Memorandum

To: Interested Parties

From: Graham Godwin, Senior Researcher

RE: West Virginia 2021 Poll

Date: November 22, 2021

Overview

Orion Strategies executed a survey of registered voters in West Virginia to gauge public opinion on various topics. The poll was conducted November 8, 2021 through November 15, 2021.

The live-interview telephone and online survey was conducted among registered voters in West Virginia. A total of 600 respondents completed the entire survey – giving the poll a 4 +/- margin of error with a 95% confidence rate. The sample reflects the state's geography by congressional district and balanced for gender. Party registration for the sample was 40% Republican, 33% Democratic and 27% Independent. Each respondent had to complete the entire survey for the survey to be counted. Due to rounding, not all sums will equal 100%.

General Observations

West Virginia is a very conservative state that is acknowledging a shift in the energy economy. Respondents across the state could be categorized as pessimistic in their view of the state's present situation.

- A combined 63% of respondents stated that they lean conservative when deciding an issue
  - 35% of Democrats self-identify as conservative
  - 67% of Independents self-identify as conservative

- Only 27% of respondents stated that they believed things in West Virginia are headed in the right direction, with 58% stating they do not

- A combined 85% of respondents did not have a favorable view of the current state of West Virginia's economy
  - 36% of respondents stated that they would rate the current state of the economy in West Virginia only fair
  - 49% of respondents stated that they would rate the current state of the economy in West Virginia poor

- 65% of respondents stated that they believe the economy in the state is getting worse

West Virginia's Views of the Energy Landscape

- An overwhelming 88% of West Virginians believe that America should be self-sufficient when it comes to the country's energy supply

- Only 22% of respondents stated that they believed a new coal-fired power plant will be built in West Virginia during their lifetime

- A combined 61% of respondents stated that they support the United States taking action to accelerate the development and use of renewable energy sources such as wind and solar power

West Virginia's Perspective on Climate

- Almost 3 out of 4 respondents (72%) reported that compared to when they were younger, winters seem less severe. Additionally, a plurality (47%) of the 3rd Congressional District believes that it floods more today than when respondents were younger
    - 78% of Democrats, 71% of Independents and 68% of Republicans all believe that winters are less severe

- When asked directly about whether the climate is changing, 62% of respondents stated that it is
    - 47% of that 62% stated that they believe human activities are causing the changing climate and additional 27% of that 62% stated that they believe a combination of human activities and natural forces is causing the changing climate
    - A staggering 70% of women respondents in West Virginia report that they think that the climate is changing.
    - 83% of Democrats, 63% of Independents and a plurality (46%) of Republicans think the climate is changing

- A combined 64% of respondents stated that their impression of their senator would stay the same or become more favorable if their senator supported the United States taking action to reduce carbon in the atmosphere
    - 25% of respondents stated that there would be no difference in their impression
    - 22% of respondents stated that their impression would be much more favorable
    - 17% of respondents stated that their impression would be somewhat more favorable

- A combined 61% of respondents stated that they support the United States taking action to reduce carbon in the atmosphere
    - This includes 88% of Democrats, 63% of Independents and 44% of Republicans

- A combined 67% of respondents stated that they support the United States taking action to reduce pollution that causes health problems and climate change
    - This includes 85% of Democrats, 65% of Independents and 52% of Republicans

Margin of Error and Confidence Interval

The margin of error is a statistic expressing the amount of random sampling error in a survey's results. This number affirms the likelihood that the results stated closely represent the results had the entire population been surveyed. Due to the fact that there is always some inherent sampling error, the margin of error allows a reader to have a level of confidence that the results being presented are accurate and depictive of the whole population.

The margin of error has an inverse relationship to the sample size. This means that as the sample size is correctly increased, the margin of error naturally decreases. This relationship stresses the importance of identifying an accurate sample size. The smaller the margin of error, the more reflective the results are of reality. With a margin of error at ± 4, a survey statistic showing 70% support for a candidate really shows that the candidate's support falls within a range of 66% and 74%. The following formula is one such example used when determining margin of error:

ME= Margin of Error; Z= the number reflecting the confidence interval; $\hat{p}(1-\hat{p})$=the population multiplied by 1 minus the population; n= the sample size.

$$ME = z\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

Solving for ME identifies the margin of error associated with the survey results.

The following equation is used to determine the confidence interval with samples over 30 individuals, when calculating margin of error.

CI= Confidence interval; $\bar{x}$=sample's mean; t=corresponding t-score based on a 95% confidence level (1.96); s= the standard deviation of the population; n= sample size

$$CI = \overline{X} \pm t\frac{s}{\sqrt{n}}$$

The confidence level is an estimate that shows the level of the accuracy relating to the results. A 95% confidence level indicates the viewed stats will fall within the margin of error 95% of the time.

Using the above example of 70% for a candidate, a margin of error at ± 4 at a 95% confidence rating states that 95 times out of a 100 the true observation falls between 66% and 74%.

4 is the margin of error calculated for this survey at a 95% confidence interval.

Orion Strategies continuously utilizes a confidence level of 95% and a margin of error of approximately 5% to ensure reliable survey results.

Sample Size and Characteristics

Sample size refers to number of individuals from which data is collected. Picking an accurate sample and sample size is vital to producing valid results. Having a correct sample size will allow the group being surveyed to resemble the characteristics of population from which they came. This allows the results of a survey to be predictive of the population's actions.

The following equation is used when determining sample size:

SS= sample size; Z= normal distribution of the population; p(1-p) =the population multiplied by 1 minus the population; c= the number reflecting the confidence interval.

$$SS = \frac{Z^2 p(1-p)}{C^2}$$

Solving for SS identifies the sample size needed to create a statistically accurate representation of the population.

Once an accurate sample size is determined, the selected sample must accurately mirror the characteristics of the greater population. This is achieved by first studying the characteristics of the whole population then ensuring those same characteristics are present in the sample size. For example, if a population of 1,500 is 49% female and 45% over the age of 60, then in a sample of 300 147 must be female and 135 must be over the age of 60. If the correct sample size has been identified, all the necessary characteristics and traits of the population should automatically be reflective in random sample. Due to the nature of polling in regard to non-answers and incomplete surveys, sometimes the sample size is expanded to ensure accurate characteristic representation.

The margin of error addresses the fact that the percentages of the population's characteristics might not mirror the percentages of the sample's characteristics on a one-to-one ratio.