# Cost of Counting the Vote

## The Price of Upgrading Voting Systems in 43 U.S. Counties

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May 31, 2018 - Amid serious concerns about whether our elections are secure from hackers and computer error, many state and local governments are looking to replace out-of-date paperless voting systems with paper ballot and electronic scanner systems.

Pricing of voting equipment is often opaque, and in many cases, prices are negotiated on a local level. To bring some much-needed clarity to the issue, this report examines how much 43 county governments in 10 states paid for voting equipment. With this information in hand, local election officials and citizens can make the most of limited election equipment dollars. The states are: California, Florida, Iowa, Kentucky, Minnesota, Ohio, Oregon, Pennsylvania, Texas and Virginia.

Our key finding: While most precinct ballot scanners cost around $5,000 to $6,000, some counties have been able to negotiate more favorable pricing. However, a few counties paid a much higher than average price for their equipment.

Our key conclusion: It's important that counties band together or engage state authorities where appropriate to negotiate prices and get the best contract terms for voting equipment. Leasing equipment is an option for county officials to address the security threats quickly without committing to buying new systems on a short time frame.

### Limited Federal Funding

In the 2018 federal spending bill passed by Congress in March 2018, lawmakers made $380 million in election security funding available to states for replacing paperless voting systems, implementing post-election audits and securing election databases. That funding is now with state election officials, who are determining how to distribute it.

The majority of Americans already vote on paper as part of a national shift away from electronic voting. But millions still rely on all-electronic systems. A voter-verified paper ballot or record on solid card stock can be easily audited or recounted. It is the only reliable way to determine

whether there was an error or problem with the electronic vote count. These are not the punch card systems of old, but rather similar to standardized tests where the voter fills in an oval by hand or a computer prints out a completed ballot with their choices.

## Findings

Public Citizen made open records requests of several dozen counties that have purchased voting machines in recent years.[i] Between open records requests and data obtained by two other groups concerned with election security – Free & Fair and the Brennan Center for Justice – we aggregated the data from 43 counties that have recently purchased new voting equipment. We collected data from counties and states that purchased voting equipment within the past 12 years, but the majority of purchases were within the last few years.

In some cases, the sample sizes for comparison were small. However, the difference between the highest and lowest prices for the very same machines proves the value of negotiation. Differences in prices paid per machine may also seem small, but most counties purchase machines in bulk. As a result, failing to negotiate the best price could cost counties' taxpayers thousands, if not millions of dollars.

The majority of the machines purchased were different types of paper ballot scanners. The data reflects election officials' preference for the more secure paper ballot and scanner voting systems. No voting machine with software is totally secure; in fact, these scanners might be easy to hack. Voter-marked paper ballots are inherently more secure because they provide a way to audit the vote count done by the machines and to detect errors and hacks if they occur. Hand-marked paper ballots, and ballots marked with an assistive device for people with disabilities, are the best recovery plan in case of a hack, error or simply the need for a recount.

The paper ballot and scanner systems purchased will meet election security best practices only if the county or state also conducts a rigorous post-election audit of the vote count. A rigorous post-election audit entails checking the machine count against the paper ballots for enough of a percentage of the vote count to be confident the results are correct. One can't do an audit without voter-verified paper ballots or records, so this is a key step.

According to the website of the nonprofit organization Verified Voting, at least three of the states in this report have inadequate audit laws: Iowa, Kentucky and Virginia. Other states could improve their audits to increase the certainty of catching errors or hacks. Rhode Island, New Mexico and Colorado are pioneer states in conducting very robust audits that ensure the vote was correctly counted to a high degree of statistical confidence.

We did not collect enough data to draw conclusions about pricing practices within the market overall or about any particular manufacturer's overall pricing practices. For example, we received only partial data from one county that had purchased a ClearVote system and two

counties that purchased Unisyn systems. Rather, we seek to share the data that is available so states and counties have a better sense of the range of prices paid by local governments for similar products.

Our data contains more information about prices paid by Virginia counties due to that state's 2017 decision to decertify paperless voting systems, leading to the bulk leasing or purchase of voting machines by 22 counties. Seventeen Virginia counties had fulfilled our open records request at the time of publication. Below is a list of the counties that responded to our open records request and a summary of the prices the counties paid for the most popular voting machines in the data set. For a full list of the pricing data on all models, visit: http://bit.ly/VotingEquipmentPricing. We will continue to update the data as we hear back from more counties.

| County | State |
|---|---|
| **Contra Costa** | CA |
| **Inyo** | CA |
| **Marin** | CA |
| **Mono** | CA |
| **Napa** | CA |
| **Orange** | CA |
| **San Francisco** | CA |
| **San Mateo** | CA |
| **Alachua** | FL |
| **Clay** | FL |
| **Escambia** | FL |
| **Hernando** | FL |
| **Leon** | FL |
| **Manatee** | FL |
| **Page** | IA |
| **Jefferson** | KY |
| **Ramsey** | MN |
| **Ashland** | OH |
| **Belmont** | OH |
| **Carroll** | OH |
| **Clermont** | OH |
| **Tuscarawas** | OH |
| **Multnomah** | OR |
| **Westmoreland** | PA |
| **Denton** | TX |
| **San Jacinto** | TX |
| **Bath** | VA |
| **Buchanan** | VA |

| | |
|---|---|
| **Chesapeake** | VA |
| **Colonial Heights** | VA |
| **Culpeper** | VA |
| **Cumberland** | VA |
| **Emporia** | VA |
| **Falls Church** | VA |
| **Lee** | VA |
| **Madison** | VA |
| **Martinsville** | VA |
| **Norfolk** | VA |
| **Poquoson** | VA |
| **Portsmouth** | VA |
| **Rappahannock** | VA |
| **Tazewell** | VA |
| **Washington** | VA |

## Vote Machine Pricing Comparison Chart (Most Popular Models)

**Central Scanners**

| Vendor | Model | Lowest - Highest Price Paid per machine | Difference btwn High & Low Price | Most Common (mode) Price per Machine | # of Counties in Dataset | Year Bought | Description/ Features |
|---|---|---|---|---|---|---|---|
| **Election Systems & Software (ES&S)** | DS850 | $94503 - $111,500 | $16,997 | $111,500 | 6 | 2014, 2015 | Central High speed digital scanner |
| **ES&S** | DS450 | $49950 - $53000 | | n/a | 3 | 2017 | Central High throughput scanner |
| **Hart Intercivic (Hart)** | Verity Central | | | $12,868 | 1 | 2015 | Central Scanner |
| **Dominion Voting Systems (Dominion)** | Image Cast Central Kit | $25,000 - $70,000 | $45,000 | $25,000 | 4 | 2017 | Central Tabulator |

| Precinct Scanners & Ballot Marking Devices/Printers | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Vendor** | **Model** | **Vendor Quoted Prices (verbal quotes 2018)** | **Lowest - Highest Price Paid per machine** | **Difference btwn High & Low Price** | **Most Common (mode) Price per Machine** | **# of Counties in Dataset** | **Year Bought** | **Description/ Features** |
| **Dominion** | ImageCast BMD Accessible Unit | ~$3,000-3,500 | | | $3,175 | 1 | 2017 | Disabled access ballot marking device |
| **Dominion** | ImageCast Evolution | Requested | $6200 - $7250 | $1,050 | $7,250 | 8 | 2017 | Precinct Tabulator |
| **ES&S** | Automark | | $1995 - $5090 | $3,095 | N/A | 4 | 2006, 2014 | Optical ballot marking device (w. headset, flashcard & other complementary hardware) |
| **ES&S** | DS200 | ~$5,000 | $4873 - $6325 | $1,452 | $5,750 | 14 | 2017 | Digital image scanner w. internal backup battery, plastic ballot box w. steel door & e-bin, paper roll & 4 GB jump drive |
| **ES&S** | ExpressVote (BMD terminal) | Vendor declined to disclose | $3325 - $3500 | $175 | $3,325 | 11 | 2017 | Universal voting system: Ballot marking device (BMD) terminals w. internal backup battery, power supply w. AC cord, ADA keypad & 4 GB Flash Drive |
| **Hart Intercivic** | Verity Print | | | | $5,500 | 1 | 2017 | Paper ballot printing unit |
| **Hart Intercivic** | Verity Scan | ~$6,000 w/ software | | | $6,100 | 5 | 2017 | Precinct-based ballot scanning unit |
| **Hart Intercivic** | Verity Touch | | | | $4,650 | 1 | 2017 | Electronic voting unit |

There are a few cases where the prices for popular machines varied significantly:

- Alachua County, Florida paid $70,000 in for a five-year lease starting in 2015 of the ImageCast Central Count Tabulator. The same equipment was sold for $25,000 to three other counties.

- Rural Brookings, South Dakota paid $1,500 less for an ES&S DS850 scanner than three Florida counties.

- We did not look at software pricing in general due to the difficulty of comparing products, but one transaction popped out. Carroll County, Ohio, paid $2,752 per unit in 2014 for the same ES&S Unity software that Westmoreland, Penn., bought in 2006 for $8,813. The software is sold for use with ES&S DS200 and DS850 scanners.

- Ashland County, Ohio, paid $6,710 per unit for the Unisyn OVO system last year. The same vendor quoted the machine price as $5,500 in April 2018. Page County, Iowa, paid $3,990 for the OVO system five years earlier.

In a couple of cases, vendors appeared willing to offer rural counties with smaller populations steeper discounts. Perhaps this is in recognition that counties need central scanners for counting absentee and provisional ballots, regardless of the size of their tax base.

While this report lists prices for all vote tabulating purchases in recent years, it includes a few purchases of older technology and paperless machines that by design do not meet the bare minimum security criteria. The best systems from a cybersecurity standpoint allow the voter to mark a ballot by hand or with an assistive device and then have the ballot counted separately by a scanner that tallies the votes.

Voter-marked and verified ballots allow for a rigorous post-election audit where a small percentage of the total votes can be checked against the machine count.

## Methodology

After identifying a few dozen counties that recently purchased voting equipment, we sent each county an open records request, tailored to each state's guidelines. Our requests asked for the production of records relating to: (1) the number of vote tabulating and ballot marking devices purchased within the past seven years, (2) the total cost of the machines most recently purchased and the date of purchase, (3) the number of registered voters at the time of the most recent purchase.

Our goal was to better understand how much counties spent on vote tabulating equipment as well as the cost per registered voter. A significant reason for the variation in the price per voter and average price per voter is the variation in county population size.

In most cases, we did not include software costs, vendor discounts, training, installation or other support services in the per-unit or per-voter price calculation. We made exceptions when the discounts were offered per-unit specifically, and where the differences in software costs were significant between counties.

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[i] Westmoreland County, Pennsylvania provided a contract for the study from 2006, but we did not send any initial open records requests for purchase made more than seven years ago. The vast majority of the data was collected for purchases within the last few years.