LINKING JOBS AND TALENT: LANDING AMAZON HQ2 IN VIRGINIA

MHEC Annual Commission Meeting – November 9, 2020

VEDP Virginia Economic Development Partnership VEDP.org

IN JUST THE LAST DECADE, WORKFORCE AVAILABILITY HAS RISEN TO THE TOP OF SITE-SELECTION CONSIDERATIONS

In 2008, top site consultants in the U.S. ranked "availability of skilled labor" as the **third** most important site-selection factor; in 2018, they ranked it **no. 1**

In 2008, corporate real estate execs in the U.S. ranked "availability of skilled labor" as the **sixth** most important site-selection factor; in 2018, they ranked it **no. 1**

Source: *Area Development* surveys (2008 and 2018); VEDP analysis

VIRGINIA HAS MANY EDUCATION STRENGTHS TO BUILD ON AS IT WORKS TO BECOME AMERICA'S BEST-EDUCATED STATE BY 2030

- PreK-12 and higher education in Virginia represent perennial state selling points for VEDP (e.g., higher ed ranked no. 2 by SmartAsset, best public schools in the South by WalletHub)
- USN&WR ranks many public/private Virginia institutions strongly overall, with UVA, William & Mary, and Virginia Tech all ranking in the top 30 for public universities in the U.S.
- Bachelor's degree attainment among the highest in America
- Decentralized higher education governance model, like that of the U.S. overall, is a defining aspect of the VA higher ed
- FastForward through the Virginia Community College System (VCCS) is helping address demand for sub-baccalaureate postsecondary credentials

EDUCATION IN VIRGINIA: AREAS FOR IMPROVEMENT (WHICH ALSO EXIST IN MOST OTHER STATES, AS WELL)

- Big gaps remain in early childhood education (and child care), which is the foundation of the entire talent pipeline
- Insufficient pipeline of skilled trades completers (e.g., electricians, machinists, welders, industrial maintenance) in multiple regions
- Tech-talent pipeline not sufficient to address large number of openings, including but not limited to Northern Virginia / DC metro
- Persistently high levels of underemployment among full-time employed individuals with a bachelor's degree or higher (roughly 25% – better than many other states but still too high)
- Educational attainment and performance disparities between rural and urban areas, and between Northern Virginia and other regions

amazon

25,000

NEW JOBS

$2.5B

CAPEX

Northern Virginia

SETTING THE STAGE: SEPTEMBER 6-7, 2017

September 6, 2017 (the day before)

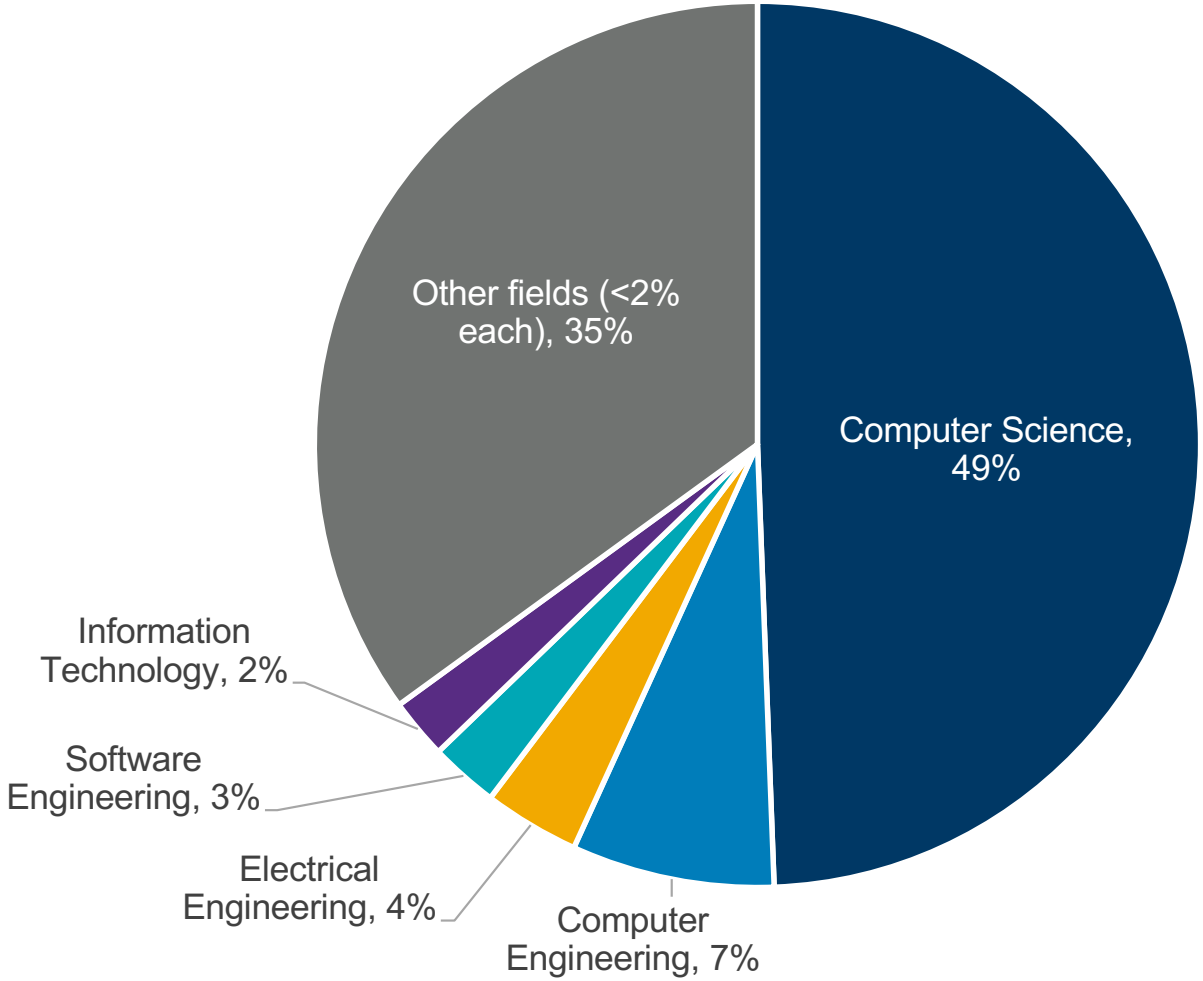
- In Virginia, the state economic development leader (CEO of VEDP) is an ex-officio, voting member of the state higher education coordinating board
- Draft of five-year state economic development plan envisioned tech as the biggest job growth driver, with one constraint – the tech talent pipeline
- Two potential solutions – statewide CS education push (K12 and higher ed) and a new tech campus in Northern Va. – would cost hundreds of millions

September 7, 2017 (HQ2 competition begins)

- Amazon releases RFP launching a competition for the largest competitive, private-sector economic development project in U.S. history
- Top selection criteria: attractive site/building, operating costs, incentives, **talent (especially tech talent availability and pipeline)**, connectivity (e.g., flights, transit, broadband), cultural fit, and quality of life
- VEDP day-one assessment: many competing states will offer $5-10 billion or more in incentives – a sum Virginia would not consider

COMPUTER SCIENCE IS THE DOMINANT DEGREE FIELD TIED TECH-INTENSIVE JOBS, SUCH AS SOFTWARE ENGINEERING

Distribution of degrees by field for tech employees at Amazon Seattle HQ



Additional perspectives on tech-talent pipelines:

VEDP analysis of U.S. Census ACS microdata indicates that computer science is, by far, the most common major for college grads working in software development or computer programming positions in the U.S. overall as well as in the DC/MD/VA region

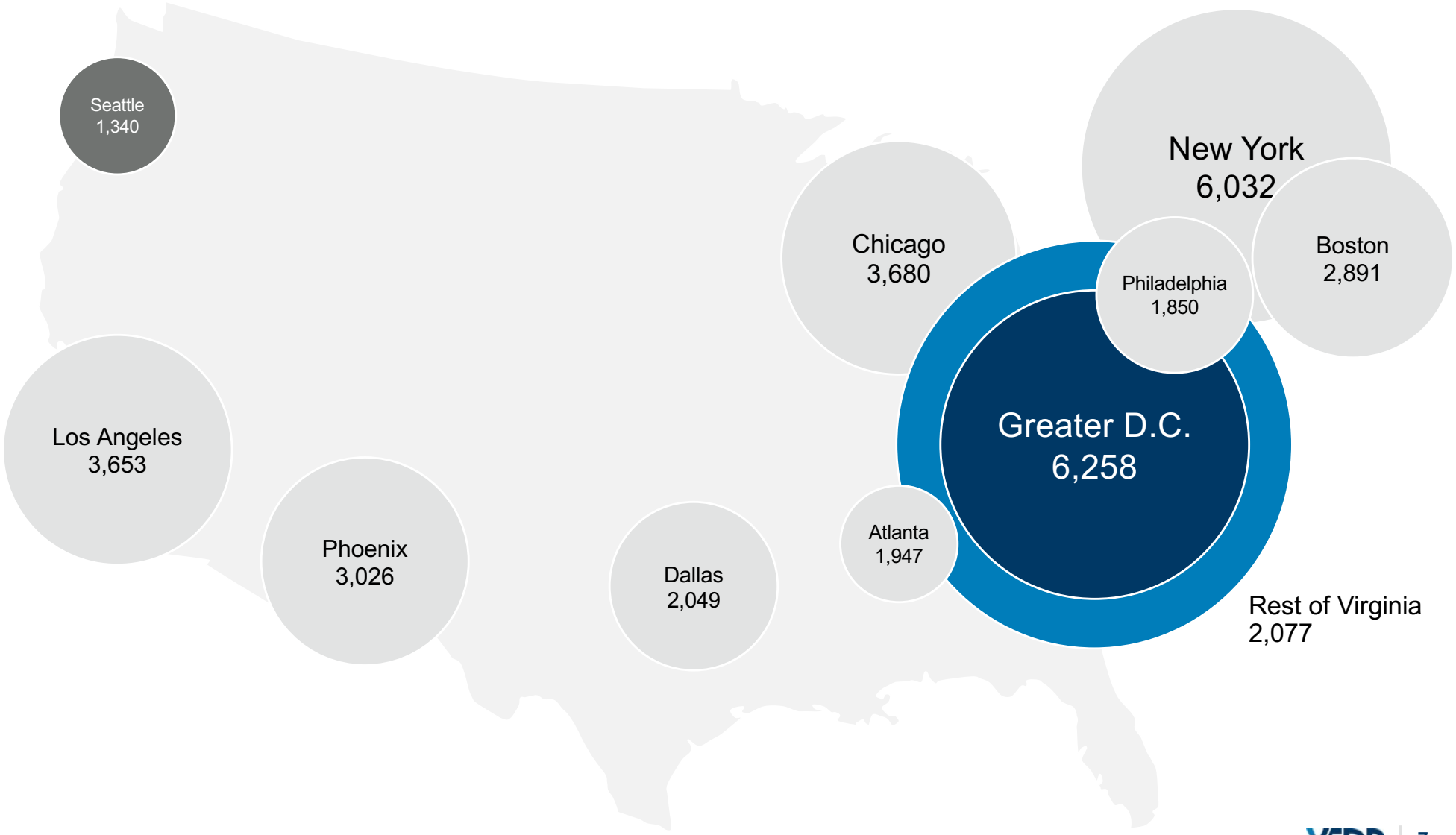
Interviews and focus groups with many tech employers confirmed computer science as the principal college degree field of concern re: strengthening the tech-talent pipeline in Virginia (in addition to alternative pathways, e.g., coding boot camps)

Source: social media data; U.S. Census American Community Survey; VEDP analysis

THE D.C. METRO AREA IS THE TOP PRODUCER OF TECH TALENT (I.E., GRADS IN C.S. AND RELATED FIELDS) IN NORTH AMERICA

New computer science graduates, annually (Bachelor's degree and above)

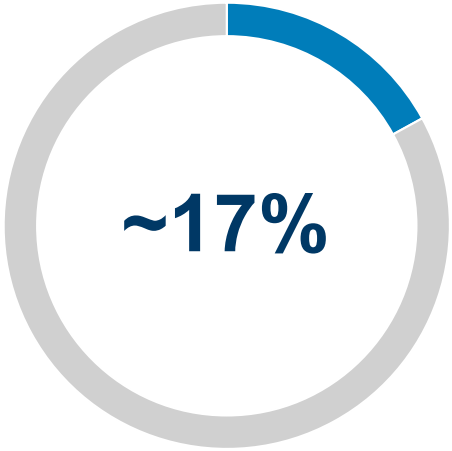
Number of new computer science graduates, 2015



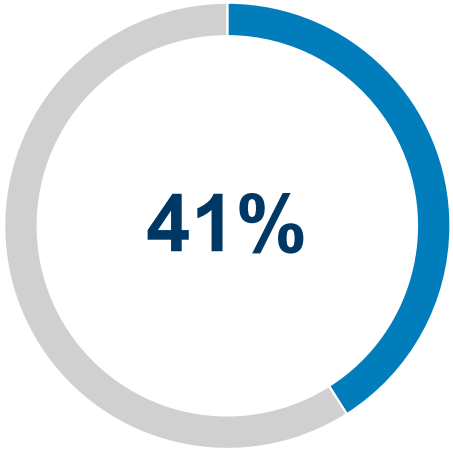
SOURCE: U.S. Department of Education, National Center for Education Statistics, integrated Postsecondary education data system (IPEDS), 2015

AFRICAN AMERICANS AND WOMEN ARE FAR MORE LIKELY TO WORK IN TECH IN THE DC METRO THAN IN SILICON VALLEY

Greater Washington, D.C.

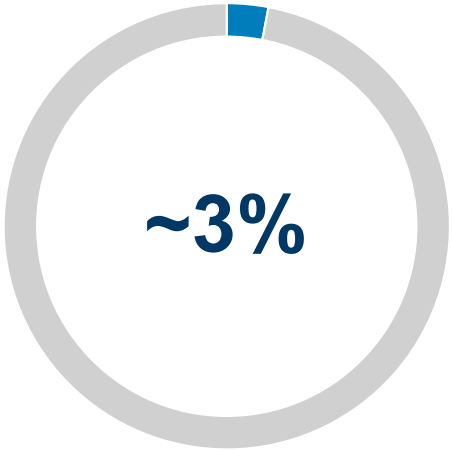


African Americans fill ~17% of all technology jobs

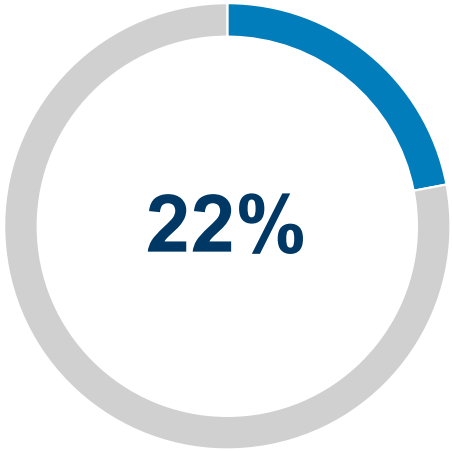


Women fill 41% of all technology jobs

Silicon Valley



African Americans fill ~3% of all technology jobs

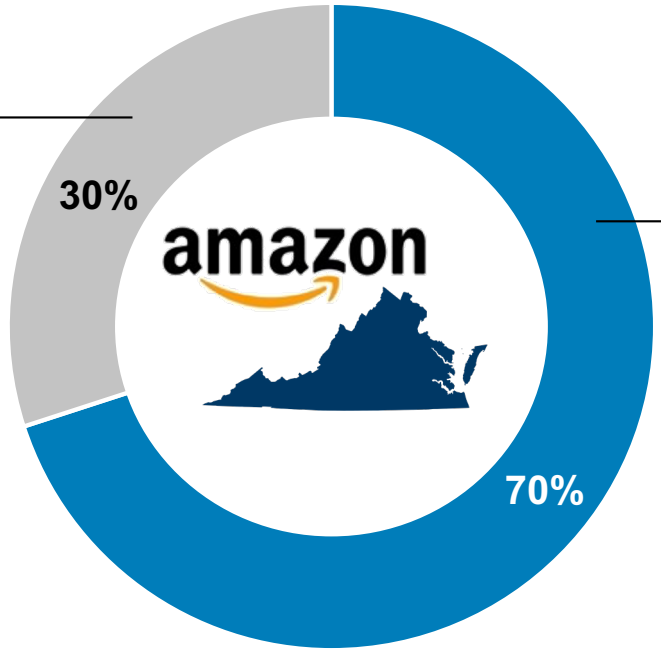


Women fill 22% of all technology jobs

WE PURSUED A DISTINCTIVE STRATEGY FOR HQ2 THAT WOULD POSITION OUR ENTIRE TECH SECTOR FOR SUCCESS

From the outset, we committed to **match the scale and structure of the financial commitment for HQ2 with the ambition of the project** through a combination of company commitments and investments in our state and regional competitiveness for all technology firms and corporate headquarters

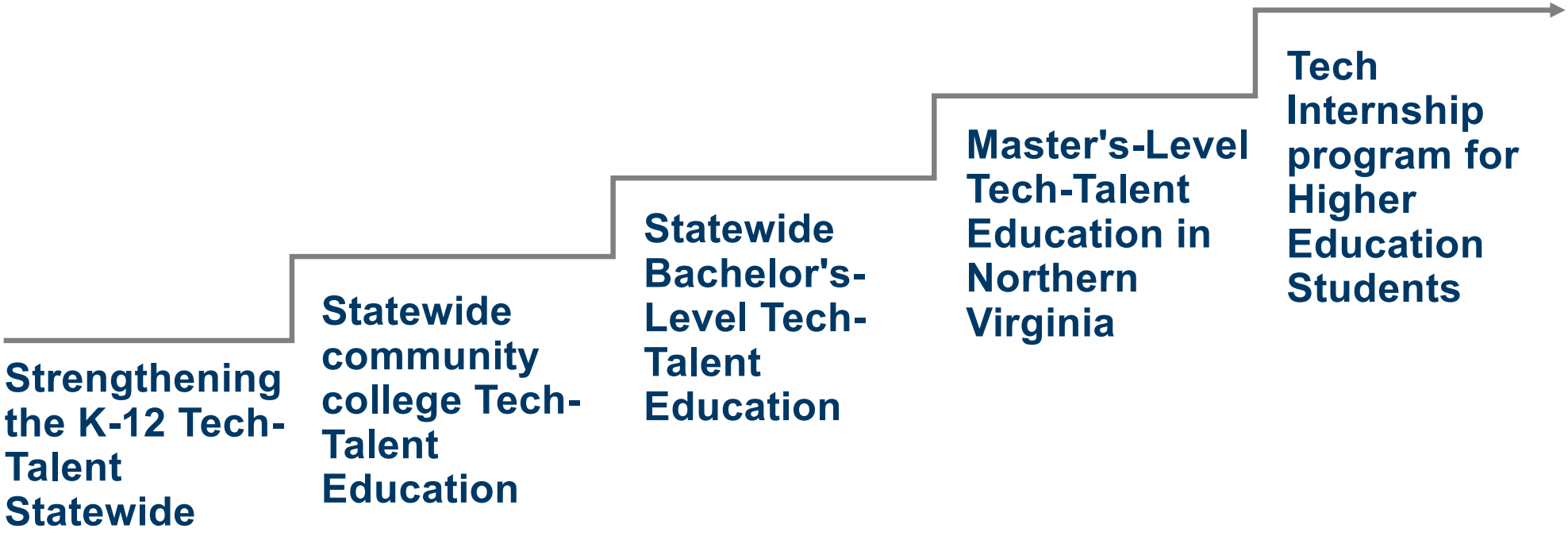
TRADITIONAL INCENTIVES



INVESTMENTS IN VIRGINIA'S COMPETITIVENESS:

We launched a series of initiatives to grow Virginia's tech talent and infrastructure, while supporting Amazon's success in Virginia

VIRGINIA IS INVESTING ~$1.1 BILLION IN A PERFORMANCE-BASED TECH-TALENT INITIATIVE TO DOUBLE ANNUAL CS GRADS (BS+MS)

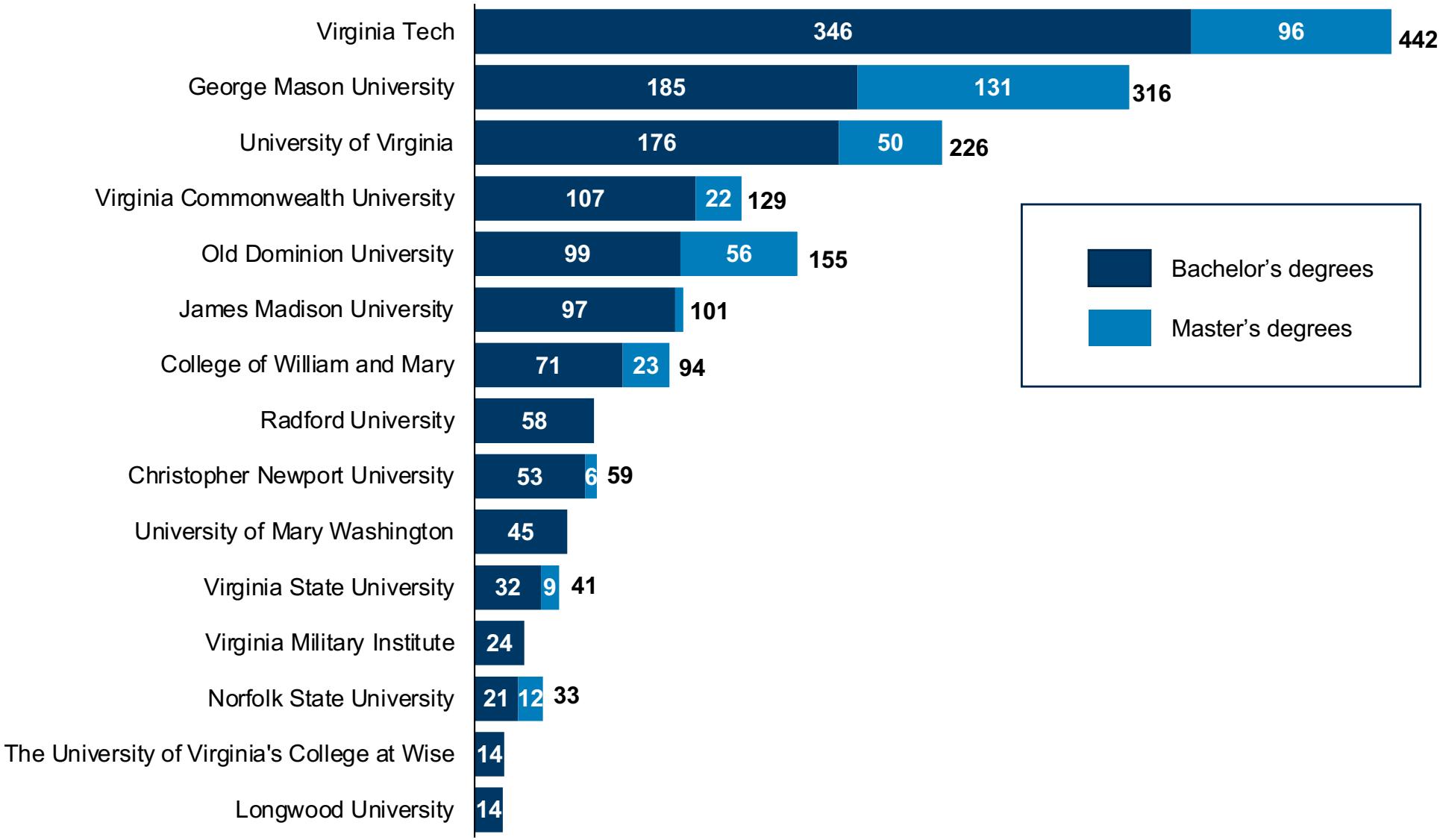


To add 32,000 BS/MS grads in CS and related fields over 20 years, Virginia is investing:

- ~$675MM in undergrad education, including 250-300 new faculty lines, startup packages, capital projects (new buildings and labs), and operational support
- ~$375MM in graduate education, including 50-75 new faculty lines, startup packages, capital projects (a new tech campus plus new buildings), and operational support
- $25MM in tech internships/apprenticeships in higher education
- $25MM in K12 computer science education (e.g., professional development, online curricula)

VIRGINIA'S PUBLIC INSTITUTIONS PRODUCE OVER 1,300 BACHELOR'S AND 400 MASTER'S DEGREES IN COMPUTER SCIENCE-RELATED FIELDS

Three-year annual average through AY 2017-2018



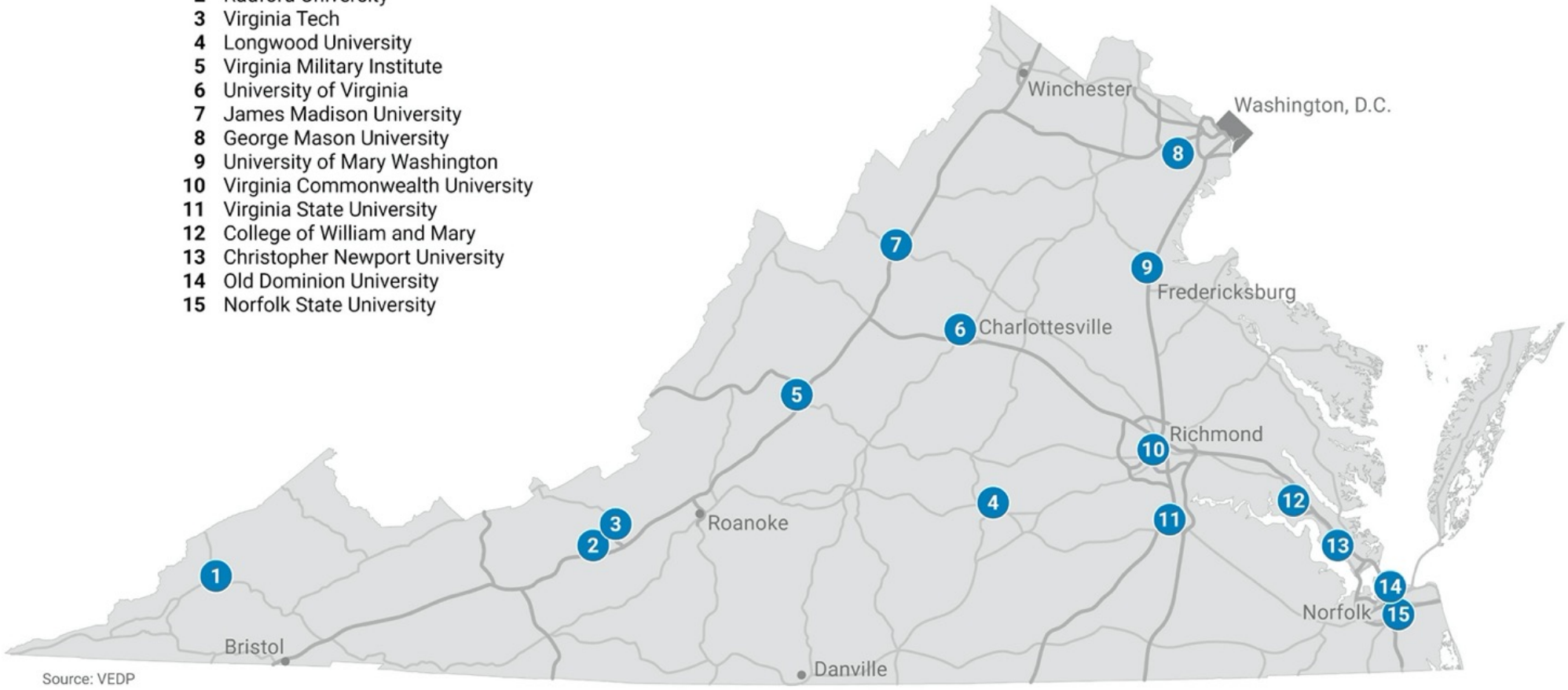
Note: This data is based on numbers directly provided by Virginia's higher education institutions for computer science, computer engineering, and software engineering bachelor's and master's degrees.

Source: Virginia's public higher education institutions; SCHEV; VEDP analysis

14 OF 15 PUBLIC UNIVERSITIES IN VIRGINIA ARE PARTICIPATING IN THE COMMONWEALTH'S TECH TALENT INVESTMENT PROGRAM

Four-Year Public Colleges & Universities

1. University of Virginia's College at Wise
2. Radford University
3. Virginia Tech
4. Longwood University
5. Virginia Military Institute
6. University of Virginia
7. James Madison University
8. George Mason University
9. University of Mary Washington
10. Virginia Commonwealth University
11. Virginia State University
12. College of William and Mary
13. Christopher Newport University
14. Old Dominion University
15. Norfolk State University



Source: VEDP

Four-Year Public Colleges & Universities

VA TECH WILL ESTABLISH A GRADUATE-LEVEL INNOVATION CAMPUS IN NORTHERN VIRGINIA, WITH A $1B FIRST PHASE

EXAMPLES OF EQUITY-BUILDING MEASURES ASSOCIATED WITH COMPUTER SCIENCE EDUCATION IN VIRGINIA

- Strong emphasis on building the K12 pipeline of students prepared to study rigorous computer science programs (e.g., funding for online curricula and professional development)
- Expanded scholarship opportunities for underrepresented student populations (e.g., Virginia Tech)
- Emphasis on transfer programs – community colleges to universities, as well as undergraduate-to-graduate programs
- $3.9 million donation from Amazon (through Amazon Future Engineer) to Code VA to expand computer science access to under served and underrepresented communities

VIRGINIA'S SHEEO, PETER BLAKE, AND HIS STAFF/BOARD PLAYED AN INTEGRAL ROLE IN VIRGINIA'S HQ2 WIN

- Provided advice to VEDP on how to integrate higher education into tech-focused strategic plan for economic development
- Convened higher education leaders across Virginia to seek their input on how we could create an HQ2 bid centered on higher education (e.g., CS education, tech research, tech campus)
- Managed in-state RFP process with higher education institutions to secure apples-to-apples responses from all public institutions
- Provided input on draft statewide fiscal model to achieve ambitious goals (i.e., $1.1 billion in new state investment for 25-35,000 more BS and MS degrees in computer science and related fields)
- Helped craft legislation to formalize the program
- Coordinating negotiations with institutions and state leaders to finalize a performance-based MOU with each participating school, including providing analyses on productivity and funding models
- Will monitor performance annually for next two decades, with periodic funding adjustments based on performance

HQ2: RENDERING OF FIRST PHASE OF NEW CONSTRUCTION AT METROPOLITAN PARK

Q&A

APPENDIX

THE CASE FOR NORTHERN VIRGINIA

- North America's top producer of tech talent
- A global and inclusive region…on a human scale
- America's only metro leading public and private sector innovation
- A stable and competitive partner with a legacy of exceptional governance
- A portfolio of trophy sites ready to match the scope, speed, and scale of HQ2
- A new model of economic development for the 21st century

See www.hqnova.com for Virginia's full Amazon HQ2 pitch and related details

MOST OF VIRGINIA'S PROPOSED COMMITMENTS ARE INVESTMENTS IN THE TECH-TALENT PIPELINE AND TRANSPORTATION INFRASTRUCTURE

Focus area	Component	Description	Size ($MM)
Company incentive	Provide post-performance incentive grants	Provide post-performance job-creation grants to offset Amazon's talent acquisition and development costs associated with standing up HQ2	**550[1]**
Tech-talent pipeline initiative	Expand tech-talent pipeline across Virginia	Expand Virginia's statewide tech-talent pipeline, adding bachelor's degrees in computer science and closely related fields in excess of current levels over the next 20 years, as well as invest $25 million in expanded internship opportunities to connect tech students to tech jobs	**Up to 710[2]**
	Launch tech campus(es) in Northern Virginia	Build a tech campus (or two distinct campuses) alongside a leading anchor university that will attract and retain top talent globally, creating an additional 12,500 – 17,500 master's degrees in computer science and closely related fields in excess of current levels over the next 20 years	**Up to 375[2]**
	Broaden K-12 tech-talent pipeline	Boost the tech-talent pipeline of the future by further developing and deploying K-12 tech-talent education programming	**25**
Regional infra-structure expansion	Enhance multimodal transportation infrastructure	Provide State support for priority transportation infrastructure projects that will improve mobility in the region	**195[3]**
Total of company incentives			**550[1]**
Total of state competitiveness investments (tech-talent pipeline initiative and infrastructure expansion)			**Up to 1,305[4]**

1 Maximum value of $550 million assumes company creates 25,000 jobs with average annual wages of $150,000, plus benefits, escalated at annually up to $200 million in additional company incentives (for a cumulative total of $7SO million) is available if the company creates a total of 37,850 qualifying jobs within 20 gears

2 Value represents the maximum new state investment in capital and operational support that be required to achieve the referenced degree production outcomes. Participating institutions will enter into MOUS that detail their plans for growth, state funding commitments, annual reporting requirements, and future funding parameters associated with performance. The total new state investment to grow bachelor's-level tech-talent education will be determined in part by how much of the growth in computer science and related fields is associated with an overall increase in college graduates at each institution and how much relates to a shift in the degree-field mix that mix occur at some institutions

3 Maximum value of $195 million assumes company creates 25,000 jobs with average annual wages of $150,000, plus benefits, escalated at 15% annually. Up to $100 million in additional state infrastructure commitments (for a cumulative total of $295 million) is available if the company creates a total of 37,850 qualifying jobs within 20 years

4 Maximum value assumes company creates 25,000 qualifying jobs and assumes maximum potential state investment for the tech-talent pipeline initiative

PRELIMINARY FORECAST FOR PERFORMANCE-BASED, STATE TECH-TALENT PIPELINE INVESTMENTS BY FISCAL YEAR

DRAFT

Project Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	
Fiscal Year (Academic Year)	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**Total**
BS degree production				**98**	**211**	**340**	**469**	**591**	**703**	**812**	**903**	**927**	**937**	**937**	**937**	**937**	**937**	**937**	**937**	**937**	12,552
BS degree production (cumulative)				98	308	648	1,117	1,708	2,411	3,223	4,126	5,053	5,991	6,928	7,865	8,803	9,740	10,678	11,615	12,552	
MS degree production	**64**	**159**	**287**	**414**	**542**	**669**	**797**	**956**	**956**	**956**	**956**	**956**	**956**	**956**	**956**	**956**	**956**	**956**	**956**	**956**	15,364
MS degree production (cumulative)	64	223	510	924	1,466	2,136	2,933	3,889	4,845	5,801	6,758	7,714	8,670	9,626	10,583	11,539	12,495	13,451	14,408	15,364	
Total degree production	64	159	287	512	753	1,009	1,266	1,548	1,659	1,768	1,860	1,883	1,894	1,894	1,894	1,894	1,894	1,894	1,894	1,894	27,916
Total degree production (cumulative)	64	223	510	1,022	1,775	2,784	4,049	5,597	7,256	9,024	10,884	12,767	14,661	16,554	18,448	20,342	22,235	24,129	26,022	27,916	
State capital investment ($MM)																					
BS	34	34	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	135
MS	8	15	23	30	30	30	30	30	30	27	-	-	-	-	-	-	-	-	-	-	252
Total capital investment	**41**	**49**	**56**	**64**	**30**	**30**	**30**	**30**	**30**	**27**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**387**
Debt service for capex		**3**	**6**	**10**	**15**	**17**	**19**	**21**	**23**	**26**	**27**	**27**	**27**	**27**	**27**	**27**	**27**	**27**	**27**	**27**	
Operational support ($MM GF)																					
BS	5	11	18	26	31	34	37	39	37	35	32	29	28	28	27	27	27	27	27	27	553
MS	3	6	8	9	9	9	10	12	6	5	5	5	5	5	5	5	5	5	5	5	123
Total state op. support	**8**	**17**	**26**	**34**	**40**	**43**	**47**	**51**	**43**	**39**	**37**	**34**	**33**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**676**
Total debt service and op. support	**8**	**20**	**32**	**45**	**55**	**60**	**66**	**72**	**66**	**65**	**64**	**61**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**1,092**

Note that numbers above are provided for state fiscal years (i.e., 7/1 of previous year to 6/30 of the label year); employment totals are for each fiscal year-end

RAMP-UP SCHEDULE FOR DOUBLING THE COMMONWEALTH'S TECH TALENT PIPELINE IN COMPUTER SCIENCE AND RELATED FIELDS

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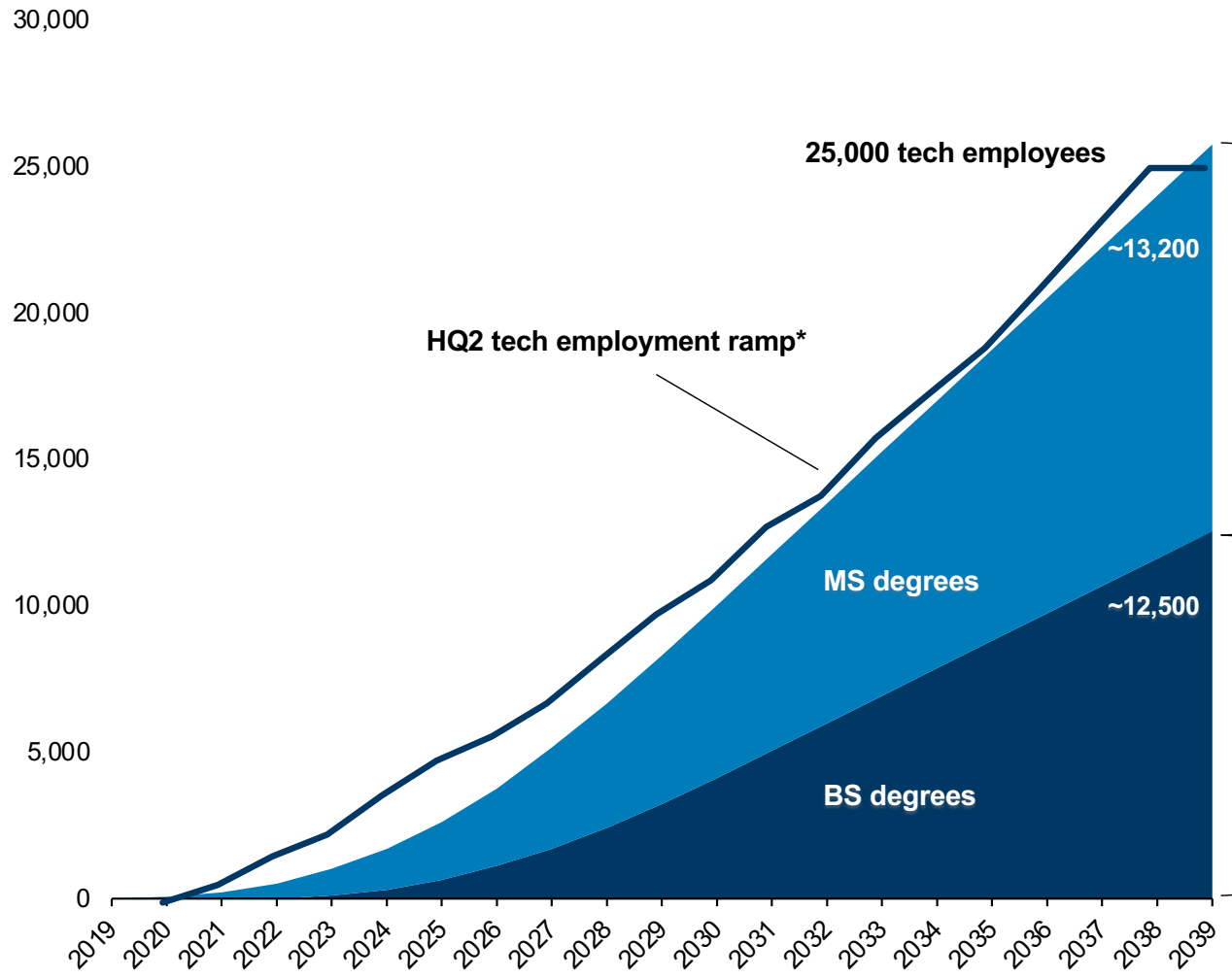


~25,000 total new degrees produced

Over 13,000 additional CS-related Master's degrees over 20 years

Current thinking is that roughly 2/3 of the Master's degrees would be produced by Virginia Tech at the NOVA Tech Campus and 1/3 would be produced by George Mason

Full ramp results in more than an additional 1,000 master's degrees produced each year

Over 12,000 additional CS-related Bachelor's degrees over 20 years

Full ramp (beginning in 2023) results in over an additional 900 degrees produced each year

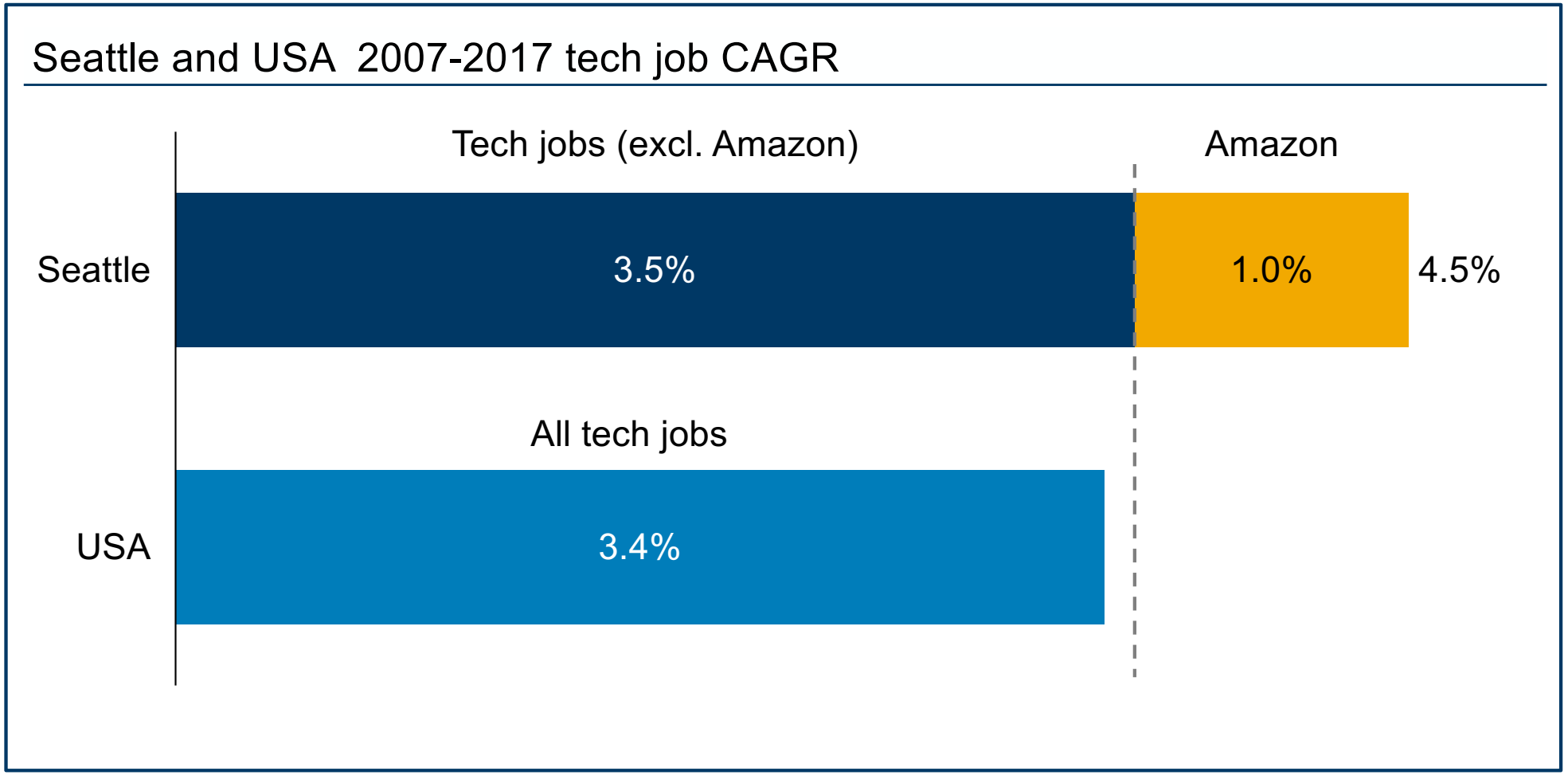
PROGRAM DESIGN

- Performance-based program with institutions receiving sustaining funding only for hitting their growth targets in MOUs; startup funds provided to secure faculty to grow (e.g., startup packages)
- Target degrees principally will be computer science (>75%), computer engineering (10-15%), and closely related fields (e.g., software engineering)
- There will be opportunities for all public institutions with relevant programs to participate
- We envision additional master's degrees being principally funded in Northern Virginia, with Virginia Tech and GMU; undergrad (BS degree) expansions are envisioned to occur statewide; a transfer program with VCCS also will be included to maximize degree production and state ROI
- We envision allocating new degree slots based on a number of factors, incl. institutional interest, state cost per additional degree (considering GF and capital investment, where applicable, as well as reallocation), and size of degree production increase relative to the baseline level
- Each institution will have an MOU detailing its planned growth in enrollment and degrees in the target fields, with state funding provided initially based on the forecast and later based upon actual results relative to target enrollments and degrees
- Considering both the time available and confidentiality, prior to the announcement we initially worked with a core group of institutions (Virginia Tech, GMU, UVA, W&M, and VCCS) to help craft the tech-talent pipeline initiative
- Seven (7) Designated Reviewers (including VEDP) are tasked with evaluating university expansion proposals and negotiating MOUs with each participating institution

VIRGINIA TECH'S INNOVATION CAMPUS

- Virginia Tech will build a new, innovative, technology-focused campus focused on graduate-level education in CS and related fields that will be located in Alexandria
- The Innovation Campus will be a global center of tech excellence and talent production, where people, research, industry, and ideas collide to spark transformation in the tech sector
- Based on a state match of $250 million, Virginia Tech has pledged a 1:1 match from philanthropy, with other sources adding to its match beyond a 1:1 ratio (public/private developer partnership where developer funds buildings to be leased to Virginia Tech for a period of time, as well as other non-state sources, e.g., F&A recovery from federal research contracts, out-of-state tuition)
- The Innovation Campus is expected to produce at least 10,000 new master's degrees in CS and related fields over the 20-year term of the Amazon agreement
- Virginia Tech already has completed extensive planning for the new campus
- GMU has expressed similar interest in growing master's programs at its Arlington campus; they believe they can raise $125 million in philanthropy with the state's 1:1 match opportunity

EXCLUDING AMAZON'S DIRECT EMPLOYMENT, SEATTLE'S TECH SECTOR JOBS EXPERIENCED HEALTHY GROWTH FROM 2007-2017



Source: Moody's Analytics; 2017 Amazon 10-K; VEDP analysis