New York State BOE Proposal
for Numbers of Voters per Machine
Guarantees Long Lines and Voter Disenfranchisement

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Don't risk electoral meltdown

Recently NYVV submitted a proposal to the New York State Board of Elections detailing why New York should allow no more than 200 registered voters per DRE and 4,000 registered voter per optical scanner.[1] This was based on queuing theory simulations of elections with DRE voting times of 3.25 minutes[2] and other evidence which we will discuss below.

On March 16, 2007, the New York State Board of Elections announced a proposal suggesting we could have one DRE per 527, 548 and 752 voters per Sequoia, Avante and Liberty voting machines. *These results are supposedly based on the AIR measurements[3] but, in fact, are in direct contradiction to those results and will lead to serious electoral problems if implemented.*

Therefore we urge the Board to vote against that proposal and, instead, to institute the numbers we recommend in our study. While our results may seem conservative, it is important to remember that elections are events with many unpredictable factors. In order to make sure that no electoral districts—even a small fraction of the total—have long waiting times, it is necessary to have a adequate excess capacity. Our proposal, based on queuing theory and actual usage data from polling places, are the right choice for New York.

Real-world experience with lever machines and DREs

Susanne Scarpa, the town clerk in Lee, MA, says that they used to have 8 lever machines for 3800 registered (active) voters, i.e. 475 registered voters per machine, and "long, long lines."[4]

A voting precinct in Nashville, TN, with two DREs had 214 actual voters in the 2006 primary (107 per DRE) which worked well. When they had 527 actual voters in the 2006 general election (263 per DRE), they "had some voters waiting in long lines to cast ballots 5½ hours after polls closed."[5]

After its disastrous experience in 2004 and problems in 2006, the state of Ohio has prescribed a limit of 175 registered voters per DRE (starting in 2013). [6]

These numbers are consistent with our figure of 200 registered voters per DRE for New York.

Paper ballots/optical scan is the way to put voters first

Ms. Scarpa of Lee, MA mentioned above went from 8 lever machines with "long, long lines" to paper ballots and a single optical scanner. Lee's 35 marking booths with 3200 actual voters in 2004 had no lines.[4]

Londonderry, NH used paper ballots and had 12,000 actual voters processed with two optical scanners in 2004, i.e. 6,000 actual voters per scanner. [7] We believe that such a scanner, even with undervote notification turned on, could process 3,000 actual voters and serve 4,000 registered voters, assuming a 75% turnout.

Londonderry had 100 marking booths and no lines for the marking booths.[7]

The AIR study[3] said (Exhibit 5, page 21) that ballot marking took 3-4 minutes, a time comparable to the time to use DREs. Marking booths for PBOS represent the same potential choke point for voter flow as do DREs. The difference is that it is easy to avoid traffic jams with PBOS by buying many marking booths at less than $200. But it is prohibitively expensive to buy a comparable number of DREs at a cost of $8,000 or more each.

Queuing Theory

Queuing theory is the mathematics governing lines.

The results of a queuing theory election simulation gives a statistical spread of results that will occur in an election.[2] Not every election district will have long lines. But what if 10% or even 1% have long lines? New York has over

7,600 polling places.[8] A 10% failure would have 760 polling places with long lines and a 1% failure would affect 76 polling places. Long lines and the resulting wait times will cause voters to leave without voting. Even for 76 polling places, this is unacceptable.

We note that the high degree of statistical confidence required means that one cannot predict what will happen by simply asking a few precincts how their lever elections have gone. First, one must know the exact conditions of these elections—how many lever machines, how many voters, and their arrival times. If only 10% or 1% had long lines under certain conditions, an assurance that everything was fine will not tell you what will happen in a large statistical sample, i.e. the whole state of New York. The best predictor of that is queuing theory.

We do know, however, that Lee, MA had "long, long lines" with 475 registered voters per machine.[4] *When trying to predict rare events, existence of those rare events is more telling than many reports that nothing untoward happened.*

Problems with the proposal before the BOE

We consider a specific example to show why the proposal before the BOE is incorrect and fatally flawed. According to the AIR report[3] (Exhibit 5, pg 21), voters took a "trimmed" average of 3:53 to vote on the Avante DRE. Dividing that into a 900 minute (15 hour) day, AIR obtains a "Maximum Daily Rate" (MDR) of 232 voters (Exhibit 10, page 26).

Note that they call it the Maximum Daily Rate.

In fact, 232 people taking an average of 3:53 each could never actually vote in a 15 hour day without the forming of long lines, given that the voters will arrive randomly, there will be extra voters at peak hours, there will be breakdowns, and there will be voters who may each take more than 30 minutes because they need accessibility aids.[9]

How, then, could an Avante DRE serve 548 registered voters? Even a 50% turnout would have to process 274 voters, well beyond the 232 "Maximum Daily Rate" determined by AIR and far, far more than any truly practical number. In the 2004 election, the New York statewide turnout was 60%, which would be 328 voters. The Lee, MA 2004 election[4] and the Londonderry, NH 2004 election[7] both had a turnout of over 80%.

The New York State Board of Elections must reject the current proposal, which will condemn thousands upon thousands of New York State citizens to long lines and voter disenfranchisement. Please don't take risks with our elections.

References

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