Cost Comparison of Voting Equipment for New York State

Touchscreen DRE with VVPB Printer

vs.

Precinct Based Optical Scan + Ballot Marking Device

BACKGROUND:

1. Unlike a central-count optical scan voting system, a precinct-based (or polling-place-based) system scans the ballots at the polling place, as they are cast. After marking their ballots, voters insert them into the scanner.

If they have over-voted, the scanner will reject their ballot and inform them to contact a poll worker in order to exchange their spoiled ballot for a replacement. In such cases, the spoiled ballot is placed in a privacy envelope to ensure ballot privacy, and then marked as spoiled and deposited into a secure box for storing spoiled ballots.

If voters have under-voted, the scanner will warn them of that condition, and give them the option of retrieving their ballot and marking additional contests. However, if the under-vote is intentional, voters can instruct the scanner to accept the under-voted ballot.

Once a ballot has been cast and counted by the scanner, the scanner deposits the ballot into a secure ballot box. An example of such a scanner is described at: http://www.essvote.com/HTML/docs/Model100.pdf [*].

2. A ballot marking device provides a touch screen interface that can be used by visually-impaired voters (i.e., to display the ballot in very large fonts) and an audio interface for blind or reading-impaired voters. In many ways, it looks like a DRE but it is not one. The big difference is that instead of storing the voter's choices electronically, it fills in the ovals on a standard optical scan ballot.

You can think of such a device as a computerized marking pen. An example of a ballot marking device is the Vogue AutoMARK described at: http://www.vogueelection.com/products_automark.html.

3. Since New York States HAVA implementation plan states that the ultimate goal is “replacement of 19,843 lever machines used in 15, 571 election districts in the November 2000”, we assume each polling place will require a sufficient number of voting stations of whatever type to accommodate the same number of voters per polling place.

Current industry metrics for DREs and optical scan voting systems show them typically accommodating 300 voters or less per voting station. (Santa Clara County, California used a metric of 250 voters per DRE voting machine.) If so, then depending on voter turnout, each lever machine would probably require at a minimum 2 voting stations to replace it and perhaps as many as 3 or 4.

[*] All references to actual products are for illustrative purposes only; New Yorkers for Verified Voting does not endorse any specific brand or vendor of voting systems nor does it have any financial ties to any such vendors.

COST COMPARISON:

1. Equipment needed

When comparing costs of replacing New York State's lever machines with either optical scan or DRE systems, it's vital to understand the following facts:

- With DRE systems, *each lever machine must be replaced by at least one DRE*. In fact, it is likely that more than one DRE will be required per lever machine, due to the additional time it takes voters to vote on a DRE (possibly up to 15-20 minutes per voter).

- With paper ballot/optical scan systems, each lever machine must be replaced by at least one *privacy booth* (which is simply a writing table and curtains to ensure voter privacy while marking their ballot). But, *a single optical scanner can service 10 or more privacy booths.*

Therefore with an optical scan system, most polling places in the state *will need to purchase only one optical scanner and one ballot marking device*, and a number of privacy booths equivalent to the current number of lever machines in that polling place.

However, with DRE systems all polling places *will need to purchase at least one DRE for each of their current lever machines*.

It should be apparent then, even before we analyze cost specifics, that this means a paper ballot/optical scan system will require less equipment to purchase, maintain, test, operate, and eventually, replace.

2. Cost estimate to equip a polling place with ballot marking device + polling-place-based optical scanner

The current estimate for the cost of a ballot marking device is $4,500. A similar estimate for a polling-place-based optical scanner is $5,000, and a similar estimate for a privacy voting booth is $250.

For a polling place with 3 voting stations, the total capital cost would be:

(1) Ballot marking device $4,500
(1) Polling place optical scanner $5,000
(3) Fold-up voting booths $750

------- Total cost **$10,250**

3. Cost estimate to equip a polling place with DRE voting machines + VVPB printers

The estimated cost of a typical DRE full face ballot voting machine (as required by New York State law) is about $8,000 per voting station. It is easily possible that more than one DRE will be required per lever machine due to the additional time it takes many voters to vote on a DRE (possibly up to 15-20 minutes per voter). But for this analysis we will assume a one to one replacement.

In addition, most DREs use "Smart Cards" which voters must insert into the DRE before voting. Each voter's Smart Card must be initialized by a poll worker using a device called an encoder. The encoder writes information about the voter to the Smart Card that allows the DRE to determine, among other things, which electronic ballot should be displayed to the voter. Smart Card encoders are therefore

required equipment which must be purchased and maintained. We estimate the cost of a Smart Card encoder here at $1000. One encoder will be needed for each voter sign-in table at the polling place. For this analysis, we assume that one encoder must be purchased for every two DREs.

For a polling place with 3 DRE voting stations, the total capital cost would be:

(2) Smart Card Encoders $2,000
(3) DRE voting machines $24,000

------- Total cost **$26,000**

In this case, with three machines per precinct, the DRE solution is more than twice as expensive as a solution using ballot marking devices and polling-place-based optical scanners, just in terms of initial capital outlay.

Polling places with more than one lever machine see significant savings:

Number of Lever Machines Per Precinct	Paper Ballot/Optical Scan Cost	DRE VVPB Cost
1	$9,750	$9,000
2	$10,000	$17,000
3	$10,250	$26,000
4	$10,500	$34,000
5	$10,750	$43,000
6	$11,000	$51,000
7	$11,250	$60,000
8	$11,500	$68,000

Note the dramatic cost increase per DRE machine compared to the systems using optical scanners. Why? Because each precinct needs only a single optical scanner and ballot marker, and must only add additional privacy booths at $250 each for each existing lever machine. But with DRE systems, each lever machine must be replaced by an $8000 DRE, and at least one or more $1000 Smart Card encoders.

This also means that if it becomes necessary to add additional voting booths in an existing polling place, this can be done very inexpensively with a paper ballot/optical scan system. Such a system only needs additional privacy booths at $250 each. With DREs, to add additional voting booths a new machine must be purchased at $8000.

4. Maintenance costs

When you factor in the increased maintenance costs of DREs (because there are physically more units to maintain) and the increased costs for logic and accuracy tests, security audits, the larger number of poll workers needed to operate DRE polling places, etc., the DRE solution will likely prove even more expensive in ongoing maintenance and operating costs.

5. Printing costs

This analysis does not include the cost of printing the optical scan ballots that are used in the “precinct-based optical scan + ballot marking device solution". However, neither does it include the costs of printing the VVPBs produced in the "DRE+VVPB-printer" solution. These are considered to be roughly comparable because both consume paper and ink (or toner). In fact, one can argue that the per-ballot printing costs for mass-produced optical scan paper ballots may be lower than the per-VVPB printing costs for individually-printed VVPBs.

Also keep in mind that any jurisdiction that deploys DREs must still continue to print paper ballots (e.g., optical scan ballots) to meet the needs of their absentee voters. So it is false to argue that a jurisdiction will avoid having to print any paper (e.g., optical scan) ballots if they deploy DREs with VVPB printers in their polling places. Regardless of what they do, jurisdictions will need to continue printing mass produced [optical scan] paper ballots for their absentee voters.

While deploying DREs with VVPB printers may reduce the number of such mass-produced paper ballots that need to be printed in advance of the election, its does not eliminate the need to print any. Thus, jurisdictions will still be faced with all of the costs of contracting for the printing of such paper ballots. Certain fixed costs are involved regardless of the number of ballots printed: the labor cost of designing and laying out the ballot, and the one-time printer setup charges.

Thus, while deployment of DREs + VVPB printers may reduce the total cost of printing mass produced [optical scan] paper ballots, the cost per ballot for printing those ballots used by absentee voters will actually go up because of the fixed costs. If the printers who print these ballots give price breaks at various levels for large orders, the loss of such discounts for smaller orders will also add to the cost per ballot for the printing of absentee voter ballots.

For example, if the deployment of DREs + VVPB printers reduces by a factor of 4 the total number of mass-produced paper ballots printed, the corresponding reduction in those ballot printing costs will be significantly less than a factor of 4 because of the fixed costs. Furthermore, any reduction in the number of mass-produced paper ballots that are printed will be offset by the costs incurred in printing a corresponding number of VVPBs.