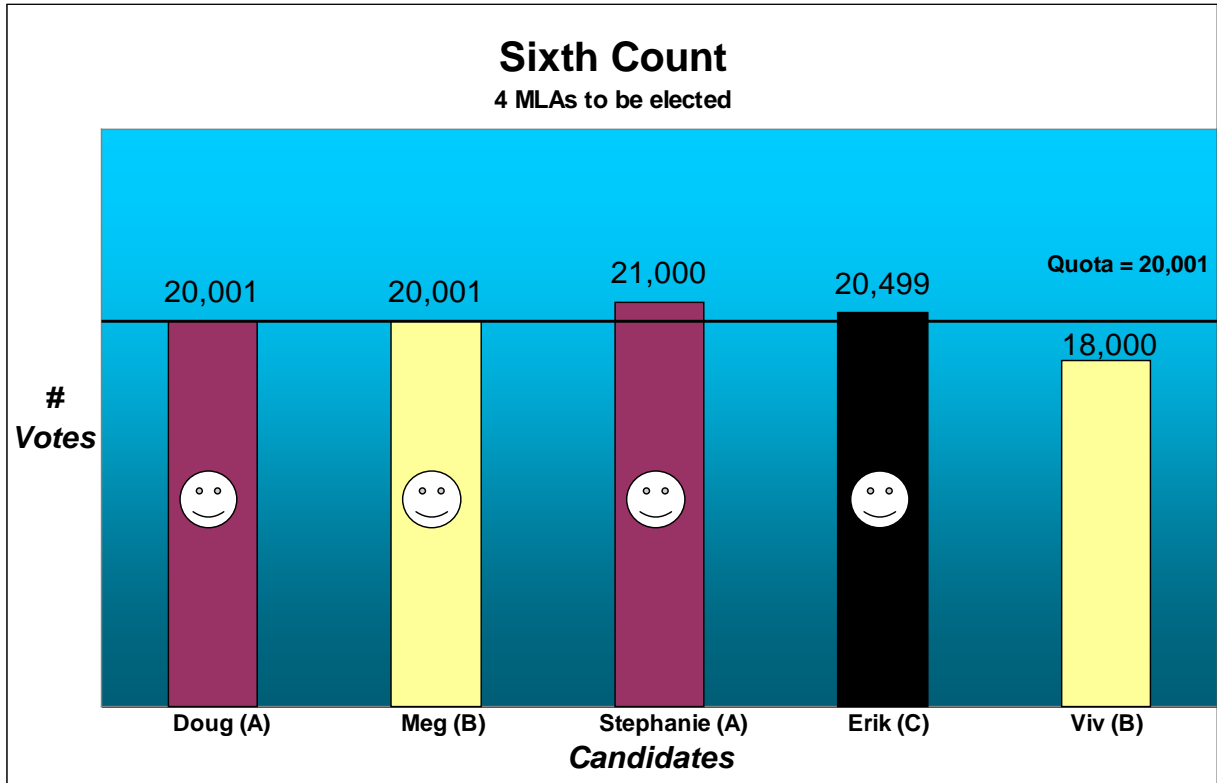
5,000 to Viv 1,000 to Erik

You will see that only 6,000 votes were actually transferred to other candidates. This is because 200 of Bill's voters didn't indicate a preference other than their first choice for Bill. Therefore, there are no further choices to count, and those 200 ballots are set aside as "exhausted" ballots.

We still haven't had any further candidates elected, but Stephanie, Erik and Viv are all close to reaching the threshold. The next count, which will transfer Martin's votes, will decide the remaining seats.

next....

Referendum Information Office
BC-STV VOTE COUNT SIMULATION 2



Here's how Martin's votes were transferred:

2,500 to Erik 2,000 to Viv 1,500 to Stephanie

Again, you will see that not all of Martin's votes were transferred. A total of 6,000 votes were transferred, because 298 of Martin's supporters did not indicate a second preference.

After this round of counting, Stephanie and Erik have been elected and all four seats in this district have been filled.

* * *

Want more information?

Contact the Referendum Information Office:

Website – BCreferendum2009.ca

Toll Free – 1-800-668-2800 **Vancouver** – 604-775-2800