



STEM Investment Council

May 22, 2015

9:00am – 12:00pm

2 World Trade Center

Mezzanine Rooms 3&4

121 SW Salmon St., Portland

Call-In Information:

Dial (888) 204 5984

Code 992939

JIM PIRO, Chair

AUBREY CLARK

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Staff:

MARK LEWIS

AGENDA

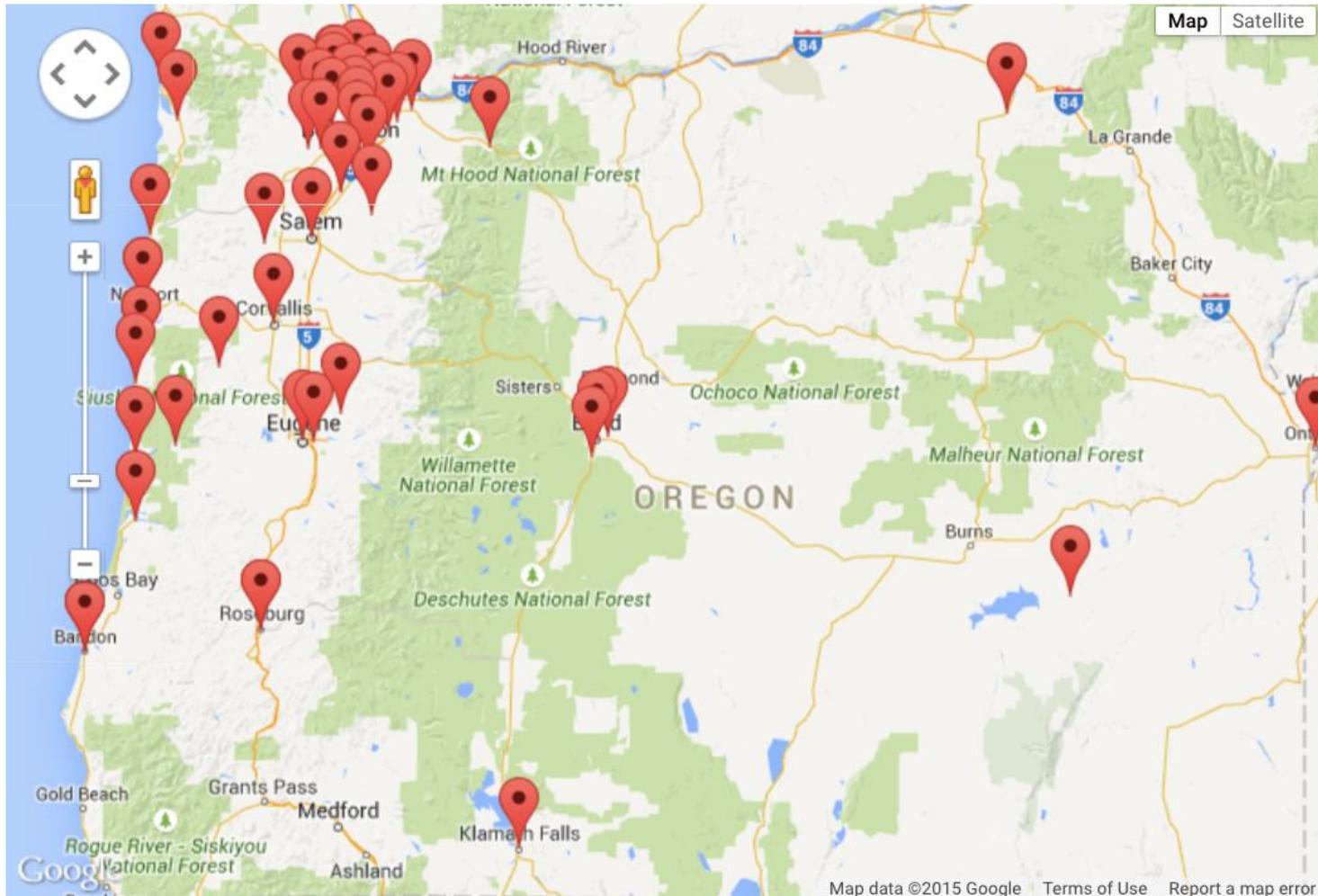
- 1. Welcome & Introductions**
- 2. Director Updates**
- 3. Subcommittee Updates**
- 4. STEM Strategic Plan Feedback**
- 5. HECC's New Funding Model**
- 6. Prior STEM Grants Processes**
- 7. Public Comment**

Members of the public wanting to give public testimony must sign in.

There will only be one speaker from each group.

Each individual speaker or group spokesman will have three (3) minutes.

All meetings of the STEM Investment Council are open to the public and will conform to Oregon public meetings laws. The upcoming meeting schedule and materials from past meetings are posted online. A request for an interpreter for the hearing impaired or for accommodations for people with disabilities should be made to Seth Allen at 503-378-8213 or by email at Seth.Allen@state.or.us. Requests for accommodation should be made at least 48 hours in advance.



Reached:

~10,000 students

~2,100 teachers and adults

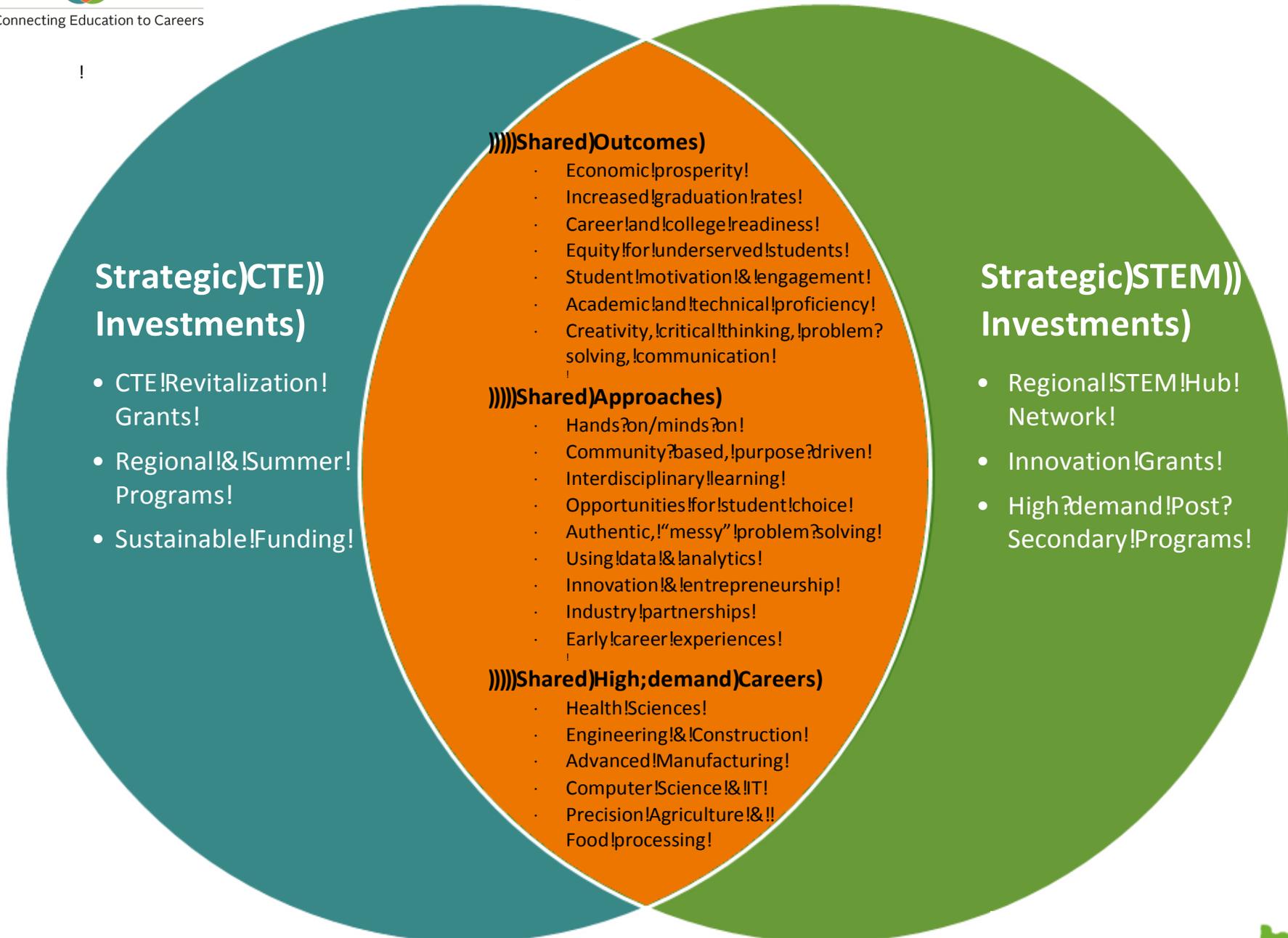
- 1) Regional STEM Hubs
 - Support current 6
 - Expand to 4-6 more regions

- 2) STEM Innovation Grants
 - Transform math
 - Applied mathematics
 - Adaptive learning pilots
 - Increase K-12 computer science & engineering
 - Out of school programs for underserved

- 1) Post-secondary Talent Development
 - *Program start-up funding aligned to high-wage, high-demand*
 - Support services for underrepresented minority students

**Portfolio management: communication, technical assistance, synergies, knowledge capture & dissemination, research into practice.*

Connecting Education to Careers



Strategic CTE Investments

- CTE Revitalization Grants!
- Regional & Summer Programs!
- Sustainable Funding!

Strategic STEM Investments

- Regional STEM Hub Network!
- Innovation Grants!
- High-demand Post-Secondary Programs!

Shared Outcomes

- Economic prosperity!
- Increased graduation rates!
- Career and college readiness!
- Equity for underserved students!
- Student motivation & engagement!
- Academic and technical proficiency!
- Creativity, critical thinking, problem solving, communication!

Shared Approaches

- Hands-on/minds-on!
- Community-based, purpose-driven!
- Interdisciplinary learning!
- Opportunities for student choice!
- Authentic, "messy" problem-solving!
- Using data & analytics!
- Innovation & entrepreneurship!
- Industry partnerships!
- Early career experiences!

Shared High-demand Careers

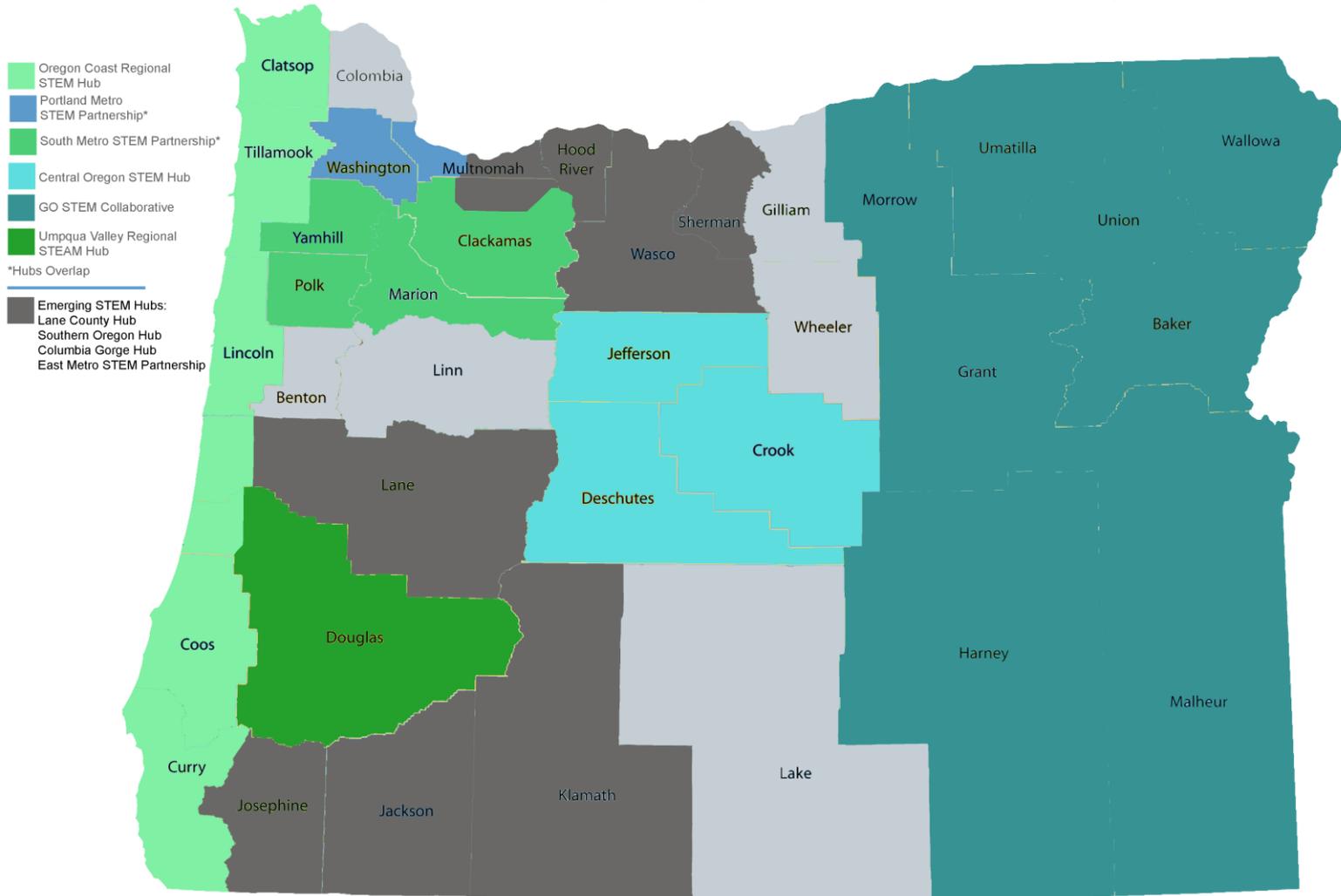
- Health Sciences!
- Engineering & Construction!
- Advanced Manufacturing!
- Computer Science & IT!
- Precision Agriculture & Food processing!



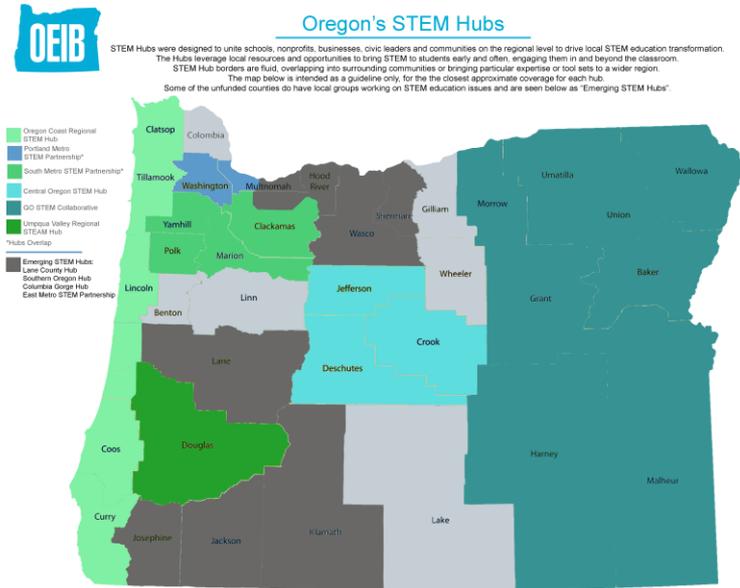
Oregon's STEM Hubs

STEM Hubs were designed to unite schools, nonprofits, businesses, civic leaders and communities on the regional level to drive local STEM education transformation. The Hubs leverage local resources and opportunities to bring STEM to students early and often, engaging them in and beyond the classroom. STEM Hub borders are fluid, overlapping into surrounding communities or bringing particular expertise or tool sets to a wider region. The map below is intended as a guideline only, for the the closest approximate coverage for each hub.

Some of the unfunded counties do have local groups working on STEM education issues and are seen below as "Emerging STEM Hubs".



- 1) Backbone support (1-2 FTE)
- 2) Programming
 - Teacher & leader PD
 - Out of school
 - Industry partnerships
 - Bridging programs
- 3) Common needs
 - Multiple hubs
 - Example: Oregon Connections, Common Measures
- 4) Cross-hub collaboration
- 5) Capacity-building TA
- 6) Associated data & research



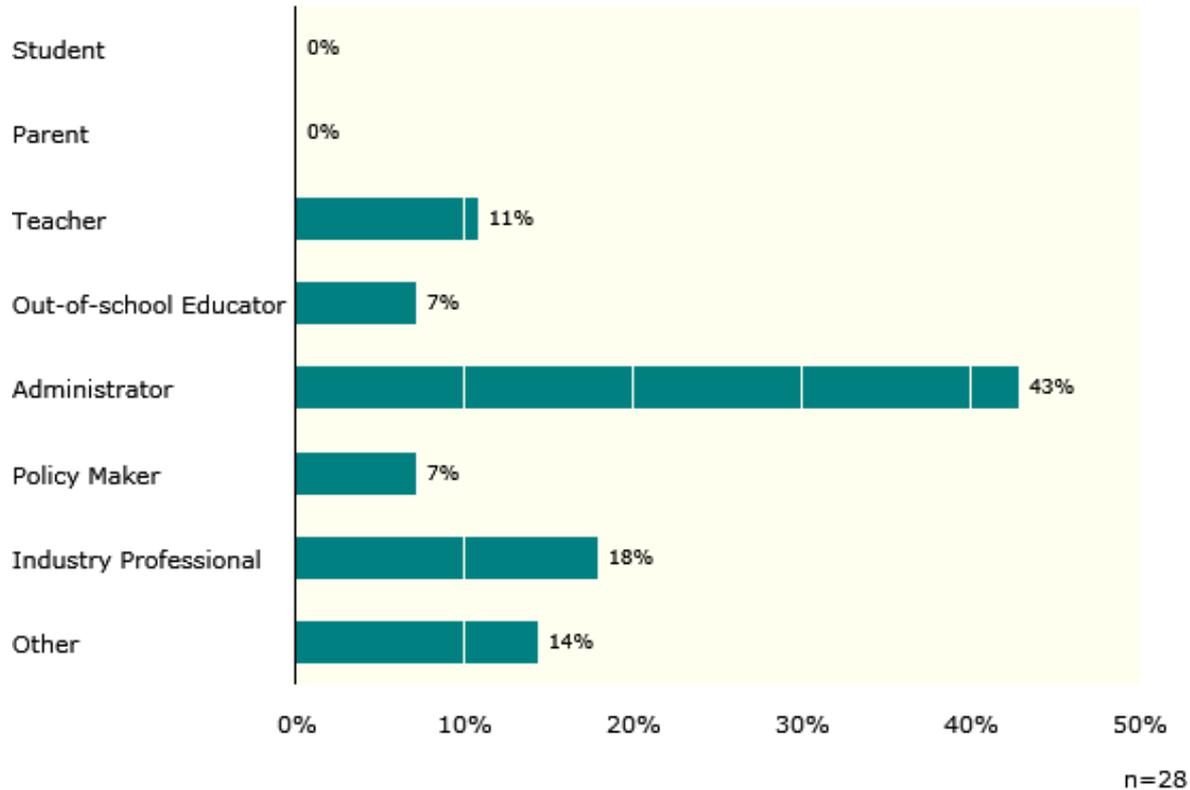
STEM Plan Survey

preliminary findings

Participation

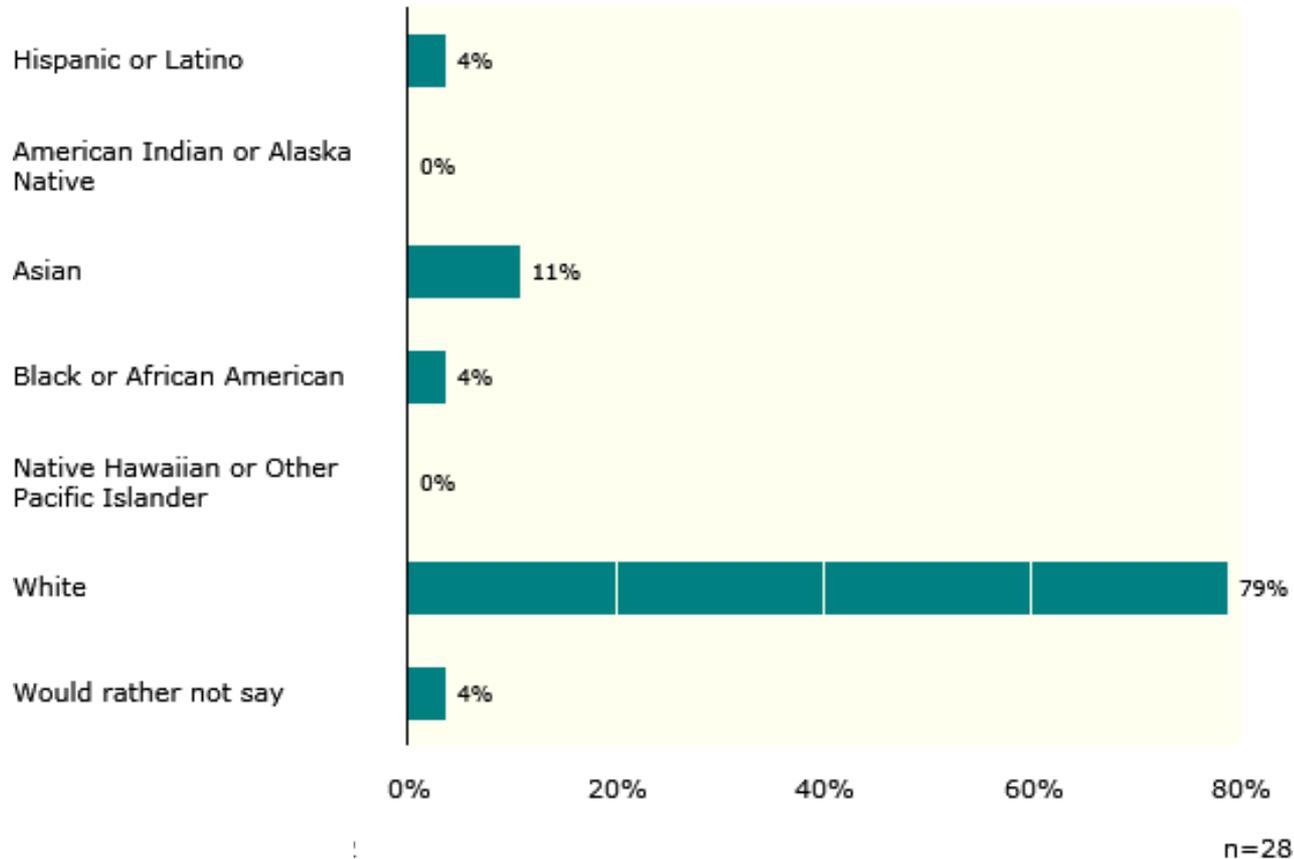
Could you tell us a little about yourself?

To begin with, how would best describe your profession?



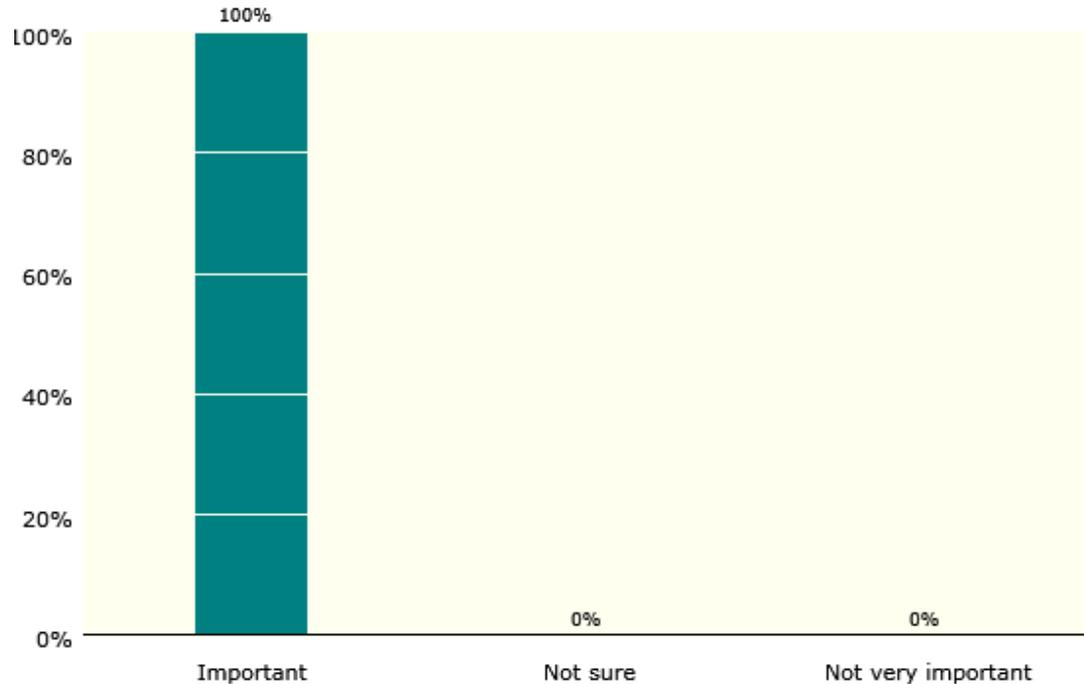
Participation

Whith what race or ethnic category do you most identify with?



Importance

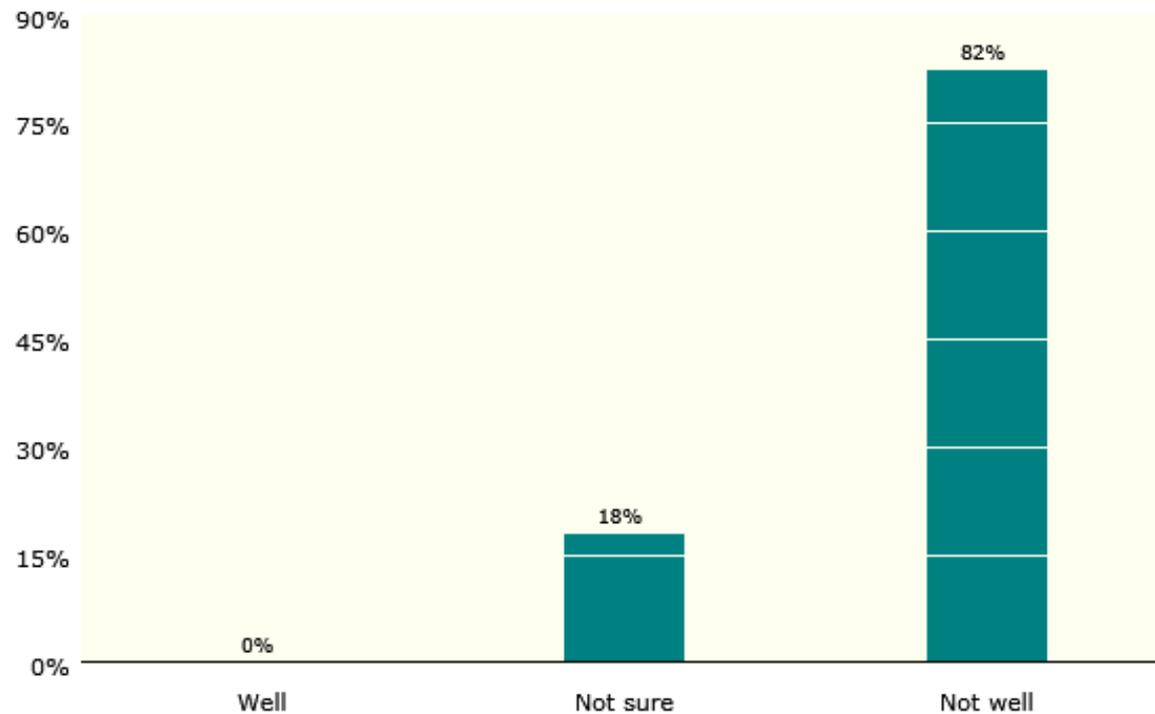
How important do you feel that it is that we better prepare our students with STEM-related skills that empowers them to the creative problem solvers needed for this new innovation economy?



n=28

Performance

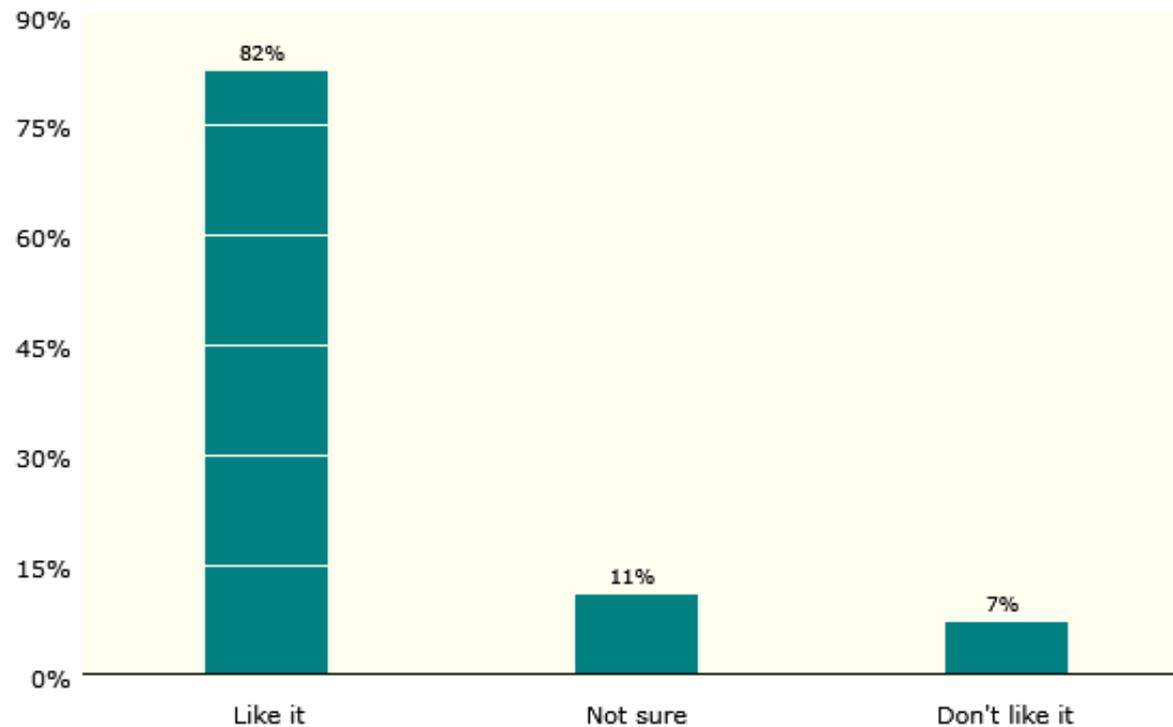
How well do you think we are currently doing to prepare each and every student with STEM-related skills and mindsets to be the creative problem solvers needed for this new economy?



n=28

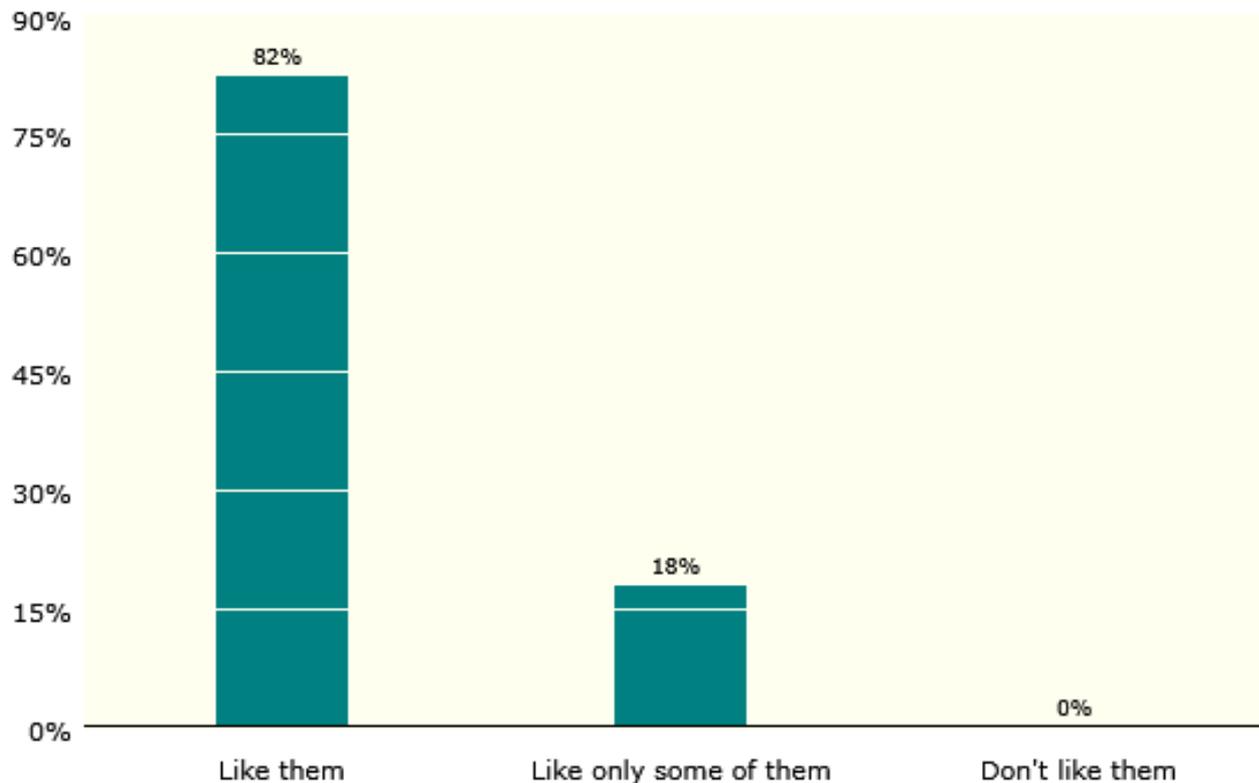
Vision Alignment

As an overall impression, what do you think about our vision statement?



Values Alignment

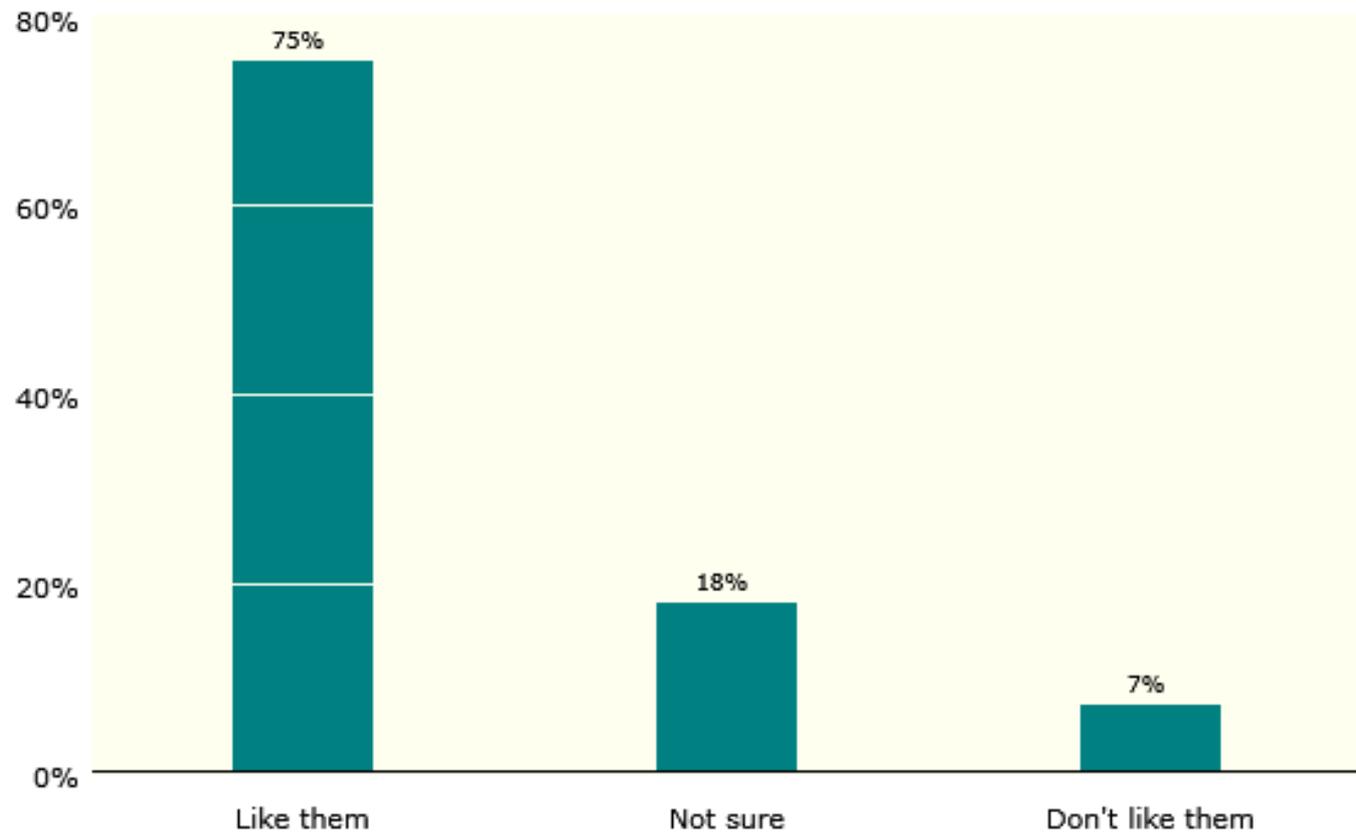
As an overall impression, what do you think about this "Our Beliefs" statement?



n=28

Goal Alignment

What are your overall impression of our goals?



n=28

Next Steps

- Broaden our net
- Deepen our reach

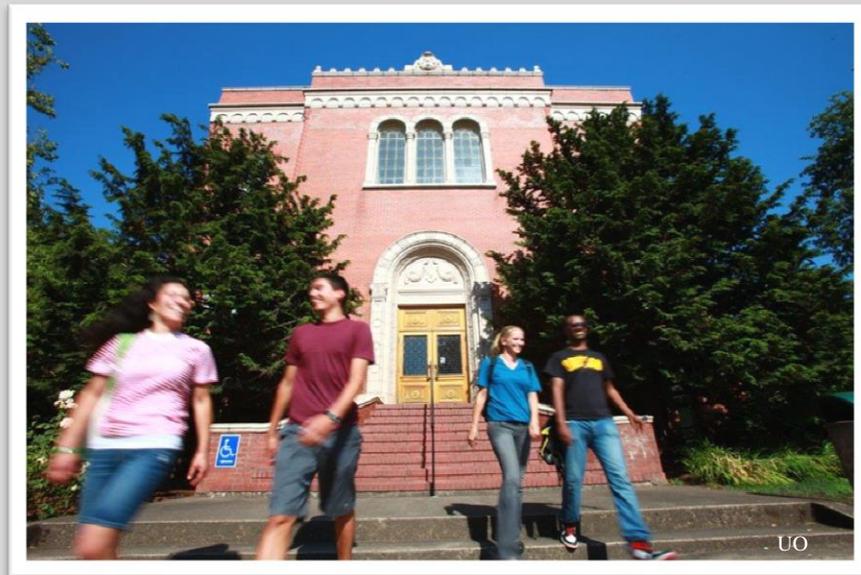
Need for a narrative “wrapper”

- What is the purpose of this strategic plan?
- What is the change that we seek?
- Who are the primary audiences?
- What are the primary challenges that we are facing?
- How do we measure success?

HECC University Funding Distribution Model



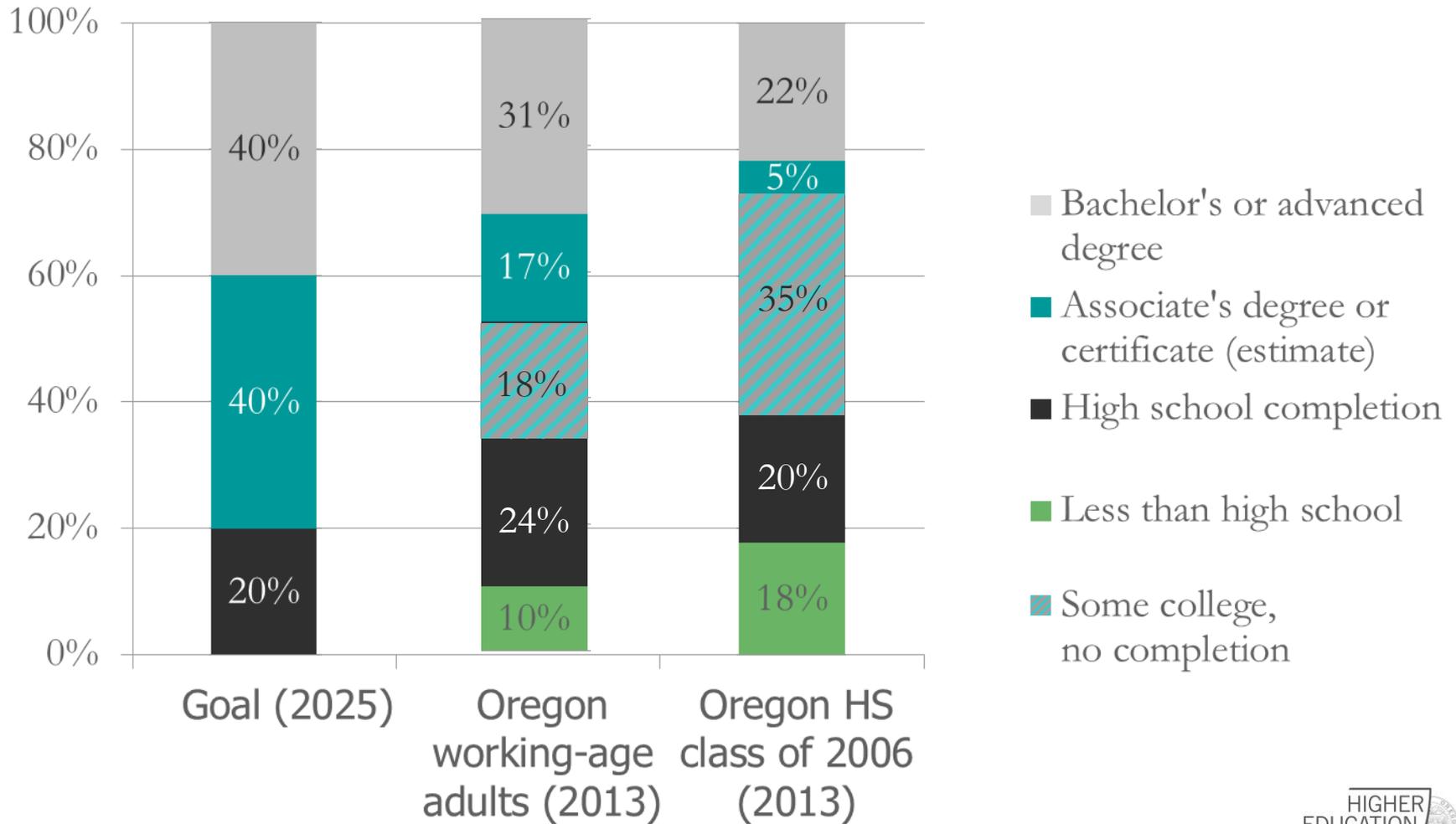
OEIB STEM Investment Council



May 22, 2015

BRIAN FOX, Director, University Budget and Finance
Higher Education Coordinating Commission

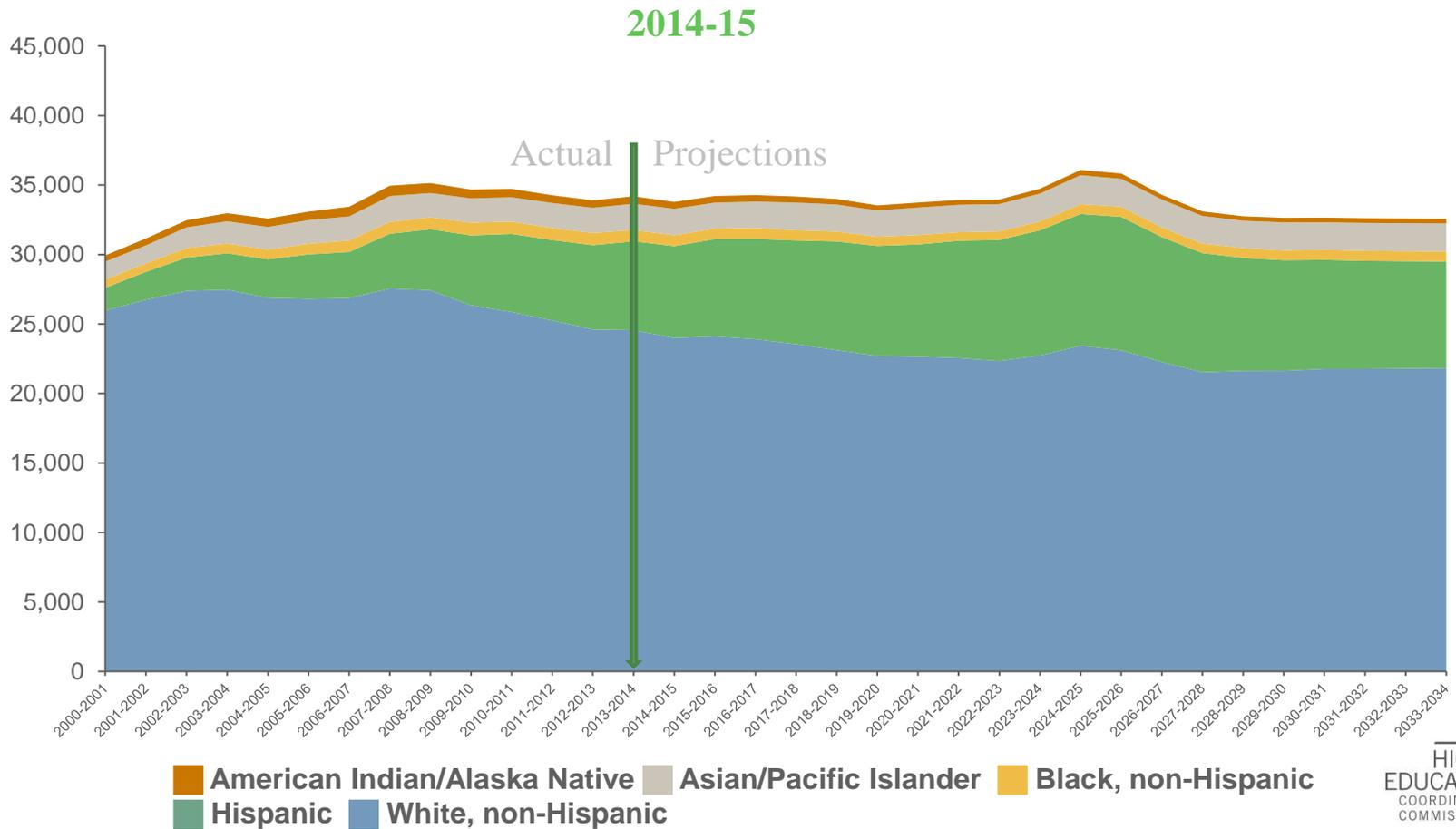
CONTEXT: 40-40-20



Source: HECC analysis of the American Community Survey, ECONW

CONTEXT: INCREASING DIVERSITY

Oregon Public High School Graduates by Race/Ethnicity, Actual and Projected



*Source: OUS Office of Institutional Research, Projections March 2015

RATIONALE – DEGREE TYPE

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Figure 4: High-wage/high-demand occupations requiring at least postsecondary training

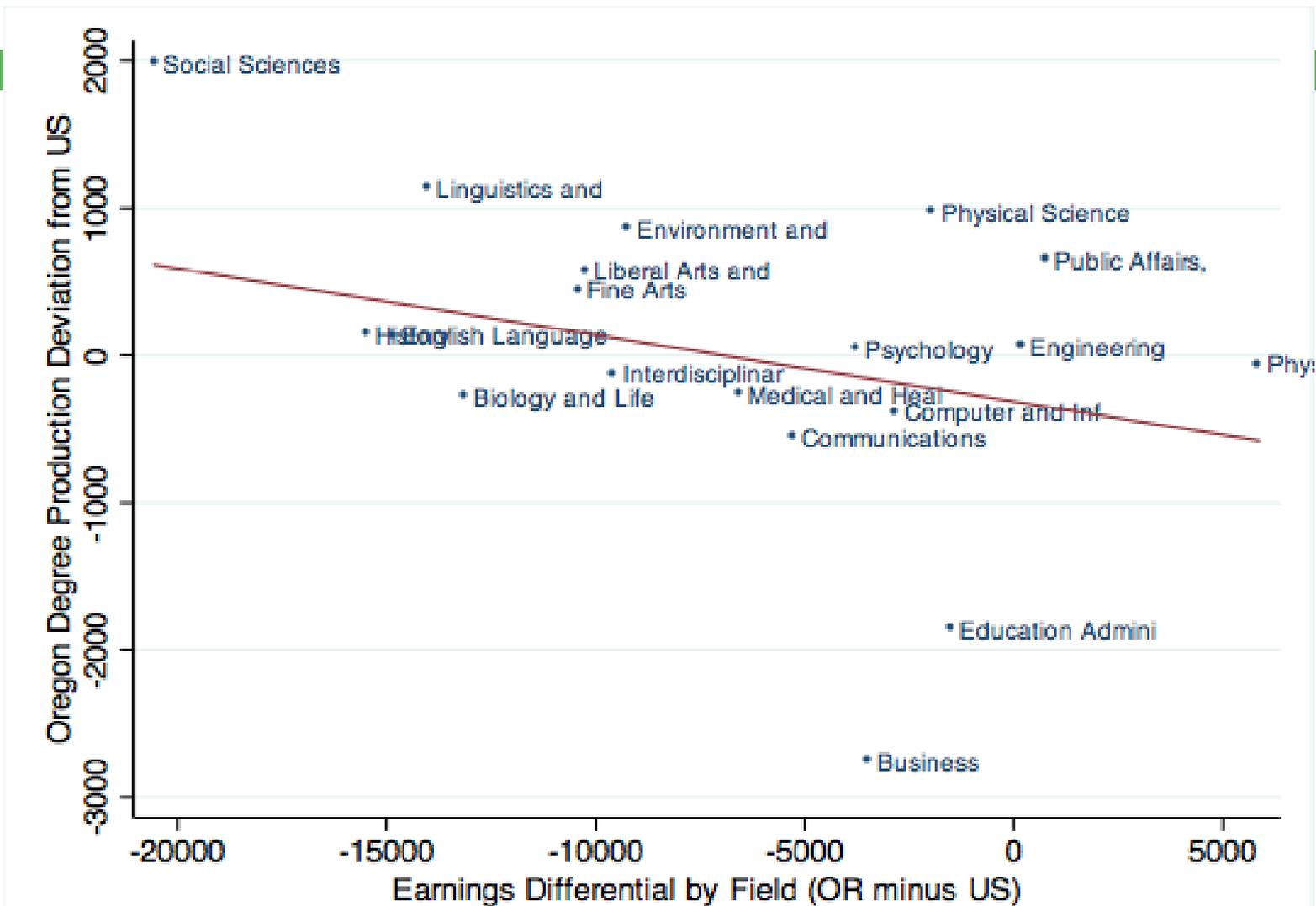
OED Priority Rank	Occupation	Total openings 2012-2017	Competitive education level
16	General and Operations Managers	3,470	Bachelor's
11	Accountants and Auditors	2,662	Bachelor's
5	Carpenters	2,303	Post-secondary training
→ 16	Physicians and Surgeons	1,794	Advanced
4	Industrial Machinery Mechanics	1,118	Post-secondary training
→ 16	Computer Systems Analysts	973	Bachelor's
16	Cost Estimators	879	Bachelor's
16	Welders, Cutters, Solderers, and Brazers	802	Post-secondary training
→ 16	Computer Occupations, All Other	800	Bachelor's
10	Machinists	751	Post-secondary training
5	Sales Managers	715	Bachelor's
→ 16	Pharmacists	704	Advanced
→ 3	Medical and Health Services Managers	661	Advanced
→ 5	Industrial Engineers	656	Advanced
→ 16	Operating Engineers and Other Construction Equipment Operators	642	Post-secondary training
→ 5	Computer Hardware Engineers	621	Advanced
5	Marketing Managers	604	Bachelor's
11	Construction Managers	600	Bachelor's
→ 1	Physical Therapists	591	Advanced
16	Firefighters	585	Associate's
16	Librarians	317	Advanced
→ 2	Medical and Clinical Laboratory Technologists	297	Bachelor's
→ 11	Veterinarians	272	Advanced
11	Urban and Regional Planners	268	Advanced
11	Medical and Clinical Laboratory Technicians	265	Associate's

Source: ECONorthwest analysis of OED data.



OREGON DEGREE PRODUCTION & EARNINGS

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Source:

ECONW analysis of IPEDS 2010-2012 completions and American Community Survey 2009-2011

[U.S. Bureau of Economic Analysis Regional Price Parities for States and Metropolitan Areas, 2006-2010](#)

LEGISLATIVE MANDATE AND HECC PROCESS

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ORS 351.735(3)(d)

- 3) The Higher Education Coordinating Commission shall:
 - d) Adopt rules governing the distribution of appropriations from the Legislative Assembly to community colleges, public universities listed in ORS 352.002 and student access programs. These rules must be based on allocation formulas developed in consultation with the state's community colleges and public universities, as appropriate.

WHAT IS OUTCOMES BASED FUNDING?

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Outcomes-Based Funding (OBF)

- Links the distribution of state funding to state educational attainment goals
- Directs state investment to completions (including course completions, degree and certificate completions)
- Designed to reward and reinforce institutional investments in student success and support services
- Focused on achieving equity goals

25 states currently have some form of OBF system and 9 more are currently developing them

- Colorado recently approved an outcomes based funding formula for both 2 and 4 year institutions

COMMON CONCERNS

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Primary concerns of stakeholders

- Equity and access
- Degree and program quality

Some HECC considerations

- Fund underrepresented students at a significantly higher rate.
- Conduct annual evaluations of universities that include a robust set of qualitative and quantitative evaluations of academic and programmatic quality.

OUTCOMES-BASED FUNDING

9

A method for the distribution of state resources

Not a substitute for the need for additional state resources

An appropriate alternative to tight state oversight of institutions

Its aims should be modest, and should reflect the state's particular higher education context

DESIGN PRINCIPLES FOR PERFORMANCE FUNDING

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*(with thanks to Dennis Jones, NCHEMS): Outcomes Based Funding; the Wave of Implementation**

- Begin at the beginning
- Measure what you want to get
- Fund what you measure
- Understand (and appreciate) the angst
- Recognize performance funding as one piece of the puzzle

THE RESOURCE ALLOCATION MODEL (RAM)

11

The RAM allocates the Public University Support Fund (PUSF) to the seven public universities

The RAM contains two primary funding items: line item and enrollment funding

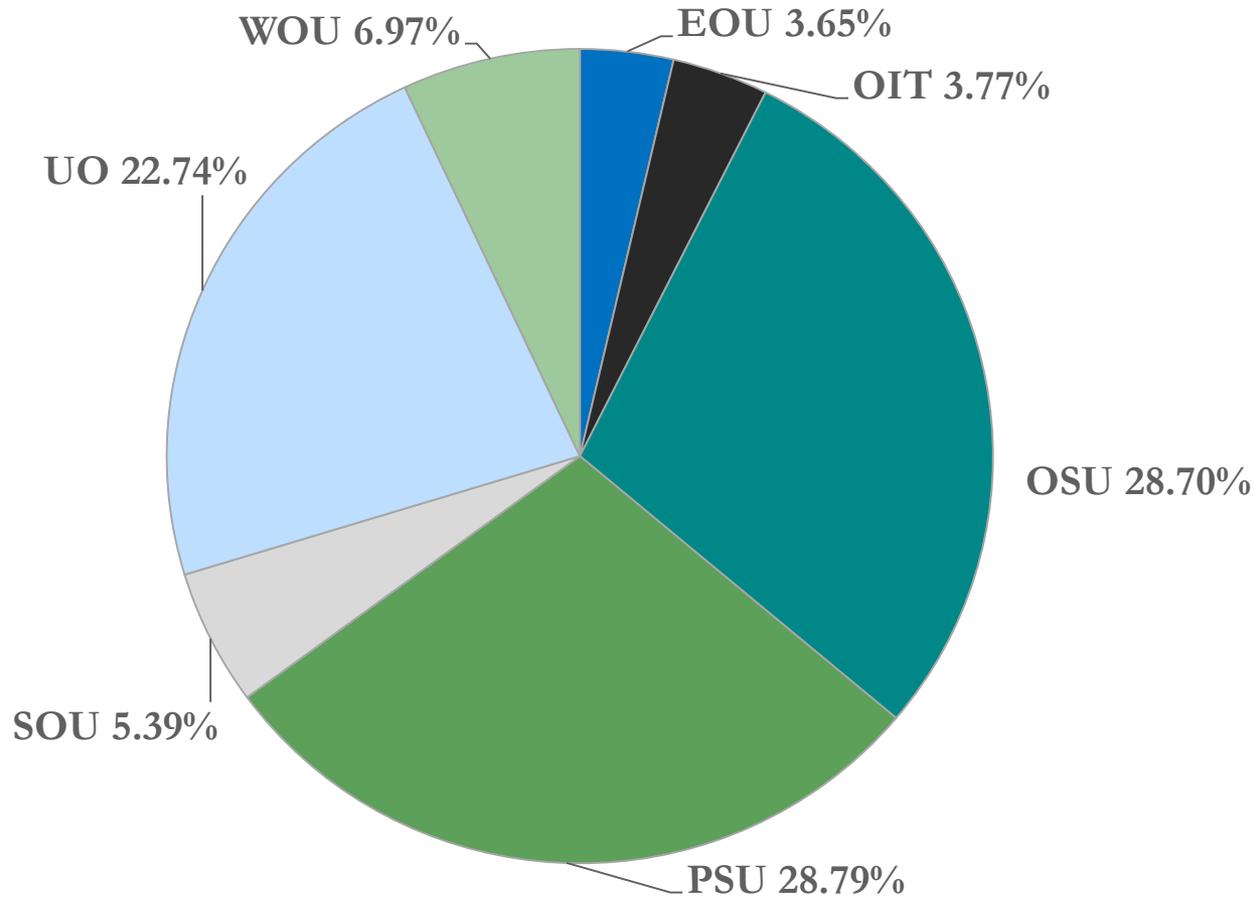
- The majority of funds flow through a cost-weighted enrollment driven formula (70%)
- A set of line items, including Regional Support, Research and Public Service are supported (29%)
- A small incentive fund for student success allocates resources based on degrees completed and emphasizes underrepresented minority or rural students (1.5%)

RAM uses single year data and is highly volatile, particularly dangerous for institutions that are more reliant on state funding and are enrollment dependent

ENROLLMENT AND COMPLETIONS BY INSTITUTION

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Proportion of Resident Student Credit Hour Completions



Three-year rolling average of resident SCH production, degrees conferred and degrees conferred to targeted student sub-populations and in targeted fields of study.

WORKGROUP'S PROCESS & OUTCOMES

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HECC convened a workgroup including senior financial, academic, and student affairs administrators from each university as well as student and faculty leaders.

HECC used existing states' models and literature to create an OBF model that builds from others yet meets Oregon's unique institutional context.

The HECC articulated the following principles to guide the workgroup:

- Reflect HECC strategic plan and OEIB Equity Lens
- Focus on student access and success with an emphasis on underrepresented populations
- Encourage high demand/high reward degrees
- Recognize/reward differentiation in institutional mission and scope
- Use clearly defined, currently available data
- Maintain clarity and simplicity
- Utilize phase-in period to ensure stability, beginning with 2015-17 biennium

Workgroup convened in June 2015 and through an iterative process delivered the fully developed SSCM to HECC staff in February 2015.

STUDENT SUCCESS AND COMPLETION MODEL

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The Student Success and Completion Model (SSCM) has three primary components:

- **Mission Differentiation Funding** supporting regional, research and public service mission of each university
- **Activity-Based Funding** which invests in credit hour enrollment of Oregon resident students
- **Completion Funding** which focuses investment in degree and certificate completion of Oregon resident students with particular emphasis on underrepresented student populations and priority degree areas

Transition mechanisms are in place to smooth the transition from RAM to SSCM:

- **Graduated increase** in completion funding and measured transition from enrollment funding
- **Stop-loss and stop-gain** mechanism to ensure all institutions have predictable funding levels and share in increased resources

SSCM uses three-year rolling average to reduce volatility in funding to universities

MISSION DIFFERENTIATION ALLOCATION

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There are **three types** of mission differentiation funding:

- **Regional Support** allocations provide resources for the higher cost mission of the four Technical and Regional Universities (TRU) and OSU Cascades which serve a unique and critical public purpose
- **Research Support** allocations provide resources for key economic development and innovation needs of the state
- **Mission Support** allocations provide funding for non-instructional activities, as diverse as the Veterinary Diagnostic Laboratory (OSU) and NEW Leadership Oregon (PSU)

Funding indexed to Portland CPI/legislative funding

Mission Differentiation Funding comes “off the top”

TRU Shared Services will be incorporated into Regional Support allocation.

ACTIVITY BASED ALLOCATION

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Replicates cost-based weighting factor approach in previous funding model

Supports and incentivizes enrollment, and provides intermediate payment

Continues to support partnerships between institutions and across sectors

Funds enrollment and courses for all resident students

HECC will convene a workgroup to update cost weighting factors which were developed over 15 years ago

COMPLETION FOCUSED ALLOCATION

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Degrees at all levels are funded: Bachelor's through PhD's as well as graduate certificates

Cost adjustments are made to reflect program duration, program type, and for transfer students

Additional weighting is provided for students who complete from traditionally underserved student populations, including:

- Low income, underrepresented minority, rural, and veteran students

Additional weighting is provided for students who complete in areas of critical need for the state, including:

- STEM, Healthcare and Bilingual Education

TARGETED PROGRAMS

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STEM

- Two-digit CIP Codes
- Historic OUS STEM CIP Code definition
- Includes engineering, technology, biological, natural and physical sciences, mathematics and computer science



HEALTHCARE

- Focus on building health related capacity for growing sector
- Health related professional programs
- Includes applied programs in medical imaging
- Set aside for two year terminal programs in EMS and Polysomnography Tech

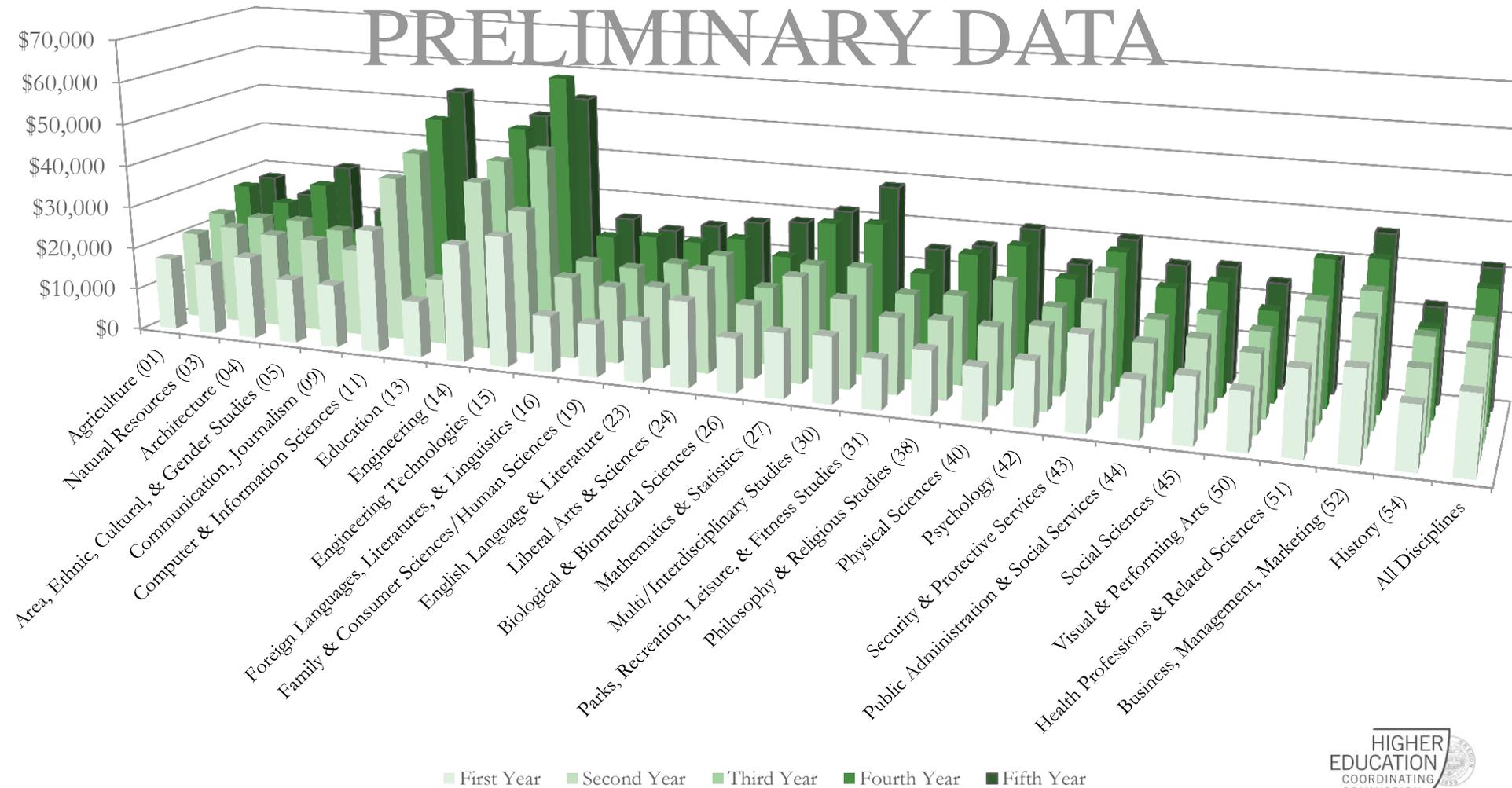


BILINGUAL EDUCATION

- TSPC certification code
- Focus for English language learners
- Build capacity for growing young Latino population
- Flexible for both undergraduate and graduate teaching certification

MEAN FULL-TIME ANNUAL EARNINGS BY DISCIPLINE – 2007-08 GRADUATING COHORT

PRELIMINARY DATA



EVALUATION FRAMEWORK AND TIMELINE

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On advice of the workgroup and in line with national best practices a prescribed re-evaluation process for the SSCM was built into the model



Every other year, the HECC, in consultation with stakeholders, will examine definitions, weighting factors and similar items to ensure that unintended consequences are understood and accounted for and adjustments are made if necessary



Every six years the HECC will undertake a more comprehensive process to ensure that the Model reflects the needs of institutions and priority of the state in directing resources



Through the evaluation of institutions with institutional boards the HECC will focus on academic quality financial integrity and productivity of institutions to inform funding model re-evaluations

TRANSITIONING TO NEW FUNDING SYSTEM

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Stop loss

- Brackets downside risk for institutions. During the transition period, the stop loss is set such that no institution can lose funding and ensures that during the first year all institutions see at least a 4.5% increase in funding.

Stop gain

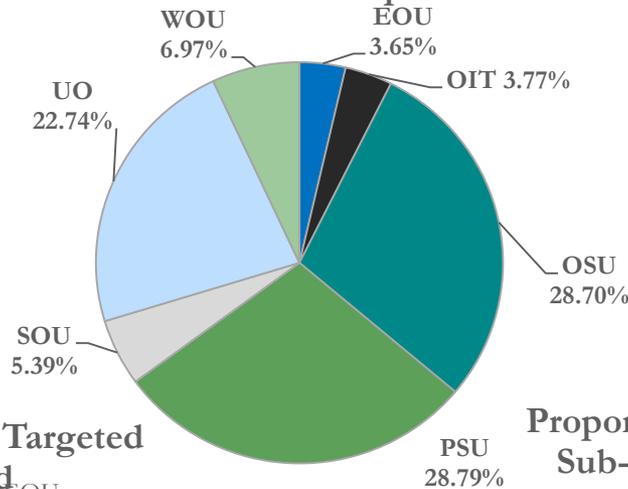
- The stop-gain tool is designed to prevent an institution from receiving an abnormally large increase in allocation in excess of a pre-determined threshold when compared to the prior year

Phase in of completion funding

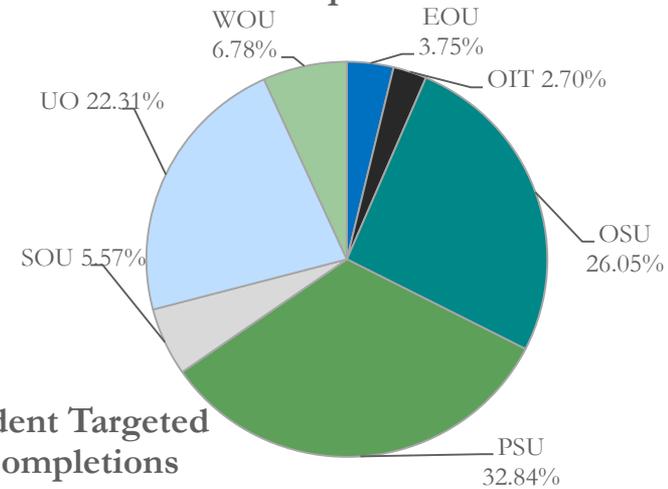
- During the first year a relatively small portion of total funding is based on degree completions. Over subsequent years completion funding will increase until it accounts for 60% of formula based allocation.

ENROLLMENT AND COMPLETIONS BY INSTITUTION

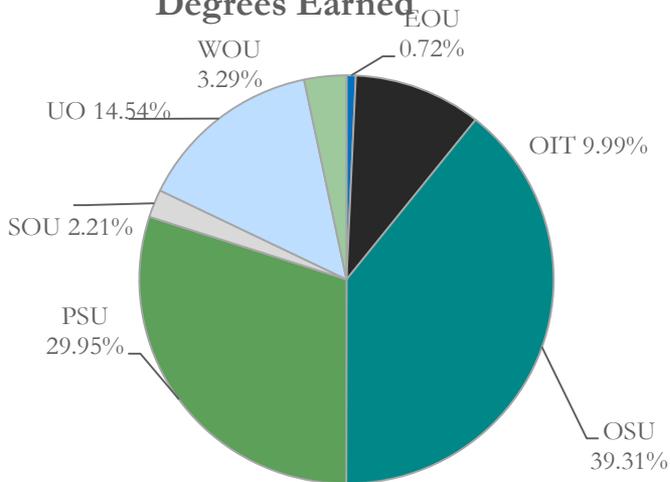
Proportion of Resident Student Credit Hour Completions



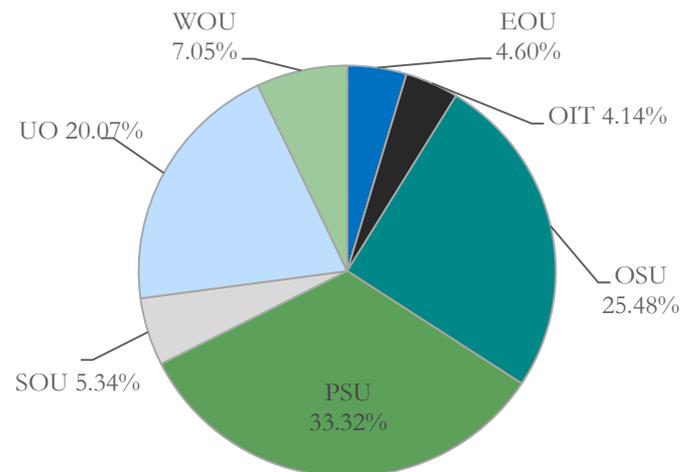
Proportion of Resident Degree Completions



Proportion of Resident Targeted Degrees Earned



Proportion of Resident Targeted Sub-Population Completions



Three-year rolling average of resident SCH production, degrees conferred and degrees conferred to targeted student sub-populations and in targeted fields of study.

WRAP-UP

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- University funding model development began in June 2014 with a meeting of HECC leadership and the Presidents' Council.
- HECC convened a workgroup in June 2014 which developed the evolutionary SSCM.
- The SSCM provides increased stability and predictability to public universities and focuses resources on meeting 40-40-20 and the equity lens through investments in underserved students and degrees in critical fields.
- The SSCM balances mission, enrollment and completion funding.
- Regional support funding is continued and the cost of TRU shared services are funded “off the top”.
- Funding model effectively links state investment with the state's 40-40-20 goal and rewards institutions for focusing on the most at risk Oregonians.

QUESTIONS

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Brian Fox
Director
University Budget and Finance
Higher Education Coordinating Commission

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503.725.2913



STEM Grants Process for 2013-2015

STEM Investment Council
May 22, 2015

Jamie Rumage
Oregon Department of Education

- Legislative Authorization – Establishes policy framework to operate
- Grant Development – Ensures we are meeting the needs of students statewide
- Application Process – Effective delivery of funds
- Grant Review & Selection – Achieve the greatest investments and outcomes
- Monitoring – Ongoing support for success
- Lessons learned – Moving forward

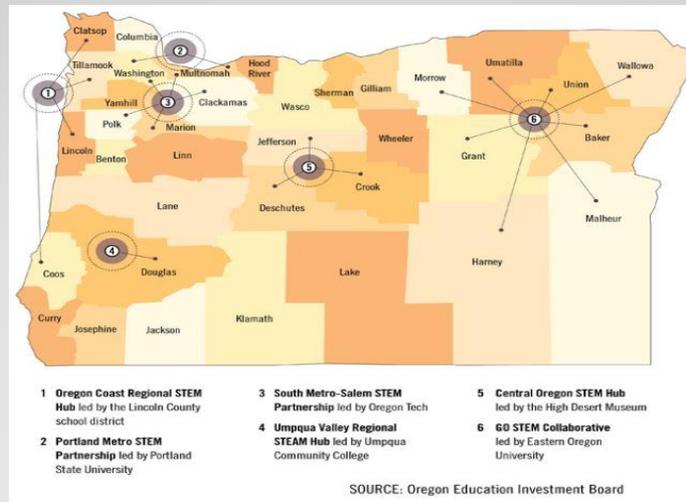
Component of 2013-2015 STEM Initiatives

Baseline criteria for releasing STEM funding
was driven by policy frameworks



Grant-making Process

- Equity Lens, 40/40/20, closing the achievement gap
- Increase proficiency in Math/Science
- Attainment of STEM degrees
- Partnership Plans: Two-tiered options



Regional STEM Hub Needs

- Underserved & underrepresented populations
- Cross-curriculum & careers pathways
- In-School & Out-of-school space
- Strong partnerships with community, business & industry



Programs and Schools Needs

- Statewide communication
- Webinars and ongoing support
- Submit via secure file transfer



Application Process

- Reviewer training via webinar (Calibration and IRR)
- Individual review with justification
- Onsite group review with justification
- Constructive feedback



Review & Selection Process

- Grant managers provide on-going technical assistance (site visits, grant convening, interim reporting and continual check-ins)



Ongoing Support for Success

- Finding reviewers for all three STEM Initiatives was a challenge
- 5 reviewers is ideal, even numbers less ideal
- Try to anticipate the number of applications (~90 for STEM, STEAM and CTE program & activity grants)
- Better understand the full timeline to write, release, and have submissions of the RFP, then to funding to the grants

Lessons Learned





**Questions?
Or Contact:**

jamie.rumage@state.or.us

TECHNOLOGY EDUCATORS / TECHNOLOGY-ENGINEERING EDUCATORS

Teachers from three educational endorsements make up a good STEM program:

- Science Ed teachers
- Technology Ed teachers [aka Technology-Engineering Ed teachers]
- Math Ed teachers

Since many people no longer know what a Technology Ed teacher does [or, that they even exist], it's important to understand what they bring to the interdisciplinary STEM program. Tech Ed teachers are specialists in technology – especially those technologies students need for project-building. They also understand the “engineering design process” – how to design and prototype [build for testing] tangible solutions to real-world problems.

They have taken a range of technology courses in their college teacher preparation in order to be able to assist students with many types of projects.

EXAMPLES OF COURSES LEADING TO A TECHNOLOGY EDUCATION OR TECHNOLOGY / ENGINEERING EDUCATION TEACHING ENDORSEMENT [terminology depends on college and state]

- Fundamentals of Power Technology
- Intro to Technical Drawing & Constraint Based Solid Modeling
- Introduction to Building Construction
- Introduction to Manufacturing Processes
- Graphic Communications Technology
- Constraint Based Solid Modeling & Production Drawings
- Engineering Design
- Teaching Transportation, Energy, and Power Technologies
- Trigonometry
- Robotics Education
- Curr. & Methods in Tech. Educ
- Lab Planning in Tech. Educ
- Engineering Graphics and Technical Illustration
- Materials Processing and Fabrication
- Materials Molding and Forming c
- Materials Precision Production
- Electronics Technology
- Computer Assisted Design and Drafting
- Construction Systems
- Transportation Systems
- Energy and Power Technology
- Communication and Multimedia
- Metals Manufacturing Technology
- Technology and Civilization
- Introductory Physics
- Technical Writing and Literacy
- Microcomputer Applications
- Teaching Methods for Technology Education
- Professional Field Experience

[This is a selected compilation from three college programs of study.]

This document was put together by Donna Cohen, M.Ed.

[Vocational Education Admin, former Tech Ed teacher dcohen@dcoheninfo.com]

Comments to STEM Investment Council

May 22, 2015

Donna L. Cohen, MEd, MLIS

Technology Education Teacher for 11 years; Master of Ed. in Vocational Ed. Administration

1. I would like to remind the council once again that Oregon needs to seriously and immediately examine creating a program leading to a teaching endorsement in Technology-Engineering Education – which accounts for fully half of what STEM is. Oregon ended its program in the early 90s but other states do have them. I am attaching a list of the types of courses leading to this endorsement. The obvious approach is to partner up the community colleges, for technology courses, with professional teacher ed programs, for professional ed programs, e.g. Portland Community College with PSU or Concordia.

2. An update on the problem with the design of the STEM workspace in the remodel of Roosevelt HS in Portland. In spite of intense efforts from our community group to convince the district of their mistake, they plan to go ahead. However, we have filed a complaint with the federal Office of Civil Rights, and we plan to bring a lawsuit against the district, in the manner of Brown v Board of Education. Roosevelt's student body is 70% students-of-color and the school will be getting about 3,500 sq ft of space – inadequate for a STEM facility. The Franklin HS plan is for 9,000 sq ft. There is a way to rectify this situation even now, if PPS came to their senses. [See flyers]

Roosevelt is acknowledged by Portland Public Schools as having been treated inequitably over the years and as being an under-resourced school. Yet, PPS did not take the opportunity of the remodel to begin to redress this situation. In fact, the plans for Roosevelt lean toward a less academic environment overall, as opposed to Franklin, indicating expectations of students in our community are less than for students in neighborhoods whiter and wealthier.

I have written a 55-page evidence-based report documenting the planning process at these two schools which demonstrates that Franklin had serious advantages from the outset – starting with the fact that they had an abundance of knowledgeable people whereas no individual from PPS had any background relevant to a STEM-type workspace. I was truly appalled at the level of inequity in the planning process.

Unfortunately, to this day PPS still refuses to bring in someone with this expertise. Thus, there is no curriculum; there is not even a plan for space usage, and the initial equipment list which was emailed to us in March demonstrated a complete lack of understanding of how to equip a tech-engineering space. Really, how does a school district get away with this?!

I wonder at this point if anyone and any institution on the local or state level really means what it says about equity. The result for Roosevelt, if we cannot change things, is that thousands of students-of-color and girls will continue to come out of the school destined to not find their way to STEM fields, or take much longer to do so.

The report, and more information about the planning process, can be found at www.civictinker.net/RHS-STEM-OCR.html