

# Single Transferable Vote: ERS97 vs. the Meek method

## 1. Context

The rules of the Single Transferable Vote (STV) voting system promoted by the Electoral Reform Society are encapsulated in a document called ERS97, after the year it was last revised. ERS97 details several versions of STV. The ERS usually recommends the Scottish variant of STV, and this is probably what the Society has been using. It's simple to use, but it does make some approximations. However, it turns out that the Scottish STV is not the method that was actually approved by RSS Council for use in our Council elections.

Council was approached on the subject of voting by a member, I. D. "David" Hill, who was the direct descendant of Thomas Wright Hill, the schoolteacher who invented STV. David was very knowledgeable about voting systems and was a Council member of the Electoral Reform Society (and chair of its Technical committee), which promotes STV for wide variety of purposes. David was pushing an improved version of STV invented by Brian Meek of KCL and it was the Meek method that was approved by Council for use by the Society.

## 2. Why STV?

STV was invented to deal with some of the problems encountered when electing a number of candidates for a council or other body using common methods (like Multiple X voting).

### 2.i Wasted votes

Votes can be wasted either by being surplus to the number of votes a candidate needs in order to be elected, or by being given to a candidate who is subsequently eliminated. STV retrieves these votes and makes them contribute to the election.

### 2.ii Voters should be treated equally

STV tries to do this as far as possible. The Meek method does it better than others.

### 2.iii There should be no incentive for voters to vote other than in line with their preferences

There is much less incentive for voters using STV to vote tactically.

## 3. Surpluses

If a candidate receives more votes than is needed for them to be elected (*i.e.* their votes exceed the quota) their surplus votes are passed on the next candidate in their list of preferences and they are deemed to be elected. If, after the surpluses have been distributed it is still the case that no candidate has enough votes to be elected the candidate with the fewest votes is eliminated and their votes are redistributed. This process of surplus redistribution and candidate elimination is repeated until all the

seats have been filled. There are issues to do with which votes should be passed along as surplus, or whether *all* votes should be passed, after suitable downweighting. Different versions of STV deal with this in different ways.

#### 4. The quota

If there are  $s$  vacancies to be filled. The quota  $q$  is the smallest number such that if  $s$  candidates have  $q$  votes each it is not possible for an  $(s + 1)$ th candidate to also have as many as  $q$  votes. It can be shown that, if the total number of votes is  $T$  the quota should be  $\left\lceil \frac{T}{s+1} \right\rceil$ , where  $\lceil \cdot \rceil$  denotes the 'ceiling function' that rounds up a number with a decimal part to the next whole number. Alternatively, it can be expressed as  $\left\lfloor 1 + \frac{T}{s+1} \right\rfloor$ , where  $\lfloor \cdot \rfloor$  denotes the 'floor function' that truncates a number to create an integer result. When candidates' votes exceed the quota he or she is bound to be elected.

#### 5. Differences between Meek and Scottish (and other) STVs

In the usual versions of STV a candidate passes the quota threshold for being elected at most once. In subsequent rounds that person is then ignored and receives no more surpluses. In the Meek method elected candidates continue to receive, and transfer on, surpluses but they have a *keep value* that determines the weight to be attached to those transferred votes at each stage in the proceedings. Initially, every candidate has a keep value of 1.00 (*i.e.* they keep the full value of any received votes). If they pass the quota their keep values are revised downwards. The use of continually-adjusted keep values for every candidate in every round makes the method excessively complicated if done manually, but it presents no problems for a count conducted with aid of a computer.

#### 6. Why is Meek better?

- All candidates are treated equally, regardless of when or if they reach the winning threshold. This results in better proportionality, due to the more detailed surplus calculation
- Votes are always transferred from their first choice, to their second choice, and so on. With other STV methods some ballot choices may be skipped, depending on when candidates reached the threshold or when someone was eliminated. That is, the voting more accurately reflects the voters' intentions.
- With Meek, when a candidate is eliminated their votes are counted as if they were never in the election in the first place. With other methods the presence of a candidate who is eliminated can change the outcome of the election. (In practice it would be difficult for bad actors to exploit this.)