

Virginia Cost and Funding Need Study Report

(Pursuant to Contract Awarded by SCHEV Under RFP #245-04221)



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Executive Summary

In 2021, the General Assembly directed the State Council on Higher Education in Virginia to study higher education costs and funding needs of the Commonwealth's public institutions and to submit a report with recommendations that "identify and recommend

1. methods to determine appropriate costs, including a detailed cost analysis, of Virginia public institutions of higher education and peer institutions.
2. measures of efficiency and effectiveness, including identification of opportunities for mitigating costs, increasing financial efficiencies, and incorporating current best practices employed by Virginia institutions and other institutions nationwide.
3. provisions for any new reporting requirements, including a possible periodic review of cost and strategies employed to implement efficient and effective operational practices.
4. strategies to allocate limited public resources based on outcomes that align with state needs related to affordability, access, completion, and workforce alignment, and the impact on tuition and pricing.
5. the impact of funding on underrepresented student populations; and
6. a timeline for implementation."

Pursuant to this charge, an interagency panel selected NCHEMS to assist with conducting this study through an RFP process. SCHEV identified four major deliverables as part of the review, which are listed below along with key findings from the project. Throughout the project, NCHEMS worked closely with SCHEV to produce and refine every significant element, and both consulted regularly with key stakeholders, particularly OpSix (a body established in Virginia statute to review institutional six-year plans consisting of the Staff Directors of the House Appropriations Committee and the Senate Finance and Appropriations Committee, the Director of the Department of Planning and Budget, the Director of SCHEV, the Secretary of Finance, the Secretary of Education, or their designees) and institutional finance officers but also other institutional leaders, the Council of Presidents, and important advocacy groups. This study was narrowly aimed at Virginia's approach to funding its public institutions' Education and General (E&G) operating budgets.¹ While important, other aspects of state funding support to higher education were not within the scope of the study, including capital funding for higher education, state-funded financial aid, auxiliaries (e.g., housing, bookstore operations, athletics), and endowments.

Deliverable 1: Review of funding policies: Conduct a review of policies nationally and compare them to Virginia's current funding model. For this aspect of the project, NCHEMS conducted research on Virginia's financing policies, analyzed data provided by SCHEV, and developed, fielded, and analyzed a national survey of state finance policies (in partnership with the State

¹ Education and General (E&G) funding and expenditures refer to the core activities related to the institution's instructional mission such as faculty salaries, institutional support, student supports, libraries and other academic support costs, etc.

Higher Education Executive Officers national association, SHEEO). The findings from this survey are that:

- **States should strategically align funding with statewide goals.** Above all, the funding approach should be deliberately designed and implemented in alignment with statewide goals.
- **Base funding approaches in other states are rarely strategic.** Researchers, funders, and policymakers have focused their attention in recent years on performance funding, resulting in few studies covering institutions' basic funding needs. Most states use a Base Plus approach to funding public institutions, by which appropriations to institutions are set equal to the funding level from the prior year (or biennium) plus a percent increase that is either consistent across institutions or otherwise related to estimated additional expenses due to salaries or benefits. States that rely on this type of funding approach do not routinely reassess the "Base" component. Such approaches are rarely strategic or aligned with specific state educational goals even when states are able to specify what factors help determine the "Plus" part of the funding. Base Plus approaches assume historical funding patterns are appropriate and adequate, fail to strategically address significant changes in the circumstances of institutions, and can often lead to or exacerbate funding inequities across institutions (which typically lead to inequities in access to programs or adequate supports for students from targeted populations).
- **Formulas are a better basis for rational and strategic funding approaches.** States with base funding approaches that are better equipped to make rational and strategic investments, and to respond to disruptions with a strong foundation of evidence, incorporate formulas. The best formula-driven approaches are sensitive to variation in institutional costs that are driven by differences in mission, program array, institutional size (including provisions that support the success of smaller institutions that are less able to benefit from scale economies), and characteristics of the student body. Formula approaches that are best equipped to capture and reflect that sensitivity in costs rely on the number of semester credit hours (SCH) produced by discipline and level, with a set of weights that account for the different costs of delivering those SCHs. Tracking SCHs is a common practice in use by institutions, and they can be related to a full set of the costs of instructional delivery that vary meaningfully by discipline and level—factors such as faculty and staff compensation, equipment requirements, curricular and student supports, clinical or similar experiences, and other differences deemed to be pedagogically sound (e.g., class size limitations).
- **Virginia's current base funding formula no longer serves as a strategic and rational mechanism for resource allocation.** Virginia's existing approach to funding public institutions uses a "Base Adequacy" calculation that relies on student-faculty ratios. No other state reported using this measure to establish base funding requirements. While faculty costs account for the majority of instructional expenses, they are not the only variable that will differ across disciplines and levels. Furthermore, once

Virginia's public institutions all reached the calculated base adequacy amounts (based on total funding from the state plus tuition revenue), the base adequacy formula no longer served as a rational or strategic approach to resource allocation. Instead, Virginia's current funding approach functions like a Base Plus model.

- **State funding should address foundational costs, be sensitive to institutional missions, and embed incentives linked to state goals.** In addition to a formula that rationalizes institutional costs, states with strategically aligned funding models also include elements that account for a minimal set of foundational costs, intentionally consider the differences in public institutions' roles and missions, and include a performance component that directs funding to institutions based on their ability to make progress toward state priorities.
- **State funding policies should be mindful of differences in institutional capacity to generate tuition revenue.** Although Virginia is among a few states that have formally described cost-sharing targets, its approach to such targets fails to recognize important differences in institutional role and mission, particularly those related to differences in institutional capacity to raise tuition and other non-state revenue.

Deliverable 2: Efficiency and effectiveness review: Inventory Virginia institutions' practices and research those in other states to identify opportunities for mitigating costs and increasing efficiencies for incorporation by Virginia institutions. NCHEMS reviewed reports from other states on institutional and system-wide efforts to improve operational efficiencies and institutional effectiveness. Typified by reports from Texas and Ohio, these reports catalogued the various ongoing efforts being undertaken at their institutions. NCHEMS also developed, fielded, and analyzed a survey of Virginia's public institutions related to similar efforts currently underway or recently implemented. The following are findings from the multi-state review and Virginia institution survey:

- **Virginia's institutions are active in seeking efficiencies, most commonly by making improvements internally (versus collaboratively) and with a focus on administrative services.** They consistently look for opportunities to operate more efficiently and creatively implement them. They are less likely to reach across institutional boundaries to find efficiencies that can scale beyond their campus. And there is less attention to efficiency gains related to academic delivery. The latter can be more difficult to implement in most settings, due in part to the necessity of engaging faculty productively in making changes to the curriculum.
- **Multi-institutional collaborations can yield substantial savings.** The most significant savings from efficiency activities have come from collaborations of multiple institutions related to purchasing and library services. These tend not only to free up money for other priority purposes, but they also enhance the quality of services to students, faculty, and other institutional stakeholders.

- **Activity in Virginia is similar to those in other states.** These observations are consistent with the findings from other statewide efforts to drive greater efficiencies: most successful efforts lead to the reinvestment of resources in improving institutional quality or student success, initiatives are more commonly aimed at improving administrative services rather than in the academic arena, and multi-institutional collaborative activity is even more likely to address the delivery of administrative services.
- **Savings are reinvested in institutional priorities, which can include better service to students.** It is difficult to ascertain the extent to which efficiencies were passed on to students and families in terms of slowing the pace of tuition increases or through financial aid awards or otherwise helped students and families save money by improving the likelihood of graduating or time-to-degree. Perhaps just as often, however, are savings used for more institutionally focused reinvestments in academic quality, new programs, or other opportunities that may or may not yield a payoff directly for an institution's current students.

Deliverable 3: Identification of trends in costs and determination of estimated costs for higher education: Gather and analyze data on funding and costs for higher education and create benchmarks for evaluating revenue and expenditures of Virginia institutions. Using Virginia-specific data supplied by SCHEV and national data from various sources, especially IPEDS, NCHEMS developed new peer groups for Virginia's institutions and benchmarked financial data of Virginia's institutions in comparison to these peers. In generating data to support the funding model, NCHEMS conducted research on costs analyses that have been done by other states or systems. In summary:

- **While total education operating revenue per student was nearly identical to the national median, state funding of public institutions in Virginia is well below the national average.** Virginia's educational appropriations per student was lower than 37 other states in FY 2021 (excluding financial aid, research, and medical education). Tuition revenue, which, on a per student basis, exceeds the national average has made up the difference. In the first two decades of this millennium, the share of educational costs borne by students in Virginia has climbed by nearly 24 percentage points, a cost shift exceeded by just 10 other states.
- **Funding levels have been volatile in recent years; the resulting unpredictability inhibits good institutional planning.** New money provided by the General Assembly and supported by federal stimulus funding has helped Virginia's institutions weather the pandemic. As welcome as this infusion of funding has been, Virginia's institutions (not unlike others elsewhere) have experienced funding inconsistency from one year to the next over the past decade, making it challenging to predict support levels and to plan effectively. In the wake of the Great Recession, state General Fund (GF) support per in-state-student dropped from \$9,103 in FY2009 across the public four-years and \$4,371 in the two-year sector to respective low points of \$6,528 and \$2,957 in FY 2012 (adjusted

for inflation). Thereafter the institutions collectively saw gradual improvements through FY2017, which resumed after a one-year dip in FY2018. Due to a combination of state budget increases and declining enrollment in the two-year sector, per student funding in the two-year sector has recovered to pre-Recession levels, but remains 16 percent below pre-Recession levels in the four-year sector. Moreover, because they are less able to raise tuition revenue and thus more dependent on state funding, the institutions that are typically most affected by unpredictable state funding support are those that primarily serve higher proportions of low-income, under-represented students—those populations that Virginia’s strategic plan identifies as in need of special focus, especially in light of anticipated demographic changes. This volatility can severely impede the achievement of state goals.

- **Virginia’s public institutions spend fewer E&G dollars per student.** In FY2019, Virginia’s public institutions spent 4.3 percent less on core administrative and instructional costs. If spending on auxiliary enterprises (housing, athletics, bookstores, etc.) is included, Virginia’s institutions spent 11.6 percent more per student, but this report is focused on E&G revenue and expenditures. Further, consistent with statewide figures, looking at Virginia’s institutions in comparison to institution-specific comparison groups of similar institutions across the country reveals that Virginia’s institutions collect more revenue from tuition and less from state appropriations. These comparison groups play no direct role in the funding model design that this report recommends, though they are expected to provide additional data to help validate the funding amounts the model generates for each institution, especially as the state transitions to the use of a new model. Moreover, the comparison groups are important and valuable for benchmarking purposes more generally—both for assessing institutional financial resources and spending and for assessing student outcomes.
- **Affordability for resident students remains a significant problem.** On average, first-year resident students from median income households attending public four-year institutions full-time had to pay the equivalent of almost 20 percent of their annual income to attend college, even after accounting for grants. For students in the lowest income quartile, that proportion was 72 percent. Both figures were notably higher than the national average.
- **Differences between Virginia’s institutions are substantial.** Aggregated revenue and spending levels obscure important variation across the institutions. Virginia is home to both well-funded public institutions and institutions that operate much closer to the margins. This shows up in many ways important to state goals, especially in terms of the students each institution tends to serve. For example, the proportion of Pell Grant recipients in the undergraduate student body ranges from 68 percent at Virginia State University to just 15 percent at the University of Virginia in 2020-21. Similarly, the non-White population at Norfolk State University accounts for roughly 97 percent of all students, while at Christopher Newport University, that share is just 24 percent. Any

adjustments to the funding model must be carefully calibrated with a full awareness of these key facts about which institutions serve what audiences.

Deliverable 4: Recommendations for a new funding model: Create or modify a funding model or models for use in Virginia. Drawing on the work conducted for the other three deliverables and from its experience working on postsecondary finance through the nation, NCHEMS developed a preliminary new cost and funding model for use by SCHEV to estimate plausible costs of higher education and recommend appropriations levels to the legislature. The model builds from a conceptual framework that is novel in its design and application to data, one that is appropriate not only for the specific Virginia context, but also balances the alignment of funding to state needs and accounts for real operating costs incurred by institutions.

- **Design principles guided development of the funding model.** Early in the project, NCHEMS, with consultation from SCHEV, developed a set of principles for the design and eventual implementation of a funding model. This set of principles, which is detailed beginning on page 43 of this report, was intended to serve as a guide to the difficult decisions that inevitably accompany the revision of a funding model. It received considerable feedback and overall acclamation from key stakeholders, including institutional representatives.
- **A typology of institutional costs provided a sophisticated yet straightforward framework for the cost and funding model.** The proposed new funding model is closely linked to a conceptual framework that is both coherent and adapted to address statewide goals, while being sensitive to differences in institutional mission and capacity for acquiring tuition revenue. It does this by organizing estimates of costs that begin with a minimum, “frugal” level of administration sufficient to preserve the value of the institution as a state asset (the bottom two elements of the basic form of the framework depicted in Figure 1), before factoring in costs that vary by academic program array and characteristics of the student body (scale, scope, and audience). The framework next addresses costs of creating and sustaining performance improvements, adding new capacity, and supporting various activities that are effectively purchases of services. The top two categories are activities important to the institution but are funded externally or by the institution itself.

Figure 1. Taxonomy of Institutional Costs

	Other
	Externally Funded Research and Public Service
	Purchase of Goods and Services
	Capacity Building
	Performance / Incentives
	Audience
	Scale & Scope
	Preventative maintenance as applied to facilities, technology, and personnel
	"Frugal" foundational funding

This basic form of the conceptual framework fits within a larger version (Figure 2) that details the relationship between these categories and their role in accounting for institutional costs (the Cost Model), investments in institutional and state priorities, the portion of the state General Fund appropriation that is to be allocated based on the Funding Model, and where the responsibility for providing financial support for each category rests. Feedback from stakeholders concerning this conceptual framework was generally positive as an organizational scheme for providing guidance to the legislature on resource allocation decisions.

- **The funding model is dynamic and can adjust to changing conditions.** A significant component of the funding approach is the use of a dynamic simulation that allows SCHEV to quickly and easily assess the effects of adjustments in the parameters of the funding model itself. As data are updated and conditions change over time, this tool can also help SCHEV continue to develop and advance funding recommendations to the Governor and General Assembly that are aligned with state priorities and political and budgetary realities.

Figure 2. Institutional Funding Adequacy Framework

			Category	Function and Roles
			Other	Advancement, auxiliaries, athletics, etc.
			Externally Funded Research and Public Service	Grants management, community engagement, museums, arts, extension services
Incentive Funding Tied to State Goals & to Six-Year Plans			Purchase of Goods and Services	Funding for specific purposes, e.g., research on tobacco usage in Southwest Virginia, incentives to seed and support shared academic program delivery, noncredit offerings
			Capacity Building	Funding needed to start new programs or fund initiatives prioritized by the General Assembly, the Governor's office, or through the 6-year plan process
Performance / Incentives			Performance / Incentives	Factors in the model that recognize: activities related to strategic plan, closing equity gaps, economic development
			Audience	Semester credit hours (SCH) weighted by student characteristic(s) or added weights applied to headcount
Scale & Scope			Scale & Scope	Semester credit hours (SCH) weighted by level and discipline
			Preventative maintenance as applied to facilities, technology, and personnel	Shares of facilities replacement value of facilities, technology value, payroll (for professional development)
"Frugal" foundational funding			"Frugal" foundational funding	Benchmarked against similar institutions with relatively low spending on administrative expenses

Recommendations

Virginia has a strong, vibrant public higher education infrastructure. Collectively, the institutions spur innovation and economic development, work to assure the Commonwealth’s workforce needs are appropriately met and attract talent from elsewhere to settle in the state. They are clearly an integral part of the state’s strategy to retain its position as a national leader in economic prosperity and societal health. But they will struggle to continue to fulfill this duty without sufficient funding strategically allocated to them in concert with clear goals and in full awareness of the roles each institution plays individually and as part of a broader collective. Virginia’s approach to funding institutions is in need of a new model that restores rationality, coherence, and strategic alignment with the state’s goals, all of which have eroded since the last major revision to those policies. This report develops a conceptual framework that lays the foundation for an improved funding model that meets these criteria. As this report is released, additional elements remain under review. Several factors—delays in the 2022 General Assembly session and budgeting process, changes in administration that occurred partway through the project, and the need for ongoing review of data inputs and metrics—have slowed

progress toward the complete adoption of a new funding model. The following provides recommendations on the deliverables and notes where additional work remains to be completed.

- 1. Adopt the conceptual framework and continue to refine the parameters and data sources for use in the model.** Virginia should make it a goal to allocate General Fund support to public institutions in accordance with this conceptual framework and with the recommendations for specific appropriations levels that SCHEV will make using the framework and the model. While additional work is needed to further refine the data sources and funding parameters, the conceptual framework that details a strategic approach to funding has general consensus among key stakeholder groups. NCHEMS provided recommended parameters and an interactive model that are under review and should continue to be refined over the next six months.
- 2. Adopt differential cost-sharing targets.** Virginia should adopt differential cost-sharing targets to aid in prioritizing the allocation of state support to public institutions in alignment with state goals and in recognition of the differences in mission. While Virginia’s current base adequacy model accounts for the mix of in-state and out-of-state students in assessing whether or not the state’s support level met the cost-sharing target, it does not have a formal method of determining an institution's ability to raise tuition and fees given the variation of income levels of in-state students. In addition, the Commonwealth should consider excluding the “frugal” base funding requirement from the cost-sharing calculation.
- 3. Implement an incentives and performance component of the conceptual framework that rewards institutions for making progress toward state goals.** Further development and testing of metrics for the incentives component of the framework are needed. Such a component should allocate sufficient funding to steer institutional decisions, yet limit competition among them that is not productive. The incentives and how achieving them translates into dollar amounts should also be transparent and predictable. A system built on fixed dollar amounts per point, paired with a thoughtful approach to making strategic adjustments when Virginia’s institutions collectively earn more funding than the legislature appropriated for the incentive funding pool and when they collectively earn less than that amount, can address these criteria.

Additionally, the Institutional Performance Standard (IPS) funding should also be re-evaluated for its impact and relevance, particularly for the six education-related measures. Once a more fully developed incentive model is ready, it is not logical to maintain the IPS process separately from the more robust and integrated approach to be built.
- 4. Use the model to prioritize the funding components.** Ensure that funding needs related to the cost estimates (fixed and variable costs) and incentives and performance are met before allocating funds to new capacity building initiatives.

5. **Adopt a phased-in approach to using the new funding model.** Too abrupt a change in institutional funding can be disruptive and counter-productive to the achievement of state goals. As Virginia shifts to a new funding model, it should take a deliberate approach over several years by implementing a stop/loss strategy in the transition. A stop/loss strategy means that the state will implement some limits on how much an institution's budget can be affected during a transition to the new funding approach. Usually, such provisions include a specific schedule. For example, a stop/loss provision might specify that institutions will not be subjected to changes that exceed a percentage greater than plus or minus one percent in Year 1, plus or minus three percent in Year 2, and plus or minus five percent in Year 3. In Year 4, the new funding model would be fully implemented with no stop/loss in effect.
6. **Regularly review the funding model.** Ensure that the funding model is reviewed on a periodic basis—more regularly for technical issues and once every 8-10 years for adherence to policy priorities.
7. **Create and regularly convene a technical funding model workgroup.** Ensure that all institutions and their leaders have an in-house technical expert on how the formula works, and so that there is a sense of shared ownership for the technical aspects of the model's implementation. A standing workgroup consisting of experts on the technical aspects of the funding model design and its implementation, one for each institution, would ensure a sense of shared ownership among the institutions over the accuracy and performance of the model. Not only would this group help SCHEV with highly technical issues (e.g., the number of years to use as an average, the assumptions that may need to be reassessed) and comprise the core team for the regular technical reviews mentioned above, its members would also be well positioned to use the model and its simulation tool in assessing the impact on funding of decisions under consideration by institutional leaders.
8. **Identify strategies to mitigate tuition and fee increases that may result from state supported salary increases or other state required mandates.** Due to the split funded approach to higher education costs where the state pays a portion of costs (roughly 50%, but varies by institution), state supported increases in salaries often result in an increase to tuition and fees. While investments in salaries are a shared interest of the state and the institution, strategies should be considered to mitigate the concerns related to tuition and fee growth when this occurs.
9. **Create incentives that encourage institutions to collaborate for greater efficiency in administrative services and in academic delivery.** Virginia's institutions are active in seeking ways to streamline their operations, but typically do so on their own. Major savings and reinvestment opportunities are available through collaborative activity, as demonstrated by the Virginia Higher Education Procurement Consortium (VHEPC) and the statewide library consortium (VIVA). Collaborations are difficult to implement and sustain, especially in academic delivery, but a compelling financial reason can induce participation by institutions on a voluntary basis. Funding that can seed and support the development of collaborative activities will likely be an investment strategy that states

throughout the country will turn to more often, especially those seeking effective responses to converging enrollment and financial pressures. Efficiency gains to be derived from such efforts must be measured based on all the participating institutions and in terms of costs avoided by students and the state, and by the enhanced services collaboration can generate, rather than being viewed simply as benefits accruing to individual institutions.

10. Monitor progress toward greater efficiency and effectiveness using metrics.

SCHEV should seek to more regularly measure institutions' individual and joint efforts to improve efficiency and effectiveness. These efforts should rely on existing data as much as possible so as to avoid adding reporting burdens to institutions. Even if these data are already reported to SCHEV, it remains valuable to gather data from IPEDS for benchmarking purposes. Metrics that are relatively straightforward to calculate include: state and tuition revenues per graduate, degrees relative to enrollment, and expenditures relative to enrollment.

11. Revise the approved group of comparison institutions. After completing a review of candidate institutions for comparison groups—NCHEMS provided an initial group of national comparative institutions and, following a request to add to the number of institutions in the groups, particularly for some of the institutions, a second group of comparison institutions. These groups are important for benchmarking Virginia institutions in terms of their finances and their student outcomes. NCHEMS selected the comparison groups based on similarities in the mission they serve expressed primarily in their program array, research activity, student characteristics, and size, as well as some other important features (whether they operate a hospital, are a Land-Grant institution or HBCU, their geographic location, etc.). Notably, none of the selection criteria included data about their funding levels or student outcomes. The same groups should be used for all benchmarking analyses in order to avoid selecting institutions on the basis of the outcome they are examining. Details about the comparison groups and the process used to select them are provided in Appendix F. Comparison Groups. While NCHEMS' original comparison groups were named in the interim report, the expanded groups have not yet been shared with the institutions; there is a need to gather feedback from the institutions before they are finalized.

12. Develop an implementation plan to identify next steps and policy changes that need to occur to support the recommendations included in this report. As noted, there are several elements of the model that need to be adopted by stakeholders to meet the requirements outlined in the budget language for this review. Revised comparison groups for each institution to be used for benchmarking and to assess the fitness of the funding model also need to be adopted, as are metrics for assessing institutional effectiveness and efficiency. SCHEV, in partnership with stakeholders, should develop a plan to continue this work and identify policy changes in code or budget language that need to be implemented to support these elements, with a target of completion by the 2023 General Assembly session.

Introduction

The Commonwealth of Virginia has a long and illustrious history of being at the vanguard of public education in the United States reaching all the way back to the colonial era and to Thomas Jefferson’s vision for using education, including higher education, to drive economic development, civic leadership, and societal well-being. Today, that heritage has contributed to Virginia routinely ranking as one of the best states for higher education in the nation, particularly for its high graduation rates and levels of education attainment in the population. Indeed, Virginia boasts above-average performance in high school graduation, college-going, retention, and college graduation. Despite the strong performance of its traditional pipeline, Virginia still outperforms all but nine states in the rates at which adults of working age are enrolled in college.

Yet challenges loom. The Commonwealth ranked 13th among states in educational appropriations per student (\$7,215 in FY2021). Meanwhile, the state’s institutions have grown rapidly more dependent on tuition revenue over the past two decades—the burden of funding them shifted toward students and families by 23.6 percentage points between FY2000 and FY2020, a greater change than all but 10 other states. Virginia’s students from median incomes spend more out of pocket to attend a four-year institution in the state than do students in 42 other states. And the state’s four-year institutions generate fewer degrees for the money than institutions in most other states, although the two-year institutions are relatively efficient.

Virginia is home to a wide mix of public institutions—internationally ranked research universities, broad access comprehensive universities, two public Historically Black Colleges and Universities (HBCUs) and a system of 23 community colleges of diverse sizes and program mixes distributed across the state. Virginia also recently adopted a statewide strategic plan, Pathways to Opportunity, with an objective to be the best state for education by 2030. The plan focuses on three priority goals that could easily be viewed as more modern expressions of Virginia’s historic vision for public higher education—that it should be equitable, affordable, and transformative. A crucial factor that will help determine whether the Commonwealth achieves its strategic goals and retains its reputation for higher education is the approach Virginia takes to providing funding support to its public institutions. Despite various attempts, Virginia’s funding policies have not fundamentally changed in the last twenty years when the current practice of estimating institutional “Base Adequacy” was established. Base adequacy refers to a formula designed to estimate the amount of funding support from the combination of state appropriations and tuition revenue that each institution required to carry out its mission.

Originally, this formula helped the Commonwealth direct new funding to institutions that fell short of the calculated levels, but in recent years all of Virginia’s public institutions have been at or above base adequacy. This has had the effect of transforming Virginia’s funding approach back into a Base Plus model by which each institution receives the prior year’s funding plus whatever special allocations they can garner through the budget-setting process. Since institutions vary widely in their ability to argue their cases successfully to the Governor’s office and the legislature, the net effect can be creeping inequities in institutional funding levels.

As a result, the state now lacks an objective, evidence-based framework for allocating resources to institutions. Nor does it have a method for assessing whether any particular institution requires more state funding (or tuition revenue) to more effectively serve its mission. Instead, the Commonwealth has fallen into a pattern of appropriating operating funding to institutions primarily based on their institutional priorities. In part because these annual changes in institutional base funding levels may or may not be closely linked to state goals and priorities, the state also provides funding through special mechanisms designed to meet specific workforce needs (such as the Tech Talent program). In the wake of the pandemic, the timing was right for the Commonwealth to develop a more comprehensive, coherent, and strategic approach to funding its public institutions.

Consequently, during its 2021 session, the Virginia legislature tasked the State Council of Higher Education in Virginia (SCHEV) to undertake a review of higher education costs, funding needs, appropriations, and efficiencies. The review charged SCHEV, in consultation with representatives from House Appropriations Committee, Senate Finance and Appropriations Committee, Department of Planning and Budget, Secretary of Finance, and Secretary of Education (a group generally referred to as the OpSix), as well as representatives of public higher education institutions to “identify and recommend:

1. methods to determine appropriate costs, including a detailed cost analysis, of Virginia public institutions of higher education and peer institutions.
2. measures of efficiency and effectiveness, including identification of opportunities for mitigating costs, increasing financial efficiencies, and incorporating current best practices employed by Virginia institutions and other institutions nationwide.
3. provisions for any new reporting requirements, including a possible periodic review of cost and strategies employed to implement efficient and effective operational practices.
4. strategies to allocate limited public resources based on outcomes that align with state needs related to affordability, access, completion, and workforce alignment, and the impact on tuition and pricing.
5. the impact of funding on underrepresented student populations; and
6. a timeline for implementation.”

(The complete language of the appropriation is provided as Appendix A.)

SCHEV, in consultation with the OpSix staff members issued a Request for Proposals (RFP) in May and subsequently awarded the contract to the National Center for Higher Education Management Systems (NCHEMS), a private, non-profit 501(c)(3) organization headquartered in Boulder, Colorado, with extensive experience in state postsecondary finance policy.

SCHEV identified four major deliverables as part of the review.

- Deliverable 1: Review of funding policies: Conduct a review of policies nationally and compare them to Virginia’s current funding model.
- Deliverable 2: Efficiency and effectiveness review: Inventory Virginia institutions’ practices and research those in other states to identify opportunities for mitigating costs and increasing efficiencies for incorporation by Virginia institutions.

- Deliverable 3: Identification of trends in costs and determination of estimated costs for higher education: Gather and analyze data on funding and costs for higher education and create benchmarks for evaluating performance among Virginia institutions.
- Deliverable 4: Recommendations for a new funding model: Create or modify a funding model or models for use in Virginia

The statute required the submission of three reports, including:

1. A detailed project workplan to be provided to the Joint Subcommittee on the Future Competitiveness of Higher Education by August 1, 2021.
2. A preliminary report provided to the Governor and the Chairmen of the House Appropriations and the Senate Finance and Appropriations Committees by December 1, 2021. In addition to basic facts about appropriations in Virginia and the policies and practices that have shaped them, this report also included findings from a national survey of approaches used by states to allocate public funding to public postsecondary institutions, an initial review of notable statewide efforts to promote efficiency and effectiveness in public higher education, and results from initial data analyses of funding and costs of public higher education nationally and in Virginia. In addition, the report put forward a set of principles to guide the development of a new funding model and a conceptual framework intended for use in operationalizing the principles and in the design of the funding model.
3. A final report to be provided to the Governor and Chairmen of the House Appropriations and the Senate Finance and Appropriations Committees by July 1, 2022. In addition to augmenting information previously shared in the preliminary report, this final report shares additional analyses, activities, and research; describes a recommended conceptual framework for designing and implementing a new funding model for Virginia; recommends the use of specific factors for use in the funding model that are aligned with the Virginia Plan for Higher Education and with a set of core principles and values expressed and agreed to by various stakeholders; and addresses additional areas for further development and refinement of the funding model.

This study was narrowly aimed at Virginia’s approach to funding its public institutions’ Education and General (E&G) operating budgets. While important, other aspects of state funding support to higher education were not within the scope of the study, including capital funding for higher education, state-funded financial aid, auxiliaries (e.g., housing, bookstore operations, athletics), and endowments.

Process and Activities

To develop the deliverables and prepare the submissions, NCHEMS worked closely in partnership with SCHEV to collect and analyze data, identify policies and practices in other states, and communicate regularly with, and gather input from, a variety of stakeholders. Throughout the project, NCHEMS and SCHEV were assisted and advised by two groups representing key stakeholders. The first was OpSix, a leadership body designated in the Code

of Virginia to work with Virginia's public institutions and their six-year planning processes. OpSix is composed of the Secretary of Finance, the Secretary of Education, the Director of the Department of Planning and Budget, the Director of SCHEV, the Staff Director of the House Committee on Appropriations, and the Staff Director of the Senate Committee on Finance and Appropriations, or their designees. The second stakeholder group consisted of eight members of SCHEV's Finance Advisory Council which includes the chief financial officers at the institutions (FAC-8). Both groups met regularly throughout the project to receive updates on the project and provide input and feedback.

In addition to the meetings with OpSix and FAC-8, NCHEMS and SCHEV also prioritized engagements with other key stakeholders to ensure their feedback could be incorporated into final products. NCHEMS traveled to Richmond on two occasions to hear from additional stakeholders and occasionally met with some of them virtually. SCHEV maintained more regular contact and provided updates to this broader community. These additional stakeholders included:

- Finance Advisory Committee members (chief financial officers at the institutions).
- Members of SCHEV's Instructional Programs Advisory Committee (chief academic officers at the institutions).
- SCHEV Council members.
- Institutional presidents, particularly President Makola Abdullah of Virginia State University, who served as chair of the Council of Presidents and President Timothy Sands of Virginia Tech, rising chair of the Council.
- Advocacy groups, namely the Virginia Higher Education Business Council, Virginia 21, and the Partnership for College Affordability and the Public Trust.

In addition, SCHEV maintained a publicly accessible project website (www.schev.edu/coststudy) to provide updates and information throughout the project.

As much as possible, NCHEMS used Virginia data on student enrollments and funding and expenditures as the basis for its analysis. Where comparisons to other states or institutions were appropriate, NCHEMS collected data from the Integrated Postsecondary Education Data System (IPEDS), which is the federal government's official data collection for colleges and universities. NCHEMS used these data to create analyses of institutional funding levels in comparison to similar institutions elsewhere in the nation and to develop a cost and funding model. The cost and funding model is a tool NCHEMS developed in fulfillment of the fourth deliverable that allows NCHEMS and SCHEV to adjust key parameters and observe the estimated results. The parameters and results from the modeling will be discussed later in this report.

Additionally, NCHEMS developed and fielded two surveys. The first was a national survey of state higher education executive offices to generate information on other states' approaches to determining the allocation of the base funding levels to public institutions, chiefly to respond to the requirements specified in the first deliverable. The second survey addressed activities and initiatives designed to increase efficiency and effectiveness at Virginia's public institutions; it was administered to the chief financial officers of Virginia, who worked with their internal

colleagues to provide responses. NCHEMS analyzed the results of this survey in responding to the requirements of the second deliverable. In designing both surveys, NCHEMS received substantial input from SCHEV and from FAC-8. In addition, the State Higher Education Executive Officers national membership association (SHEEO) aided in the development of the instrument for the survey of its members and fielded it on NCHEMS' behalf.

Lastly, in addition to drawing on its own extensive expertise working with state finance policies, NCHEMS conducted research on funding approaches over time in Virginia and other states as appropriate throughout the project, in particular to gather detailed information about other states' use of formulas to allocate resources to institutions based on core administration and instructional costs. Additional details about process and activities, as well as methods and specific data sources consulted in analyses and in the creation of the cost and funding model tool can be found in Appendix B.

Background and Context

Before tackling the deliverables and the funding model itself, it is important to recognize key features of the context that are unique to Virginia and important to the development of a new funding model and related recommendations. First among these is the *Pathways to Opportunity* strategic plan for higher education, which establishes that higher education should be equitable, affordable, and transformative, and that these goals should guide policymaking in general and specifically the design of the funding model and the selection of parameters that influence the allocation of funding. In addition to the strategic plan, key features of the context for funding policy include:

- **Autonomy helps ensure strength in institutional diversity.** A strong tradition of institutional independence with final decision-making authority delegated to the institutions' Boards of Visitors. This has led to a situation in which the institutions have evolved in very different ways, a variation that is celebrated by both institutional leaders and policymakers; the resulting diversity of institutions is highly valued. Additionally, Virginia's institutions have a national reputation for their quality that is reflected in their abilities to attract non-residents to enroll, a situation that helps to augment the revenue base for statewide funding of public higher education. These out-of-state students also contribute their talent to Virginia's workforce when they remain in the state after successfully completing a degree.
- **State government still exercises close control over factors that affect institutional finances.** The historical nature of the relationships between state government and its universities. These relationships have been characterized by strong involvement of state government in functions more typically reserved to institutions in other states—for example, position control and the requirement that institutional non-general funds (NGF) mostly raised through tuition and fees be deposited in the state treasury with any earnings held by the state. These practices were changed in major ways by the Restructuring Act of 2005, which granted autonomy to institutions in numerous administrative areas in return for accountability for meeting performance objectives

established by the state. The extent of the autonomy granted to institutions varied, but all of them are subject to meeting certain limited performance requirements (via the Institutional Performance Standards process) to receive any interest earned on their NGF revenue.

- **Virginia’s community college system allocates state funding to its constituent campuses.** The organization of the Virginia Community College System as a single fiscal entity (versus 23 individual community colleges that are allocated funding directly). For purposes of this project the appropriation of a pool of resources to the State Board of Community Colleges for subsequent allocation to the constituent colleges is a key feature in the design of the new funding model—although the amount of resources to be appropriated to the system will be subject to the funding model and its formula calculations.
- **Virginia’s current approach to estimating institutional costs is more than twenty years old.** The design and implementation of the “Base Adequacy” funding model that was put in place in 2000. This model was intended to ensure that each institution received funding sufficient to carry out its mission. The model:
 - Reflects student credit hours at different levels and in different disciplines produced by each institution.
 - Calculates full-time equivalent (FTE) faculty required to teach this mix of student credit hours by institution.
 - Establishes faculty costs by multiplying calculated faculty FTE by each institutions’ blended salary that mixes the salary cost of full-time and part-time faculty. The result generated constitutes the bulk of instructional cost at an institution.
 - Calculates support service costs based on ratios by institutional type.
 - As previously noted, in recent years all institutions have been funded at levels above those determined by the Base Adequacy model, thereby nullifying its utility as a funding approach with a rational and evidence-based connection to institutional funding requirements and to overall statewide priorities.
- **An explicit policy goal for sharing educational costs with students has proved elusive.** A long-standing policy stating the intent that the Commonwealth’s contribution for in-state students of costs using the base adequacy formula should be 67 percent of total funding. Despite this policy being in statute since 2004, the target level has never been reached for all the institutions, and only a few institutions of the smaller institutions and HBCUs have ever reached that threshold. Currently the state contributes approximately 50 percent of the funds devoted to the policy’s calculated base costs of institutional operations. The fact that the statutory target was never reached, but that institutions are seen as “fully funded” points to a failure in state finance policy.

- **Lacking a more rational and strategic funding model for its public institutions, the Commonwealth has turned to appropriating funds for specific and distinct programs.** A practice of making large, targeted appropriations to higher education for purposes deemed to be of high priority. This funding may be directed to individual institutions or may serve as a mechanism through which institutions received taxpayer support indirectly. Among the investments that fit this description are: Tech Talent, the “Get Skilled, Get a Job, Get Ahead” (G3) program, the Workforce Credential Grant Program, and a Tuition Moderation funding policy aimed at curbing tuition increases.
- **Virginia uses debt financing to supplement funding available to address equipment needs.** It is common for other states to address facilities needs in this way, but Virginia also supports a Higher Education Equipment Trust Fund through which institutions rely on bond funding to pay for some routine equipment costs; this is an unusual approach to financing such costs.
- **In addition to funding institutions directly, Virginia invests in various state financial aid programs.** Virginia makes a significant investment in financial aid through state-funded programs administered by SCHEV, amounting to \$252.7 million in state appropriations for aid to undergraduate students in FY2022.² Eligibility for the different programs funded under this appropriation vary; among the criteria that programs variously use are financial need, merit, and enrollment in specific high-demand programs or at different types of institutions. Although student financial aid is a critical element in the financing strategy each state uses, along with state appropriations and tuition-setting, adjustments to Virginia’s state financial aid programs are not within the scope of work for this report.

Findings and Observations

This section highlights the most important findings relative to each of the first three deliverables sought for the project.

Review of Funding Policies

As an important input to any revisions to Virginia’s approach to funding its public higher education institutions, NCHEMS drew on the experiences of other states and related them to the context and history of funding in Virginia. To generate this information, NCHEMS conducted a review of research literature on funding approaches, surveyed state finance officers nationally, examined Virginia’s policies and practices, and gathered more detailed information on other states’ funding formulas where appropriate. These activities led to the following observations:

² SCHEV (2021). *Financial Aid at Public Institutions of Higher Education in Virginia*. Retrieved May 26, 2022 from <https://schev.edu/docs/default-source/reports-and-studies/2021-reports/trends-in-financial-aidfinal.pdf>.

- **Recent research on the details of states’ base funding policies is scant.** While there has been extensive recent research on performance funding of public institutions, far less attention has been given to state base funding policies.
- **Research on performance funding approaches yields helpful lessons.** Research on performance funding has driven institutions to adopt more data-informed decision-making practices, while acknowledging that some institutions are better equipped than others in using their data in a sophisticated manner. It also finds mixed results in terms of how well performance-funding policies support the achievement of priority state goals such as increases in degree production, reductions in equity gaps based on race/ethnicity and income, or other goals.³ To the degree that performance-based funding is a zero-sum game, it can exacerbate institutional competition for resources. In such cases, even an institution that shows improvement may lose funding to an institution that scores better, making it difficult for institutions to start and sustain interventions that address state priorities.⁴ Approaches that seem to work best:
 - incorporate clear incentives for institutions to serve underrepresented and low-income populations, and
 - avoid relying on metrics that put institutions disproportionately serving adults and other students from low-income, underrepresented, first-generation, and rural backgrounds at a disadvantage, and
 - incorporate a process for allocating funding to institutions that is transparent, and predictable, and
 - do not create interdependencies among institutions that make a given institution’s funding allocation subject to factors beyond its ability to control; that is, the process avoids allocations to any one institution dependent on how well other institutions score on the incentive component’s metrics.
- **In determining appropriations levels, most states rely heavily on whatever institutions received from the state in the previous budget.** Most commonly, states allocate the bulk of their funding to public institutions through Base Plus approaches, according to the survey of SHEEO finance officers and consistent with other research.⁵

³ Ortagus, J.C., Kelchen, R., Rosinger, K., & Voorhees, N. (2020). “Performance-Based Funding in American Higher Education: A Systematic Synthesis of the Intended and Unintended Consequences.” *Educational Evaluation and Policy Analysis* 42 (4), 520-550; Gándara, D. & Rutherford, A. (2018). “Mitigating Unintended Impacts? The Effects of Premiums for Underserved Populations in Performance-Funding Policies for Higher Education,” *Research in Higher Education* (59), 681-703; Hillman, N.W., Tandberg, D.A., & Fryar, A.H. (2015). “Evaluating the Impacts of ‘New’ Performance Funding in Higher Education. *Educational Evaluation and Policy Analysis* 37 (4), 501-519.

⁴ NCHEMS (2109). *Report on the State University System of Florida’s Performance-Based Funding Model*. Retrieved May 29, 2022 from <https://nchems.org/wp-content/uploads/191018-Florida-SUS-PBF-Report-Submitted.pdf>.

⁵ Lingo, M., Kelchen, R., Rosinger, K., Baker, D., Ortagus, J., and Wu, J. (2021). *The Landscape of State Funding Formulas for Public Colleges and Universities*. InformEd States. Retrieved November 3, 2021

Factors that determine the “Plus” part of the funding vary but tend to be based on rising costs for inputs (e.g., health care), institutional priorities that attract legislative interest, or just a fixed percentage increase. Because these are dependent on historical funding levels, they are susceptible to becoming disconnected from state priorities and to creating inequities among institutions over time. This approach is also ill-equipped to address budget shortfalls: what is the “base” supposed to mean when budgets are stressed?

- **Formula funding approaches for supporting base operations outside of performance-based formulas are less common.** Fewer states rely on funding formulas that are not performance related. Those that do tend to focus on enrollment and differential costs of instruction, according to survey results. Slightly less common among formula states were those that included factors that accounted for differential costs associated with serving different student populations.
- **Semester credit hours are commonly used as the base measure for estimating instructional costs.** Several states calculate variation in the costs of instruction based on semester credit hour (SCH) production: Illinois, Louisiana, Massachusetts, Minnesota, Nevada, New Jersey, Oregon, Tennessee, and Texas. These calculations are the basis for a schedule of weights that describe the relationship across lower- and upper-division undergraduate and graduate credits at the master’s and doctoral/first-professional levels, as well as across disciplines.
- **Virginia’s use of student-faculty ratios to address variation in costs is unique.** NCHEMS was unable to find any state that utilized student-faculty ratios to estimate differences in instructional costs, as Virginia does in its Base Adequacy model. Because faculty salaries typically comprise a majority of instructional costs, Virginia’s approach is not wholly dissimilar to an SCH-based approach. Using SCHs is preferable because they can be measured more straightforwardly (including to count completed credit hours, not just attempted credit hours) and lend themselves to incorporating variation in costs that occur across disciplinary areas (or levels, such as for specific, expensive equipment needs) and across different student populations. Our analysis of existing weighting schedules shows that a conversion of Virginia’s student-faculty ratios into weighted SCHs produces a far narrower range than is found in the SCH-based weighting schemes used by other states, although adding in Virginia’s faculty costs (which vary by discipline) would make this comparison more valid. A final point is important: in addition to the fact that states’ methods in calculating instructional costs by SCH are not consistent, the resulting weights are not perfectly empirical in any event as states sometimes modify the weighting scheme to reflect policy priorities. For instance, a

from

https://static1.squarespace.com/static/5d9f9fae6a122515ee074363/t/612d9d7458f7db4cfd58baab/1630379382136/InformEdStates_Brief_LandscapeofStateFundingFormulas.pdf. This research incorporated performance funding policies in its review of state funding approaches, whereas the survey conducted for this project sought to exclude performance-related mechanisms from its analysis.

conversation with a member of Oregon’s state agency revealed that its weights are relatively low for graduate level programs in part due to an intentional choice to maintain a priority on undergraduate education in keeping with Oregon’s statewide strategic plan. It is worth noting, though, that the weights in use for instruction at the undergraduate level were less variable than those used for graduate and first-professional programs. Weights for health-related first-professional programs were largely absent; states tended to fund those activities through a separate mechanism.

- **Most states do not explicitly set a cost-sharing target, as Virginia does.** Only a few states reported setting targets for cost-sharing with students as Virginia does. Of those that have such a provision, Tennessee and Minnesota set different levels for different sectors.

This review of national practices shows that, although it is less common for states to rely on a funding formula, those that make effective use of one have a more rational strategy for resource allocation than states that rely heavily on a strategy that rolls forward past allocations. Furthermore, it is common for states with formulas to use semester credit hour production, in combination with a weighting scheme that accounts for differences by discipline and level, as a proven method to account for variation in the costs of instruction across institutions. Virginia itself was once such a state. But as described earlier, its base adequacy calculation no longer guides allocation decisions in a meaningful way. A return to a funding formula will restore the use of a principled, strategic funding approach.

Efficiency and Effectiveness

As policymakers consider how much funding support public institutions should receive, they seek assurances that institutions are operating efficiently and effectively and look for opportunities to stimulate additional cost savings that may be passed on to students in the form of reduced tuition prices or reinvestment in improvements in institutional performance. NCHEMS reviewed national reports on efficiency initiatives in other states and also surveyed Virginia’s institutions about their own efforts to realize savings or to fuel improvements in student success, research output, or other effective practices.

Virginia institutions are active in seeking efficiencies and effectiveness. Relevant initiatives could be described as consisting of changes internally to an institution or were collaborative activities undertaken by multiple institutions or other partners. In the former category were activities such as:

- Changing the organizational structure to reduce managerial costs.
- Monetizing physical assets.
- Investing in more efficient systems—campus-wide purchasing contracts, investing in climate control systems, streamlining business processes, etc.
- Improvements in academic productivity, such as by reducing the number of small classes and changing curricula or by reducing student time-to-degree through advising improvements, guided pathways, providing credit for prior learning, etc.

Collaborations across institutional boundaries were routinely mentioned for administrative functions such as disaster recovery, risk management, purchasing, financial records, construction management, etc. Much less common are multi-institutional collaborations in the academic domain, but Virginia institutions reported taking part on joint research projects through the Commonwealth Cyber Initiative and as participants in Virginia Catalyst, a research consortium; joint efforts to build infrastructure for online education and to provide library services through the Virtual Library of Virginia.

Virginia institutions have also sought to capitalize on collaborative efforts that span institutional boundaries, but more can be done to incentivize and sustain such activity. In general, NCHEMS found that Virginia's public institutions have been active and creative in looking for ways to increase efficiency. Numerous examples exist in the inventories the institutions provided in response to the survey. For example, GMU's adoption of a telehealth approach to delivery of many health services generated improved efficiencies and may have been especially valuable as the pandemic struck. NSU developed agreements with other institutions to smooth pathways for incoming transfer students in social work and for NSU graduates seeking a law degree. In the process Virginia's institutions have adopted many best practices from the field, especially in the innovative use of technologies. Generally, institutional efforts have been confined to intra-institutional actions, and almost all focused on administrative functions. Virginia institutions can document millions of dollars in savings from these efforts, but the biggest savings achieved have come through collaborative action, especially through participation in the Virginia Higher Education Procurement Consortium (VHEPC) and the statewide library consortium (VIVA). Many of the funds freed up from these activities were devoted to addressing affordability by minimizing price increases or by providing additional institutional student financial aid. Institutions generally reported improvements in quality as a second priority, most notably through retaining faculty or improving academic programs.

While Virginia institutions have shown a willingness to engage in collaborative activity, more could be done in this arena to reduce costs and improve services, especially in expanding collaborations to include a broader array of administrative functions and in putting a greater emphasis on partnerships in the academic and student services functions. However, Virginia does not have the governance structure that makes brokering these arrangements straightforward; many of the best examples of academic program sharing occur within systems of institutions, for example. For more collaborations to really blossom, it will probably require an intermediary organization to play an active role and for seed money to be available. SCHEV could provide the capacity for the brokering capacity needed, and its involvement could have the added benefit of putting efficiency improvement in a larger context that makes the state and executive branch agencies part of the community of solutions, as Texas has tried to do. Funding would need to be sufficient to help nascent collaborations get beyond the start-up phase and become sustainable. This will require participating institutions to recognize that the revenue they can acquire from partnering will exceed the cost/benefit of acting independently or from electing not to offer a particular service at all (even if it represents a clear benefit to students or the community).

Virginia already engages in numerous practices that are proving effective at reducing costs nationally, including collective purchasing, reductions in utility costs, and shared library resources. All of these are characteristic of collaborative activity. Additional efforts Virginia institutions can take that reflect promising practices nationally are in this same vein: collaborations across institutional boundaries in academic program delivery, online delivery, and sharing administrative functions and resources. For example, there is a growing interest in sharing academic programs or courses, as highlighted by platforms created by SREB to allow HBCUs to exchange courses and by the Council of Independent Colleges for its members to do the same thing. These collaborative activities are not always straightforward to implement, and support from SCHEV and the Commonwealth can help spur more of them to greater success.

While collaborations offer the most promise for substantial payoffs that remain underutilized nationally, there are other promising practices that Virginia institutions can look to. These include:

- Acquiring new energy sources and implementing control systems that reduce usage.
- Implementing guided pathways initiatives, meta-majors, and other curricular reforms that help streamline pathways for students and improve their likelihood of earning degrees and certificates. Such programs should be accompanied by adequate supports that help students connect these to real world jobs. Likewise are programs that intentionally incorporate relevant work experience, ideally with pay, into programs—internships and co-operative experiences may require investments on the part of institutions to establish, but the returns for students and their success are often significant.
- Organizational reorganization and scheduling improvements can impact both student success and the bottom line if thoughtfully implemented. Institutions that do not continually evaluate the productivity of their departments and majors or review their scheduling are likely to be wasting scarce resources that could be more effectively deployed. Institutions can combine departments and reduce or redesign majors to generate savings. Challenging assumptions about and reviewing habitual practices for academic scheduling, and reorganizing it around students' needs rather than faculty preferences, can both improve students' time to degree and also save significant money if the effort reduces low-enrolled courses, better utilizes existing space, and allows students to attend the courses they need when they need them.
- Cultivation of a culture of using data and evidence will improve operations and positively impact student success and equity (though in the latter case it will be important that care is taken in the use of predictive analytics so that the inequities are not baked into the results). For example, the use of data to deeply inform proactive academic advising, pioneered by Georgia State University, has proven to have substantial impacts on student success. (Worth noting is that this kind of initiative may be accelerated by the collaborative deployment of a common platform.)
- As reported by the institutions in Texas and Ohio, Virginia's institutions are seeking to create greater efficiencies through organizational and business system improvements, a priority that is a common approach to efficiency improvements. Such efforts are likely to be highly contextualized and customized, and they can impact virtually any part of the

institution. But many of them include using technology to deploy more paperless systems.

- Finally, institutions can strategically outsource certain activities that are not central to the higher education mission, such as leasing parking structures and contracting with local providers to obtain services. An example may be health and mental health services that can be provided by local hospitals or clinics. Ohio institutions conducted an asset review to identify assets that could be monetized; they discovered opportunities to lease space, sell properties, and engage the surrounding community more intentionally.

Metrics can help the state and institutions monitor their progress toward greater efficiency and effectiveness.

Even if it is reasonable to expect that institutions are motivated on their own to design and implement cost-savings strategies and initiatives that lead to greater effectiveness, it is still worthwhile to measure these efforts and their results. Where appropriate, data sourced from Virginia can provide a level of richness and context-specific information that other publicly available data cannot match. But it remains valuable to gather data from IPEDS for benchmarking purposes; especially good performance in other states can equip SCHEV and institutions with clues about where to dig deeper for promising ideas to adapt to generate improved efficiency and effectiveness. Candidates for appropriate metrics to be considered at the state level:

- State and tuition revenues per graduate. This should be measured separately for different degree levels or, alternatively, a weight could be applied to the denominator to reflect the level of degree, e.g., an associate's degree is worth .5 graduates. Weights could be applied to the number of graduates for graduates of color or Pell Grant recipients to reflect in an efficiency measure the priorities of the state as embedded in the Virginia Plan. SCHEV constructed a version of this, cost per degree-year, in its 2019 in its strategic finance plan.⁶
- Undergraduate degrees per 100 undergraduate FTEs and the equivalent for graduate students. This measure is a typical one used for productivity and "throughput." It captures the rate at which enrollments are converted to completers but is sensitive to the proportion of degrees awarded at each level and to the proportion of part-time and full-time students because, even though FTE standardizes the denominator, part-timeness remains correlated with lower and slower graduation rates. It is a metric that remains especially useful for comparing an institution against itself and other like institutions, even if it has weaknesses in comparing across the diversity of Virginia's institutions. (It is also useful for making projections for the future.)
- Expenditures per FTE. Unbundling categories of spending to match the conceptual framework can be especially helpful, and Virginia's CARDINAL data may provide especially good metrics. In IPEDS terms, however, expenditures per FTE on instruction

⁶ SCHEV and Strategy Labs (2019). *Strategic Finance Plan for Virginia: Aligning Higher Education Finances and Strategies*. Retrieved March 15, 2021 from <https://www.schev.edu/docs/default-source/Reports-and-Studies/2019/strategic-finance-plan1113.pdf>.

plus the instruction share (of the tripartite mission⁷) of academic support plus student services provides a useful measure of the costs incurred for teaching, while expenditures per FTE on institutional support plus a portion of operations and maintenance gives an estimate of how much of an institutional budget is committed to administrative services and facility upkeep.⁸ There should be some attention given to student support expenditures per headcount student in order to ensure adequate support services for students who are enrolled part-time—and are more likely to be from underrepresented, low-income, and adult populations.

Additional detail about the Efficiency and Effectiveness survey and findings are available as Appendix D. Efficiency and Effectiveness Report

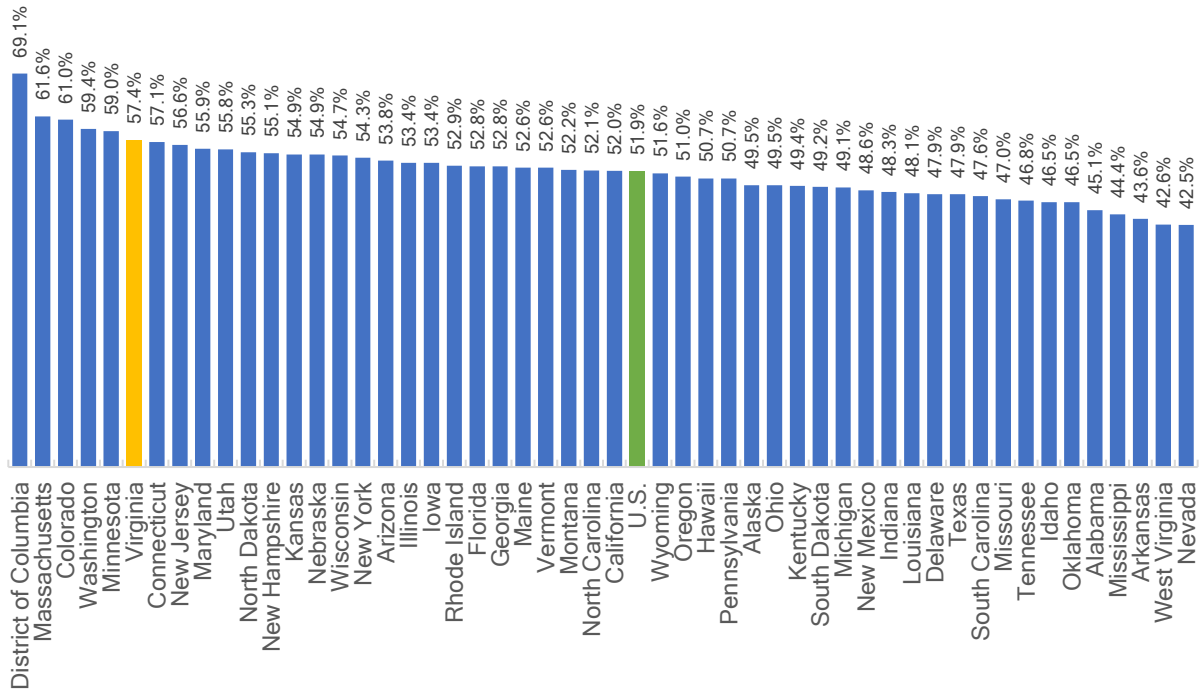
Costs and Funding in Higher Education

Before proceeding directly into an analysis of costs and funding, it is useful to lay out some facts about the performance of Virginia’s public higher education institutions in comparison with those in other states. First, there is much to applaud about the extent to which Virginia’s institutions serve students in the state. Virginia boasts one of the highest educational attainment rates among states, as well as above-average performance in high school graduation, college-going, retention, and college graduation. And, once the time it should take full-time students to earn a credential is normalized, the state’s institutions generate more credentials for the money than institutions in most other states. Despite the strong performance of its traditional pipeline, Virginia still outperforms all but nine states in the rates at which adults of working age are enrolled in college (Figure 3-Figure 7).

⁷ The tripartite mission includes instruction, research, and public service.

⁸ IPEDS data for each of the “functional” expenditure categories—such as instruction—includes spending on operations and maintenance (O&M) of classroom buildings. Separately, IPEDS collects a total amount of “natural” expenditures on O&M. To avoid double counting the O&M costs, an adjustment that estimates the portion of the O&M total already reflected in instructional expenditures, and excluding that amount from the sum of instruction plus O&M, is necessary.

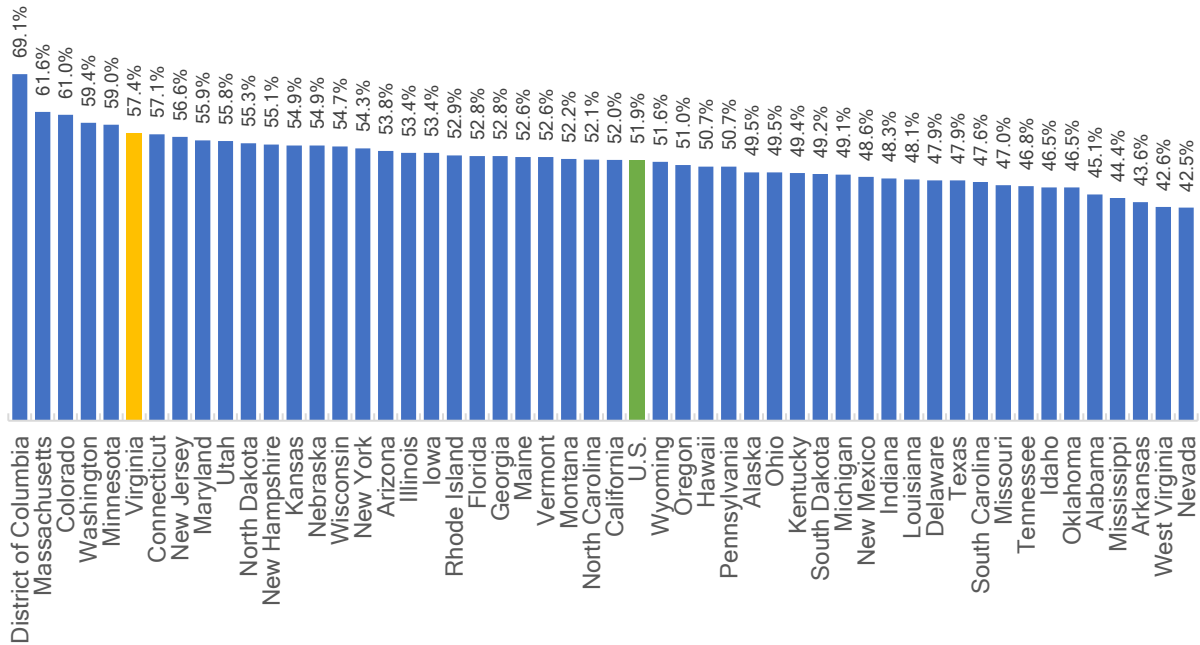
Figure 3. Educational Attainment of the Population Aged 25-64, 2019



Note: Data are for the proportion of the population with a high-quality credential or degree.

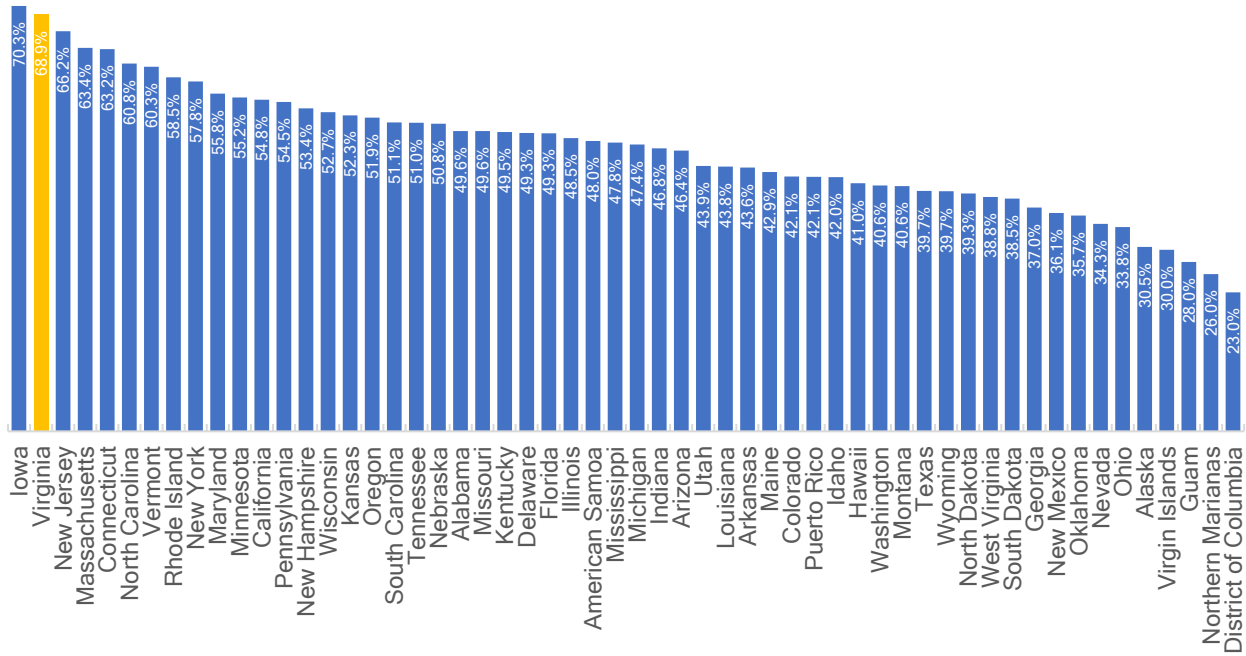
Source: Lumina Foundation, Stronger Nation, <https://www.luminafoundation.org/stronger-nation/report/#/progress>.

Figure 4. College-Going Rates of Recent High School Graduates, 2018



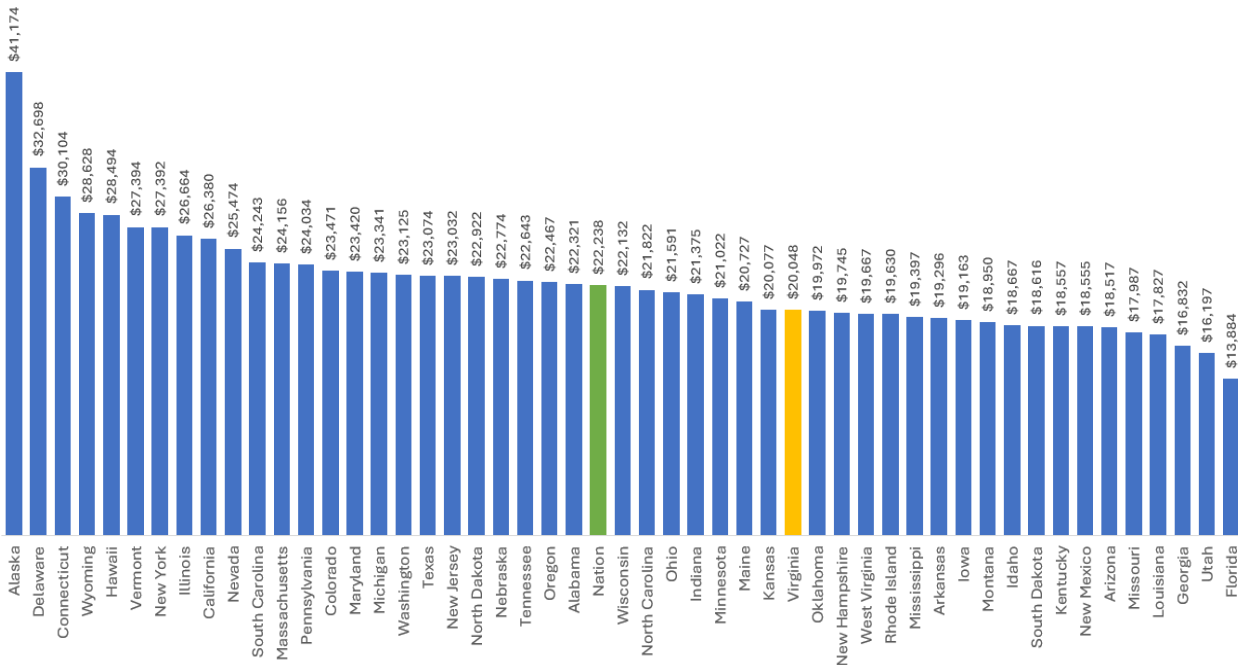
Source: Western Interstate Commission for Higher Education, Knocking at the College Door: Projections of High School Graduates, 2016. NCES, IPEDS.

Figure 5. Graduation Rates Among Four-Year Public Institutions Within 150% of Normal Time, 2020



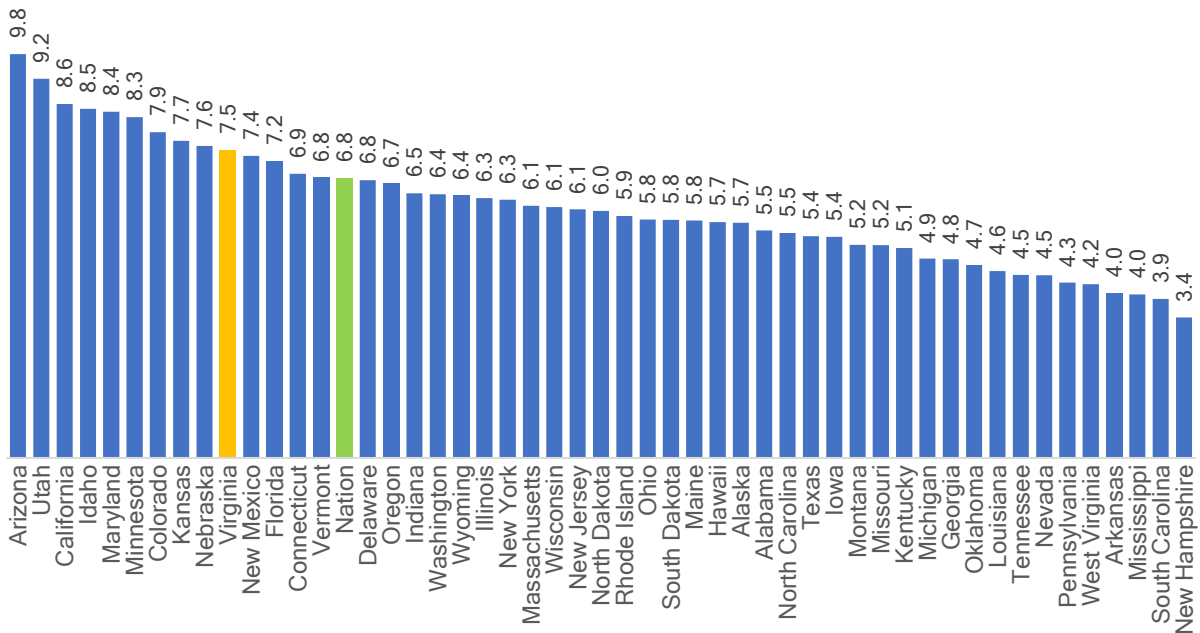
Source: NCES IPEDS, SCHEV.

Figure 6. Education & Related Expenditures per Degree Year, 2010-2019 (10-Year Average)



Source: SCHEV-provided data from original source of NCES, IPEDS Finance & Completion files, SCHEV/HCM Strategists Weighted Awards.

Figure 7. Undergraduate Enrollment Age 25-49 as a Percent of Population, Fall 2019

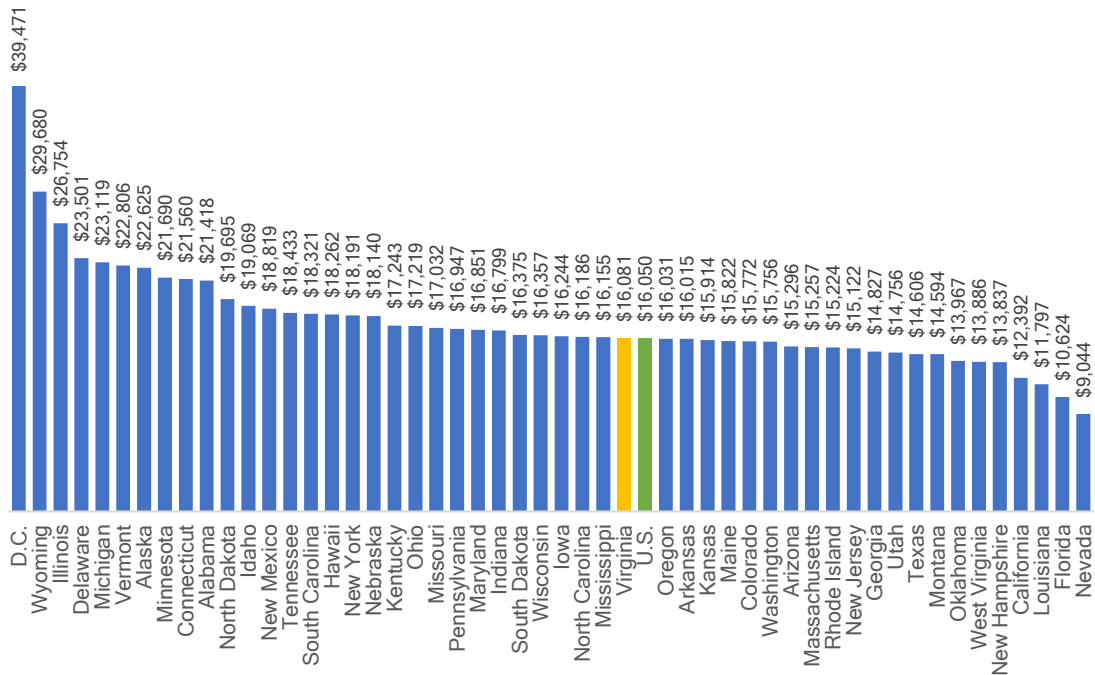


Note: Population data are for those with less than an associate degree.

Source: NCES IPEDS, U.S. Census Bureau, 2017 American Community Survey One-Year Public Use Microdata Sample.

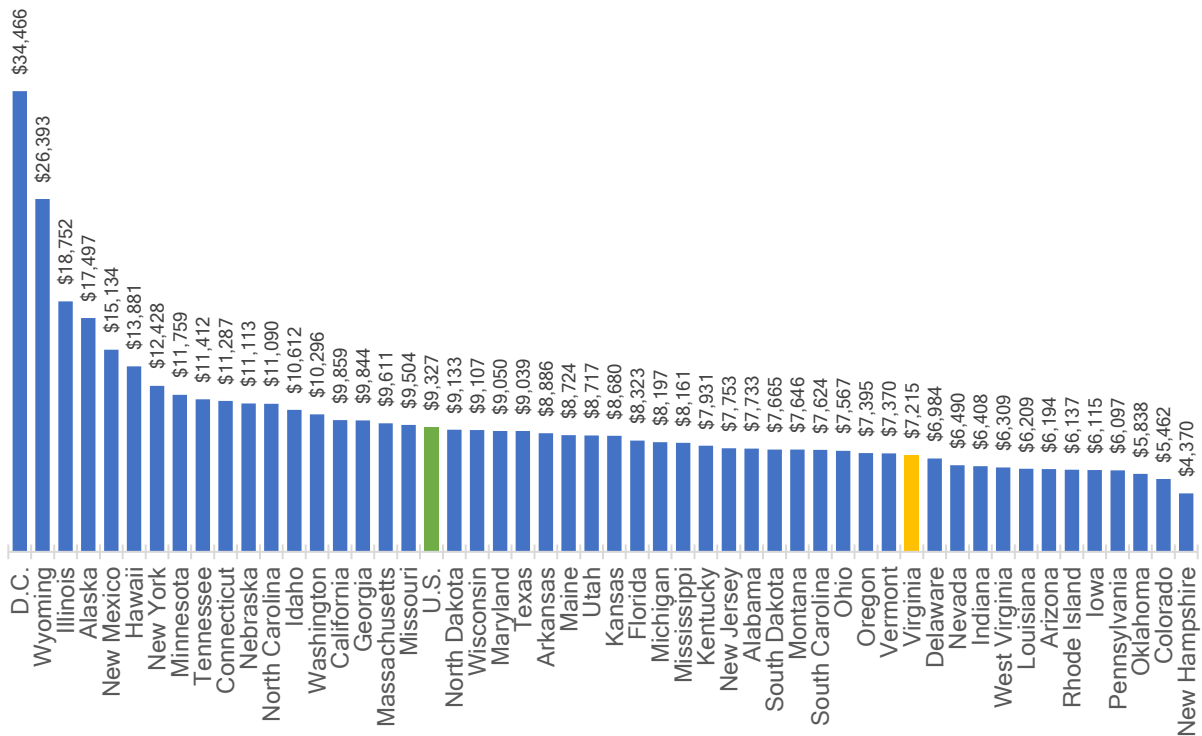
Yet challenges loom. Although in terms of total educational revenue per student, Virginia is almost equivalent to the national average, the Commonwealth ranked 38th among states in educational appropriations per student (\$7,215 in FY2021). Virginia’s institutions closed this gap with tuition revenue, raising more than \$2,000 per student than the nation as a whole and ranking 18th among states on this measure. This increased tuition dependency has been the product of at least two decades—the burden of funding public higher education in the Commonwealth shifted toward students and families by 23.6 percentage points between FY2000 and FY2020, a greater change than all but 10 other states. Virginia’s students from median incomes spend more out of pocket to attend a four-year institution in the state than do students in 42 other states (Figure 8-**Error! Reference source not found.**).

Figure 8. Total Educational Revenue per FTE, FY2021



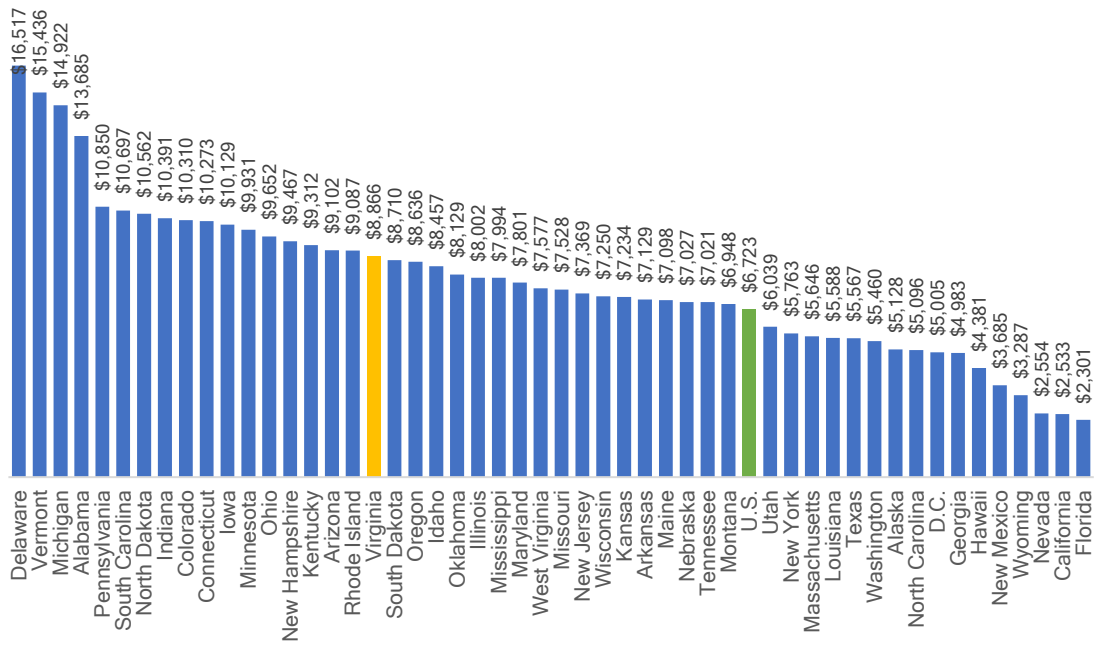
Source: SHEEO SHEF

Figure 9. General Fund Educational Appropriations per FTE, FY2021



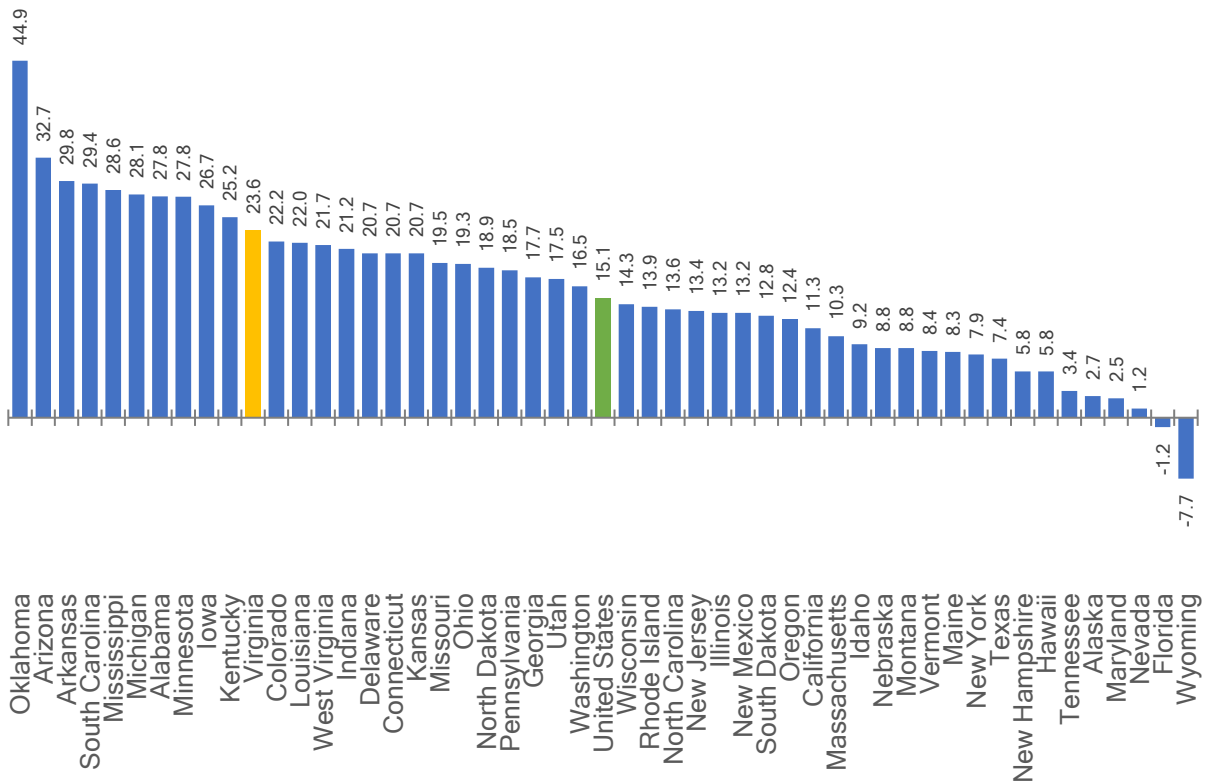
Source: SHEEO SHEF

Figure 10. Net Tuition Revenue per FTE, FY2021



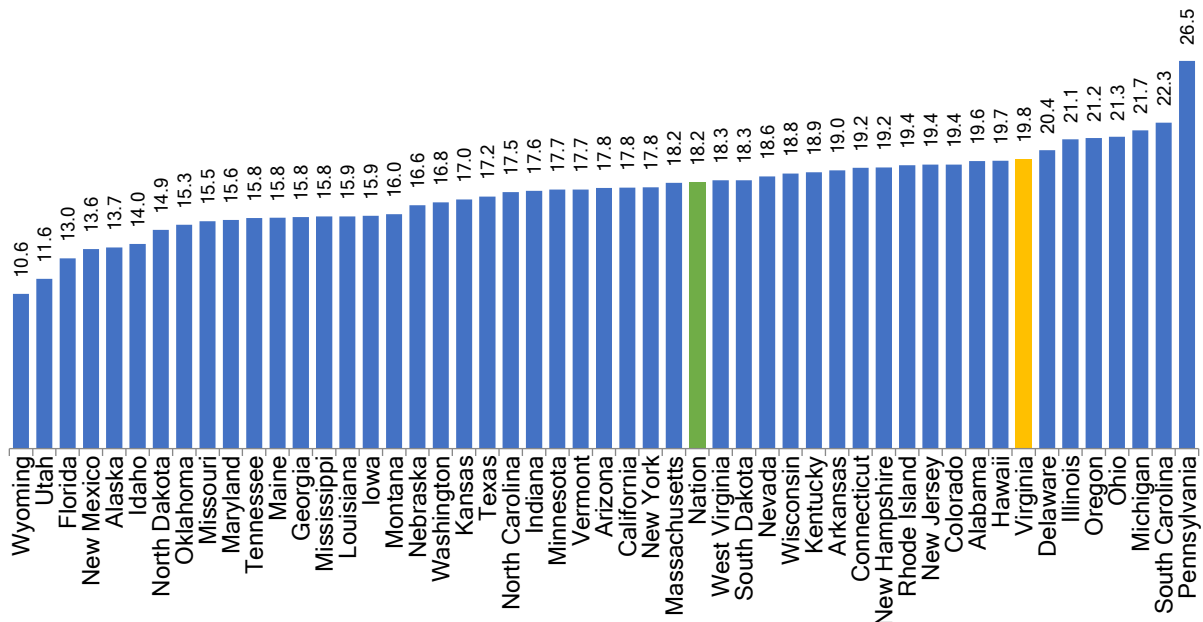
Source: SHEEO SHEF

Figure 11. Change in Student Share, FY2000-2020



Source: SHEEO SHEF

Figure 12. Net Price as a Percent of Median Family Income, Public Four-Year Institutions, FY2018



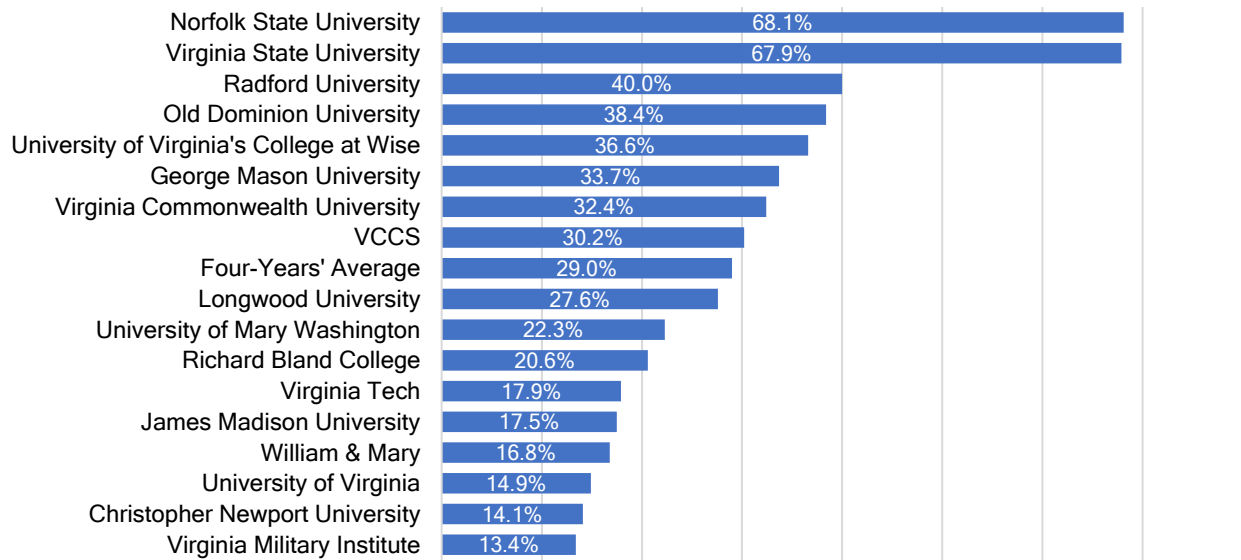
Source: NCES IPEDS; U.S. Census Bureau, 2018 American Community Survey (ACS) One-Year Public Use Microdata Sample (PUMS) File

To provide additional context, it is also crucial to describe characteristics of the populations of students served by the different public institutions in Virginia. The differing characteristics of student bodies has important implications for the design of a funding model, particularly those elements that seek to ensure sufficient funding is available to adequately support students who may face challenges related to being from a low-income, underrepresented, first-generation, rural background (or a combination thereof), are adult learners, or have weaker academic preparation.

Figure 13 illustrates the wide variation in the presence of low-income students at each of Virginia’s public institutions. About seven of every 10 undergraduates at Virginia’s two HBCUs is a recipient of a Pell Grant, compared to less than two out of 10 at VMI, CNU, and UVA. Interestingly, as a group VCCS and Richard Bland College were just seventh with only about a third of their students receiving Pell. This data point belies the reality that low-income students are most sensitive to opportunity costs. Moreover, only students who completed the federal financial aid application are included in these data; it may be that VCCS students who are low-income did not complete that application at relatively higher rates than students attending four-year institutions, as is sometimes observed in other states (e.g., California). With a strong economy, low-income students in large numbers opted not to attend community colleges. But just a few years prior, their presence in those institutions was substantially higher as a proportion of the total enrollment.

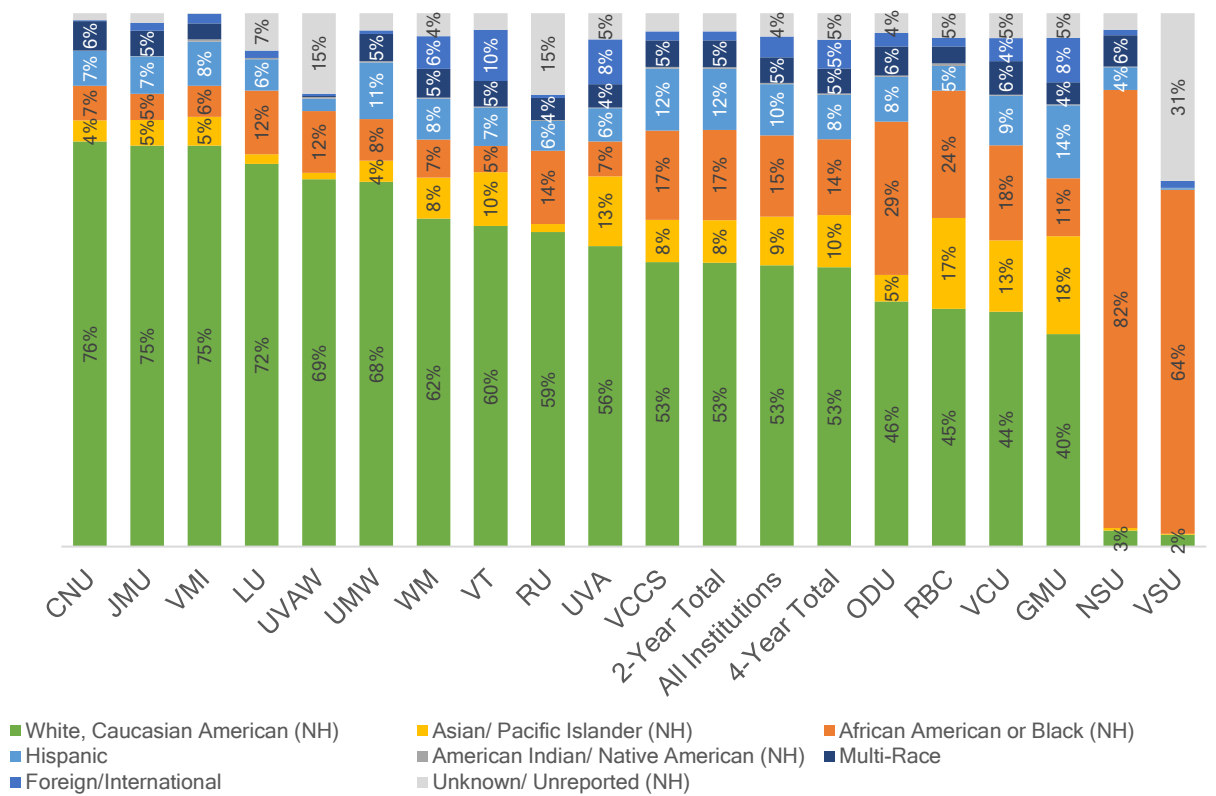
As with income, significant variation exists across Virginia’s public institutions in the racial/ethnic composition of its students (Figure 14).

Figure 13. Pell Grant Recipients as a Percent of In-State Undergraduate Enrollment, 2020-21



Source: SCHEV

Figure 14. Enrollment by Race/Ethnicity, Fall 2020



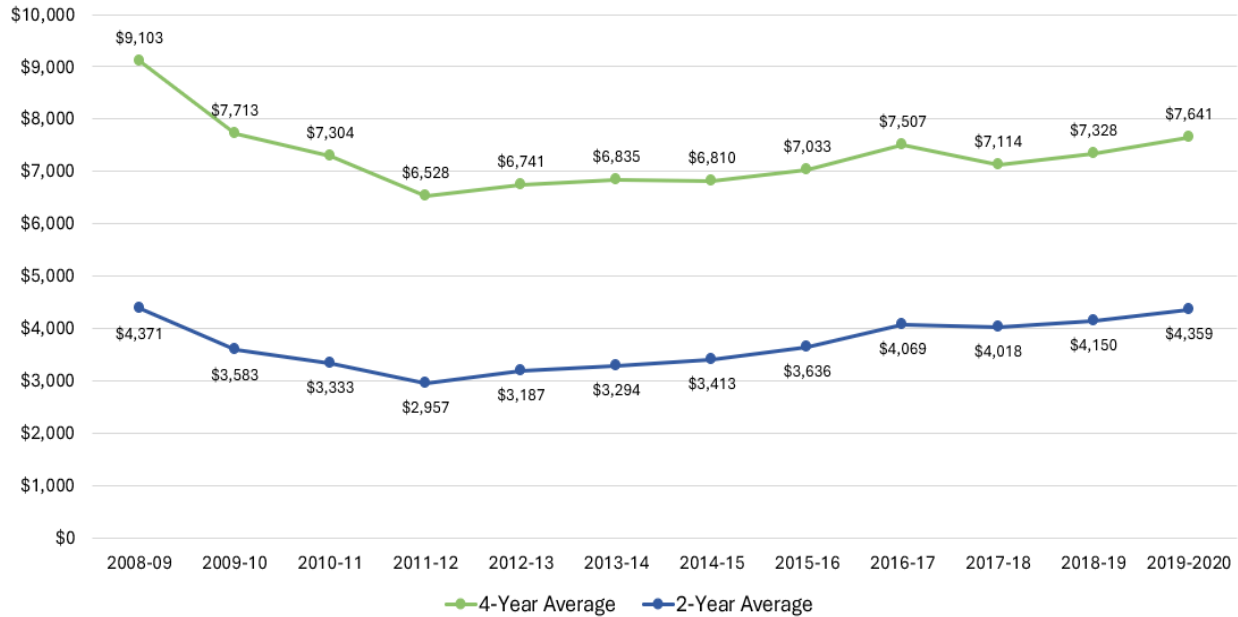
Source: SCHEV

Virginia institutions have been subject to volatility in funding in recent years. New money provided by the General Assembly and supported by federal stimulus funding has helped Virginia’s institutions weather the pandemic. As welcome as this infusion of funding has been, Virginia’s institutions (not unlike others elsewhere) have experienced funding inconsistency from one year to the next over the past decade, making it challenging to predict support levels and to plan effectively. In the wake of the Great Recession, state GF support per in-state-student dropped from \$9,103 in FY2009 across the public four-years and \$4,371 in the two-year sector to respective low points of \$6,528 and \$2,957 in FY2012 (Figure 15, adjusted for inflation). Thereafter the institutions collectively saw gradual improvements through FY2017, which resumed after a one-year dip in FY2018. Due to a combination of state budget increases and declining enrollment in the two-year sector, per student funding in the two-year sector has recovered to pre-Recession levels, but remains 16 percent below pre-Recession levels in the four-year sector.

This overall pattern obscures substantial variation, with total general fund support per in-state student ranging from \$14,792 at UVA-Wise to \$4,324 at VCCS in FY2020 (Figure 16) and non-general fund appropriations ranging even more widely, from \$23,460 at UVA to \$4,644 at RBC (Figure 17). Altogether, total educational appropriations from the General Fund and Non-General Fund sources ranged from \$28,843 at UVA to \$9,543 at VCCS (Figure 18). Institutional

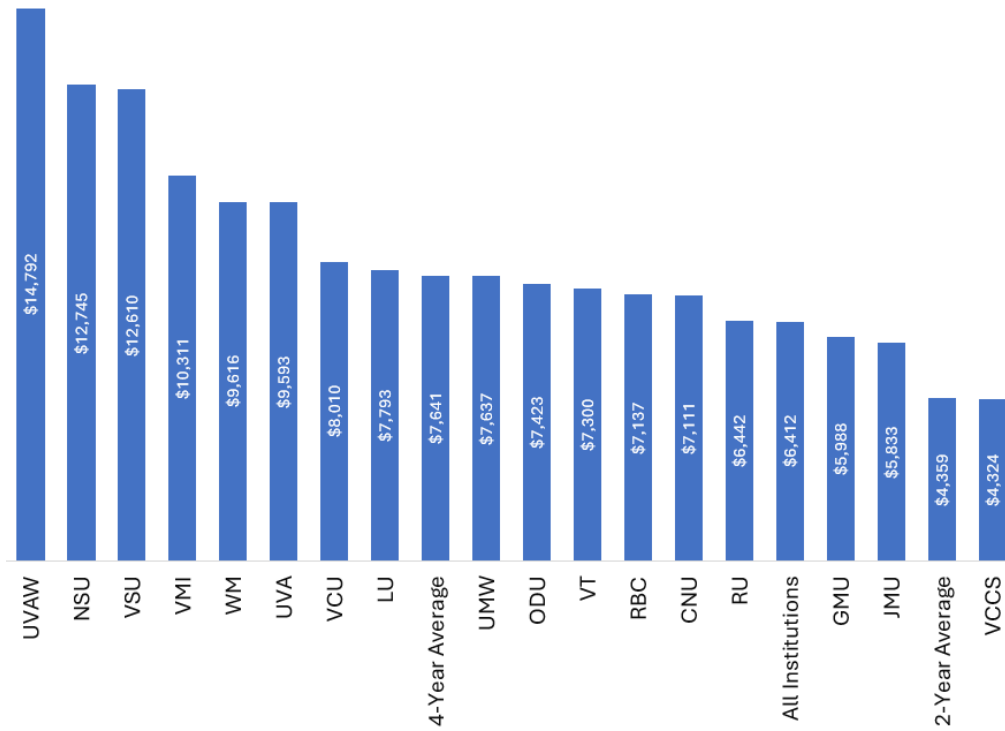
experiences in the dozen years between the Great Recession and FY2020 were quite different, with wide variation in the degree to which they had to deal with swings in general fund support (Figure 19, which orders the institutions by the percent change over the entire period).

Figure 15. E&G General Fund Appropriations per In-State FTE, FY2009-20



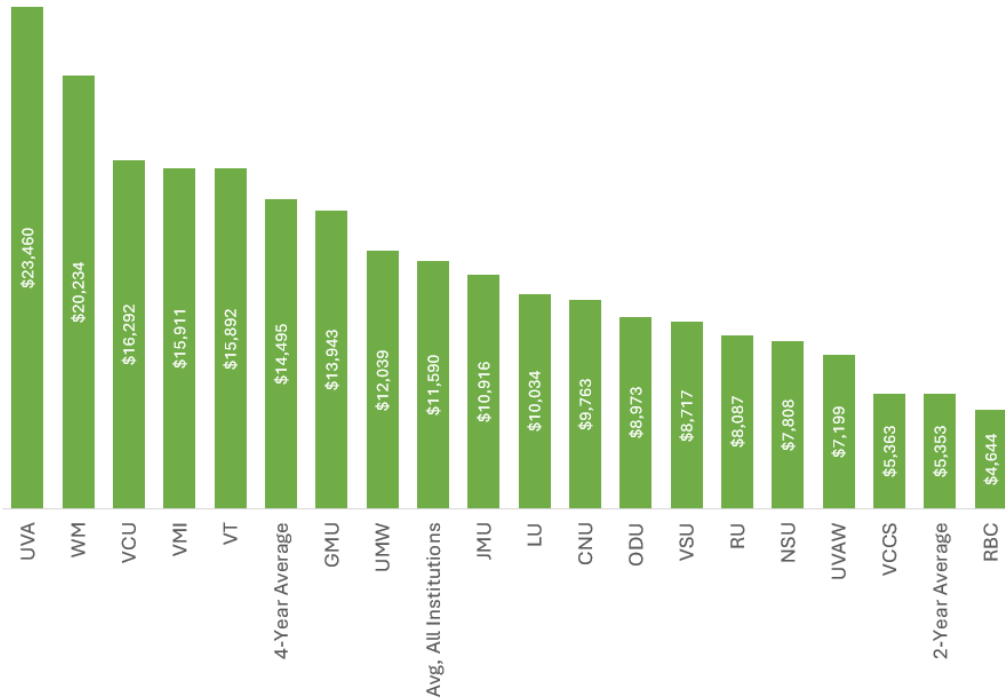
Note: Adjusted for inflation using CPI-U and expressed in 2020 dollars.
Source: SCHEV

Figure 16. E&G General Fund Appropriations per In-State FTE, FY2020



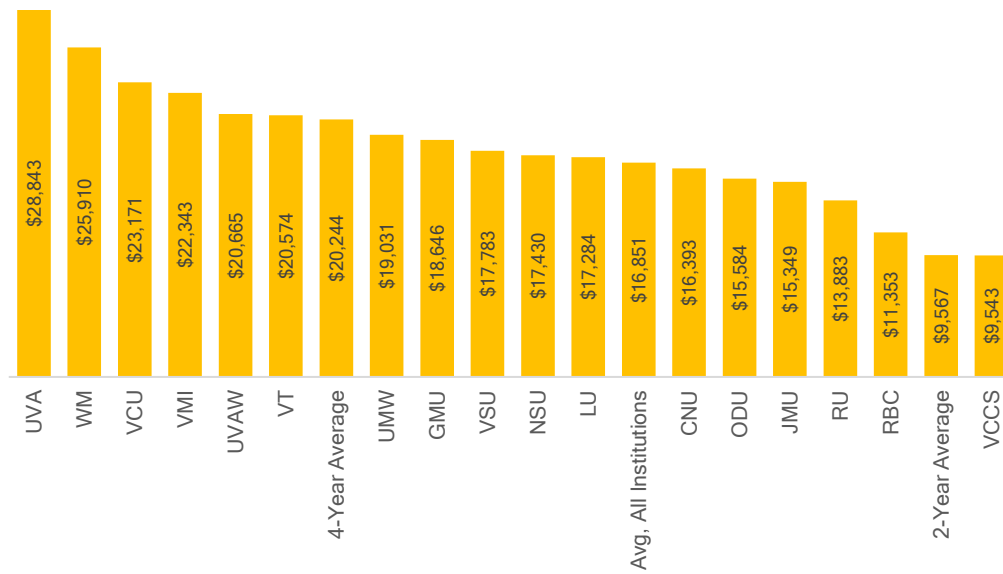
Source: SCHEV

Figure 17. E&G Non-General Fund Appropriations per FTE, FY2020



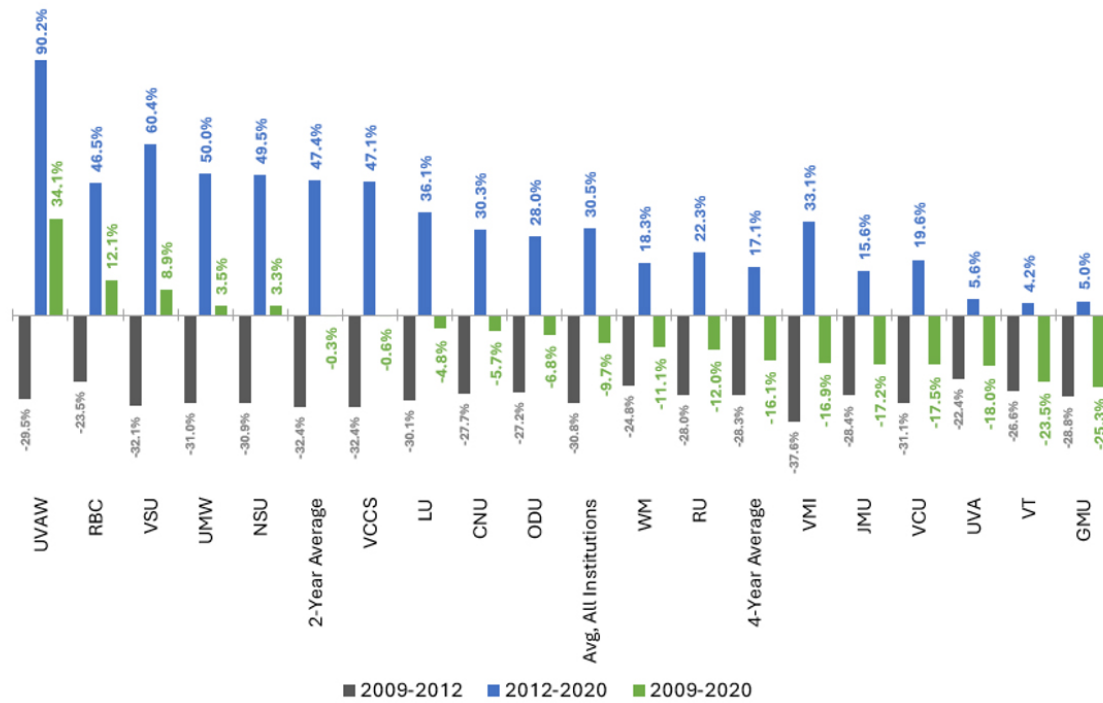
Source: SCHEV

Figure 18. Total E&G (GF & NGF) Appropriations per FTE, FY2020



Note: The data in this figure will not equal the amounts in the previous two figures due to a difference in denominators.
 Source: SCHEV.

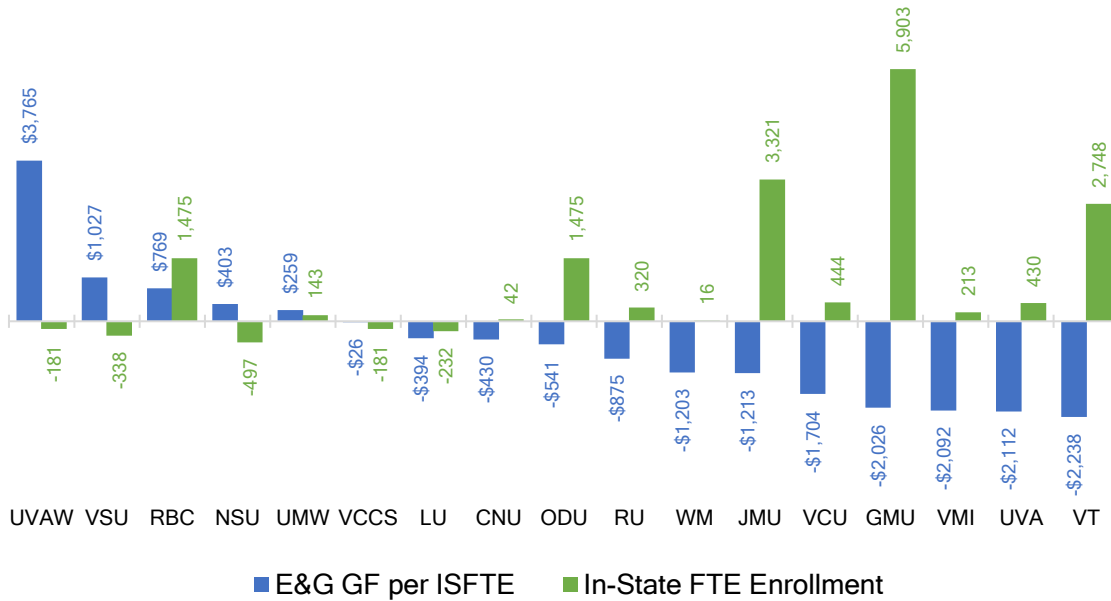
Figure 19. Percent Change in E&G General Fund Appropriations per FTE



Note: Figures are adjusted for inflation using CPI-U.
Source: SCHEV

A more detailed review of how enrollment and funding changed across institutions over this timeframe highlights inconsistencies that raise questions about how well served Virginia has been by its approach to allocating resources to institutions. For example, changes in enrollments that have not been matched by changes in general fund support have meant that three of the five institutions with more per-student funding in FY2020 than they had in FY2009 all experienced decreases in in-state enrollments over the same period, while several of the institutions that were more successful at growing their enrollment of in-state students were among those that saw their general fund support drop the most (Figure 20). If funding is intended to follow in-state students, these would not be the expected patterns.

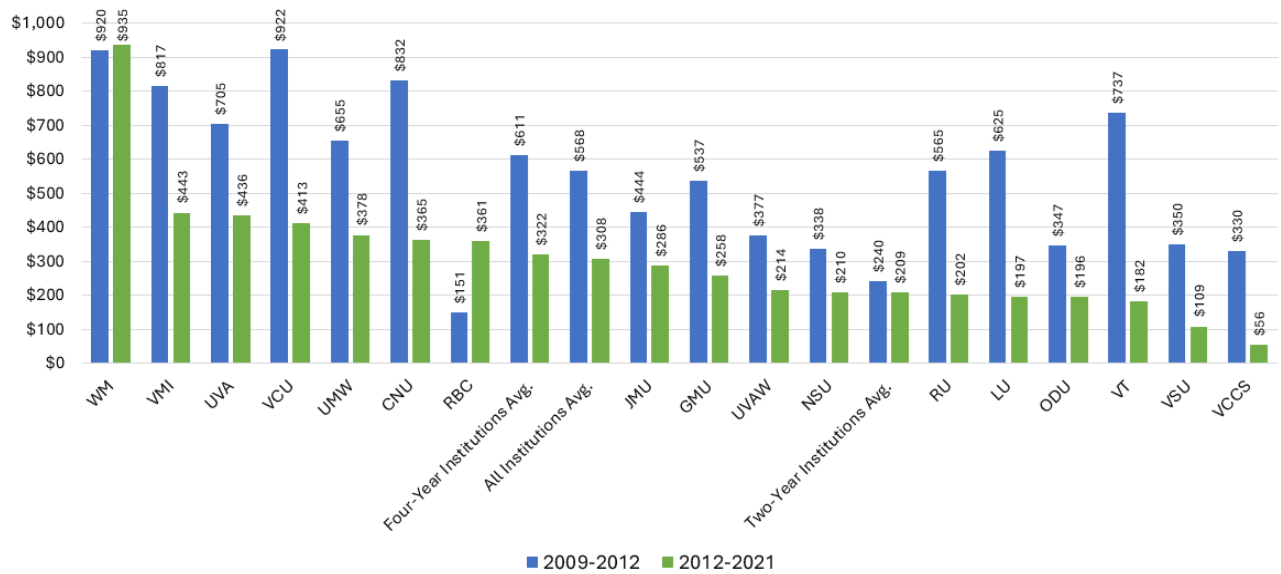
Figure 20. Change in E&G GF per ISFTE Funding & In-State FTE Enrollment, 2008-09 to 2019-20



Note: Figures are adjusted for inflation using CPI-U.
Source: SCHEV

Meanwhile, as was the pattern in other states, institutions sought to make up for declines in general fund support that accompanied the 2008 recession by rapidly increasing tuition revenue, and then easing off increases in prices as the economy improved and state funding support started to recover (Figure 21). This practice led to a statewide increase between FY2009 and FY2020 of over \$5,000 per student in tuition and fee revenue in the four-year sector (adjusted for inflation but not discounting revenue that ultimately was spent on institutional financial aid). Institutions' ability to effectively raise tuition revenue in Virginia is very uneven, however. The statewide increase in the two-year sector less than \$1,500. Variation in the relative reliance of institutions on state funding versus tuition revenue is illustrated by Figure 22, which is ordered by the change in per-student total revenue from tuition and fees and E&G General Fund appropriations (it also focuses on the change between FY2014 and FY2020 since data are more complete on institutional aid funding for that period). It shows how much some institutions such as William and Mary, the University of Virginia, and Virginia Tech came to rely increasingly on tuition and fees support relative to what they received directly from the state. Others, such as Mary Washington, VSU, and VCCS, became relatively more dependent on state support.

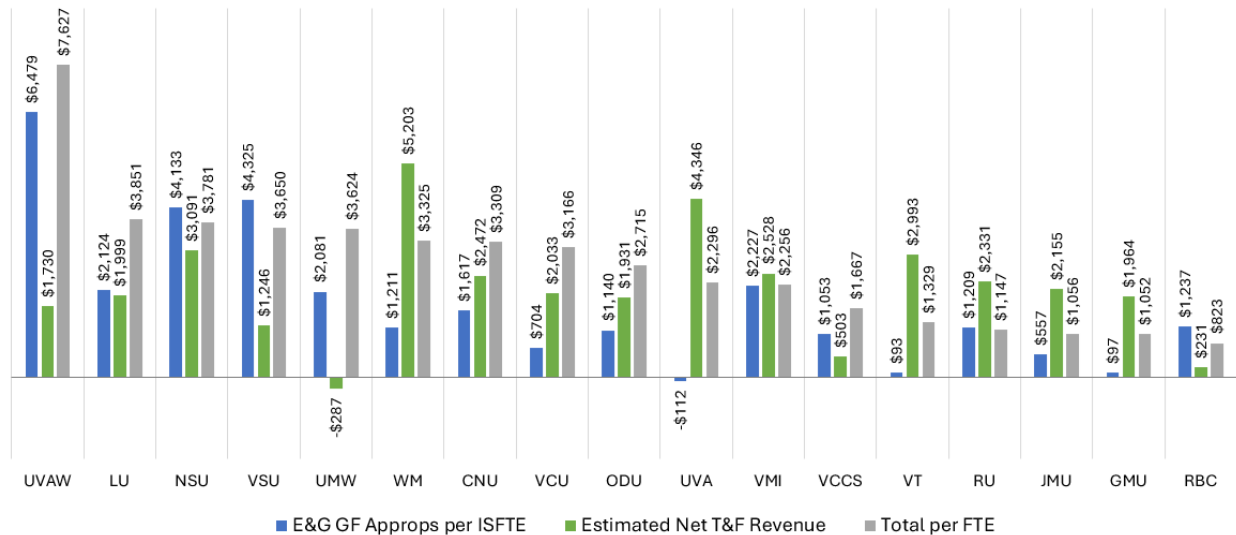
Figure 21. Average Annual Change in In-State Undergraduate Mandatory T&F Prices, 2009-2012 and 2012-2021 (2020 Dollars)



Note: W&M implemented a fixed four-year undergraduate tuition plan in FY2013, which means its figures for 2012-2021 are a mix of an annual rate and a four-year rate.

Source: SCHEV

Figure 22. Change in Revenue per Student, FY2014-2020



Note: Adjusted for inflation using CPI-U and expressed in 2020 dollars. These figures include T&F revenue that is ultimately used for financial aid, for which data were unavailable prior to FY2014.

Source: SCHEV estimates reported by institutions.

These different patterns of revenue collection have important implications for the design of a state funding model that satisfactorily assures adequate support for institutions of all types. It may be unreasonable to assume that these past trends can carry on indefinitely into the future.

For example, institutions that have increased tuition substantially—even if significant proportions of the revenue generated from those increases were used to provide financial aid to students with financial need—may be at the point where the market will no longer allow further increases of this magnitude. It is nevertheless the case that institutions are in quite different positions relative to their ability to absorb cuts in state funding and to prosper in an increasingly competitive landscape for prospective students.⁹

Benchmarking Analyses

A significant portion of the preliminary report was devoted to describing the aggregated finances of Virginia’s public institutions in reference to comparison groups selected for each institution based on characteristics such as size, mission, program array, and research activity. SCHEV maintains an approved peer group for each institution, but these groups are not routinely updated, and they include diverse sets of public and private institutions with widely varying business models, revenue streams, program arrays, and, ultimately, cost structures. Despite these inconsistencies, the purpose of these approved peer groups has been to benchmark faculty salaries as an indicator of the levels of relative funding of Virginia’s institutions.

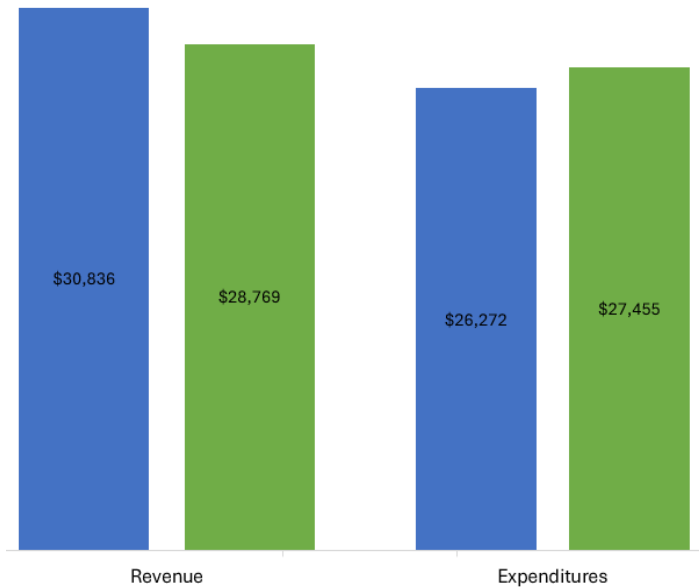
Notwithstanding this historic use of peers, the new funding model does not use peers to arrive at recommended levels of support to be provided to each public institution. However, NCHEMS developed a set of peers for each institution that could be used for benchmarking revenue and expenditure levels, as well as other indicators of performance such as degree and certificate production, student outcomes, and affordability. Details concerning the process utilized for the peer groups can be found in the preliminary report.

Out of a concern expressed by SCHEV and the working groups that the original groups selected by NCHEMS consisted of too few institutions, NCHEMS revisited the peer groups in preparing this final report. The added institutions made no difference in the overall statewide findings. Where meaningful differences in the group mean and median per-student funding and expenditure levels for individual Virginia institutions existed, they tended to be lower for the expanded group than for NCHEMS’ original selections.

Collectively, Virginia’s four-year institutions collected more E&G revenue but reported lower E&G expenditures on a per-student basis than the aggregated group average (Figure 23). This comparison is more striking when revenue and expenditures are broken down into their components. On the revenue side (Figure 24 [Error! Reference source not found.](#)), Virginia’s institutions, in aggregate, generated more revenue from tuition than the average of their comparison groups, and received slightly less from state appropriations.

⁹ Western Interstate Commission for Higher Education (2020). *Knocking at the College Door: Projections of High School Graduates Through 2037*. (Boulder, CO: Author). Retrieved January 15, 2021 from <https://knocking.wiche.edu/report/>. Grawe, N. (2018). *Demographics and the Demand for Higher Education*. (Baltimore, MD: Johns Hopkins University Press).

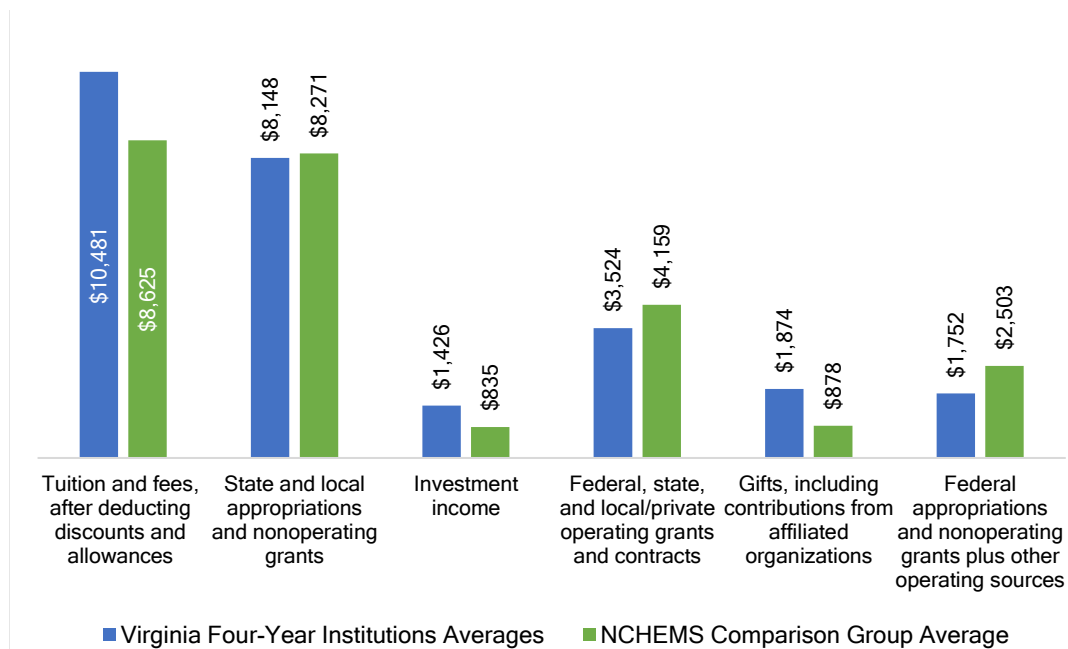
Figure 23. E&G Revenue and Expenditures per Student, FY2019



Notes: Revenue is calculated as total revenue minus revenue from hospital operations, independent operations, and auxiliaries. Expenditures exclude spending on hospital, independent operations, and auxiliaries. Data for the comparison group is the average of the average for each group.

Source: IPEDS

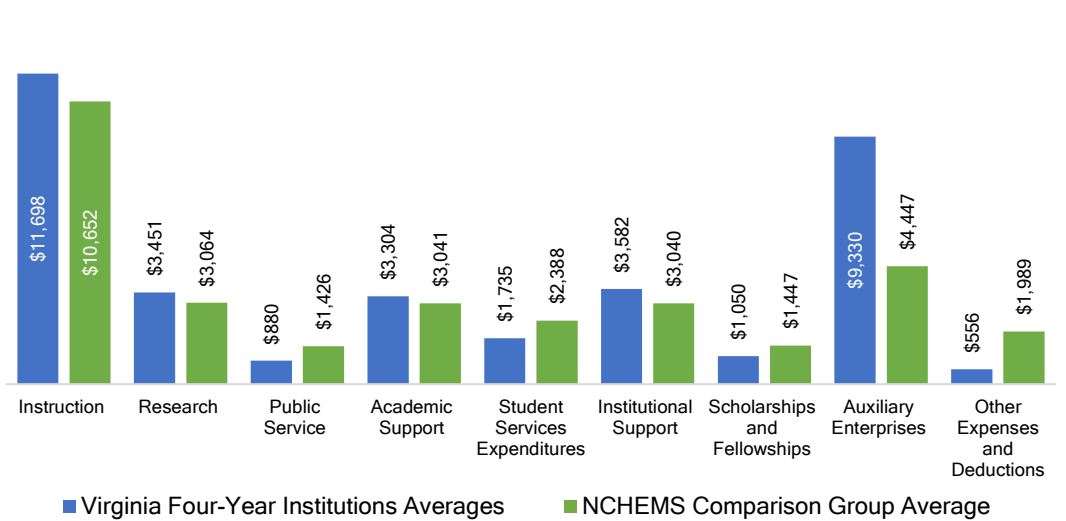
Figure 24. Revenue per FTE by Source, FY2019



Source: IPEDS

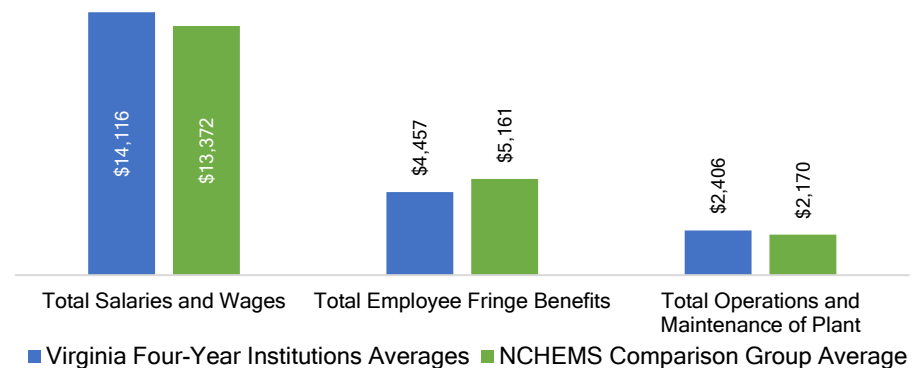
More interesting is the extent to which the groups differ in spending patterns, since the spending levels are not as inextricably tied to the institutions' governance arrangements as revenues are. Figure 25 [Error! Reference source not found.](#) breaks expenditures down by functional classification, while Figure 26 shows them by natural classification. Both charts show that Virginia institutions spend slightly more than their aggregated peer group average. Exceptions are for spending on auxiliary services—an outlier that deserves some additional attention—and on fringe benefits. It is not immediately obvious why spending on auxiliary services among Virginia's institutions is so high relative to other institutions. One possible explanation is that the differences are due to uncommon practices in how auxiliary spending is accounted for and reported in Virginia. Another is that Virginia's four-year institutions may tend to house students in campus-owned facilities at higher rates than similar institutions elsewhere. While these data suggest that there may be savings to be found by reducing auxiliary spending, additional research and analysis are needed to determine what is reasonable and possible.

Figure 25. Expenditures per FTE by Functional Category, FY2019



Source: IPEDS

Figure 26. Total and Selected Natural Expenditures per FTE, FY2019



Source: IPEDS

Recommendations for a new funding model

Principles

An early focus of the project was the development of a set of guiding principles that could provide a solid foundation for the new model by reflecting and transmitting the values and priorities that lie at the heart of the effort. Drawing on multiple conversations with key agency and institutional leaders, including SCHEV and other critical executive branch agencies, staff at the legislature's money committees, institutional presidents, members of SCHEV's Finance Advisory Council (FAC), and other stakeholders, and on NCHEMS' decades-long experience working on postsecondary finance in other states, NCHEMS prepared a set of principles that were thoroughly vetted and ultimately adopted. The principles presented below are a high-level expression of the criteria that governed the design and development of underlying conceptual framework, the funding model itself, and the selection of the parameters that yield the recommended distribution of resources to Virginia's public institutions.

Design Principles

1. **Students first.** Virginia's funding policy should put the highest priority on the needs of students and the Commonwealth.
2. **Pathways to Opportunity: Equitable, Affordable, Transformative.** The model should reinforce the goals articulated in SCHEV's strategic plan, *Pathways to Opportunity: the Virginia Plan for Higher Education*:
 - a. Equitable. Closing gaps in both access and success.
 - b. Affordable to students while maintaining effectiveness of institutions
 - c. Transformative—Increase social, cultural, and economic well-being of individuals and communities of the Commonwealth and its regions.
3. **Capitalize on institutional diversity and particular strengths.** The model should recognize different institutional missions (and the costs associated with those missions) as reflected in:
 - a. Levels and disciplines of program offerings
 - b. Characteristics of students served, particularly those students who must be served if equity gaps are to be closed.
 - c. Special features of the institution, e.g., Land-Grant status, military programs, health science programs, research missions and expectations, and HBCU status.
 - d. Appropriate expectations and incentives, e.g., for VCCS and RBC, the model should recognize and reward successful transfer to a four-year institution in addition to completion of a program of study.

Since the mission components of program offerings and characteristics of students served are common to all institutions, these factors should be incorporated as inherent features of the model. Special features of institutions need not be incorporated—they may be handled through separate appropriation processes.

4. **Foster alignment among critical state finance policies.** The model must recognize the important relationships between the state’s appropriations to institutions, tuition policies and the revenue consequences of those policies, and student financial aid policies and practices.
5. **Consider all facets of the state’s funding responsibility.** The state must allocate its resources in ways that assures funding to each institution at a level adequate for preserving its value as a state asset and sufficient for its capacity to fulfill its mission and continuously seek improvements in operating efficiency and quality, while maintaining “affordability” to students.
6. **Strategic investments in institutional improvements.** In addition to the funding formula(s), there should be a provision for state investments in institutional changes and improvements. This feature is necessary to create capacity that allows individual institutions to better serve their missions and enhance their abilities to serve the needs of the Commonwealth and its citizens. These state investments should not be considered as part of any institution’s “base” funding in subsequent years.
7. **Clear and purposeful incentives and expectations.** The model should provide incentives for institutions to contribute to both the economic development and the workforce development needs of the Commonwealth. while advancing the goals of the Virginia Plan These incentives should reinforce institutional efforts to address the educational needs of traditionally underserved student populations and to commercialize research.
8. **Foster institutional flexibility and innovation.** The model should not be constructed in a way that it constrains the institutions’ abilities to decide HOW allocated funds are to be utilized (i.e., not dictate assignments of funding to specific internal budgetary categories).
9. **Institutional contexts.** The model should yield “equitable” funding levels in relation to institutions’ respective needs, which vary based on mission, student characteristics, and other unique features.
10. **Community colleges.** The funding model will recognize the authority of the Virginia Community College System to allocate funding to its constituent campuses in whatever manner the System elects to use. Therefore, the model will use these same principles in allocating funding to the VCCS as a single entity.
11. **The model should:**
 - a. **Be transparent**—the incorporated calculations are clear and yield predictable results. The model is not a “black box.”
 - b. **Be explainable** to policymakers, institutions, and others. Taxpayers should be able to discern clear linkages between state priorities and how funds are allocated to institutions.
 - c. **Incorporate both General Fund and Non-General Fund revenues** in a manner that acknowledges differing institutional capacities to raise revenue from diverse

- sources, as well as the shared commitment between the Commonwealth, its institutions, and students (and their families) in paying for the costs of education.
- d. **Be actionable.** It should provide guidance to the legislature to commit funding in specific directions, both when additional resources are available and when economic conditions and state budget challenges may require that strategic cuts be made to institutional funding. Identify both ideal and realistic targets applicable to all for the model to allow for full funding in the short term of at least realistic targets thereby enhancing model credibility and importance.
 - e. **Minimize administrative burden** by relying on readily accessible metrics that are used for other purposes (where possible).
 - f. **Enable reasonably accurate forecasts** of anticipated state funding based on known metric changes.

Implementation Principles

1. Any new funding model should be phased in over a period of 3-5 years so that no institution is subjected to a significant decrease in state funding nor benefits from a larger increase in state funding than it can effectively manage. In short, there should be both stop-loss and stop-gain features to the implementation.
2. A robust, deliberate, and well-documented process for gathering, reviewing, and inputting data into the model(s) should exist. The data collection and review process should be completed sufficiently rapidly that the model results are contemporaneous with institutional policies, practices, and planning activities.
3. The new model should be utilized in both good times and bad—it should be utilized both when distributing new funds and when allocating budget cuts.
4. Implementation of the model should not abrogate the authorities and responsibilities of institutions and their Boards of Visitors regarding their role in establishing tuition and fee schedules. This does not mean, however, that the model should not take cognizance of the revenues raised from these sources in determining allocations of state funds to institutions. Nor does it mean that institutions should not be held accountable for their shared roles (along with state and federal governments and students themselves) in assuring affordability for students.
5. Any model(s) should be reviewed/evaluated on a regular basis, and any changes that result from those evaluations should be phased in according to a similar manner as the initial implementation so that institutions have a reasonable opportunity to adjust to new or revised incentives. SCHEV and the legislature should resist the urge to make significant changes to the model(s) in the interim between the reviews.

After considerable discussion and revisions, this set of principles was generally adopted by key stakeholders, including OpSix and FAC-8. They were subsequently used to shape the conceptual framework, to identify data and metrics for use in creating a new funding model, and to reconcile differing perspectives about the model design and features.

Conceptual Framework

Building from the principles, NCHEMS developed a conceptual framework to be used as a roadmap for developing a revised funding formula and operationalizing it.¹⁰ It is common for postsecondary institutions' costs to be expressed in terms of total expenditures or as a subset of those focused on instructional costs, such as "education and general expenses." The conceptual framework that will inform revisions to the funding model complement these more common perspectives with a new lens for looking at institutional funding requirements, particularly by adding a focus on the costs that comprise the most basic level of operational support an institution needs just to exist. Once that basic (and frugal) level of institutional funding adequacy is determined, the model progressively incorporates estimates of the expenses required to deliver programs of varying costs to student populations with varying needs, to incentivize continuous improvement, to invest in new capacity, and to produce specified non-instructional goods and services. Figure 27 **Error! Reference source not found.** presents a partial diagram of the full conceptual framework that focuses on categories of operational financial needs of public postsecondary institutions.¹¹ These categories are (starting at the bottom of the diagram):

- Foundational – expenses that are associated with employing senior institutional leaders and with performing core functions related to governance, information technology, audit/accounting and other compliance-related activities, human resources, etc.
- Maintenance/renewal – expenses necessary to ensure that institutional assets are appropriately tended, including physical facilities, equipment needs, curricular relevancy, and human resources, as well as necessary planning activities to ensure the institution maintains its ability to serve its mission and to prevent any further depreciation of an important state asset.
- Scope – expenses related to the breadth of the array of academic programs, recognizing differences in funding levels required for programs with different costs of delivery.
- Scale – expenses related to the size of the enterprise. More students require more classes, faculty/staff, support services, equipment, etc.

¹⁰ In the preliminary report, NCHEMS described two additional conceptual frames that would inform the project. The first emphasized the need for finance policy to be developed in a way that ensures that all three major financing levers—appropriations, tuition, and state financial aid—be working in alignment with state goals. The second advanced a standard for assessing affordability by setting a reasonable and measurable expectation for student self-support and using it to inform policymakers about how resource allocation policies contribute to varying levels of affordability for different student populations. The third framework advances a standard for calculating a frugal level of institutional funding requirements is analogous to the way a standard for affordability sits at the heart of the second conceptual framework.

¹¹ NCHEMS initially developed this framework for a paper presented as part of SHEEO's Public Investment in Higher Education: Research, Strategies, and Policy Implications series, which can be found at <https://sheeo.org/project/public-investment-in-higher-education-research-strategies-and-policy-implications/>. It has been adapted to fit the specific contexts and conditions in Virginia.

- Audience – expenses related to serving different populations of students whose needs for support services vary by type and magnitude.
- Performance/Incentives – expenses associated with efforts to stimulate continuous improvement in institutional performance according to a set of established priorities and the infrastructure to sustain a culture of innovation and reliance on high-quality data.
- Capacity building – start-up expenses necessary to add new programs, implement new interventions intended to yield more effectiveness, scale best practices, etc.
- Purchase of goods and services – expenses associated with distinctive mission-specific costs such as the pursuit of activities related to unique statewide academic programs, research, Land Grant and other public service activities, and other activities that serve specific state needs.
- Externally funded research and public service – expenses associated with carrying out grant and contract-funded activities that are neither institutionally funded nor funded by the Commonwealth of Virginia.
- Other – expenses associated with all other functions, including advancement, auxiliaries, athletics, and other independent operations, etc.

Figure 27. Taxonomy of Institutional Expenditures

	Other
	Externally Funded Research and Public Service
	Purchase of Goods and Services
	Capacity Building
	Performance / Incentives
	Audience
	Scale & Scope
	Preventative maintenance as applied to facilities, technology, and personnel
	"Frugal" foundational funding

Figure 28 builds on the earlier diagram by adding detail that describe how this framework provides a rational design for a revised funding model for Virginia. It includes:

- A description of functions and roles associated with each spending category, along with (in some cases) the data needed to estimate related costs

- Specifications for whether the expenses captured within the categories are largely fixed costs, variable costs, or incentive funding tied to state or institutional priorities. The fixed and variable costs together comprise a cost model that NCHEMS has designed for use in estimating the annual operational expenses for each institution to deliver instruction across its array of programs to its mix of students with their varying characteristics related to race/ethnicity, income, prior academic preparation, age, etc.
- Assignments for what (or who) bears the responsibility for funding each of the categories.

Finally, the diagram identifies how the cost model plus a portion of the investments in state and institutional priorities together comprise the proposed revised funding model for Virginia. As shown, the funding model does not include all of the latter since the level of support for these activities will be determined by the governor and legislature as part of each biennial budget. Nor does the funding model cover expenses for externally funded and self-funded activities.

Figure 28. Institutional Funding Adequacy Framework

			Category	Function and Roles		
			Other	Advancement, auxiliaries, athletics, etc.		
			Externally Funded Research and Public Service	Grants management, community engagement, museums, arts, extension services		
Funding Model	Incentive Funding Tied to State Goals & to Six-Year Plans			Purchase of Goods and Services	Funding for specific purposes, e.g., research on tobacco usage in Southwest Virginia, incentives to seed and support shared academic program delivery, noncredit offerings	
				Capacity Building	Funding needed to start new programs or fund initiatives prioritized by the General Assembly, the Governor's office, or through the 6-year plan process	
				Performance / Incentives	Factors in the model that recognize: activities related to strategic plan, closing equity gaps, economic development	
				Audience	Semester credit hours (SCH) weighted by student characteristic(s) or added weights applied to headcount	
	Cost Model	Variable Costs			Scale & Scope	Semester credit hours (SCH) weighted by level and discipline
					Preventative maintenance as applied to facilities, technology, and personnel	Shares of facilities replacement value of facilities, technology value, payroll (for professional development)
		Fixed Costs			"Frugal" foundational funding	Benchmarked against similar institutions with relatively low spending on administrative expenses

An important purpose of the institutional adequacy framework is to help policymakers better understand the links between institutional costs and funding requirements. It suggests that there is a minimal amount of expense that is exclusively the state’s obligation to cover—that which is necessary to preserve the institution’s value as a state asset. This level is represented in the diagram by the Foundational and Maintenance/Renewal categories (the two categories in blue). The dark blue Foundational funding component refers to the expenses necessary to operate the core administrative functions at a frugal level. The light blue Maintenance/Renewal category reflects the funded needed not to make improvements in the institution’s conditions; using deferred maintenance as an example, it is not intended to make progress on retiring an institution’s backlog of deferred maintenance. Rather, it is the funding necessary to keep the deferred maintenance backlog from getting any worse. Likewise, there are expenses associated with ensuring that equipment is repaired or replaced on an appropriate schedule. And for higher education institutions in particular, in which institutional assets include the curriculum and tenured faculty members have a working lifespan of a length not dissimilar from a building, it is appropriate to ensure that there is sufficient funding for curricula revision and professional development to maintain the value of those assets.

This minimal level of funding represents what is necessary to maintain the institution’s value as a delivery site to student populations and communities that, in its absence, could not be served effectively (or possibly at all). In fact, these two categories are conceptualized as the funding support that is necessary simply to open an institution’s doors; even if no students go through those doors, the institution incurs unavoidable costs just to prevent deterioration of the physical facilities, secure the campus and make it safe, and conduct routine administrative tasks such as purchasing, human resources, and fiscal affairs.¹² In other words, these “frugal” costs are the level of funding sufficient to support each public institution’s preservation as a state asset. In this view, a public institution does not need to enroll any students at all, or conduct any research, and it will still accrue costs that the state as the owner cannot avoid.¹³ These are costs that properly fall under the exclusive responsibility of the state to support. They are especially important to recognize for smaller institutions with less capacity to spread their fixed costs over more students and benefit from economies of scale. No tuition or other revenue should be expected to bear the burden of these “value preservation” costs. Tuition revenue should be reserved to pay for instructional costs—those that are reflected in the Scale, Scope, and Audience categories—and to support other operational costs associated with organizational capacity and enhancement.

This conceptualization is also intended to inform strategic discussions about the balance of revenue sources of different institutions appropriate to their varied missions and the characteristics of their student bodies. For example, institutions face different conditions in their respective markets, leaving some more vulnerable than others to proportional cuts in state spending. Although it can be difficult to draw a bright line between these categories in accounting data, to the degree that data are available and sufficiently accurate to measure these categories, then the framework also provides quantitative guidance for allocating funding to institutions. Supplementing these frameworks is the expectation that Virginia’s public institutions will contribute to state goals and student achievement by striving for increased operational efficiency, especially related to the foundational costs, and by increasing degree and certificate productivity rates.

Thus, application of this conceptual framework leads to a funding model that is comprised of components that account for the actual costs of institutions and a component that is designed to

¹² These funding requirements are akin to those facing state parks as described in Koch and Prescott (2021), which highlights unavoidable funding requirements exist for parks even when there are no fee-paying visitors, such as those necessary for patrolling and rescue, insurance, compliance with environmental regulations, etc.

¹³ In some states that are facing bleak projected demographic and fiscal futures, there have been active discussions about whether the state may be overinvested in public higher education and might consider closing institutions as a way to make financial ends meet. Yet a decision to divest itself of an asset like a public institution inevitably imposes substantial direct costs on the state in the short term—costs that are rarely fully understood or acknowledged—even if divestment eliminates these liabilities over the longer term. Such a decision also creates permanent indirect costs to the affected communities and student populations. (Vermont’s recent experiences are germane here, as described in the Final Report of the Select Committee on the Future of Public Higher Education in Vermont at <https://ljfo.vermont.gov/assets/Uploads/c2ef482057/Final-Report-of-the-Select-Committee-on-the-Future-of-Public-Higher-Education-in-Vermont-Submitted.pdf>.)

incentivize institutions to link their activities and investments to the achievement of state goals. The cost component is constructed using the best available information about actual institutional costs from Virginia’s public institutions and in comparison to others around the nation, rather than starting from total state appropriations and allocating proportions of that amount to the various institutions. Even if the results yield a total funding level in excess of what can be supported through state funding and tuition revenue, the model will provide actionable insights about how best to ration limited state funding.

Additionally, the conceptual framework recognizes that the political leadership of the Commonwealth will reserve for itself the prerogative to make specific investments in postsecondary education outside of what the funding model estimates is required for supporting the public institutions. The framework creates space for these investments in two ways: investments in added capacity and investments in services.

Investments in added capacity are intended to build institutional capacity to better meet clearly defined state needs in priority areas. Such investments may be directed to one or more specific institutions—for instance, to assign an institution the task of developing a new program in cybersecurity to meet the growing workforce need for skilled talent in that area. These investments may or may not address particular institutional priorities as expressed in institutional six-year plans. These capacity-building investments are intended to be non-recurring; it may require multiple years of funding to get a new program off the ground, and there should be an understanding when the initial investment is made about how long it will last and according to what timeline it will gradually diminish and disappear. As the new capacity develops and comes online, the results should be observable in the scale, scope, and audience components of the cost model. Returning to the cybersecurity example, as students are recruited and enroll in the new program, their activity will be recorded in their attempted SCHs, and the associated costs funded like any other established program. In other words, with respect to investing in capacity, the state is not expected to fund the related activity outside of the funding model in perpetuity.

Investments in added capacity include seeding collaborations among multiple institutions. As described in the section on efficiency and effectiveness, Virginia could use some funding support to stimulate collaborations that show promise for creating efficiencies that spread across multiple institutions (and possibly beyond higher education itself) or by ensuring that academic programs are more widely available without requiring individual institutions to set up new programs where the demand is likely to be more sporadic or where the associated costs are simply too great. As collaborations become more established and entrenched within participating institutions’ operations, the state can look for new investments. However, there may be cases where there is an ongoing need to sustain worthy collaborative activity, as noted in the “purchase of services” description that follows.

A second set of payments to be made by the legislature occur when one or more institutions is effectively a preferred vendor for a product or service that it is specially equipped to provide. These purchases of goods and services may or may not be a source of recurring funds to the individual institutions, but there is not the same expectation that the investments will generate

new capacity that can gradually be reflected in the funding model. Among the activities that fall into this category are:

- State-funded research activity (distinct from research activity funded by other partners including the federal government).
- State-funded public service activity, e.g., Virginia Tech’s ongoing involvement in documenting and addressing tobacco usage in Southwest Virginia.
- Regional economic development or other civic initiatives.
- Academic programs that are not captured in the scale, scope, and audience calculations (programs in first-professional health care fields may qualify)
- Non-credit programming.
- Additional funding support to support the growth of awards in specific programs of demonstrated workforce demand (such as the existing Tech Talent program).
- Funding that is necessary to support collaborative activity across multiple institutions that a) would not occur in its absence and b) has the effect of promoting greater operational efficiency across the group of participating institution or supports academic programming to reach specific populations or meet a clear state or regional need. In such cases, the “service” to be purchased is effectively a market failure.

Building the Funding Model

Using the institutional funding adequacy conceptual framework as a guide, the next step was to deploy data in developing the calculations for the separate components of the model—the colorful building blocks in Figure 28. This section will briefly address each component. While the design features and their translation into the model’s parameters are the result of substantial analysis and review, at this point they are not the result of a consensus among various stakeholders, including institutional finance officers and representatives of the executive and legislative branches. Rather, the following is provided as a basis from which to continue a dialogue with these stakeholders that will eventually yield the set to be employed in operationalizing the new funding model.

It is important to note that this modeling exercise was iterative. NCHEMS created an initial simulation and populated it with data acquired from SCHEV and from national sources for use in estimating the value of each of the building blocks for each institution. NCHEMS incorporated multiple approaches for estimating these different elements. Each of the key factors could be adjusted in real time and the simulation would produce new results. Once a working simulation was ready, SCHEV carefully reviewed it to ensure that it was functioning correctly, the best available data were being employed, and the data themselves were accurate. Next, NCHEMS and SCHEV demonstrated the simulation for the full FAC, OpSix, and other key stakeholder groups during NCHEMS’ visit to Richmond in April. To keep discussions focused on design of the model and its functioning, the simulation was presented to the finance officers without

institutionally specific data. This was done to better ensure that feedback would address the fit of the conceptual framework and the manner in which the simulation effectively operationalized and reflected decisions tentatively or fully reached by that point, rather than risking the possibility that the finance officers would focus on what the results meant for their respective institutions and give feedback on that basis. With this additional input, NCHEMS made additional revisions to the model, developed a set of preferred parameters, and shared these results with SCHEV.

What follows is a straightforward explanation for how NCHEMS and SCHEV operationalized the various components of the conceptual framework, after which the preferred set of parameters are presented with a brief discussion of the reasoning behind each choice. More detailed explanations of the calculations are available in Appendix E. Model Parameter Calculations

The Frugal “Base”

First, a reminder that “base” in this component refers just to the minimal and mostly mission-agnostic costs of preserving the institution as a state asset—the “opening the doors” costs—not as the word “base” is routinely used in finance policy to cover all the necessary costs of serving an institution’s particular mission. This reminder is useful since Virginia’s “base adequacy” formula attempts to do the latter.

It is not possible to perfectly isolate the base costs from the costs associated with size and the complexity of an institution as reflected by mission and program mix. Notwithstanding the inherent challenges of making this distinction, other states have recognized the need to direct funding to public institutions that accounts for differences in economies of scale. For example, in Oregon’s funding model, \$2.9 million is allocated to each public institution to cover a portion of the core administrative expenses necessary to operate an institution. Institutions with fewer than 1,400 students receive an additional payment that is progressively greater the smaller they are. Pennsylvania also incorporates estimates of base costs roughly similar in intent.

A final determination for the most appropriate calculation is still to be made after further consultation with OpSix and the institutions. NCHEMS and SCHEV evaluated several methods for calculating the frugal foundational base. These are more carefully described in Appendix E.

Model Parameter Calculations, which provides details on the options and discusses their relative merits and shortcomings. Ultimately, makes the case that the most appropriate approach is to employ a deliberately simple regression of institutional enrollment on institutional support expenditures by sector (public research, public comprehensive four-year institutions, and public two-year institutions). The results of this bivariate regression provided estimates of administrative costs required even before students are enrolled, plus the additional costs of administration that accrue on a per-student basis.¹⁴ Because it is in the public interest for

¹⁴ The regression’s y-intercept is conceptually the cost of administration necessary even when no students are enrolled, while the coefficient on the independent variable gives the per-student costs of

Virginia's institutions to strive to be more efficient than the average of public institutions nationally, both values should be reduced to approximate an appropriately frugal level of funding need for administrative operations before calculating the level required for each of Virginia's institutions.

Preserving the value of the institutional assets also requires funding to maintain the value of the campus, equipment, and other assets like the curriculum. Data to operationalize estimates for these funding needs were provided by Virginia's Cardinal system and followed industry recommendations such as setting aside a portion of the replacement value of E&G-related facilities, a portion of the value of depreciable equipment, and a portion of the wages paid out to full-time faculty, staff and classified employees (excluding benefits, teaching assistants, adjunct faculty, etc.).

Scale and Scope

The next element in the funding model is to account for the actual instructional costs at Virginia's public institutions. Two primary factors drive these costs: enrollment levels (scale) and variation in the cost of delivery of programs (scope). The model incorporates these costs with attempted SCHs as the core data, a method similar to those in use in other states with formula funding approaches. SCHs produced by discipline and level that are already collected by SCHEV. The model then averages those SCHs over the most recent three years and aggregates them into disciplinary clusters based on similarities in the costs of instructional delivery. Next, the model relies on an estimate for a base cost per SCH. Typically, this base cost is set equal to the measured cost of delivering a credit hour in a lower-division course that is pedagogically straightforward in that it does not require labs or small group discussions. That is, it is relatively inexpensive to offer. Often it is a course like Psychology 101. In general, analyses of the cost of this type of SCH finds that it falls within a relatively narrow range of between \$200 and \$215 at public four-year institutions. Variation can be observed across different institutions and institution types in these costs due to relatively higher faculty salaries at some institutions, but such differences are not exclusively the state's responsibility to support with funding.

To address the cost differences by disciplinary cluster, a schedule assigns a relative weight to each SCH produced in each cluster at each level, starting with a weight of 1 being assigned to the discipline-level combination that determined the base cost per SCH. More expensive combinations of discipline and level are assigned more weight. This weighting schedule draws on research and analyses on differences in disciplinary costs that have been conducted by states and independent organizations.¹⁵ Because states with these cost-based formulas tend to

administration. Additionally, the funding model treats institutions with fewer than 1,800 FTE as equivalent to having 1,800 students. This level is adjustable in the simulation, and it effectively serves to define a minimum frugal cost for small institutions that have less capacity to achieve scale economies.

¹⁵ Basu Conger, S., Bell, A., & Stanley, J. (2010). *Four-State Cost Study*. Boulder, CO: SHEEO. Retrieved May 28, 2022 from <https://files.eric.ed.gov/fulltext/ED540266.pdf>. Texas Higher Education Coordinating Board. *Expenditure Study*, <https://www.highered.texas.gov/institutional-resources-programs/funding->

fund first-professional programs in health care fields separately, there is less reliable information about the proper weight to assign to SCHs in those programs. To address this uncertainty, NCHEMS constructed the model so that those SCHs could be extracted from the analysis and funding provided separately, similar to the way other states have treated those programs.

Ultimately, Virginia should continue to seek consensus for the final selection of a weighting scheme for its funding model. Experience in other states suggests that the result will likely be better described as a workable compromise rather than a consensus, and that it will also reflect a mix of empirical evidence on actual cost variations and policy priorities. The influence of policy priorities may be seen in adjustments to the weights for undergraduate versus graduate programs, a slight boost to those for programs leading to occupations in high demand versus other programs, or by simply reducing the recognized per SCH cost in order to encourage institutions to seek efficiencies.

Audience

Instructional costs also vary based on the characteristics of the students being served. Students with poorer academic preparation, less income, fewer role models with prior postsecondary education experiences of their own, less family and community support, and more complex life responsibilities such as having a full-time job or dependents require more academic and other supports to be successful. As a result, serving them effectively simply costs more. Worth noting is that these additional costs are not adequately addressed through performance or incentive funding provisions alone. Those provisions in performance funding are crucial if they are to avoid creating perverse incentives and to drive improvements. But a sustained commitment to funding the added costs of service to those students is needed as well. The model reflects these additional costs by assigning additional weight based on the number of students at each institution who are Pell recipients or are members of underrepresented populations.

Incentive Funding

Moving beyond the components that are intended to address the operational costs of Virginia's public institutions, the funding model next includes provisions for a portion of the overall state appropriation to be allocated based on institutional contributions to state priorities. These priorities, reflected in the Virginia Plan, include improvements in student success and degree and certificate production; maintaining or improving affordability; reducing and eliminating gaps in educational access and achievement for Virginia residents of different race/ethnicities, income levels, and ages; and driving economic development. SCHEV should continue to develop the specific measures and values in this component of the funding model, drawing on effective practices and policy features in use in other states. Ideally, this should be done with

[facilities/formula-funding/expenditure-study/](#). Oregon Administrative Rules Database. Oregon Higher Education Coordinating Commission Chapter 715 Division 13. <https://secure.sos.state.or.us/oard>. Illinois Board of Higher Education (2019). *2017-18 Academic Discipline Unit Cost Study, 2017-18 Comparative Cost Study*. Retrieved March 10, 2022 from https://www.ibhe.org/assets/files/FY18_Cost_Study_Final_crd_revisions.pdf. Louisiana Board of Regents (2020). *Funding Formula Process Manual*. Retrieved March 10, 2022 from <https://regents.la.gov/wp-content/uploads/2021/08/Funding-Formula-Process-Manual-Revised-Apr-2020.pdf>.

some urgency so as to have a complete model ready for the next biennial budget, or as soon as possible. Among effective practices to be incorporated in this component are:

- That the total funding amount set aside for allocation based on incentives should be sufficiently large to garner attention from institutions.
- Ensuring that metrics are few in number, straightforward, and transparent.
- Additional weights for hard-to-serve populations are incorporated to ensure that perverse incentives are not created by the funding model (e.g., institutions choosing not to admit harder-to-serve students in order to improve performance on completion metrics).

Capacity-Building

The simulation treats this pool as a discretionary percentage of funding taken off the top of the total state appropriation to public higher education institutions.

Purchase of Goods and Services

The simulation incorporates actual amounts budgeted for research, public service, and non-credit programming documented by the Department of Planning and Budget by subtracting them from the General Fund and Non-general Fund appropriations to create adjusted totals for each pool.

Model Parameters

Ultimately, it is necessary to convert the conceptual framework into a set of calculations that will produce recommended funding levels for each of Virginia’s institutions. This requires making selections for the values to be employed for each of the model’s parameters. To generate an initial set of those parameters, NCHEMS and SCHEV used the simulation tool to develop a preferred set for use in operationalizing the funding model. These preferences are expressed in Figure 29, along with a specific value or range of values and a short explanation for the reasoning behind the selections. As previously noted, these parameters are the result of substantial analysis and review. But more engagement with institutional finance officers and legislative and executive branch staff is needed before sufficient consensus on these specific selections exists for implementation. At any rate, the preferred set is useful as essential fuel for a needed discussion among key stakeholders.

Figure 29. Initial Preferred Model Parameters

Component	Parameter	Value / Range	Justification
Frugal Base	Benchmark	Institutional Support & Academic Support	Institutional support and the instructional share of academic support provide the closest approximation of the expenditures addressed in the frugal base. Student services and instruction are expenses that are both better addressed through the Scale, Scope, and Audience component of the model. Using national data for public institutions

Component	Parameter	Value / Range	Justification
			provides assurance that the resulting base calculations are linked to real, external data.
	Minimum FTEs	1,800-2,000	Institutions should be provided base funding that is at least equivalent to an institution that is sufficiently large to generate some modest economies of scale.
	Frugal Cost at 0 FTEs	67%	This amount is roughly equivalent to the y-intercept for the 40 th percentile of public institutions nationally, which provides an appropriately frugal estimate for the costs of core administrative functions linked to the broad public institutional sector. Frugal base funding for each VCCS institution is calculated and then aggregated to the systemwide total.
	Share of Coefficient	30%	Reducing the slope of the coefficient linked to enrollment on the bivariate regression ensures that funding support targets remain frugal. There are several reasons why a large reduction is appropriate, including: <ul style="list-style-type: none"> • Institutional support costs are relatively impervious to enrollment, though not perfectly. Adding more students at some point does require additional counselors, space requirements, specialists in human resources, information technology, etc., But such costs should be spread efficiently over more students. Research on institutional economies of scale (Toutkousian) do show this occurs across total expenditures. • IPEDS institutional support data definition is not precise about the administrative costs of instruction, but rather costs are mingled with the administrative structure required for research, public service, and other activities that are part of institutional missions. Reducing the coefficient in the frugal base calculation is another way to better ensure that the institutional administrative costs that are being recognized are more focused on instruction. • The “heavy lifting” related to the costs of enrolling more students is done by the Scale, Scope, and Audience component.
Asset Maintenance & Renewal	Campus and Facilities	10% of Virginia O&M	Borrowing from effective practices in other states, the preferred calculation would be to use a proportion—roughly 2 percent—of the total replacement value of the E&G buildings (excluding auxiliaries) and grounds that make up Virginia’s public institutions’ campuses. But Virginia lacks a comprehensive measure of replacement value. The best alternative is to use a proportion of the reported spending on Operations and Maintenance of physical facilities as provided by SCHEV from Cardinal data.

Component	Parameter	Value / Range	Justification
	Equipment	Higher Education Equipment Trust Fund	Virginia’s approach to financing equipment purchases with bond funding creates a challenge for incorporating a Virginia-specific estimate of the costs of maintaining equipment, and the institutions are justifiably reluctant to see the HEETF program potentially put at risk if accounting for the operational costs of equipment renewal is formalized through a separate, but potentially less secure, funding stream (e.g., direct appropriations that are subject to fluctuations in state budget conditions). The best alternative with available data is to use the amounts provided by the state for HEETF funding. HEETF funding does not cover the institutions’ full costs for replacing and repairing equipment, but much of the remaining costs can reasonably be assumed to be covered by the Scale and Scope components of the model and shared with students. Because the HEETF funds are not included in GF E&G appropriations, it is necessary to also add these amounts to the adjusted revenue for each institution. Doing so zeroes out the impact of this component of the model. It would be preferable to have a better measure of the true costs for equipment associated with core administrative operations, but the other obvious source—IPEDS—fails to include a specific expenditure category for equipment. Its closest alternative is depreciation, but these data are subject to variation based on state and institutional practices and accounting judgments and valuations, and they comingle the depreciation of facilities and equipment. Additional analysis of CARDINAL data may permit a more specific estimate of the renewal costs of equipment needed for the administrative core.
	Personnel	1.5-2%	This amount follows industry standards in budgeting for the retention and renewal of an organization’s personnel. Industry standards typically call for 2-3 percent of total salaries to be set aside for this purpose. Some portion of the costs of professional development should be considered as part of the frugal base—at least that share that is related to the personnel executing core administrative functions—while another portion will be paid for with tuition revenue in some combination with state funding to better reflect the reality that more students require more faculty and staff who, in turn, require more professional development. But in an education setting, a college’s curriculum itself is an asset that requires continual renewal, updating, and tuning to better meet society’s needs and technological advancements. The state’s responsibility for

Component	Parameter	Value / Range	Justification
			ensuring adequate support for public higher education extends to preserving and maintaining that asset. The approach best able to account for the costs related to the renewal of the curriculum is to set aside a relatively higher amount for professional development expenditures for faculty and staff, as their knowledge, skills, and abilities are tightly coupled with curriculum quality and with student success.
Model Specifications	Overall or by Sector	Sector	Using sector differentiates several elements of unique costs for four- and two-year institutions.
	Overall or Residents Only	All Students	While Virginia maintains a policy specifying that out-of-state students should pay at least 100% of their educational costs, the cost model will work more effectively when the educational costs of ALL students are included. For example, if out-of-state students are disproportionately likely to enroll in higher-cost classes, excluding them with this parameter will distort a picture of the full costs of operating the institution. It is also worth noting that this calculation contributes to the “cost model” portion of the conceptual framework, so it would be unwise to exclude a substantial portion of the real costs institutions are facing. This specification applies to the calculation of the frugal base and to the scale, scope, and audience components of the model. Ensuring that non-residents pay their full costs can be better addressed in the cost-share element of the model.
Investment in Capacity-Building	Holdback for Capacity-Building	0-15%	The share of the funding taken off the top of Virginia’s total appropriation should be relatively small—even zero under conditions of severe funding shortfall. In more normal times, the legislature has every right, and even an obligation, to identify priorities for funding new capacity. Such investments should not come at the expense of introducing disruptive levels of volatility and unpredictability in the funding model that make it more difficult for institutions to effectively plan, adjust to changing conditions, and sustain investments in activities that are proving to be successful.
Scale, Scope & Audience	SCH Weighting Pkg	Primarily drawn on Nevada’s schedule and adapted for Virginia.	In most programmatic areas at the undergraduate level, variation in the weighting schemes is relatively minimal. Where variation is greatest is in vocationally oriented programs especially at the post-baccalaureate level. Nevada’s approach to setting discipline and level weights has the advantage of relying on a multi-state analysis of instructional costs. It also differentiates its weights based on whether they are produced at its public two-year or public four-year institutions. Other

Component	Parameter	Value / Range	Justification
			states' weighting schedules are less preferred for various reasons. For example, Texas's weights have the benefit of being empirically derived based on an annual cost study, although there is no weighting for first-professional medical, dental, and pharmaceutical SCHs. But its schedule is heavily influenced by the high proportion of research universities in that state, and the range is extremely wide for some pre-professional graduate programs. Virginia's weights are conversions from its student-faculty ratio methodology and are accordingly overly narrow—they do a poor job of capturing real variation across levels and disciplines, at least in comparison to other states' schemes.
	Discipline-Level Weights	D-L Only	This is a more straightforward way to estimate costs of delivering a credit hour for different disciplines and levels without further complicating the weighting with additional weights for student characteristics. Providing for the additional costs of serving students of different populations effectively is also more straightforward if those added weights are not linked to the discipline and level weights. (Note that using the D-L Only weights means there will not be the need to specify per SCH supplemental weights for Pell or URM students.)
	Source of SCH Cost	TX Minus Institutional Support Expenditures	Most of the options here yield per SCH costs that hover in the \$200-\$215 range for four-year institutions and somewhat less for two-year institutions. Virginia's per SCH costs are less preferable because they are based on revenue, not actual expenditures.
	URM HC Weight	\$300-\$500 for each headcount student	Students from under-represented racial/ethnic backgrounds also typically require additional supports, and those supports are not all the same as those that a low-income student might require. Virginia should ensure that effective student supports exist for students of all backgrounds, as provided for by the Virginia Plan. A weight for URM in addition to one for Pell recipients is critical since racial/ethnic minorities, especially at community colleges, tend to enroll at less-than-half-time intensity, which makes them ineligible for a Pell Grant, and they apply for financial aid at lower rates for other reasons.
	Pell HC Weight	\$300-\$500 for each headcount student.	Low-income students require additional funding and student services supports to be successful regardless of their major, degree level, or attendance intensity.
	Health Care First Professional Programs	1 st Prof Base Adequacy	The evidence base for determining appropriate weights for delivering SCHs in medical and dental education, pharmacy, and related first-professional fields is not as robust as the weights for other

Component	Parameter	Value / Range	Justification
			<p>combinations of discipline and level. This approach mirrors those taken by states like Texas and Oregon that fund their medical schools through a separate mechanism and uses each of the institution's estimated total GF and NGF revenue in lieu of any SCH-based calculation for credits in those programs.</p>
<p>Cost-Sharing Targets</p>		<p>Highly Selective National Research Universities (UVA, VMI, VT, W&M) – 30%</p> <p>Other Research and Comprehensive Universities (CNU, GMU, JMU, LU, ODU, RU, UMW, VCU) – 40%</p> <p>HBCUs, Predominately Rural-Serving, and Two-Year Institutions (NSU, RBC, UVAW, VSU, VCCS) – 50%</p>	<p>This approach to cost-sharing is revised in two ways:</p> <ol style="list-style-type: none"> 1. It applies only to the costs calculated for the SSA component. One hundred percent of the frugal base costs is the obligation of the state to preserve the value of the institution as a state/public asset. (This means that the state portion of the cost-sharing target for all costs calculated by the model will be greater than these targeted levels.) 2. Cost-sharing targets should vary by institution or institution type to reflect the very different capacity to generate revenue from non-state sources, especially tuition. Institutions that are open access (and expected to grow to meet demand) and serve relatively larger shares of low-income, less academically prepared students and adults should have a larger share of their operational costs covered by the state than institutions that are more selective, can charge relatively higher tuition prices, and attract substantial numbers of non-residents. A differentiated set of cost-sharing targets accomplishes that and reflects the reality. <p>The proposed set of preferred differentiated targets roughly reflects variation in the institutions' reliance on state funding vs. tuition revenue and is also closely aligned with institutional type, e.g., selective research universities are given the same targets. The exception is the relatively high target for the state funding obligation for Virginia's two public HBCUs. This target range is similar to where their funding comes from currently, but it also is justified as a way to help overcome historic disparities in funding. (See the table in Appendix E. Model Parameter Calculations for comparisons using two data sources on variation in Virginia's public institutions' reliance on revenue from tuition vs. the state direct appropriations.)</p> <p>Moreover, in keeping with the principles, this approach tries to strike an appropriate balance between simplicity and complexity but grouping institutions and assigning the resulting groups the</p>

Component	Parameter	Value / Range	Justification
			same cost-sharing target. An alternatives worth consideration, at the cost of making the model more complicated, is to use more precise, institution-specific ratios of in- and out-of-state students.
Incentive Funding			Further discussion and modeling are needed before preferences/recommendations can be made.
Purchase of Goods and Services			Current amounts are drawn from actual E&G program budgets for Research, Public Service, and Non-credit instruction.

Recommendations

Virginia has a strong, vibrant public higher education infrastructure. Collectively, the institutions spur innovation and economic development, work to assure the Commonwealth’s workforce needs are appropriately met, and attract talent from elsewhere to settle in the state. They are clearly an integral part of the state’s strategy to retain its position as a national leader in economic prosperity and societal health. But they will struggle to continue to fulfill this duty without sufficient funding strategically allocated to them in concert with clear goals and in full awareness of the roles each institution plays individually and as part of a broader collective. Virginia’s approach to funding institutions is in need of a new model that restores rationality, coherence, and strategic alignment with the state’s goals, all of which have eroded since the last major revision to those policies. This report develops a conceptual framework that lays the foundation for an improved funding model that meets these criteria.

Based on the foregoing analysis of quantitative and qualitative data and drawing on good practices used by other states and adapted to fit the context in Virginia, this report makes the following recommendations.

1. **Adopt the conceptual framework and continue to refine the parameters and data sources for use in the model.** Virginia should make it a goal to allocate General Fund support to Virginia’s public institutions in accordance with the conceptual framework and funding model and with the recommendations for specific appropriations levels that SCHEV will make using the framework and the model. While additional work is needed to further refine the data sources and funding parameters, the conceptual framework that details a strategic approach to funding has general consensus among key stakeholder groups. NCHEMS provided parameters and an interactive model that are under review and should continue to be refined over the next six months. Further, the General Assembly should adopt a policy that appropriations made to individual institutions outside this funding model be limited to:
 - a. Investments in building capacity to achieve specific state goals. Such investments should be temporary (a period of no more than five years), a period sufficient to allow the newly developed capacity to be fully incorporated into the funding model.
 - b. Payments for specific goods and services.

- c. Funding to support multi-institutional collaborative activity.
2. **Adopt differential cost-sharing targets.** Virginia should adopt differential cost-sharing targets to aid in prioritizing the allocation of state support to public institutions in alignment with state goals and in recognition of the differences in mission. While Virginia’s current base adequacy model accounts for the mix of in-state and out-of-state students in assessing whether or not the state’s support level met the cost-sharing target, it does not have a formal method of determining an institution's ability to raise tuition and fees given the variation of income levels of in-state students. In addition, the Commonwealth should consider excluding the “frugal” base funding requirement from the cost-sharing calculation. This is justified for several reasons: first, the frugal base reflects the cost estimated for preserving the value of each institution as a state asset. Second, Virginia’s institutions are sufficiently attractive to students from other states and around the world that they are willing to pay the full costs of their own education. Finally, many of these non-residents remain in the state after graduation to contribute to Virginia’s workforce and economy.
3. **Implement an incentives and performance component of the conceptual framework that rewards institutions for making progress toward state goals.** Further development and testing of metrics for the incentives component of the framework are needed. Such a component should allocate sufficient funding to steer institutional decisions, yet limit competition among them that is not productive. The incentives and how achieving them translates into dollar amounts should also be transparent and predictable. A system based on fixed dollar amounts per point, paired with a thoughtful approach to making strategic adjustments when Virginia’s institutions collectively earn more funding than the legislature appropriated for the incentive funding pool and when they collectively earn less than that amount, can address these criteria. The design of the incentive component should consider the following:
 - a. Good practice in implementing performance funding policies is to ensure that the amount allocated for this purpose is sufficiently large (minimally 10 percent of total state funding, and the more metrics there are, the higher that percentage should be) to get institutions’ attention and shape their behavior in response to the performance incentives.¹⁶
 - b. Virginia should consider a design for incentive funding based on a fixed dollar per point, with points earned based on a few important measures linked to state goals, to determine the incentive funding dollars to be earned by each institution. Such an approach offers the best chance that the results of improvement are as fully paid for

¹⁶ Jones, D. (2016). *Outcomes-Based Funding: Taking Stock* (Indianapolis, IN: Complete College America). Retrieved May 29, 2022 from https://completecollege.org/wp-content/uploads/2017/09/OBF-Double-Sided-90-COPIES_JP.pdf. Snyder, M. Boelscher, S., & Zaragoza, D. (2021). *Driving Better Outcomes: Fiscal Year 2020 State Status & Typology Update*. (Austin, TX: HCM Strategists). Retrieved May 29, 2022 from <http://hcmstrategists.com/wp-content/uploads/2020/08/DRIVING-BETTER-Outcomes-Fiscal-Year-2020-State-Status-Typology-Update.pdf>.

as possible, thereby reducing unproductive competition among institutions that have tempered the effectiveness of performance funding policies in other states. Moreover, this approach makes the incentive component of the funding model consistent with the model's treatments of cost.¹⁷ The fixed amount can be established for the first years of implementation based on a sufficiently large pool of funding and a review of institutions' recent past performance against the metrics selected for use in allocating funding for incentives achievement. The resulting per point value should remain fixed for subsequent years and periodically be reviewed with stakeholders including institutions. This approach will help avoid encouraging competition among institutions over a too-small incentives pool.

- c. The fixed value for each point, along with the incentive metrics themselves, should be periodically reviewed as part of a regular formula review process.
- d. So that a design incorporating a fixed point value does not presume to function like an entitlement program, Virginia can make adjustments after the points are tabulated and the earned funding values determined. For example, when the total incentives earned do not equal the appropriated amount for incentive funding, the funding will need to be adjusted. To make adjustments, Virginia should allow for any excess incentive funding to roll into a durable fund that will function like an escrow account to be used to preserve the value of incentive points in this portion of the funding model. It should address shortfalls by incorporating a portion of the cost model in any proportional reductions that may be necessary. Ideally, the frugal base should not be included in these proportional reductions. This will result in a total amount of "earned" funding that grows and shrinks in subsequent years based on the accumulation of incentive points, rather than the approach most commonly taken of establishing the total value of the incentive funding pool and distributing it to institutions in proportion to their respective accumulation of performance points. The drawback of the latter approach is that it puts institutions directly in competition with one another in ways that serve as a barrier to collaboration. For example, institutions in states like Oregon argue that there is no benefit to serving students who transfer if the receiving institution is the one awarded for degrees conferred. It also routinely leads to circumstances in which institutions that show improvement in their performance nevertheless wind up with less performance funding due to relatively better performance of another institution. This makes an institution's funding at least partially dependent on the relative performance of other institutions, raising questions of fairness as well as predictability and transparency, and limiting their ability to plan effectively.

¹⁷ By way of example for how the initial fixed value of a point can be set: if the incentive pool is anticipated to be \$160,000,000 (or roughly 10 percent of the FY2020 total General Fund appropriation for E&G activities) and the total points earned by all the institutions combined equals 1,000, then the value for each point will be set at \$160,000. In subsequent years, each point earned by an institution for reaching incentives would continue to be worth \$160,000.

- e. This approach implies that the state will need to budget conservatively to provide a sufficiently large pool of incentive funding to cover substantial improvement among most if not all institutions. Any leftover “unearned” portion of that pool can be set aside to cushion impacts to higher education of funding cuts in difficult budget years. One option is to place these moneys in a durable fund that functions like an escrow account, to be used exclusively for higher education, as Alabama does and experts have recommended.¹⁸ When the funds available are not sufficient to fully fund the incentive pool, cuts to institutions should be made proportionally—including the scale, scope, and audience element of the cost model (but not the frugal base since that is exclusively the state’s responsibility to fund) in proportionately reducing allocations to each institution will blunt the degree to which the performance incentives are compromised.

Additionally, the Institutional Performance Standard (IPS) funding should also be re-evaluated for its impact and relevance, particularly for the six education-related measures. Once a more fully developed incentive model is ready, it is not logical to maintain the IPS process separately from the more robust and integrated approach to be built.

- a. Fold IPS funding into the incentive pool.
 - b. Determine which of historic metrics, if any, are to be maintained and incorporated into the incentive component.
 - c. Retain the IPS review process as a mechanism for accountability review and oversight of the institutions.
4. **Use the model to prioritize the funding components.** Ensure that funding needs related to the cost estimates (fixed and variable costs) and incentives and performance are met before allocating funds to new capacity building initiatives.
 5. **Adopt a phased-in approach to using the new funding model.** Too abrupt a change in institutional funding can be disruptive and counter-productive to the achievement of state goals. As Virginia shifts to a new funding model, it should take a deliberate approach over several years by implementing a stop/loss strategy in the transition. A stop/loss strategy means that the state will implement some limits on how much an institution’s budget can be affected during a transition to the new funding approach. Usually, such provisions include a specific schedule. For example, a stop/loss provision might specify that institutions will not be subjected to changes that exceed a percentage greater than plus or minus one percent in Year 1, plus or minus three percent in Year 2,

¹⁸ Alabama maintains two rainy day funds: one for general purposes and one exclusively for education. Bipartisan Policy Center (2020). *A New Course for Higher Education*. Retrieved May 29, 2022 from https://bipartisanpolicy.org/download/?file=/wp-content/uploads/2020/01/WEB_BPC_Higher_Education_Report_RV8.pdf. The Institute for Access and Success (2019). *Better Together: How a Reimagined Federal-State Partnership to Fund Public Higher Ed Could Help Bring College Within Reach for All*. Retrieved May 29, 2022 from <https://ticas.org/wp-content/uploads/2021/10/How-Congress-Can-Recession-Proof-Public-Higher-Education.pdf>.

and plus or minus five percent in Year 3. In Year 4, the new funding model would be fully implemented with no stop/loss in effect.

6. **Regularly review the funding model.** Ensure that the funding model is reviewed on a periodic basis—more regularly for technical issues and once every 8-10 years for adherence to policy priorities. This review may include a study aimed at generating Virginia-specific estimates of SCH costs and weights. However, any such study should be undertaken with clarity about how the anticipated benefits will justify the expenses associated with that analysis, particularly with an awareness of these caveats:
 - a. While having a solid empirical basis behind the funding model is essential, there will be pressure to adjust weights to reflect policy priorities and to resist the possibility that a detailed Virginia-specific cost study would serve to bake in the existing cost structures present at institutions, which could lead to perverse incentives and be a barrier to innovation.
 - b. It is not clear why the costs of instruction in any given discipline should vary widely across states. Even when variation is observable, there are many reasons for it that are difficult or impossible to observe, such as cost differences due to specialties within disciplines, mixes of disciplines within disciplinary clusters, and differences in delivery that have cost implications. Variation in cost of living or relative competition for talent in a given discipline are also potential causes, but it is unclear what a cost model should do about either of these. In any case, a funding model should not aim to be so precise in assessing costs that such considerations render it useless. Its calculations should be viewed as a guide for decision-making in allocating resources rather than a determinant of them. In sum, a Virginia-specific set of estimates would be helpful, but their absence should not raise questions about the legitimacy of the model since other states are able to generate reasonably similar cost estimates, especially for undergraduate education.
7. **Create and regularly convene a technical funding model workgroup.** SCHEV should convene a group aimed at ensuring that all institutions and their leaders have an in-house technical expert on how the funding model works, especially the formulas and simulation tools that support it, and so that there is a sense of shared ownership for the technical aspects of the model's implementation. The workgroup would focus on ensuring the accuracy of the model's underlying data, the data to employ for each of the model's components (highly technical questions such as how many years to average or how to adjust the model to account for disruptive events like COVID), the assumptions that need to be reassessed, how best to maximize its usability as a planning tool, etc. In addition to carrying out a quality assurance function alongside SCHEV staff, this workgroup would also serve as the core team to consider regular reviews. Participation in this group should be a value to the institutions, not just beholden to SCHEV to aid its work. A crucial task members of this group can perform is to advise institutional leaders by utilizing the funding model to anticipate the likely impact of their decisions as needed, as well as to help support the effort to provide guidance to SCHEV about the policy decisions embedded in the funding model. In keeping with this role, this group would be

distinct from the regular members of SCHEV's FAC. Instead, it should be comprised of members who are both technically capable and sufficiently senior to have their involvement and input valued by institutional leaders. Additionally, such a body would provide transparency into the workings of the model, at least to the institutions.

8. **Identify strategies to mitigate tuition and fee increases that may result from state supported salary increases or other state required mandates.** Due to the split funded approach to higher education costs where the state pays a portion of costs (roughly 50%, but varies by institution), state supported increases in salaries often result in an increase to tuition and fees. While investments in salaries are a shared interest of the state and the institution, strategies should be considered to mitigate the concerns related to tuition and fee growth when this occurs.
9. **Create incentives that encourage institutions to collaborate for greater efficiency in administrative services and in academic delivery.** Virginia's institutions are active in seeking ways to streamline their operations, but typically do so on their own. Major savings and reinvestment opportunities are available through collaborative activity, as demonstrated by the Virginia Higher Education Procurement Consortium (VHEPC) and the statewide library consortium (VIVA). Collaborations are difficult to implement and sustain, especially in academic delivery, but a compelling financial reason can induce participation by institutions on a voluntary basis. Funding that can seed and support the development of collaborative activities will likely be an investment strategy that states throughout the country will turn to more often, especially those seeking effective responses to converging enrollment and financial pressures. Efficiency gains to be derived from such efforts must be measured based on all the participating institutions and in terms of costs avoided by students and the state, and by the enhanced services collaboration can generate, rather than being viewed simply as benefits accruing to individual institutions.
10. **Monitor progress toward greater efficiency and effectiveness using straightforward metrics.** SCHEV should seek to more regularly measure institutions' individual and joint efforts to improve efficiency and effectiveness. These efforts should rely on existing data as much as possible so as to avoid adding reporting burdens to institutions. Even if these data are already reported to SCHEV, it remains valuable to gather data from IPEDS for benchmarking purposes. Metrics that are relatively straightforward to calculate include: state and tuition revenues per graduate, degrees relative to enrollment, and expenditures relative to enrollment.
11. **Revise the approved group of comparison institutions.** After completing a review of candidate institutions for comparison groups—NCHEMS provided an initial group of national comparative institutions and, following a request to add to the number of institutions in the groups, particularly for some of the institutions, a second group of comparison institutions. These groups are important for benchmarking Virginia institutions in terms of their finances and their student outcomes. NCHEMS selected the comparison groups based on similarities in the mission they serve expressed primarily in their program array, research activity, student characteristics, and size, as well as some

other important features (whether they operate a hospital, are a Land-Grant institution or HBCU, their geographic location, etc.). Notably, none of the selection criteria included data about their funding levels or student outcomes. The same groups should be used for all benchmarking analyses in order to avoid selecting institutions on the basis of the outcome they are examining. Details about the comparison groups and the process used to select them are provided in Appendix F. Comparison Groups. While NCHEMS' original comparison groups were named in the interim report, the expanded groups have not yet been shared with the institutions; there is a need to gather feedback from the institutions before they are finalized.

- 12. Develop an implementation plan to identify next steps and policy changes that need to occur to support the recommendations included in this report.** As noted, there are several elements of the model that need to be adopted by stakeholders to meet the requirements outlined in the budget language for this review. Revised comparison groups for each institution to be used for benchmarking and to assess the fitness of the funding model also need to be adopted, as are metrics for assessing institutional effectiveness and efficiency. SCHEV, in partnership with stakeholders, should develop a plan to continue this work and identify policy changes in code or budget language that need to be implemented to support these elements, with a target of completion by the 2023 General Assembly session.

Conclusion

This revised approach to paying for public institutions is an opportunity to uphold and extend Virginia's proud legacy of forward-thinking policies employing educational investments to drive economic prosperity and societal well-being. It promises to do this through the creation of a rational, conceptually sound approach to resource allocation in higher education. The resulting funding model equips Virginia's policymakers with a guide to making strategic investments in the state's public colleges and universities, restoring a capacity for evidence-based decisionmaking that had eroded over the past two decades.

Building on a coherent vision for the funding needs of public institutions, the model will better ensure that they have what they need to carry out their missions and pursue their goals within the context of the Commonwealth's strategic plan for higher education, a plan designed to ensure that Virginia stays at the vanguard in excellence in education that serves the needs of the state and its citizens. It aligns that plan with funding by:

- Creating a more stable and predictable fiscal backbone for core services.
- Recognizing and accounting for meaningful differences in institutional costs of delivery.
- Ensuring a focus on meeting the needs of targeted student populations.
- Putting resources that incentivize and reward institutions for improved productivity and student outcomes
- Prioritizing continuous improvement.
- Promoting and sustaining innovation and transformation.

Finally, the coherent conceptual framework at the heart of this funding model sets it apart and reestablishes Virginia's historic legacy as a leader in higher education and an example for other states to follow.

Appendix A. Appropriations Language Requiring the Cost and Funding Study

As reflected in Item 152 of HB 1800 from the 2021 legislative session, the General Assembly called for this cost and funding study. The specific language is excerpted below.

1. Out of this appropriation, \$300,000 the second year from the general fund is designated to support related costs of undertaking a review of higher education costs, funding needs, appropriations and efficiencies.
2. The State Council of Higher Education, in consultation with representatives from House Appropriations Committee, Senate Finance and Appropriations Committee, Department of Planning and Budget, Secretary of Finance, and Secretary of Education, as well as representatives of public higher education institutions, shall review methodologies to determine higher education costs, funding needs, and appropriations in Virginia. The review shall identify and recommend: (1) methods to determine appropriate costs, including a detailed cost analysis of Virginia institutions and peer institutions; (2) measures of efficiency and effectiveness, including identifying opportunities for mitigating costs, increasing financial efficiencies, and incorporating current best practices employed by Virginia institutions and other institutions, nationwide; (3) provisions for any new reporting requirements, including a possible periodic review of cost data and strategies employed to implement efficient and effective operational practices; (4) strategies to allocate limited public resources based on outcomes that align with state needs related to affordability, access, completion, and workforce alignment, and the impact on tuition and pricing; (5) the impact of funding on underrepresented student populations; and (6) a timeline for implementation.
3. The review shall build on existing efforts including the assessment of base adequacy, recommendations provided through the Strategic Finance Plan, and peer institution comparisons to determine if existing funding models should be updated or replaced. It shall also build on promising practices and include input from Virginia's institutions, policy makers, and other education experts. Any such review and assessment shall consider the mix of programs, mission, enrollment level, and other characteristics of Virginia's public institutions of higher education.
4. The Council shall submit a proposed workplan to the Joint Subcommittee on the Future Competitiveness of Higher Education in Virginia by August 15, 2021. The Council shall submit a preliminary report and any related recommendations to the Governor and the Chairs of the House Appropriations and Senate Finance and Appropriations Committees by December 1, 2021 with a final report by July 1, 2022.

Appendix B. Data and Methods

To address the requirements of the project, NCHEMS undertook extensive research and analysis in the following areas:

- Document review
- Surveys
- Data analysis
- Stakeholder engagement
- Analysis of other states' formulas
- Simulating the funding model

Document Review

Immediately upon project initiation, SCHEV began supplying NCHEMS with important documents, including internal and external reports, statutes, and other materials. Among these and other relevant reports gathered by NCHEMS were:

- Policies such as the cost-sharing policy.
- Materials describing the base adequacy formula calculations and their use.
- Relevant SCHEV publications such as the strategic plan and its reports on higher education funding, tuition and fees, and financial aid.
- Studies by JLARC addressing public institutional funding.
- Documents and analyses from previous proposals to revise Virginia's funding model, e.g., former Governor McDonnell's Commission on Higher Education Reform, Innovation, and Investment¹⁹ and the Higher Education Accountability Commission chaired by Linwood Rose that operated in 2011.
- Information collected in prior years by SCHEV about institutional initiatives undertaken to improve operating efficiency.
- Reports published by other organizations and media reports that address Virginia's funding approach, e.g., the Partnership for College Affordability and the Public Trust, Ed Reform Now.²⁰
- Publications and data produced by national organizations on state funding of public postsecondary education, e.g., the State Higher Education Executive Officers (SHEEO), HCM Strategists, and InformEd States.

¹⁹ <https://www.schev.edu/docs/default-source/institution-section/planning-and-performance/heoa-tj21/report-from-governor-s-commission-on-higher-education.pdf>

²⁰ Murphy, J., Dannenberg, M., & Riggins, K. (2021). *Higher Education School Finance Inequity and Inadequacy in Virginia* (Education Reform Now). <http://edreformnow.org/wp-content/uploads/2021/07/VA-Issue-Brief-Update-7.9.pdf>.

Surveys

NCHEMS also developed two survey instruments, as required by the project specifications. The first was developed to gather information about how states across the nation allocate state funding to public institutions. It was designed and fielded in partnership with the SHEEO membership association.

The second survey has been developed to gather information on the efforts Virginia institutions are making to improve operational efficiency and effectiveness. This survey was developed collaboratively with SCHEV and with FAC-8.

Data Analysis

To analyze current and historical funding patterns and spending levels at Virginia's institutions, and to assemble the information essential to developing the new funding model proposal, NCHEMS began gathering data from an array of sources. These sources and their expected uses are listed below:

- Virginia-specific data supplied by SCHEV. Even prior to project initiation, SCHEV anticipated many of the projects' data requirements and prepared a substantial dataset on institutional finances stretching back to FY2008, confirmed their data with the institutions, and provided the dataset to NCHEMS. In addition, NCHEMS developed a request for additional data from SCHEV covering:
 - Semester credit hour production by level and field for all students overall and disaggregated by residency, race/ethnicity, and Pell recipients.
 - Financial aid awards by income, race/ethnicity, and residency.
 - Course section sizes.
 - Detailed expenditure data from the state's accounting system (Cardinal).
- Integrated Postsecondary Education Data System (IPEDS).²¹ NCHEMS also gathered data from IPEDS for benchmarking Virginia institutions in comparison to similar institutions.
- Instructional cost data from various other states, used to create schedules of weights to apply to SCHs based on disciplinary cluster and level.

In organizing and analyzing these data, VCCS institutions—together with the VCCS system office—are treated as a single unit and their data are aggregated. NCHEMS and SCHEV agreed that presenting and using these data in this manner is appropriate given that state funding goes to VCCS as a single line item, and VCCS subsequently makes allocations to its individual institutions.

²¹ IPEDS is administered by the National Center for Education Statistics (NCES), the agency in the federal government tasked with keeping official education statistics. IPEDS is the primary federal data source on postsecondary education; multiple annual data submissions are required of institutions as a condition for participating in Title IV financial aid programs. Due to differences in definitions and in the timing of the collection of data, data provided by SCHEV and IPEDS data will differ.

Stakeholder Engagement and Project Communications

To ensure that the project deliverables are all adequately informed by the knowledge and perspectives of various stakeholders, and that those stakeholders are also kept abreast of project progress and develops, NCHEMS and SCHEV identified specific groups with whom to maintain regular communication and created opportunities for stakeholders to be engaged and to provide information and feedback. Two groups have been particularly helpful in providing guidance and feedback on the project as it has unfolded. The first of these is the OpSix workgroup, a leadership group composed of staff from the Secretary of Finance, the Secretary of Education, the Director of the Department of Planning and Budget, the Director of SCHEV, the Staff Director of the Senate Committee on Finance and Appropriations, and the Staff Director of the House Committee on Appropriations. NCHEMS and SCHEV have conducted biweekly project update conversations with OpSix members. The second is a sub-group of the Finance Advisory Council, labeled FAC-8, that has reviewed and commented on work products at each stage of development. In addition, there have been weekly meetings between NCHEMS and SCHEV staff.

In September, NCHEMS staff made a site visit to Richmond in order to meet with a wide cross-section of stakeholders, including:

- SCHEV leadership—its Executive Director, Chair, and Vice Chair—and senior staff
- OpSix members and their staff
- Members of SCHEV’s Finance Advisory Council (finance leaders at the institutions)
- External stakeholders with an interest in this project

In addition to these face-to-face meetings, a virtual meeting was conducted in which NCHEMS presented the project plan to institutional presidents and gathered their thoughts on the major issues the project should address.

There was a clear sequencing strategy employed throughout the project in which NCHEMS and SCHEV sought consensus and buy-in from stakeholder groups on the big picture questions at each stage prior to displaying the actual projected impact of decisions on funding allocations to individual institutions. This was done first through discussions about the project goals and the development of the guiding principles. With the principles in place, NCHEMS facilitated a discussion about the conceptual framework—an early version of which was included in NCHEMS’ proposal but many adaptations were necessary to fit it to the context in Virginia. Next, in starting to develop the heuristic simulation tool that would serve to operationalize the conceptual framework, NCHEMS sought information from SCHEV and stakeholders about the data to populate it. With the simulation developed, NCHEMS gathered feedback about the results it produced with hypothetical data before finalizing the model and developing recommendations.

Throughout the project, NCHEMS and SCHEV met at least weekly to discuss progress, share updates, address questions that arose, and plan and coordinate. Additionally, SCHEV and NCHEMS met virtually on a biweekly basis with OpSix and FAC-8. To focus the discussion at these meetings and move it forward along a logical path, each meeting had a specific agenda.

The FAC-8 meetings were supplemented with informal polls to help quickly gather feedback by identifying areas of broad consensus as well as areas where opinions diverged. The polls, which NCHEMS developed and SCHEV helped to refine, were fielded in the several days leading up to each FAC-8 meeting, after which NCHEMS would compile and analyze the data and use the results to facilitate the discussion. The polls addressed FAC-8 members' views on the conceptual framework, the parameters to be used, the use of SCHs and weights to apply to them, and incentive funding. The polls were purely a way to help organize conversations and move the group toward consensus; they were not intended to be reported on or used as evidence that a decision was formally made.

In April 2022, NCHEMS returned to Richmond for a series of meetings with key stakeholders. During this trip, NCHEMS and SCHEV discussed the funding model that was then in draft form. Subsequent meetings with OpSix, the FAC, the Virginia Higher Education Business Council, Virginia 21, and Chair Makola Abdullah of the Council of Presidents yielded additional input. For these meetings, NCHEMS demonstrated the conceptual framework, which had evolved from its initial character to increasingly better fit the Virginia context, and a draft version of the simulation. Following that visit, NCHEMS continued to refine the funding model and the simulation and began drafting the final project report.

Analysis of Other States' Formulas

Drawing on the results of the national funding survey, NCHEMS consulted with other states and reviewed websites to better understand their funding models. Of particular focus were the way in which other states sought to estimate a base level of funding need for each institution and the collection and use of information about instructional costs. In the process, NCHEMS gathered several state reports, as well as regulatory or statutory language addressing the components of the state approach to funding.

Simulating the Funding Model

A major effort in the project was to develop a heuristic funding simulation allowing for the use of various parameters to direct the allocation of state resources to institutions. NCHEMS used SCHEV-supplied data for as much of the simulation as possible, but also drew on comparison data from IPEDS where necessary. The simulation closely reflected the conceptual framework, and NCHEMS created an initial draft version for use in gathering feedback from the institutional finance officers during the April visit and subsequently. While this version used actual Virginia data, the specific institutional identities were shielded intentionally so that the conversation would remain focused on the big picture rather than on any single institution's results. NCHEMS and SCHEV gathered feedback from this conversation, incorporated it into a new version of the simulation, and used it to develop a set of preferred parameters.

Appendix C. Survey of Public Institutional Funding Policies

As required by the RFP scope of work, NCHEMS conducted a national survey of state funding policies and practices. The survey was intended to gather details about how states fund their public institutions with respect to state definitions of (and targets for) “base adequacy” and for sharing educational costs with students and families—what factors affect funding levels, how they monitor and assess progress toward achieving affordability goals, and special funding streams to pursue state priorities. NCHEMS collaborated with the State Higher Education Executive Officers association to field the survey. SHEEO reviewed early drafts of the survey, assisted NCHEMS with piloting the survey with a selected group of state finance officers, described and sought support from its members during its regular calls, and sent the survey to the distribution list it uses to collect responses to its annual State Higher Education Finance (SHEF) survey. SCHEV staff also reviewed the survey instrument. The survey was fielded online using Qualtrics; the instrument is included beginning on the next page. Ultimately, there were 48 responses from 46 states.^{22,23}

In designing this survey, NCHEMS, SCHEV, and SHEEO sought to ensure that respondents would be able to provide answers that were specific to the base amount of funding provided to public institutions. The intent was for respondents to concentrate their answers on money appropriated to institutions on a recurring basis and that was not allocated on the basis of institutional performance against any measures of outcomes (such as graduation numbers or rates) or money directed to institutions for one-time only investments (unless those investments were subsequently rolled into the base). Rather, the survey sought to gather information about the factors that influenced decisions about the amount of recurring funding states appropriated to their institutions to support operations, factors such as enrollment counts, employee counts, adjustments driven by changes in personnel costs or other input costs, operational expenses for facilities, and comparisons to peer institutions. In order to signal particular interest in base funding, the survey first asked for information about the amount of funding allocated to institutions on the basis of performance so that subsequent questions would be more clearly applicable to base funding only. The survey also asked that funding allocated on the basis of completed credit hours be treated as base funding, rather than performance funding, if those counts were used in lieu of counts of enrollments. Since most questions asked for data and information for FY2021, respondents were also asked to include federal stimulus funds in their base funding levels insofar as those funds offset cuts in general fund support to institutions that had been budgeted before the onset of the pandemic.

What follows is the discussion of recent research on state base funding that was publicly released just as this survey was being fielded. Next appears the results of the NCHEMS-SHEEO survey as discussed in the interim report submitted in December 2021, after which the survey instrument is included.

²² States with separate SHEF reporters for the four- and two-year sectors each sent separate responses, including North Carolina and Wyoming.

²³ This survey was in development when the InformEd States report was issued; there are differences in the findings for similar topics that are due to timing and to differences in the respective research designs.

Research on state higher education funding policies and practices is widespread. There is considerable research documenting how state funding to higher education tends to serve as a balance wheel for state budgets facing an economic downturn, research describing the responses of institutions to changes in state funding, and research on how state funding affects institutional expenditures and student accessibility and outcomes, among others.

In recent years, a growing number of states have adopted so-called performance-based funding approaches that distribute a portion of existing or new state money to institutions according to how well they perform on a set of measurements such as graduation numbers or rates, productivity measures, and workforce participation. This trend has spurred substantial research on the parameters states use to allocate funds under these models. This research provides insights into common factors; it also points out that, in most states, the amount of funding tied to outcomes is insufficient to incentivize the desired changes in performance. It also finds evidence of perverse incentives when the performance that is incentivized is not sufficiently concentrated on improving the outcomes of low-income, underrepresented minorities, or adult learners.²⁴

In contrast to the interest by the research community in documenting performance funding and its consequences, there has been surprisingly little effort to provide detail about how states appropriate money to institutions to support basic operations. This is in spite of the fact that nearly all states allocate the majority of their direct funding of institutions to base support. MGT Consulting Group once produced periodic reports on states' base funding approaches, but those reports were discontinued in the early 2000s. More recently, the researchers behind the InformEd States Clearinghouse released a brief about state funding policies that included base funding.²⁵ Using an intensive method of reviewing statutes, budget documents, and audit reports, they categorized state base funding approaches as Base+ Only, Enrollment Only, Performance Only, some combination of the preceding types, or No Funding Formula. The researchers also assessed whether states included provisions for Equity or Research in their approaches, with equity referring to extra funding intended to address additional resource requirements based on the characteristics of an institution or the students it serves, and research referring to additional funding or weights within the formula designed to provide support for overall research capacity. Figure 30 shows the number of states in each category according to InformEd States' research; Virginia is categorized as an Enrollment Only state for

²⁴ Ortagus, J.C., Kelchen, R., Rosinger, K., & Voorhees, N. (2020). "Performance-Based Funding in American Higher Education: A Systematic Synthesis of the Intended and Unintended Consequences." *Educational Evaluation and Policy Analysis* 42 (4), 520-550; Gándara, D. & Rutherford, A. (2018). "Mitigating Unintended Impacts? The Effects of Premiums for Underserved Populations in Performance-Funding Policies for Higher Education," *Research in Higher Education* (59), 681-703; Hillman, N.W., Tandberg, D.A., & Fryar, A.H. (2015). "Evaluating the Impacts of 'New' Performance Funding in Higher Education. *Educational Evaluation and Policy Analysis* 37 (4), 501-519.

²⁵ Lingo, M., Kelchen, R., Rosinger, K., Baker, D., Ortagus, J., and Wu, J. (2021). *The Landscape of State Funding Formulas for Public Colleges and Universities*. InformEd States. Retrieved November 3, 2021 from https://static1.squarespace.com/static/5d9f9fae6a122515ee074363/t/612d9d7458f7db4cfd58baab/1630379382136/InformEdStates_Brief_LandscapeofStateFundingFormulas.pdf.

its funding of four-year institutions and as an Enrollment+Performance state for how it funds its two-year institutions.²⁶

Figure 30. InformEd States Categorization of State Funding Approaches

Type	Four-Year Institutions	Two-Year Institutions
Base+ Only	13	4
Enrollment Only	7	8
Performance Only	–	2
Base+Enrollment	6	10
Base+Performance	13	8
Enrollment+Performance	3	6
Base+Enrollment+Performance	3	9
Research	10	–
Equity	14	13
No Formula	9	2

Source: InformEd States

InformEd States’ research also examined how state funding approaches had evolved over time, generally finding that more states moved to hybrid models (e.g., Base+Performance), typically by adding performance funding to their models, and that states were less reliant on enrollment as a driver of funds in the four-year sector. A roughly similar number of states maintained equity provisions in their state funding strategies throughout the period studied, 2004 to 2021.

Definitions of Base Funding Adequacy

Based on the NCHEMS-SHEEO survey, three states in addition to Virginia reported having a definition of base funding adequacy: Alabama, Maryland, and Oregon. Alabama’s Commission on Higher Education makes recommendations “derived directly from its assessment of the actual funding needs of each of the universities, as presented to it by the presidents, which assessment may include, but shall not be limited to, derived conclusions that may be based upon standard techniques of objective measurement, need and unit cost figures arrived at through the use comparative and verified data secured from the various institutions, applied in an impartial and objective manner, and comparison shall be made not only between similar functions of institutions in Alabama but also between Alabama institutions and similar functions of institutions located in other states.” While this definition implies that peer groups may play a role in the base adequacy definition, Alabama’s response indicated that funding levels, in reality, were adjusted for retirement, retirees’ health insurance benefits, and an overall three percent increase.

Maryland’s definition of base adequacy is set at levels determined by the executive branch, which are then incorporated in the legislature’s budget deliberations. Oregon calculates a

²⁶ This categorization reflects the fact that the VCCS allocates a portion of its state appropriation to its constituent institutions, as opposed to the state providing those dollars directly to institutions via a performance model.

measure known as Current Service Level (CSL), which effectively applies a series of assumptions about inflation in costs of factors of production, principally those associated with wages, retirement benefits, health care benefits, and capital costs to institutions' previous funding levels.²⁷

Base Funding Approaches and Factors

The survey revealed considerable variation in how states support the base operations of their public institutions. Most states reported the use of a Base+ approach to determining institutional allocations, either singly or through a combination of approaches that also includes a formula or other approach in addition to Base+ (Figure 31). In these latter cases, the survey responses suggest that a portion of an institution's state appropriation is comprised of these respective approaches (i.e., some share of the base funding, but not the whole amount, is allocated using a formula, or a formula is used to inform the "+" part of the Base+ approach). Within the two-year sector, 18 respondents reported using a Base+ approach, with an additional four that reported relying exclusively on historical funding patterns or institutional requests to determine base funding; 17 states use a formula, with six using both Base+ and a formula to allocate base operational support to institutions.

In contrast, Base+ funding and historical funding patterns or institutional requests were substantially more common approaches to determining base appropriations levels to public four-year institutions. Overall, Base+ funding was reported by 26 respondents, 15 of which reported it was solely used in that sector. History and institutional requests were wholly or partially determinative in 13 states. States relied less heavily on formula funding; it alone drives four-year funding in only three states and is used in combination with another approach in six other states.

Five respondents responded "Other" regarding the funding approach for their two-year sectors; one reported "Other" as the funding approach for the four-year sector. In these states some approach other than Base+, formula funding, or funding history and institutional requests are instrumental in determining appropriations levels. Typically, these responses indicated that institutional appropriations were simply a product of the political process of budget development, or, in New Hampshire's case, the system board allocated its block grant without providing information about exactly what approach was used. However, a review of the descriptions of what constituted "Other" for respondents that selected that option suggests that many used it to indicate that some portions of institutional appropriations are made based on some type of formula, often including performance measures; adjustments driven by an assessment of rising input prices such as personnel costs; or one-time funding.

It is worth noting that it is difficult to compare these results with those reported by InformEd States. This difficulty can be attributed to quite different methods used to collect the data and to the NCHEMS/SHEEO survey's exclusion of performance-based funding. However, differences may also be due to variations in the written policy and in how they are interpreted or implemented.

²⁷ Oregon Higher Education Coordinating Commission (nd). *Current Service Level (CSL) Calculations, Higher Education Support Funds, 2021-23 Biennium*.

Figure 31. NCHEMS/SHEEO Survey of Categories of State Funding Approaches

Category	Two-Year Sector		Four-Year Sector	
	Responses	States	Responses	States
Base+ Only	5	MN, MO, UT, VA, WV	15	AZ, CA, FL, IL, IA, KS, MN, MO, MT, NE, NM, NY, UT, VA, WV
Formula Only	6	IL, KS, NJ, OH, PA, TN	3	KY, OH, TN
History/Institutional Requests Only	4	CT, DE, IN, ME	10	AK, CT, DE, IN, ME, MS, PA, SC, SD, WA
Other Only	5	AZ, MD, MS, SC, VT	4	MD, MI, NH, VT
Base+ & Formula	4	ID, MT, NE, OR	4	ID, NJ, NC, OR
Base+ & Other	4	AR, NY, OK, WI	3	AR, OK, WI
Base+ & History/Inst. Requests	3	AL, HI, IA	3	AL, HI, WY
Base+, Formula, & Other	2	CO, WA	1	CO
Formula & Other	5	CA, KY, LA, SD, WY	1	LA

Source: NCHEMS/SHEEO Survey

Factors Affecting Appropriations Levels

A central purpose behind the NCHEMS/SHEEO survey was to determine the array of factors that states use to set institutional funding levels. This section of the survey may be the only recent detailed national analysis of state funding strategies focused on base operational support; these factors offer options and opportunities for Virginia’s funding model design. Survey respondents who indicated that they used either a Base+ or Formula approach (alone or in combination) to funding base operations were subsequently asked to select from a list of factors that were influential in determining individual institutional base funding levels.

States that rely on a Base+ approach for both two- and four-year sectors most commonly take institutional initiatives into account when allocating funds to institutions, followed closely by considerations of the costs for maintaining/operating new assets (such as new facilities and new programs being brought online), as well as enrollment levels (Figure 32). Particularly among four-year institutions, it was common for states to simply apply a fixed percentage increase (decrease) to all institutions. While average wage rates were only referenced by a few states, personnel costs were clearly commingled with “Input Costs.” Of the five states that reported using input costs as a factor in determining Base+ funding levels, all of them indicated that fringe benefits were a factor and four reported using salaries. (Three states also reported considering the costs of utilities and equipment and one considers state risk insurance premiums.) In addition, several of those who reported “Other” factors as important described compensation-related increases as being what they meant. Far less commonly reported factors

were employee counts and student/faculty ratios. “Other” responses otherwise most often indicated that Base+ funding levels were substantially driven by the political process.

Figure 32. Factors Affecting Funding Levels for States Employing a Base+ Policy

Category	Two-Year Sector		Four-Year Sector	
	Responses	States	Responses	States
Fixed Percent	5	AL, AR, MO, NM, WA	8	AI, AR, CA, IL, MO, NJ, NM, NY
Enrollment	8	ID, MT, NM, NY, NC, UT, VA, WA	8	CA, ID, MT, NJ, NM, NC, UT, VA
Employee Count	0		2	NC, WY
Student/Faculty Ratios	1	MT	0	
Average Wage Rates	2	MT, UT	3	MT, NC, UT
Input Costs (Personnel, Equipment)	5	AL, MT, OR, UT, VA	5	MT, NC, OR, UT, VA
New Assets or Programs	9	AR, ID, IA, MT, NY, NC, OK, UT, VA	10	AL, AR, FL, ID, IA, MT, NY, OK, UT, VA
Institutional Initiatives	10	AL, AR, HI, ID, IA, OK, UT, VA, WA, WI	12	AR, CA, FL, HI, ID, IA, NC, OK, UT, VA, WI, WY
Peer Comparisons	1	MT	1	MT
Other	8	CO, MN, NE, NC, OK, WV, WI	11	AL, AZ, CO, FL, KS, MN, NE, NJ, OK, WV, WI

Source: NCHEMS/SHEEO Survey

States that reported using a formula approach to funding institutions’ base operations often reported using similar factors across both two- and four-year sectors (Figure 33). For example, among states that rely on a formula for base operations, Idaho, Kentucky, Louisiana, and Ohio reported using the same set of factors for both sectors. Overall, apart from “Other” factors, states typically used enrollment levels and cost differentials by program and level as factors in formulas in the two-year sector. Among four-year institutions, differential cost structures were most common. Additionally, factors accounting for differences in student characteristics and the use of completed credit hours were used by three states in each sector. Less common factors were headcount enrollment, facilities, and peer comparisons. “Other” descriptions mostly indicate some additional detail, such as in how Louisiana uses peers, or to clarify that the formula applies just to new funding (in Pennsylvania²⁸).

²⁸ Notwithstanding what this table seems to indicate, Pennsylvania’s response did not indicate that its two-year sector relied on Base+ funding.

Figure 33. Factors Affecting Funding Levels for States Employing a Formula

Category	Two-Year Sector		Four-Year Sector	
	Responses	States	Responses	States
FTE Enrollment	6	CA, KS, LA, MT, OR, WA	2	LA, OR
Headcount Enrollment	1	NJ	0	
Completed Credits	3	IL, LA, OH	3	LA, OH, OR
Differential Costs	6	ID, KS, LA, MT, OH, WA	4	LA, ID, OH, OR
Student Characteristics	3	IL, LA, OH	3	LA, NJ, OH
Square Footage of Facilities	1	LA	1	LA
Institutional Mission	1	LA	2	LA, OR
Faculty/Staff Compensation	3	LA, MT, TN	2	LA, TN
Peer Comparisons	2	IL, LA	1	LA
Other	7	ID, IL, KY, LA, PA, TN, WY	3	ID, KY, LA

Source: NCHEMS/SHEEO Survey

The survey also sought information from states about streams of state funding provided to public institutions other than through recurring base funding support. Six states reported funding set asides for collaborations that are intended to create improved educational opportunities, service delivery, or efficiencies on operations and six states also reported that the state legislature typically reserves a portion of the total higher education appropriation for making investments directed to public institutions in pursuit of specific state priorities (Figure 34). Additionally, thirty-one states provide special purpose funding of some form. Respondents used the “Other” option to provide additional detail—for example, Alaska reported on the inconstancy of state funding approaches over time, an issue that may be common among other states had the survey queried them directly about it. Finally, a question asking whether state funding policies include a provision that explicitly incentivized improved efficiencies in institutional operations only yielded four positive responses, two of which referenced the use of outcomes or productivity metrics in directing dollars. The others talked about financial incentives and divestment strategies and funding for “systemness.”

Figure 34. Additional Components in Determining State Funding Levels

Category	Responses	States
Incentives to Encourage Cross or Multi-Institutional Partnerships for Services or Program Delivery	6	ID, IN, MN, OK, SD, VA
A Pool Taken “Off the Top” for Investments in State Priorities	6	AL, ID, MT, NM, OK, VA
Special Purpose Funding	31	AL, AZ, CA, CO, CT, FL, HI, ID, IN, IA, KY, LA, ME, MI, MN, MS, MO, MT, NJ, NM, NC, OH, OK, SC, SD, VA, WA, WI, WY
Other	7	AK, KY, LA, NM, OH, OR, VA

Source: NCHEMS/SHEEO Survey

Mid-Year State Funding Shortfalls

As a consequence of the pandemic, as well as past recessionary cycles, many states have experienced sudden and sharp declines in revenue collection. Resulting cuts to funding for public higher education imposed in the middle of a budget cycle have been challenging for systems and institutions to accommodate strategically; most frequently the responses have been opportunistic. Therefore, the survey asked respondents about any formalized approaches that their state uses to address impacts from funding shortfalls that occur during a fiscal year. Most commonly, respondents indicated that there was no formalized state response to such conditions, that the response was up to the governor and legislature to pass a revised budget, or that cuts would be imposed on a pro-rata basis with institutions generally receiving the same size percentage cut. By contrast, Alabama maintains an Education Trust Fund, to which it adds funds up to a specified limit during good times, and from which it authorizes withdrawals to offset cuts when state funding declines.

Affordability

State finance officers were also asked a series of questions about how their state policies seek to preserve or improve student affordability. The first question asked if there was a formal target for cost-sharing. Only four states, in addition to Virginia, responded that they employed such a policy. Minnesota seeks to provide two-thirds of the total from tuition and fees and state appropriations to public postsecondary institutions on a consistent basis.²⁹ In addition, Minnesota also utilizes a Shared Responsibility Model (similar to the framework described previously) to set the target for student out-of-pocket payments as a proportion of a recognized cost of attendance level, with the remaining amount to be covered by the student’s (or their family’s) federally determined Estimated Family Contribution, Pell and other federal grants, and

²⁹ Minnesota Statutes, section 135A.01. According to SHEEO, of public institutions’ revenue from state support and tuition revenue, the latter accounted for 55 percent of the total across all institutions in FY 2020.

the state grant.³⁰ This target is operationalized through its student financial aid policy. Tennessee reported that its policy expects students attending public four-year institutions to pay 45 percent of total costs, students attending public community colleges to pay 33.3 percent, and student attending colleges of applied technology to pay 20 percent. Wyoming seeks to set tuition at its two-year institutions at a level such that tuition revenue accounts for 23-28 percent of total system-wide unrestricted revenue.³¹ Finally, while Nebraska did not specify a numerical target, it does aim to ensure that most per-student educational costs are covered by state funding, with tuition rates set to be appropriate to the role and mission of each sector within the state.

Although few states report having a clear cost-sharing policy, 29 states reported that they regularly measure or report on affordability. Among respondents, 10 states require regular reports on affordability in adherence to a statute, board or agency policy, or statewide strategic plan. A closer look at the measures and strategies in use shows considerable variation across states. Some use consistent measures and issue a regular report. Others appear to have a less formalized approach but are aware that state policymakers pay close attention to the issue and use various reports from third parties to inform decisions about state budgetary allocations. The most common measures in use include tuition and fee levels, alone or in comparison to income, other institutions within a specific region or other states, or peer institutions; net prices; and student debt. In at least 17 states' reporting on affordability the metrics are sensitive to students' income levels and in at least two states—California and Illinois—affordability measures are calculated for racially/ethnically under-represented student populations

³⁰ The Shared Responsibility Model is more fully described in Prescott, B.T. & Longanecker, D.A. (2014). *States in the Driver's Seat: Leveraging State Aid to Align Policies and Promote Access, Success, and Affordability*. (Boulder, CO: Western Interstate Commission for Higher Education). Retrieved November 6, 2021 from https://www.wiche.edu/wp-content/uploads/2020/09/Drivers_Seat_Executive_Summary.pdf. Details about Minnesota's State Grant are available at <https://www.ohe.state.mn.us/mPg.cfm?PageID=138>.

³¹ Wyoming Community College System. <https://2ky701279qlou23p6256zftv-wpengine.netdna-ssl.com/wp-content/uploads/2019/09/Tuition-Policy-after-Oct-16-2018-meeting.pdf>.

Survey of Public Institutional Funding Policies

Although there has been substantial work done to document and study performance funding policies in recent years, less attention has been paid to allocation of base appropriations to public postsecondary institutions. This survey is an attempt to update our understanding about how states provide a basic level of support for operations at public institutions, particularly by requesting details about definitions of “base adequacy,” factors affecting funding levels, targets for sharing the costs of public higher education between the state and students, and goals for achieving affordability.

Results from this survey will inform a research brief to be published in the coming months. This survey was developed by SHEEO working in partnership with NCHEMS. Questions may be directed to Sophia Laderman at SHEEO (sladerman@sheeo.org) or Brian Prescott at NCHEMS (brian@nchems.org).

General Questions

1. First and last name {text box}
2. Agency {text box}
3. Position title {text box}
4. State {drop down of states}
5. Are you completing this survey on behalf of your state’s (select one):
 - a. 4-year public institutions
 - b. 2-year public institutions
 - c. Both 4-year and 2-year public institutions

Definitions and Amounts

6. Does your state have a definition for base budget adequacy for each public institution (i.e., the frugal level of funding required for the institution to fulfill its mission)? {Yes/No}
 - a. If Yes: Please share the definition. {Text box}
 - b. If Yes: Please share the formula the state uses for calculating base budget adequacy (if such a formula exists). A link to a website or an attachment to your survey response are welcome. {Text box}
 - c. If Yes: Please provide a reference to the statute or board policy where base adequacy is defined. {Text box}
7. Please provide the total support paid out of state general funds to support the operation of public postsecondary institutions in FY21. Include federal stimulus funding (i.e., CARES GEERF or CRF) that was used to offset cuts in state general fund support; for example, if your state cut general fund support to public institutions during FY21 but restored some or all of those cuts with stimulus funding, please include the amount of restored funding even if those funds were provided for a specific use (e.g., unbudgeted COVID-19 expenses).

Exclude state funding for financial aid that supported students' tuition payments at public institutions and state funding for research. {Separate amounts for four-year and two-year sectors, dependent on response to question #5}

(Please note: the amounts given in answering this question should be equal to the sum of the amounts provided in responding to questions 8, 9a-d and 11 below.)

8. Please provide the total amount of state general fund support to public institutions that was allocated through a **performance funding formula or pool** in FY21. (For this survey, please treat funding allocated based on completed credits as being a component of a base funding adequacy formula, rather than as part of a performance-based policy, and include those amounts in response to question 10b below.) {Separate amounts for four-year and two-year sectors}

Factors in Allocating Base Funding

9. What is your state's approach to allocating state general fund appropriations that support basic institutional operations (excluding amounts allocated through a performance-based funding formula or policy from new or recurring funds) to public colleges and universities? {Select all that apply.}
 - a. A portion of our state's appropriation is made on a "Base Plus" approach.
 - i. If selected, ask: What amount of the state operating appropriation was provided in this manner in FY2021?
 - ii. If selected, then ask: What factors are formally considered (in statute or board policy) in determining additions to the base? {Select all that apply}
 1. A fixed percentage applied to all institutions.
 2. Enrollments or enrollment changes
 3. Numbers of employees:
 - a. Faculty
 - b. Other professionals
 - c. Hourly/classified staff
 4. Student/faculty ratios
 5. Average rates of pay (overall or for category(ies) of employee)
 6. Changes in the prices/costs of inputs:
 - a. Salaries
 - b. Fringe benefits
 - c. Equipment and supplies
 - d. Utilities
 - e. Other (please specify)
 7. Additions of new assets (e.g., new programs, facilities)
 8. Institution-specific initiatives
 9. Factors derived from peer group comparisons
 10. Other (please describe)
 - iii. If selected: Please provide a reference to the statute or board policy where these factors are identified. {Text box}

- b. A portion of our state's appropriation is distributed to institutions by a formula not based on performance (including formulas that are based on cost models).
 - i. If selected, ask: What amount of the state operating appropriation was provided in this manner in FY2021?
 - ii. If selected, then ask: Please provide a description of the formula. {Text box}
 - iii. Which (if any) of the following factors are included in formulas that determine base budget adequacy calculations? {Select all that apply}
 - 1. Overall FTE enrollments
 - 2. Overall headcount enrollment
 - 3. Completed credits
 - 4. Enrollments linked to differential program costs (i.e., by level and field)
 - 5. Student characteristics (Income/Pell eligibility, underrepresented population status, etc.)
 - 6. Square feet of facilities to be maintained
 - 7. Special institutional mission requirements--Land Grant status, Research, etc.
 - 8. Numbers of faculty and staff and their compensation levels
 - 9. Funding levels of peer institutions
 - 10. Other (please describe)
 - iv. If selected: Please provide the statute or board policy where the formula is indicated.
- c. Our institutions' base budgets are determined by the legislature based on historical patterns and/or institution-by-institution requests.
 - i. If selected, ask: What amount of the state operating appropriation was provided in this manner in FY2020?
- d. Other {please describe}
 - i. If selected, ask: What amount of the state operating appropriation was provided in this manner in FY2020?

10. Who establishes the factors in allocating these appropriations (factors listed in the previous set of questions: portion of state's appropriations made on "base plus" approach, other formula, etc.)? (select all that apply)
- a. Statewide higher education agency
 - b. Governor's office
 - c. Legislature
 - d. System office
 - e. Other (please describe)

Additional Components of General Fund Allocations to Institutions

11. In addition to provisions that support base funding and performance funding, does the state's approach to allocating general fund support to public institutions incorporate:

- a. Incentives to encourage cross- or multi-institutional partnerships for services or program delivery? {Yes/No}
 - b. A pool taken “off the top” for investments in state priorities, e.g., STEM-H credentials. {Yes/No}
 - c. Special purpose funding? {Yes/No}
 - d. Other (please specify)
12. Does the funding policy explicitly incentivize improved efficiencies in the costs of operations? {Yes/No}
- a. If yes: How? {Text box}
 - b. If yes: Please provide a link or other reference to the relevant policy(ies). {Text box}
13. In cases where the state encounters funding shortfalls in the middle of a fiscal year, what approaches to addressing their impacts on postsecondary institutions are used? Please also specify any formal policies that direct or guide those responses. {Text box}

Sharing Costs With Students

14. Has your state formally adopted a target (numerical or otherwise) for sharing the burden of the costs of public postsecondary education with undergraduate students who are state residents? {Yes/No}
- a. If yes, then ask: Please specify that target, including whether it is consistent across institution types or sectors. {Text box}
 - b. If yes, then ask: Please identify the statute, board, or other policy where that goal is codified. {Text box}
15. Does the state measure and monitor student affordability?
- a. If yes, then ask: How is student affordability measured? {Text box}
 - b. Is the measure of student affordability sensitive to income level? {Yes/No}
 - c. Is the measure of student affordability sensitive to other student characteristics? {Yes/No}
 - i. If yes, then ask: Please list these characteristics. {Text box}
 - d. If Yes: Is this review a requirement of state statute or board policy? {Yes/No}
 - i. If Yes: Please provide a reference to the relevant policy(ies). {Text box}

Thank you for taking this survey. Results will be reported in a research brief to be published in the coming months and shared widely by SHEEO and NCHEMS.

Appendix D. Efficiency and Effectiveness Report

In support of SCHEV's higher education cost and funding needs study, NCHEMS conducted an efficiency and effectiveness review, seeking to identify practices that could be implemented more broadly in Virginia to better serve students at a lower cost. This study involved reviewing reports of efficiency initiatives in other states—most notably Ohio and Texas—as well as report prepared by SCHEV in 2017 describing initiatives undertaken by Virginia institutions. From these reviews and involvement with scholars working on enhancing the benefits provided by higher education systems, NCHEMS has developed a short list of good practices regarding approaches to achieving efficiency and effectiveness in college and university operations. NCHEMS, with the advice and counsel of SCHEV staff and institutional finance officers, conducted a new survey of Virginia institutions seeking updated information about their practices aimed at producing more efficient operations and generating savings that could be reallocated to high priority purposes.

It is challenging to apply the label “best practices” to any specific activities because practices are always situated in a particular context that shapes the nature of the problems and the available feasible solutions to address them. But the practices that emerged from this review might be candidates for such a label—or are at least worthy of being considered for adaptation in other institutions—take two distinct forms. First are those that involve changing structures and practices inside a single institution. These include such steps as:

- Making changes to organizational structures by combining departments/offices and thereby saving on managerial costs. Six institutions explicitly mentioned undertaking this activity.
- Monetizing physical assets—leasing unused space or selling assets that aren't needed. One institution razed unused residence halls and one other mentioned leasing space.
- Entering into campus-wide purchasing contracts for high-volume goods and services. VCCS has system-wide consortium for purchasing and other functions in addition to its membership in VHEPC.
- Conducting energy audits, investing in climate control systems that yield on-going savings, switching to LED lighting, etc. All institutions have done this.
- Improving academic productivity through elimination of small classes, revisions to curricula, etc. All institutions eliminated small classes, but there were very few instances of more fundamental changes. Instead, revisions to curricula were primarily done to reach new markets.
- Reducing time/credits to a degree for students. All institutions have implemented some efforts in this arena.
 - Advising that prevents students from taking unnecessary courses
 - Incentives for enrolling in 15 credits per semester
 - Standardizing credits to degree
 - Data-driven advising
 - Summer-session courses to alleviate bottlenecks

- o Guided pathways and improved articulation arrangements
- o Co-requisite approaches to developmental education
- o Providing credit for prior learning
- Improving business processes, moving to paperless systems, reducing the number of approvals required, eliminating the need for multiple data entry steps, etc. All institutions took this step to a greater or lesser degree.

More consequential are those steps that are collaborative actions on the part of multiple institutions/partners. Most examples of such collaborative practices involve administrative functions such as developing shared services arrangements for:

- Disaster recovery
- Risk management
- Financial records and processes
- Student record systems
- Construction management
- Purchasing—the big-ticket items in this arena involve acquisition of technology, energy, office supplies, and health care insurance and other services. All institutions are members of a purchasing collaborative—the Virginia Higher Education Procurement Cooperative
- UVA Wise relies heavily on UVA for provision of these services.
- Help desks and other student support functions

Much less common but holding promise both for generating efficiency and enhancing services to students are those collaborative arrangements that involve academic programs in some way. These can include:

- Joint offering of academic programs in some manner—the program being taught by faculty from multiple institutions with students enrolled from all participating institutions. An alternative has a program being offered by a single providing institution to students enrolled at other institutions (with student services being provided by the receive site institutions).
- Collaboration on research activities. Eight institutions collaborate through the Commonwealth Cyber Initiative.
- Seven research universities participate in VA Catalyst, a research consortium—UVA, VCU, EVMS, GMU, ODU, VT, W&M
- Joint development of infrastructure for on-line education. Multiple institutions—Not sure how many.
- Joint operations of library services—purchasing of information resources and sharing of those resources. All public institutions are members of VIVA, the Virtual Library of Virginia.
- Broad-scale articulation arrangements that include a core general education transfer curriculum under which courses are automatically accepted as meeting the gen ed requirements at all public institutions in the state. Such agreements help to avoid unnecessary credit accumulation by students who transfer. Transfer VA initiative – This

is a portal that allows students to identify which of their courses at CCs transfer to which universities/programs. It is not a statewide articulation agreement that guarantees full acceptance of a transfer core.

A review of the Efficiency and Effectiveness survey results provided by Virginia institutions shows the state’s public institutions have adopted many of these practices. All institutions have implemented one or more of these practices, many (with important exceptions) confined to intra-institutional actions and almost all focused on administrative functions. Savings in the millions of dollars have been realized by institutions’ participation in the Virginia Higher Education Procurement Consortium (VHEPC), a multi-institutional purchasing collaborative, and in the statewide academic library consortium (VIVA). Such collaborative procurement activities are clearly a national best practice. Examples of other good practices adopted by Virginia institutions are presented in Figure 35. The examples picked describe the variety of strategies being employed by Virginia institutions to either reduce costs or enhance revenues. In some instances, estimates of savings or amounts of cost avoidance were provided by respondents and are presented along with the listing of cost-saving strategies.

Figure 35. Examples of Good Practices Adopted by Virginia Institutions

Institution	Energy	HR / Health / Benefits	Contracts / Shared Services	Curriculum / Restructuring
University of Virginia	Investing in energy efficiency infrastructure— installation of LED lighting, etc.—has resulted in avoided costs of nearly \$3 million per year.	Consolidation of benefit plans management resulted in savings of \$10 million per year.		Refinanced bonds and saved a total of \$45 million over the period of bond repayment.
Virginia Community College System		Outsourced mental health services for a savings of \$1.2 million per year.	Shared purchasing arrangements for acquisition of textbooks saved students at least \$237K per year.	
College of William and Mary			Seven academic research institutions in Virginia, working together with Virginia Catalyst, signed a memorandum of understanding to share core facilities and resources in an effort to advance the research enterprise in the commonwealth.	Provost initiated a sustainable curriculum review process for each of the component schools in December 2020.
Virginia Commonwealth University				Restructuring the Provost’s Office resulted in savings of \$1.6 million. Utilizing open education resources has resulted in

Institution	Energy	HR / Health / Benefits	Contracts / Shared Services	Curriculum / Restructuring
				avoidance of costs of approximately \$5.5 million per year.
Virginia Tech	Implementation of a five-year energy efficiency program resulted in total savings of \$6 million.	Created a central source for all faculty on-line position advertising. This results in estimated savings of \$68K per year.		Restructured positions and responsibilities within Academic Advising Initiatives and University Studies to provide academic support to three key populations at risk for attrition from the university—students changing majors within the institution, transfer students, and students on university scholarship.
Christopher Newport University		Redesigned a variety of human resource processes that resulted in more effective and efficient operations. Partnered with a local Physical Therapy provider for therapy services for student athletes. This arrangement also provided access to an athletic trainer and avoided the costs associated with hiring a trainer. Annual savings of at least \$25K.		
James Madison University	Energy conservation measures that resulted in cost avoidance of \$3 million per year.		JMU is a major beneficiary of participation in various consortia, saving an estimated \$4.2 million over five years through utilization of VHEPC, and an estimated \$1.2 million in cost avoidance in 2021 through participation in VIVA.	A series of initiatives designed to improve student retention resulted in estimated increased tuition revenues of \$1.5 million per year.
George Mason University		Gained efficiencies in delivery of student health services through adoption of a telehealth approach to delivery of many health services.		As part of a student experience redesign, George Mason developed and implemented a network approach to student support, with

Institution	Energy	HR / Health / Benefits	Contracts / Shared Services	Curriculum / Restructuring
				the addition of success coaching as a major lever and investment. This approach yields additional revenues from tuition from retained students and avoids costs associated with recruiting additional students.
Longwood University			Campus-wide the university has leveraged contracts and vendors to outsource activities including audio visual support, events, accounting, facilities, healthcare, marketing, dispatch / emergency services.	Redesign of format and marketing of MBA program resulted in a tenfold increase in enrollments with the associated increase in revenues.
Norfolk State University				Developed an articulation agreement with Appalachian School of Law that allows students to get both a baccalaureate degree and a law degree in six years. This avoids two years' costs for each student enrolled in the program. Partnership agreement with Tidewater Community College's Human Services program for smooth transition for students and coordination of curriculum content for entry into Norfolk State's Bachelor's of Social Work program. This will serve to improve recruitment and retention of students.
Old Dominion University			Participation in E-LITE for shared network infrastructure yields annual savings of \$100K annually.	Merger/consolidation of academic programs has resulted in savings of \$1.5 million over a five-year period.

Institution	Energy	HR / Health / Benefits	Contracts / Shared Services	Curriculum / Restructuring
				<p>Closure of undersubscribed academic programs has yielded savings of \$500K.</p> <p>Developed courses with embedded workforce credentials. This has avoided costs to students of more than \$500K over the past five years.</p>
Richard Bland College			Entered into contracts with other state entities for provision of legal services. This provides savings of \$100K per year.	<p>Leased unused space and recognized additional revenues of \$75K per year.</p> <p>Revised policy on minimum teaching loads reduced instructional costs.</p>
Radford University			Entered into a new Beverage Pouring Rights contract that will provide the university with \$4.9 million over a period of ten years.	
University of Mary Washington	Razing a costly residence hall that was unneeded in the current enrollment climate (which reduces energy and other costs)			
University of Virginia at Wise		Provided incentives for early retirement. This yielded savings of \$298K in the first year of implementation.	Receives back-office operations support—financial, legal services, etc.—from the University of Virginia. This provides savings of more than \$200K per year.	
Virginia Military Institute			<p>Outsourced custodial services.</p> <p>Recognized extensive operating efficiencies due to not performing separate procurement actions for every purchase. Estimated to save the cost of at least one</p>	

Institution	Energy	HR / Health / Benefits	Contracts / Shared Services	Curriculum / Restructuring
			FTE at approximately \$100K.	
Virginia State University	Renegotiated natural gas contract and realized savings of \$195K annually.		Collaborative procurement is producing savings of more than \$275K per year.	

This recounting of institutional actions draws attention to the facts that:

1. The major savings achieved have been accomplished through joint action—VHEPC and VIVA chief among them.
2. Most (but certainly not all) of the efficiency initiatives yield administrative savings rather than savings in academic affairs.
3. Most of the collaborative arrangements are focused on administrative functions. There are far fewer instances of savings resulting from collaborative actions in the delivery of academic programs.

Information gleaned from the survey indicates that the funds freed up as a result of institutional efficiency initiatives were devoted to making attendance at the institutions more affordable to students, either through minimizing price increases or by providing additional student financial aid. Second priorities were those focused on enhancing quality either through ensuring retention of excellent faculty or improving academic programs.

There are additional steps that could be taken by Virginia institutions, but these steps will require SCHEV—or some other intermediary organization—to play a much more active role. These additional steps (that are consistent with best practice) involve expanding collaborations to include a broader array of administrative functions and a greater emphasis on academic and student service functions. On the administrative side there are opportunities for efficiencies in expanding shared services arrangements to include more functions and more institutions—to model the sharing arrangements that UVA-Wise has with UVA.

There are no reasons why broad partnership arrangements must be limited to procurement and library services. There are many examples of shared services arrangements that cover such functions as the range of financial and student service functions—payroll, accounts receivable, accounts payable, student records, billing, etc.

Similarly, there are numerous national examples of arrangements in which academic programs are shared across several institutions. It is noted that most of these examples are found in institutions that are part of governance systems, but they are also found among private non-profit institutions. Virginia does not have the governance structure that makes brokering these arrangements relatively straightforward. The Online Virginia Network (OVN) currently serves as more of a portal for students to access online offerings and different institutions. This means that the costs associated with the academic offering remain centered at a single institution. If OVN acted as the actual platform to provide the instruction, it is possible that costs could be pushed down. There is at least one specific example of Virginia institutions collaborating for online academic offerings: Cardinal Education, formerly known as the Commonwealth Graduate Engineering Program (CGEP), a George Mason University, Old Dominion University, The

University of Virginia, Virginia Commonwealth University, Virginia State University, and Virginia Tech. In the 2022-23 school year, UVa students are [charged](#) \$781 per credit hour for tuition in the Cardinal Education program, compared to \$1,061 per credit hour in the traditional Master's level programs at UVa's School of Engineering.

Funding to seed such further efforts, such as expanding the Cardinal Education to other disciplines, may be one way to boost collaboration across multiple institutions, especially in a state where institutional autonomy is highly valued and established in statute.

Appendix E. Model Parameter Calculations

This appendix reports on details concerning the calculations of several of the components of the institutional adequacy framework in use in the funding model proposed for Virginia. It describes the calculations in more detail than is provided in the body of the report; the specific parameters used in the model are provided by Figure 29 that begins on page 56.

The Frugal Base

As mentioned in the body of the report, NCHEMS evaluated multiple methods for estimating a frugal base. Several of the principles were important to the selection of the most appropriate method. Among them were that the frugal base should:

- Recognize the relationship of other state finance policies, and incorporate both General and Non-General Fund revenues in the formula design—the frugal base calculation should not disadvantage institutions that have less capacity to raise revenue from other sources.
- Equitable funding among institutions—the frugal base should ensure that institutions of all sizes have a reasonable financial foundation.
- Be transparent—the results generated for the frugal base should be predictable.
- Be understandable—policymakers should be able to understand the calculation and the data underlying it and its linkage to the conceptual framework that guides the calculation. Judgments are unavoidable in developing and applying a funding formula; the rationale behind those judgments should be clear.
- Minimize administrative burden—the frugal base should be straightforward to replicate.
- Clear and purposeful incentives—the frugal base is not a component in the conceptual framework that is purposefully aimed at conveying incentives to institutions, so any inevitable incentives that it creates should be neutral; for example, the frugal base should not create unusually powerful incentives toward institutional growth.

The several options for calculating the frugal base that NCHEMS considered are described in Figure 36.

Figure 36. Alternative Methods for Calculating a Frugal Foundational Base

Method	Description	Calculation Summary	Advantages	Flaws
No Separate Frugal Base	Eliminate the frugal base and allow the SSA calculation to account for foundational administrative costs	None; all costs are assumed to be fully incorporated in the SSA calculations	Straightforward calculation	Unravels the conceptual framework in which administrative costs are relatively impervious to enrollment, and, in the case of small institutions, the relationship is inverted in ways this approach would not recognize and so advantages large institutions. Also fails to recognize that a portion of the core administrative costs are driven by expenses - especially personnel expenses - in functional areas such as institutional leadership, human resources, financial services, safety and security, etc. Puts additional pressure on the weighting scheme to account for marginal administrative costs it was not designed to do and will do poorly, with unpredictable impacts on the resulting cost estimates. Turns the resulting funding recommendation almost fully into an enrollment-based formula, creating funding unpredictability for the less reputationally strong institutions, and disconnecting the funding approach from state strategic goals. Undermines the link between state funding obligations and the need to support institutions as state assets.
National Percentiles	Using IPEDS data for expenditures on institutional support and academic support by sector, select a percentile that approximates a frugal level of spending per FTE on core administrative services.	Find the values for institutional support and academic support per FTE at the 20th percentile by sector. Multiple the former by 100% to account for all of those costs and the latter by 20% to limit those costs to a necessary core, e.g. a library, but not to fully support all students enrolled. Multiply the result by each institution's FTE.	Relatively predictable and mathematically understandable. Includes a wide diversity of institutions within each sector reflecting diversity of administrative structures. Large quantity of data makes the results likely to be stable over time.	Because it is so closely tied to enrollment levels, it is not very well connected to the conceptual framework. Yields results that advantage large institutions. Use of a specific percentile (20th) and discounts attached to it are arbitrary and cannot easily be connected to an evidence base.

Virginia Percentiles	Similar to the national percentile approach, this version relies only on Virginia data on spending, with institutions clustered based on size.	Cluster institutions in Virginia by size, e.g., 0-1,999, 2,000-9,999, 10,000+ FTE, and select the lowest per-FTE spending on institutional support and/or academic support and apply to all the other institutions in that grouping (i.e., the 1 st percentile of Virginia institutions), multiplying the result by FTE.	Relatively predictable and understandable. Uses Virginia data, which may make the data more internally consistent.	Because it is so closely tied to enrollment levels, it is not very well connected to the conceptual framework. Yields results that advantage large institutions. Using the lowest value in each cluster may not be reasonable for all institutions in that cluster. Few observations make data over time less stable.
Combination of Factors	Drawing from the approach used by Oregon, use a multi-stage calculation that allocates a common base level of support to all institutions, to which additional funding is allocated: to small institutions, to research universities, and to all institutions based on resident enrollment	Step 1. Allocate \$2.9M to each institution. 2. For each institution <1,500 FTE, multiply \$1,400 times FTE enrollment times a weight that gets progressively larger as the institutional size gets smaller and add that to the base. 3. Allocate \$5M to institutions proportionately based on their research spending. 4. Allocate \$330 per resident student enrolled at each institution.	Can be modified to meet budgetary realities by manipulating the numerous variables and values. Attempts to explicitly account for mission differentiation and funding challenges unique to small institutions.	Unclear what the evidence base behind each of the variables is - they may not accurately reflect cost? Variables can be modified to meet budgetary realities and so are not linked to actual costs. Approach is opaque and unpredictable.
Simple Regression	Run a bivariate regression of FTE enrollment on expenditures, then reduce the value of the resulting y-intercept and coefficient on enrollment in order to establish a frugal foundational funding level.	Run regression by sector. To establish a "frugal" amount, use 40% of the y-intercept value plus 30% of the coefficient value times the FTE enrollment.	Can be described using a standard scatterplot and analogized to the familiar growth charts of our youth (height/weight percentiles). Yields plausible results that better reflect the conceptual framework and aligned to state strategic goals. Incorporates a greater diversity of administrative structures from institutions across the country that can contribute to higher or lower operating costs. Large quantity of data makes results more stable over time. Conceptually sound approach that can link the use of the 40th percentile on the y-intercept to an overall percentile for institutions by sector, while the adjustment in the coefficient can be explained as necessary to extract the marginal costs for administration that accompany the enrollment of additional students.	Invokes a statistical technique that may be viewed skeptically by lay audiences. Despite links to evidence and concept described above, the treatment of the y-intercept and coefficient can be challenged as disconnected from firm research results.

Sophisticated Regression	Similar to the straightforward regression except using a multivariate regression with expenditures as the dependent variable and independent variables accounting for factors such as enrollment, student backgrounds, program array, research activity, geographic factors, and other factors that could affect the funding requirements for core administrative services.	Similar to the straightforward regression.	Potentially accounts for multiple variables and more fully describes the relationship between enrollment and core administrative services costs.	Overly complex and challenging to explain. Not predictable. Difficult to connect each independent variable to research.
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Also helpful in selecting a favored method for calculating the frugal base are the results generated by two of these approaches—one using the national percentiles and one using the simple regression (Figure 37). This table shows that the former generates a substantially larger range of costs than the latter. Expressing these different estimated frugal base amounts as a percent of the GF E&G appropriation provides an indication of how much of the state appropriation would be allocated according to base costs. Because the national percentiles method multiplies the calculated frugal base per student by the institution’s FTE, larger institutions receive substantially more money and the frugal base accounts for a much larger share of the GF E&G appropriation. Institutions with a lower percentage would have more of their state appropriation allocated based on their enrollment (and program mix and audience), making both their state appropriation and tuition revenue dependent on their ability to recruit and retain students. As shown in the table, the simple regression minimizes this disadvantage for smaller institutions, which also tend to be those that serve larger proportions of students from low-income and underrepresented populations.

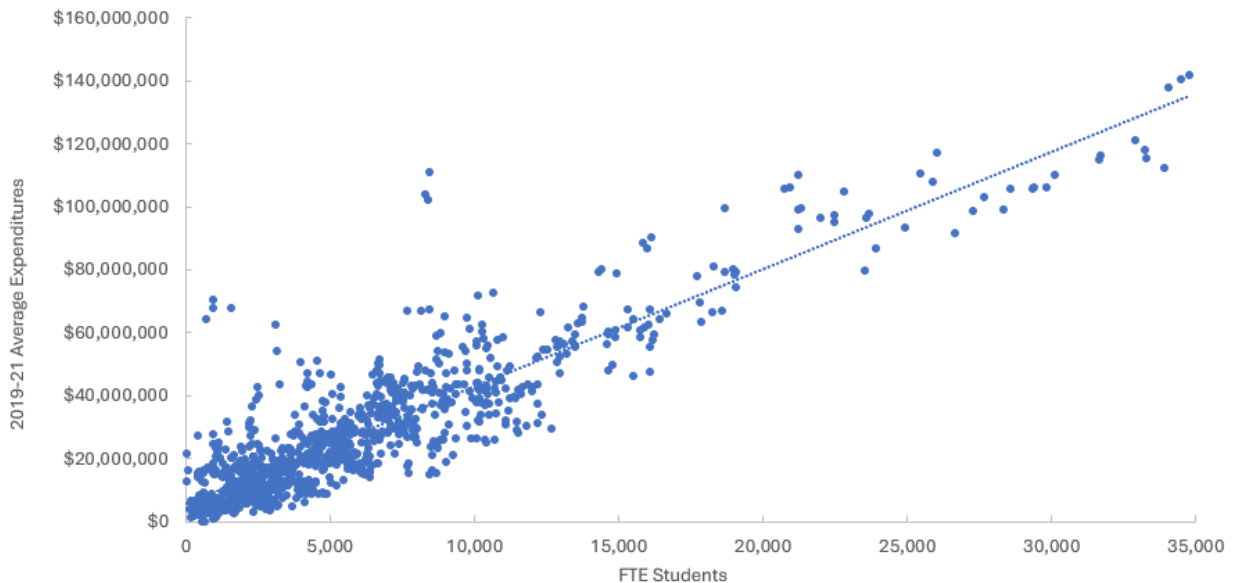
Figure 37. Results of Selected Frugal Base Calculation Methods

	Adjusted GF E&G Funding, FY2020	National Percentiles		Simple Regression	
		Frugal Base Estimate	Percent of Adjusted GF E&G	Frugal Base Estimate	Percent of Adjusted GF E&G
CNU	\$32,004,894	\$10,222,115	31.9%	\$9,030,319	28.2%
GMU	\$150,008,897	\$79,435,311	53.0%	\$53,814,968	35.9%
JMU	\$93,685,443	\$44,599,271	47.6%	\$27,339,521	29.2%
LU	\$30,153,255	\$8,854,530	29.4%	\$8,301,946	27.5%
NSU	\$48,623,485	\$10,761,563	22.1%	\$9,317,628	19.2%
ODU	\$128,201,285	\$48,734,289	38.0%	\$33,450,447	26.1%
RU	\$54,761,909	\$19,911,104	36.4%	\$14,190,654	25.9%
UMW	\$28,383,863	\$8,660,666	30.5%	\$8,198,695	28.9%
UVA	\$130,477,645	\$63,662,377	48.8%	\$43,352,507	33.2%
UVAW	\$19,976,503	\$3,221,936	16.1%	\$5,606,182	28.1%
VCU	\$182,351,362	\$68,590,647	37.6%	\$46,621,514	25.6%
VMI	\$12,336,688	\$4,043,752	32.8%	\$5,739,735	46.5%
VSU	\$37,139,120	\$8,915,640	24.0%	\$8,334,493	22.4%
VT	\$148,527,187	\$92,305,630	62.1%	\$62,352,074	42.0%
WM	\$47,667,274	\$20,960,586	44.0%	\$15,027,667	31.5%
RBC	\$8,269,500	\$2,104,510	25.4%	\$3,067,897	37.1%
VCCS	\$388,470,679	\$163,154,999	42.0%	\$127,480,024	32.8%

A major impediment to the adoption of any approach that relies on regression is the degree to which it can be easily understood. However, a bivariate regression like the one used for the Simple Regression option is relatively straightforward. The details are discussed below, but in general terms, using a regression is a typical approach used to add meaning to a two-dimensional scatterplot. In Figure 38, the position of all the nation’s public four-year

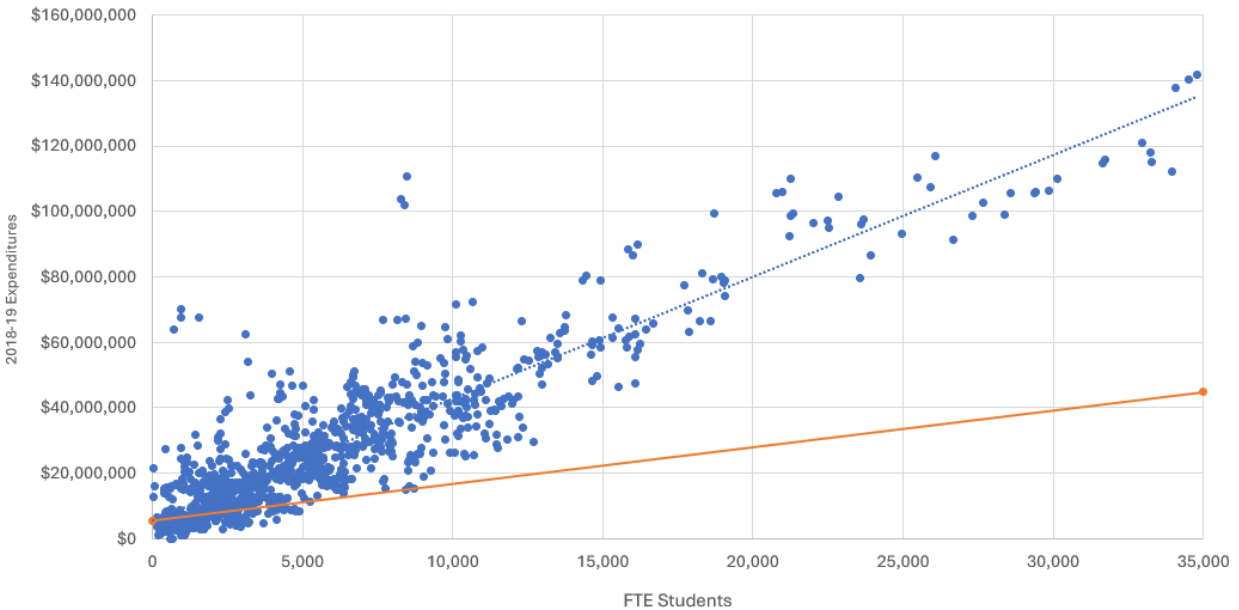
comprehensive institutions are indicated with dots based on their FTE enrollment and their expenditures on institutional support and academic support, with both values averaged over the most recently available three fiscal years. Looking just at the dots, it's apparent that, with few exceptions, they fall in a range that begins below \$20M and slopes upward. The line that is graphed is the resulting regression line that best describes the relationship between expenditures and enrollments. Roughly speaking, it suggests that at every enrollment level, institutions will tend to spend a certain amount on core administration and academic support activities, on average. Thus, this line would predict how much an average institution of the same size as any given Virginia institution would pay for these functions. This relationship is mathematically described as a y-intercept (\$5.3M) plus a coefficient (\$3,741) multiplied by the known enrollment. Using this graph, the average institution with 3,000 students would spend \$16.6M for base funds (i.e., $\$5.3M + \$3,741 * 3,000 = \$16.6M$).

Figure 38. Bivariate Regression, IS+AS%, Public Comprehensive Four-Year Institutions



But in this case, the goal is not to establish a frugal base spending level equivalent to the average. In particular, it is important to reduce the slope of the line to discount for the extent to which accounting standards will tend to make both the institutional support and academic support data reported to IPEDS more dependent on enrollment than is appropriate for our purposes. That is, more students require more academic advisors, for example. But the frugal base is mainly to address the need for leadership of academic advising activities, while the Scale calculations will estimate marginal expenses of adding academic advisors to serve a growing student population. Thus, the model uses a deliberately reduced value for the y-intercept and the coefficient, producing a new line (the orange line in Figure 39) that seeks to define a reasonably frugal level of spending on these functions.

Figure 39. Bivariate Regression With “Frugal” Line



Calculations for the frugal base—the Foundational costs and the costs for Maintenance and Renewal of the state assets—have two elements. Estimates for the foundational costs were calculated based on a deliberately straightforward regression of full-time-equivalent enrollment on administrative expenses from IPEDS averaged over FY2017-19. The expenses used were institutional support plus a portion of academic support equal to the proportion of instruction over the sum of instruction, research, and public service expenditures. This proportion seeks to account for the costs associated with the teaching part of the traditional tripartite mission of higher education alone, and conceptually assumes academic support costs associated with research and public services are to be covered by non-state revenue (external research funding and purchases of services, for example). Results from the regression are provided in Figure 40.

Figure 40. Results of Foundational Funding Regression

Sector	R ²	Y-Intercept	Coefficient
Public Research	0.55	\$1,677,830	\$5,462
Public Comprehensive	0.81	\$5,352,301	\$3,741
Public Two-Year	0.74	\$2,126,383	\$3,043

Before plugging these values into the calculation of the foundational base, both the y-intercept and the coefficient were reduced such that this base should be set at a frugal level. In effect, this has the effect of reducing both the level of administrative support the state should be expected to pay for zero students (the y-intercept) and the amount of funding the state should be expected to pay to address the costs of administration and academic support that cannot be disentangled from enrollment levels (the slope of the regression line). Without these

adjustments, it would suggest that the expenses for minimal administrative costs should reflect the national average of these costs rather than some more efficient, frugal level.

The second element added an estimate for the costs of maintaining and renewing the institution, including a portion of its facilities and grounds, equipment, and curriculum. As described earlier, these costs are what are necessary to keep conditions from worsening and the value of the institution's assets from declining. It does not include significant upgrades to facilities or reductions in the deferred maintenance backlog. For facilities costs, since Virginia lacks data on the replacement value of facilities that would be a better measure for this purpose, the model uses the average costs incurred for operations and maintenance over the previous three years. For the costs of maintaining equipment, the model uses IPEDS data for depreciation in lieu of Virginia data due to the unusual way in which Virginia pays and accounts for a large amount of institutions equipment costs through bond financing.

The maintenance and renewal calculation also includes an estimate of the cost associated with preventing the intellectual property reflected in the curriculum remains equally fresh and relevant from year to year. Following industry practices for these investments, the model uses a portion of the total wages for full-time faculty and staff.

Scale and Scope

To generate the Scale and Scope estimates, the model relied on attempted SCHs over a three-year period as supplied by SCHEV. The data provided were broken down by institution, academic year, Classification of Instructional Program (CIP) two-digit code, level of instruction (developmental, lower-division, upper-division, master's, first-professional, and doctoral), student residency, and race/ethnicity. In addition, the file included SCHs earned for all students in each of these combination of categories as well as for all Pell Grant recipients and non-metro students. (This latter group was not used because Virginia does not have a consensus definition for rural students.)

NCHEMS generated calculations of unweighted SCHs using this file simply by summing the SCHs for all student and Pell Grant recipients and for all students in each of those categories and for all Virginia residents only. Next the number of SCHs for each institution and each of these groups was recalculated with additional weight being given to SCHs based on the discipline (CIP2) and level at which the SCHs were offered. In the process, CIP2-level disciplines were combined into clusters of roughly similar costs of delivery—the lowest weights tended to be lower-division courses in disciplines that rely on few equipment needs beyond a classroom and a teacher while weights increased as the level rose, and as pedagogical requirements increased for equipment, smaller student-faculty ratios, and lab experiences. Weighting schedules were gathered from several states that conduct cost studies on a regular basis, or that use a weighting scheme that they have derived through another analytical process. In general, these weighting schemes share certain characteristics of relevance to their use in this funding model. States that use weights develop them through different methods that create differences in their relative values and may also use different methods for different institutional sectors. It is uncommon for weights to be calculated for certain programs especially

in first-professional programs in health care such as programs in medicine, dentistry, and pharmacy. Finally, states sometimes make judgment calls about the appropriate value of a disciplinary-level weight based on state priorities of political considerations, which can serve as a source of variation across states. Nevertheless, variation across disciplines in the value of the weights is relatively modest for undergraduate level instruction. Variation is relatively higher at the graduate level.

An example of a state weighting scheme is provided in Figure 41 (these are the Nevada weights applicable to universities).

Figure 41. Example of Discipline-Level SCH Weights

	Lower Division	Upper Division	Master's	Doctoral
Liberal Arts, Math, Social Science, Languages, Other	1.0	2.2	4.4	5.5
05 Area, Ethnic, Cultural & Gender Studies	1.0	2.2	4.4	5.5
09 Communication, Journalism and related programs	1.0	2.2	4.4	5.5
16 Foreign Languages, Literature and Linguistics	1.0	2.2	4.4	5.5
19 Family and Consumer Sciences/Human Sciences	1.0	2.2	4.4	5.5
23 English Language & Literature/Letters	1.0	2.2	4.4	5.5
24 Liberal Arts & Sciences, General Studies and Humanities	1.0	2.2	4.4	5.5
25 Library Science	1.0	2.2	4.4	5.5
27 Mathematics & Statistics	1.0	2.2	4.4	5.5
28 Reserve Officer Training Corps	1.0	2.2	4.4	5.5
29 Military Technologies	1.0	2.2	4.4	5.5
30 Multi/Interdisciplinary Studies	1.0	2.2	4.4	5.5
38 Philosophy & Religious Studies	1.0	2.2	4.4	5.5
42 Psychology and Applied Psychology	1.0	2.2	4.4	5.5
45 Social Sciences	1.0	2.2	4.4	5.5
54 History	1.0	2.2	4.4	5.5
99 Honors Curriculum and Other	1.0	2.2	4.4	5.5
Basic Skills Cluster	1.5			
32 Basic Skills	1.5			
Business Cluster (Business, Public Administration)	1.0	2.2	4.4	6.6
44 Public Administration & Social Service Professions	1.0	2.2	4.4	6.6
52 Business Management, Marketing & related support services	1.0	2.2	4.4	6.6
Education Cluster	1.5	2.2	2.8	5.5
13 Education	1.5	2.2	2.8	5.5
Services Cluster (Personal, Protective, Recreation)	1.5	2.2	3.3	4.4
31 Parks, Recreation, Leisure & Fitness Studies	1.5	2.2	3.3	4.4
36 Leisure and Recreational Activities				
12 Personal & Culinary Services	1.5	2.2	3.3	4.4
43 Security and Protective Services	1.5	2.2	3.3	4.4
Visual and Performing Arts Cluster	1.5	2.75	5.5	5.5
50 Visual & Performing Arts	1.5	2.75	5.5	5.5
Trades/Tech Cluster (Construction, Mechanic Tech, Precision Production)	2.0	2.75		
46 Construction Trades	2.0	2.75		
47 Mechanic Repair Technologies/Technicians	2.0	2.75		
48 Precision Production	2.0	2.75		
49 Transportation & Materials Moving	2.0	2.75		
Sciences Cluster (Agriculture, Computer, Biology, Physical)	2.0	3.3	5.5	8.8
01 Agricultural, Agriculture Operations & related sciences	2.0	3.3	5.5	8.8
03 Natural Resources & Conservation	2.0	3.3	5.5	8.8
11 Computer & Information Sciences & Support Services	2.0	3.3	5.5	8.8
26 Biological & Biomedical Sciences	2.0	3.3	5.5	8.8
40 Physical Sciences	2.0	3.3	5.5	8.8
Law Cluster	2.0	2.2	4.4	4.4
22 Legal Professions and Studies	2.0	2.2	4.4	4.4
Engineering/Architecture Cluster	2.0	3.3	5.5	8.8
04 Architecture	2.0	3.3	5.5	8.8
14 Engineering	2.0	3.3	5.5	8.8
15 Engineering Technologies/Technicians	2.0	3.3	5.5	8.8
Health Cluster	2.0	2.2	5.5	8.8
51 Nursing, Allied Health. Health Professions	2.0	2.2	5.5	8.8

Audience

In addition to the weighting by discipline and level, NCHEMS' development of the model made it possible to include weights for SCHs attempted by Pell Grant recipients and underrepresented racial/ethnic minorities. When this parameter is selected, the value of the Pell or URM weight (or both together) is applied to the SCH value before the disciplinary-level weight is applied. For instance, if there are 100 SCHs attempted in upper-division history (using the schedule above), of which 50 are attempted by a Pell Grant recipient, and the additional weight given to SCHs attempted by a Pell Grant recipient is 0.5, the weighted SCHs is given by the quantity of total SCHs-Pell SCHs plus Pell SCHs times the Pell weight, all multiplied by the discipline-level weight, or $((100-50) + 50*0.5)*2.2=275$ weighted SCHs.

Alternatively, the model accommodates weighting the student audience using a dollar amount applied to the number of students from underrepresented racial/ethnic populations or Pell Grant recipients. These headcount data were provided by SCHEV. In this case, no weights are added to the SCHs attempted by these populations.

In the model, the calculations for Scale, Scope, and Audience are summed.

Cost-Sharing Targets

A critical decision point in the final implementation of the funding model is to select appropriate cost-sharing targets. This exercise will determine whether the state and the institutions—in appropriating state funds and in setting tuition prices, respectively—have struck an appropriate balance in sharing the financial burden of operating Virginia's public institutions. As this report argues, the cost-sharing targets should not be fixed across all institutions but should rather vary in accordance with each institution's mission—particularly as reflected in the academic programs it offers and the characteristics of the students it serves—and its ability to raise tuition revenue by penetrating student markets both within Virginia and elsewhere. A comparison of the extent to which each institution relies on tuition revenue relative to state appropriations is given by Figure 42. While the measures in this table are different (both in terms of source and in net versus gross, and so cannot be directly compared with one another), it is possible to discern patterns in the variation: NSU, UVA-Wise, VSU, RBC, and VCCS are among those with the least reliance on tuition revenue—and correspondingly more on state appropriations—while UVA and W&M are on the other end of the spectrum. This is not surprising, but it does pinpoint the value and need for differences in the expectations of the state for how it should share the financing burden with institutions (and their students) differently. It also helps to identify what the appropriate target should be for each institution

Figure 42. Tuition Revenue as a Percent of Total Educational Revenue

Source	IPEDS	SCHEV
Measure	Net T&F Revenue Share, FY2018	NGF Share, FY2020
CNU	56.1%	59.6%
GMU	69.9%	74.8%
JMU	71.3%	71.1%
LU	47.6%	58.1%
NSU	31.3%	44.8%
ODU	49.1%	57.6%
RU	49.8%	58.2%
UMW	46.6%	63.3%
UVA	79.3%	81.3%
UVAW	29.9%	34.8%
VCU	60.1%	70.3%
VMI	66.2%	71.2%
VSU	33.0%	49.0%
VT	66.7%	77.2%
WM	70.4%	78.1%
RBC	33.4%	40.9%
VCCS	45.8%	56.2%

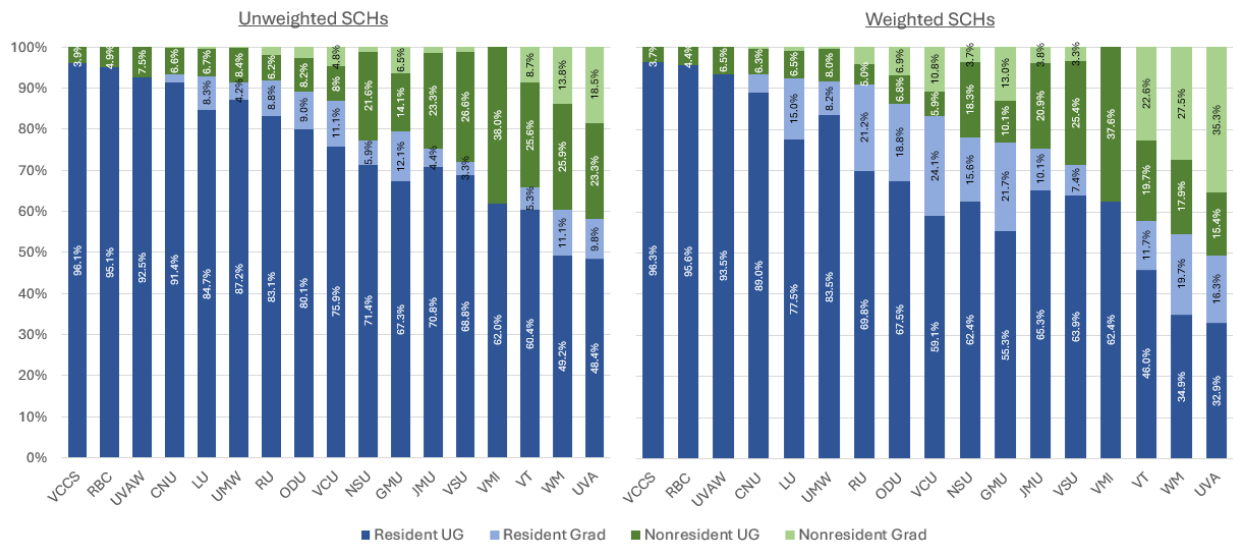
Note: Net T&F Revenue Share is calculated as net tuition revenue over the sum of net tuition revenue plus state and local appropriations. NGF Share is calculated as the NGF appropriations for E&G program divided by the sum of NGF and GF E&G appropriations.

Sources: SCHEV, IPEDS.

Also, interestingly and potentially a consideration for how Virginia policymakers ultimately set the appropriate levels of cost-sharing in this model is the mix of resident and nonresident students at Virginia’s institutions, especially when factoring in the costs of instruction for each group. Nonresidents are required by statute to pay at least 100 percent of their costs, so the calculation of SCHs produced on a weighted basis can help guide that decision. Figure 43 shows how the production of attempted credit hours is divided among students by residency and level. For example, it shows that while over 96 percent of VCCS’s SCHs were attempted by resident undergraduates, just over 48 percent were at UVA. Adding Virginians enrolled in graduate programs and residents accounted for 58.2 percent of UVA’s SCHs. A second observation is that weighting by discipline and level tends to result in a larger proportion of SCHs occurring at the graduate level, which is unsurprising since weights get progressively higher at all disciplines as level rises. But because the overall proportion of SCHs accounted for by residents shrinks, this graph suggests that nonresidents are enrolling in higher-cost programs, on average. For instance, when weighted SCHs are used, UVA’s total SCH production attributable to residents falls to barely over 50 percent of the instructional activity. To the degree that higher-cost programs are also those that may be more workforce-relevant, Virginia’s policymakers should be cautious in adjusting funding too much in lockstep with these

data, lest they inadvertently compromise the benefits that accrue from the recruitment of nonresidents to Virginia.

Figure 43. Unweighted and Weighted SCHs by Residency and Level



Note: Weights are for discipline and level only.

Source: SCHEV

Nevertheless, these data may be useful in refining the cost-sharing targets to be set in the funding model. For example, recalling that the state is solely responsible for the frugal foundational costs leaves 89 percent of W&M's total instructional costs to be shared. Of that portion, nonresidents consume 54.6 percent of its instructional costs (based on weighted SCHs). Multiplying those two portions together (0.888×0.546) = 48.6 percent. If Virginia were to apply its cost-sharing target to the portion of the estimated instructional costs associated with residents, then 67 percent of that share leaves the cost-sharing amount for use in the model at 32.4 percent. Running this calculation out for all the institutions leaves a set of cost-shares as shown in Figure 44.

Figure 44. Cost-Share Target Calculations

	SSA Costs as Percent of Model's Calculated Total Costs	Proportion of Weighted SCHs Attempted by Residents	Share of Residents' SSA	Cost-Share Target
CNU	82.1%	93.3%	76.6%	51.1%
GMU	91.3%	76.9%	70.2%	46.8%
JMU	89.1%	75.4%	67.1%	44.8%
LU	84.9%	92.5%	78.5%	52.3%
NSU	84.2%	78.0%	65.6%	43.8%
ODU	91.2%	86.3%	78.8%	52.5%
RU	88.3%	91.0%	80.4%	53.6%
UMW	83.8%	91.7%	76.8%	51.2%
UVA	73.2%	49.3%	36.0%	24.0%
UVAW	75.1%	93.5%	70.2%	46.8%
VCU	67.6%	83.2%	56.3%	37.5%
VMI	77.3%	62.4%	48.3%	32.2%
VSU	85.2%	71.3%	60.8%	40.5%
VT	82.5%	57.7%	47.6%	31.7%
WM	89.0%	54.6%	48.6%	32.4%
RBC	77.4%	95.6%	74.0%	49.3%
VCCS	89.4%	96.3%	86.1%	57.4%

Appendix F. Comparison Groups

NCHEMS' Comparison Group Selection Service (CGSS) is designed to aid institutions in selecting a group of institutions which are similar in mission to be used in comparative data analyses. CGSS has been in use at NCHEMS since 1982 and has been used by hundreds of institutions.

CGSS consists of two primary components. The first is a large database containing indicator variables on each of more than 7,000 higher education institutions. This database is constructed from data files derived from the various surveys which make up the Integrated Postsecondary Education Data System (IPEDS) survey system administered by the National Center for Education Statistics (NCES, a part of the U.S. Department of Education in Washington, D.C.). The indicator database contains variables covering institutional characteristics, faculty, finance, degrees awarded, academic programs, enrollments, research and other expenditures, and other miscellaneous data.

The second component of the CGSS is a set of algorithms designed to condense the 7,000+ institutions in the indicator database down to a useable list of potential peers for the target institution. These algorithms use a set of selected criteria to determine which institutions appear on the possible comparison institution list and their associated relative rankings within the list. Depending on the selection criteria described below, this list can be 100 institutions or more, with each institution assigned a ranking based on the criteria used.

In order to avoid selecting peers on the basis of the key variables of interest such as funding levels or student outcomes, NCHEMS only relies on data that describe institutions' relative similarities on the basis of mission, size, program array (by level and field), student body characteristics, faculty characteristics, geographic location, and other special characteristics like an institution's status as a minority-serving institution. Only after finalizing a set of peers does NCHEMS pull data on other key characteristics like funding and student outcomes.

Part I: Selection Criteria

The selection criteria work as a filtering mechanism to eliminate characteristically dissimilar institutions from the institution comparison list. An institution that does not satisfy any one of the selection criteria is excluded from further consideration as a comparison institution. For the set of Virginia institutions, selection criteria included sector (public), the 2018 Basic Carnegie Classification (the Carnegie group an institution belongs to, generally Doctorate, Masters, Bachelor's, or Associates), whether an institution is Land Grant or not, and whether it has a medical school or not. Institutions not meeting the specified criteria selected for each Virginia institution were eliminated from consideration as potential peers.

Part II: Weighting Criteria

Once the universe of possible comparison institutions has been reduced by the selection criteria specified in Part I, the Weighting Criteria can be used to rank the remaining institutions from most similar to most dissimilar with respect to the weighting criteria (variables) selected.

There are two ways that the Weighting Criteria affect the rankings of possible comparison institutions. The first way is through the specification of a range for each variable. The range for each weighting variable is set according to the target institution value. An institution which falls within the set range of values is not affected by that variable in terms of its order/placement on the comparison institution listing. An institution whose value for a particular variable falls outside of the range specified will accumulate “distance points” and will be moved lower in the listing than an institution which falls within the range.

The second way that weighting variables have an effect is through the level of importance assigned to them, which determines the number of distance points assigned to an institution for being outside the range of values for a given weighting variable. Those that fall outside of the range on a variable which has been assigned “Very Important” will receive 100 distance points and those that fall outside the range on a variable which has been assigned “Important” will receive 50 distance points. Institutions that fall within the specified range receive 0 distance points. Since institutions are ranked in ascending order by the number of distance points they accumulate, institutions with a higher accumulation of points across the weighting variables selected will be viewed as less similar than the target institution and appear lower on the list.

The weighting criteria selected for the Virginia peer analysis included fall and annual enrollment characteristics (FTE, time-status of students), distribution of awards conferred by award level, number of programs offered by award level, program array and associated distribution of awards, total research expenditures and research expenditures relative to instruction expenditures, endowment per FTE, and percent of undergraduates receiving Pell assistance.

Part III: Additional Adjustments

At this point, NCHEMS has a list of candidates to be selected as peers for the target institution, ordered by their distance scores. But the mechanics of creating that ordering may have overlooked important characteristics that make each candidate institution either a stronger or weaker match for the target institution, necessitating a further review to make additional adjustments to the list of peers. Institutions can be excluded due to known special characteristics not available/included in the selection criteria or for whom critical criteria fall farther outside the target than is acceptable (an institution may have a low distance score but fail on one or two critical criteria which would be grounds for exclusion from the final list of peers). Among the characteristics receiving special additional consideration include student body characteristics like race/ethnicity, location—both in terms of setting (urban/suburban/rural) and state (in part to ensure a reasonable diversity of environmental characteristics like state

funding policies, NCHEMS tends to avoid selecting more than two institutions from the same state, and we also avoided choosing other institutions in the same state), Carnegie classifications schema, and other special characteristics such as HBCUs.

Once the list is final with observed distance scores, a set of institutions most-like the target institution can be selected and used for comparative data analyses. Generally, 10-20 institutions were selected depending on the distribution of distance scores and how well institutions matched on critical criteria.

Part IV: Triangulation of Results

To enhance the previous methodology used, NCHEMS also employed a Hierarchical Cluster Analysis and associated proximity matrix with proximity scores to help triangulate the appropriateness of each set of potential peers. This process led NCHEMS to determine that a given institution not previously selected was a better match than originally assessed or that an institution previously selected as a peer was not as good a choice as an alternative. In those rare cases, peer groupings were adjusted accordingly to fine-tune the final set of peers selected.

Selecting System Peers for VCCS

NCHEMS altered this methodology to gather a peer group for VCCS to accommodate the need to identify and gather data on similar systems. Rather than look for institutions to match each constituent institution in the VCCS, NCHEMS surveyed the nation for systems of primarily two-year institutions for those with a mix of institutions with similar characteristics. Having identified candidate systems, NCHEMS gathered information about the number of institutions within each system that offered bachelor’s degrees (and above), were located in similar geographic locales, and were categorized in similar Carnegie classifications using the Basic classification and the Undergraduate Instructional Program classification. Subsequent analyses aggregated all relevant data to the system level, with any values assigned to the system office itself included as well.

Peers for Each Virginia Institution

Virginia institution	Peers Identified in the Interim Report	Peer Institutions Added for the Final Report
Christopher Newport University	SUNY College at Geneseo Eastern Connecticut State University SUNY Oneonta Truman State University Ramapo College of New Jersey University of Wisconsin-River Falls California State University-Monterey Bay Westfield State University Humboldt State University The University of Tennessee-Martin	Eastern Oregon University Wayne State College Henderson State University The Evergreen State College Salisbury University Shippensburg University of Pennsylvania
College of William and Mary	University of Oregon Binghamton University SUNY at Albany Miami University-Oxford	Montclair State University University of Nebraska at Omaha Rutgers University-Newark University of West Georgia Texas A&M University-Commerce

	University of New Hampshire-Main Campus University of California-Santa Cruz University of California-Santa Barbara University of Colorado Boulder	University of North Texas
George Mason University	University of Oklahoma-Norman Campus University of Memphis University of North Texas Florida State University University of Houston The University of Texas at San Antonio Texas State University University of Delaware Georgia State University University of Wisconsin-Milwaukee The University of Texas at Dallas University of Massachusetts-Amherst	University of North Carolina at Charlotte Portland State University Texas Tech University Kent State University at Kent The University of Alabama Miami University-Oxford
Norfolk State University	Delaware State University Bowie State University Fayetteville State University Texas A & M International University Frostburg State University SUNY Buffalo State Alabama State University University of North Carolina at Pembroke Lincoln University William Paterson University of New Jersey Missouri Western State University North Carolina Central University The College of New Jersey	New Jersey City University Southern Connecticut State University Grambling State University Western Illinois University Morehead State University Delta State University Rhode Island College Central Connecticut State University University of Houston-Clear Lake
James Madison University	Stockton University University of Wisconsin-La Crosse West Chester University of Pennsylvania Florida Gulf Coast University California State University-Sacramento University of North Carolina Wilmington Appalachian State University Eastern Washington University Illinois State University Miami University-Oxford	Southeastern Louisiana University Western Carolina University Rowan University San Francisco State University Kean University University of Central Oklahoma California State University-Chico Western Washington University Eastern Kentucky University
Longwood University	Truman State University Ramapo College of New Jersey Eastern Connecticut State University Westfield State University SUNY at Fredonia Worcester State University SUNY College at Plattsburgh California State University-Channel Islands The University of Tennessee-Martin Indiana University-South Bend Winthrop University Fayetteville State University	University of Mobile SUNY Cortland Western Oregon University University of North Carolina at Pembroke Colorado State University-Pueblo Missouri Western State University
Old Dominion University	Northern Illinois University Cleveland State University University of Colorado Colorado Springs Indiana State University Western Michigan University University of Memphis University of North Carolina at Charlotte Georgia Southern University	University of Massachusetts-Boston University of North Carolina at Greensboro Towson University Portland State University California State University-Fresno The University of Texas at El Paso Middle Tennessee State University Missouri State University-Springfield

	University of Louisiana at Lafayette Bowling Green State University-Main Campus Eastern Michigan University	Illinois State University
Radford University	Salisbury University University of Wisconsin-La Crosse Kean University State University of New York at New Paltz Coastal Carolina University Stockton University SUNY College at Brockport California State University-Stanislaus Salem State University Southern Connecticut State University University of North Carolina at Pembroke SUNY Cortland University of North Alabama Worcester State University Sonoma State University	Georgia College & State University Central Connecticut State University California State University-Bakersfield University of Central Oklahoma
University of Mary Washington	Eastern Connecticut State University SUNY College at Geneseo Ramapo College of New Jersey SUNY Oneonta Truman State University Western Colorado University Westfield State University Concord University University of Wisconsin-River Falls University of Montevallo SUNY at Fredonia California State University-Monterey Bay Western Oregon University Southern Oregon University Winthrop University The University of Tennessee-Martin University of South Florida-St Petersburg	California State University-Channel Islands Indiana University-Southeast
University of Virginia	University of North Carolina at Chapel Hill University of Iowa University of Utah University of Kansas University of California-Los Angeles University of Michigan-Ann Arbor University of Washington-Seattle Campus University of California-San Diego University of Maryland-College Park The University of Texas at Austin University of Pittsburgh-Pittsburgh Campus University of Wisconsin-Madison	University of Colorado Boulder University of New Mexico University of Nebraska-Lincoln University of California-Irvine
University of Virginia – Wise	University of Science and Arts of Oklahoma University of New Hampshire at Manchester University of South Carolina Beaufort University of North Carolina at Asheville University of Hawaii-West Oahu Massachusetts College of Liberal Arts St. Mary's College of Maryland Fort Lewis College University of Maine at Farmington Dickinson State University Concord University	University of South Carolina Aiken Lander University University of Minnesota-Crookston Central State University Rogers State University Montana State University-Northern

	University of Wisconsin-Parkside	
Virginia Commonwealth University	University of Kansas Florida State University University of Iowa University of New Mexico-Main Campus University of Louisville University at Buffalo University of South Carolina-Columbia University of Utah Indiana University-Purdue University-Indianapolis Florida International University University of Illinois at Chicago Wayne State University University of Mississippi University of California-Irvine University of Kentucky Temple University	Stony Brook University University of Cincinnati
Virginia Military Institute	University of New Hampshire at Manchester University of Pittsburgh-Johnstown University of North Carolina at Asheville Fort Lewis College Massachusetts Maritime Academy Maine Maritime Academy Lander University California State University Maritime Academy SUNY College of Agriculture and Technology at Cobleskill Citadel Military College of South Carolina Florida Polytechnic University West Virginia University Institute of Technology	St. Mary's College of Maryland University of Minnesota-Morris University of South Carolina Beaufort Keene State College University of South Carolina Aiken University of Minnesota-Crookston
Virginia State University	Delaware State University South Carolina State University Alabama A & M University New Jersey City University Bowie State University Fayetteville State University Texas A & M International University Alcorn State University Alabama State University Winthrop University Savannah State University Lincoln University The University of Tennessee-Martin Fort Valley State University	Frostburg State University SUNY at Fredonia University of North Carolina at Pembroke University of Houston-Clear Lake Henderson State University Ramapo College of New Jersey
Virginia Tech	Iowa State University North Carolina State University at Raleigh The University of Tennessee-Knoxville University of Maryland-College Park Auburn University University of Illinois at Urbana-Champaign Colorado State University-Fort Collins Washington State University Oregon State University Michigan State University Kansas State University Purdue University-Main Campus	Louisiana State University West Virginia University University of Arizona

	<p>Texas A & M University-College Station Rutgers University-New Brunswick University of Kentucky University of California-Davis University of Florida</p>	
<p>Richard Bland College</p>	<p>University of South Carolina-Union Northeast Lakeview College Pierce College-Puyallup University of South Carolina-Sumter University of South Carolina-Salkehatchie Kent State University at Trumbull Clovis Community College Los Angeles Harbor College South Mountain Community College New Mexico Junior College Sussex County Community College CUNY Stella and Charles Guttman Community College</p>	<p>Warren County Community College North Central Michigan College Snead State Community College Seminole State College of Florida West Hills College-Coalinga Redlands Community College</p>
<p>Virginia Community College System</p>	<p>Colorado Community College System Community College System of New Hampshire Illinois Community College Board Ivy Tech Community College Kentucky Community and Technical College System Louisiana Community and Technical College System Minnesota State University (Two-Year Institutions Only) North Carolina Community College System Oregon Community College Association SUNY Community Colleges Tennessee Board of Regents Community Colleges Washington State Board for Community and Technical Colleges</p>	<p>None Added</p>