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TO: Ben Cannon, Higher Education Coordinating Commission
FROM: Andrew Dyke
SUBJECT: HECC TARGETS THROUGH 2017

Introduction

In support of the Governor's aspirational 40-40-20 goal, Oregon's Higher Education Coordinating Commission (HECC) seeks to develop short and medium-term targets for degree production for the state's public system of higher education. This memorandum seeks to help HECC bridge the gap between aspirational goals and near-term targets by summarizing relevant characteristics of recent and anticipated educational attainment and occupational demand in Oregon.

The data presented below serves as the beginning of HECC's target development process, but also raises additional questions that HECC should consider during this process and that available data can address. We conclude this document with some possible areas of inquiry along these lines.

Data sources and methods

We focus primarily on data from three sources: Oregon Employment Department (OED), the Census Bureau's American Community Survey (ACS), and degree production data from the Integrated Postsecondary Education Data System (IPEDS). OED data and analysis provide a baseline for understanding the likely educational demands on Oregon's future workforce. Several sources of talent can help meet these demands: newly educated workers, re-entry into the labor force by Oregon residents, and migration into the state of individuals with the relevant skills. The ACS data helps to characterize the stock of educated Oregonians not currently participating in the labor market, while the IPEDS data provides information about recent outputs of Oregon institutions of higher education to help benchmark goals for the flow of new graduates from these institutions Below, we briefly describe each data source.

Oregon Employment Department occupational projections

Every two years, OED develops long-term occupational employment projections. The most recent projections, released this year cover the period 2012-2022. The projections provide, for over 700 separate occupations, 2012 employment, projected employment in 2022, and the anticipated number of new and replacement openings during this period. Based on their 2012-2022 projections, OED prepared a similar set of projections covering the period 2012-2017, which we rely on for our analysis.

For each occupation, OED assigns an "entry level education level" and a "competitive education level", where the former identifies the typical education needed for entry into the occupation, and the latter corresponds roughly to the education level many employers would

identify as making an applicant more competitive for an open position in the occupation. Establishing education requirements for occupations that require specific certification or more advanced degrees (e.g., medical professionals such as registered nurses, pharmacists, and doctors) is straightforward. But in many occupations, employees have a wide range of educational backgrounds, and requirements may vary considerably across firms and industries.

For the purposes of this report, we report on the following education levels:

- **No postsecondary:** Identifies occupations that typically do not require attainment beyond a high school diploma or equivalent.
- **Postsecondary training:** Identifies occupations that typically require postsecondary training of some kind (e.g., short-term certificate) short of an Associate's degree.
- **Associate's, Bachelor's, Advanced:** Identifies occupations that typically require an associate's, bachelor's, or more advanced degree, respectively. Advanced degrees include master's, doctorates, and other professional degrees.

The occupational projections reflect OED's estimates of how occupational demand will evolve, given the available data. Thus, the projections reflect outcomes based on the state's current economy and anticipated national, state, and local economic trends, but do not necessarily reflect the effects envisioned as the result of successfully progressing towards 40-40-20. They serve as baseline benchmarks for establishing higher education outcome targets, not as ultimate goals to which the state should aspire.

OED also maintains an "Occupational Prioritization for Training Model" and reports output from the model after updating the occupational forecast. The model seeks to inform universities, colleges, and workforce boards target scarce workforce training resources. In addition to the occupational forecast, the model incorporates information about wages, anticipated immigration, perceived current or anticipated shortages in occupational supply and the training pipeline, and other factors. Model output, ranked lists of high-priority occupations, is designed to identify occupations deserving of focused consideration in planning for the state's workforce training programs.[1] As such, the model provides a valuable input into HECC goal-setting efforts, and incorporates data related to some of the issues described below as important considerations in setting targets for higher education output.

American Community Survey educational attainment and employment status

We also rely on public use microdata samples (PUMS) from the 2012 ACS. These data allow us to characterize the relationships among age, educational attainment, employment, and labor force participation. The data identify general educational attainment levels but do not provide information about field of study or separately identify individuals who have completed a post-secondary certificate. Most such individuals would likely self-identify has having completed some college on the ACS, and we therefore cannot evaluate labor force participation of

[1] http://www.qualityinfo.org/olmisj/DataSource?itemid=00006280 provides additional detail on about the model.

certificate holders using ACS data. We report on education levels identified in the ACS data: Some College, Associate's, Bachelor's, and Advanced.

IPEDS degree production data

The IPEDS data we analyze provide historical counts of certificates and degrees awarded by Oregon institutions in recent years by broad age category and by field of study. We present selected statistics based on these data to provide context for current conditions and for possible outcomes in future years. We note that the IPEDS data do not identify industry-sponsored certifications, which for some occupations may play a more important role than some potentially relevant postsecondary credentials awarded by institutions.

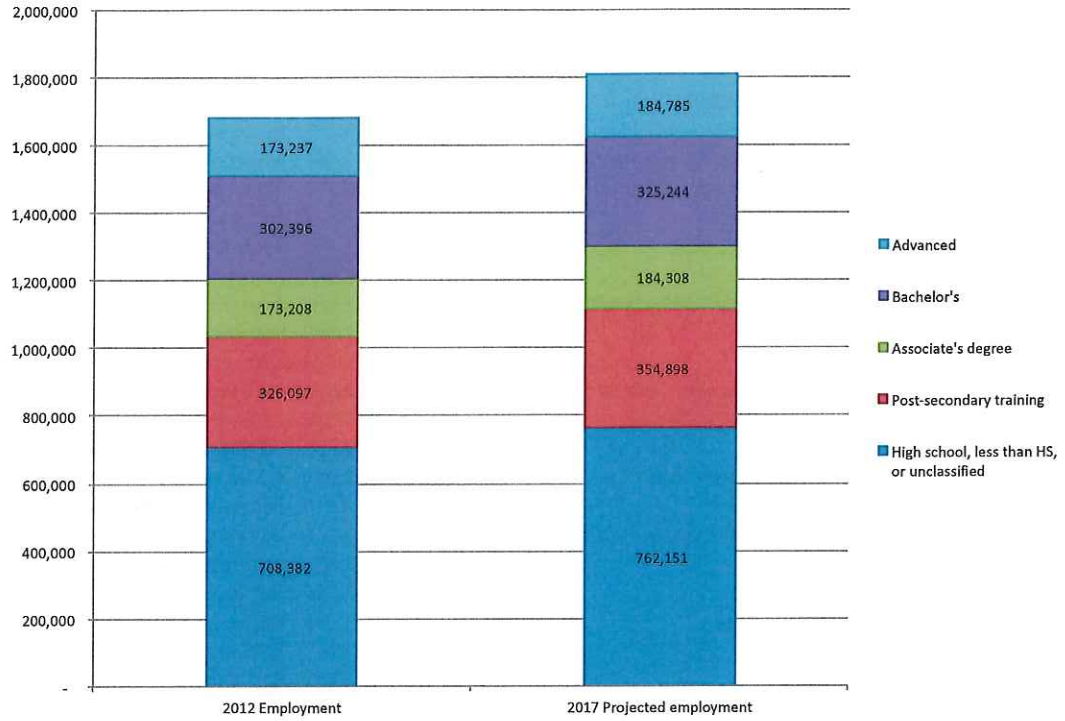
Occupational demand 2012 to 2017

The OED analysis indicates that total employment in Oregon will grow from 1,683,320 in 2012 to 1,811,386 in 2017, an increase of 7.6% (128,066 new positions). Figure 1 identifies the number of employees in occupations by educational attainment requirements for 2012 and projected for 2017. Overall, OED does not project large changes in the share of employment in occupations at each education level. In other words, the distribution of educational requirements of new positions will resemble that of all employees. Employers will need to hire for more than just new positions because individuals leave existing positions for a variety of reasons (e.g., to change jobs, retire, move out of state). In total, OED projects employers will need to hire 328,764 workers through 2017 to fill new and these newly open positions. Figure 2 displays the projected number of openings between 2012 and 2017 by educational requirements, including those that require a high school diploma or lower educational attainment.

We focus primarily on occupations that typically require some postsecondary training or an advanced degree. In all, OED projects a total of 100,586 such openings based on entry-level education requirements, and 167,759 openings based on competitive education requirements. The difference between the two projections derives from occupations for which the typical entry-level education is a high school diploma or less but for which the competitive education level requires at least some postsecondary training. While individuals with entry-level attainment that falls short of the competitive level (entry and competitive education levels are the same for many occupations) might find employment in the occupation, having the competitive attainment will generally make this more likely, and may also lead to higher wages.

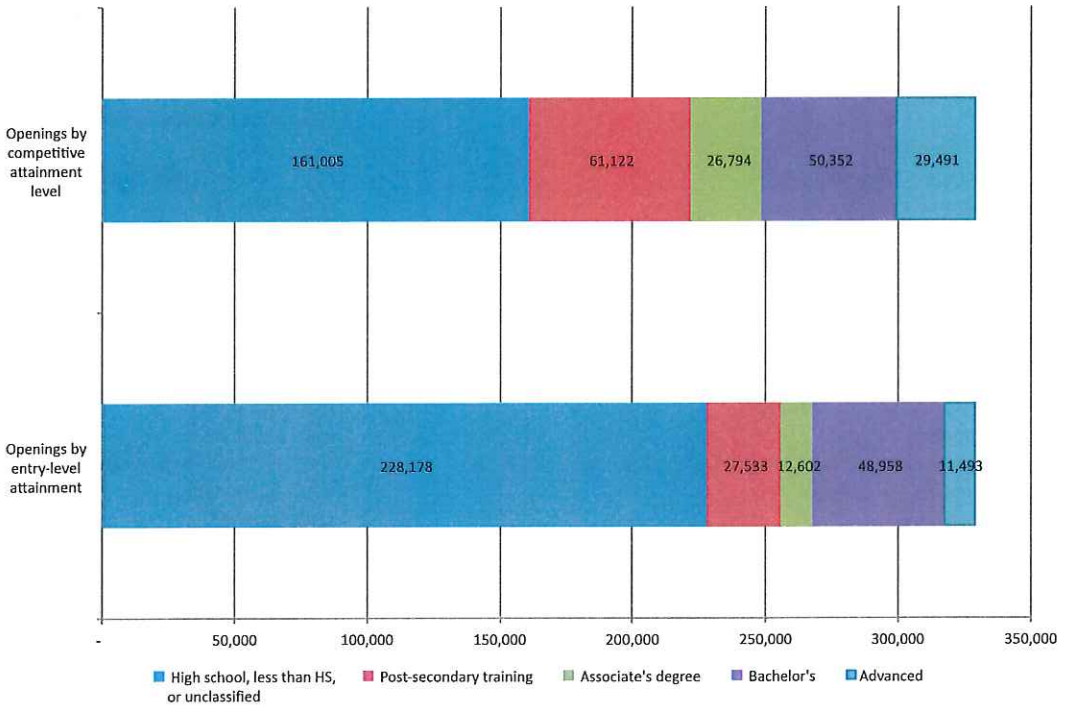
Some occupations clearly play a larger role in the labor market generally and in the projected openings. Figure 3 shows the 25 occupations with the greatest number of projected openings from among occupations requiring at least some postsecondary training. Figure 4 identifies occupations identified as high-wage (typical wages higher than the median across occupations) and high-demand (more than the median number of openings) ranked highest by OED's model. Some of the identified occupations require a specific credential or degree (e.g., registered nurses), while others may be associated with multiple possible degrees or with more general degrees (e.g., secretaries). In addition, the number of already adequately trained but not employed Oregon residents will vary by occupation.

Figure 1: Actual and projected employment by competitive education level, 2012 and 2017



Source: ECONorthwest analysis of OED data.

Figure 2: Total openings 2012 to 2017 by education requirements



Source: ECONorthwest analysis of OED data.

Figure 3: Occupations requiring at least postsecondary training with the most projected openings

Rank in total openings	Occupation	Total openings 2012-2017	Competitive education level
1	Office Clerks, General	5,188	Post-secondary training
2	Registered Nurses	4,787	Bachelor's
3	Truck Drivers, Heavy and Tractor-Trailer	3,533	Post-secondary training
4	General and Operations Managers	3,470	Bachelor's
5	Bookkeeping, Accounting, and Auditing Clerks	3,346	Associate's
6	Secretaries and Administrative Assistant	3,015	Associate's
7	Wholesale and Manufacturing Sales Reps. Except Tech./Scientific	2,866	Associate's
8	Supervisors and Managers of Office and Admin. Support Workers	2,785	Associate's
9	Supervisors and Managers of Retail Sales	2,677	Post-secondary training
10	Accountants and Auditors	2,662	Bachelor's
11	Teacher Assistants	2,563	Associate's
12	Postsecondary Teachers, Except Graduate Teaching Assistants	2,556	Advanced
13	Medical Secretaries	2,549	Post-secondary training
14	Nursing Assistants	2,393	Post-secondary training
15	Supervisors and Managers of Food Preparation and Serving Workers	2,364	Post-secondary training
16	Bartenders	2,338	Post-secondary training
17	Carpenters	2,303	Post-secondary training
18	Elementary School Teachers, Except Special Education	1,949	Advanced
19	Maintenance and Repair Workers, General	1,914	Post-secondary training
20	Secondary School Teachers, Except Special Ed./Tecnical Ed.	1,848	Advanced
21	Home Health Aides	1,825	Post-secondary training
22	Physicians and Surgeons	1,794	Advanced
23	Business Operations Specialists, All Other	1,747	Bachelor's
24	Medical Assistants	1,675	Post-secondary training
25	Computer User Support Specialists	1,459	Bachelor's

Source: ECONorthwest analysis of OED data.

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

OED Prority 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.

Potential supply

The needed supply of trained workers to fill the projected openings could come from three sources: individuals with recently acquired skills, Oregon residents trained adequately for an occupation but not currently employed in that occupation, or the migration of trained workers into the state.[2] The first identified source relates directly to output targets for local institutions of higher education. All three sources are worthy of consideration in establishing these targets, although the relative importance of each source will vary considerably by occupation. We narrow our focus below to degree production of Oregon institutions and educational attainment of Oregon residents to provide high-level context.

Trained for an occupation but not employed in that occupation

The potential pool of job applicants for an open position includes employed individuals who may or may not be actively seeking a new job, the unemployed, and individuals not currently participating in the labor force. Labor force participation rates vary with educational attainment, and reasons for opting out of the labor force vary: some choose not to seek work, others may desire work but have given up looking for a job (i.e., "discouraged workers"), and the likelihood that an individual joins or rejoins the labor force will vary with the reason for not seeking work. In addition, many individuals move into Oregon each year, and many employees in Oregon live outside the state (e.g., Vancouver, Washington residents currently employed in Oregon).

During the recent recession, many occupations lost significant numbers of employees, and overall labor force participation fell more generally. The affected individuals comprise a sizeable pool of potential workers, although the number of individuals who will ultimately return to specific occupations or to the labor force more generally remain highly uncertain quantities. A deeper analysis of these issues is more important for setting occupation-specific degree targets for some occupations than for others (OED's occupational prioritization model addresses these issues directly with available data). To inform goal-setting conversations, we present below high-level ACS data that illustrate key workforce characteristics.

Figure 5 displays the labor force participation rate by broad education levels and age groups. This type of information can nonetheless support output targets for types of degree. Assuming that recently observed labor force participation rates by educational attainment will continue into the future, the data will suggest the extent to which institutions need to produce "excess" degrees to satisfy the projected workforce need.

For example, among 25-55 year olds with a Bachelor's degree in Oregon, just under 90% are either employed or unemployed but in the labor force. The remaining individuals are considered out of the labor force. This suggests that in aggregate, the state will need to "find"

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[2] Currently employed individuals can of course also apply for a different job, but this would leave a new opening to be filled. We do not address this labor market "churn" in our discussion.

about ten additional individuals with a Bachelor's degree for every nine employment opportunities that require a Bachelor's. Because individuals with a credential in one field do not necessarily seek or find employment in that field, production targets for occupation specific degrees may need to exceed the number of potential openings by greater margins.

Figure 5: Oregon labor force participation rate by age group and educational attainment, 2012

Age group	Highest educational attainment			
	Some college	Associate's	Bachelor's	Advanced
18-24	65%	77%	86%	92%
25-54	81%	83%	87%	91%
55-70	54%	61%	59%	62%
All 18-70	70%	76%	79%	80%

Source: ECONorthwest analysis of 2012 American Community Survey PUMS.

Figure 6 displays the share of the workforce that moved into Oregon during the year prior to the ACS survey, using the same attainment and age groups as in Figure 5. Overall, four to five percent of Oregon's 2012 labor-force had moved into the state recently. These inflows reflect a combination of economic and non-economic factors.[3] Particularly for younger age groups for example, many such individuals spent a significant portion of their lives as Oregon residents but moved out of state for employment or education (e.g., most Oregon high school graduates who attend an out-of-state college). While the state of the economy will affect the desirably of returning "home", individuals often return even in a poorly performing economy (e.g., because of existing social networks). Regardless of source, immigration constitutes an important consideration in determining appropriate output targets for Oregon's public institutions.

Figure 6: Share of labor force moving into Oregon in the prior twelve months, by age group and educational attainment, 2012

Age group	Some college	Associate's	Bachelor's	Advanced
18-24	9%	4%	13%	0%
25-54	3%	4%	5%	6%
55-70	1%	1%	2%	2%
All 18-70	4%	4%	5%	5%

Source: ECONorthwest analysis of 2012 American Community Survey PUMS.

[3] We do not report on outflows in this report, although similar analysis would provide information about net inflows by educational attainment, age group, and other individual characteristics.

Recent institutional degree production

Degree production of Oregon postsecondary institutions provides a rough assessment of state systems' (CCWD and OUS) current ability to produce graduates able to compete for Oregon jobs in the future. Below, we present a high-level summary of recent degree production in Oregon by both public and private institutions. However, individuals with locally produced degrees do not necessarily seek employment in a field related to the degree received or even remain in Oregon. Furthermore, recent institutional output corresponds to a market equilibrium of institutional supply of education services and individual demand for education, not necessarily current or future institutional capacity. As in other sections, the data presented below constitute only a starting point for the HECC's goal setting because the factors that affect institutional capacity, market equilibrium, and the likelihood that an individual seeks degree-related employment in Oregon will vary considerably across degree types, institutions, and relevant occupations, and many of these factors correspond to considerations identified above that influence migration more generally.

Figure 7 displays the total institutional output of Oregon's postsecondary institutions as reported in IPEDS.[4] We display totals separately for public and private institutions, as the latter constitute an important potential supply of trained workers. The relative importance of each sector will vary by program of study.[5]

Figure 7: Output of Oregon's postsecondary institutions by credential and institutional control, academic year 2011-2012

	Certificate	Associate's	Bachelor's	Advanced	Total
Public					
Two-year	3,363	10,577			13,940
Four-year	19	57	15,136	6,537	21,749
Private					
Two-year	1,475	587			2,062
Four-year	580	523	4,404	3,531	9,038
Total	5,437	11,744	19,540	10,068	46,789
Public share	62%	91%	77%	65%	76%

Source: ECONorthwest analysis of 2011-12 IPEDS.

The age of completers in a given year also varies by age and type of completion—an important consideration for strategies that seek to increase attainment for specific age groups. Figure 8 illustrates these differences by displaying the share of completers less than 25 years old at the time of award. As indicated, recipients of bachelor's degrees tend to be younger, on average, than recipients of certificates or associate's degrees.

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[4] Completion totals include both United States residents and non-residents. "Advanced" total includes post-baccalaureate certificates.

[5] IPEDS data disaggregate completions by program of study, supporting deeper analysis of these issues.

Figure 8: Share of completers under 25 at time of award by credential and institutional control, academic year 2011-12

	Certificate	Associate's	Bachelor's	Advanced	Total
Public					
Two-year	20%	35%			31%
Four-year	16%	40%	64%	18%	50%
Private					
Two-year	44%	31%			40%
Four-year	27%	26%	74%	8%	41%
Total	27%	34%	66%	12%	24%

Source: ECONorthwest analysis of 2011-12 IPEDS.

Linking institution output and anticipated demand

Based on the data summarized above, we can, albeit crudely, compare degree production within Oregon to anticipated labor market demand and draw qualitative conclusions about how to better align supply and demand within the 40-40-20 paradigm going forward. To do so, we make several simplifying assumptions. First, we assume that institutional degree production remains at 2012 levels through 2017. Second, we make several adjustments to account for multiple degree attainment (e.g., individuals with a master's often receive the advanced degree within a few years of earning their bachelor's).[6] By not doing so, we could significantly overstate the potential supply of degrees from Oregon institutions. We do not attempt to adjust for other described above, such as migration and individuals' decisions to enter or exit the workforce. Figure 9 presents a comparison of the resulting adjusted five-year degree production estimates with OED projected labor market demand.

Taken at face value, these projections suggest that if every recipient of a degree in Oregon sought employment in a job requiring their degree, the state could face a relative undersupply of certificates, oversupply of associate's and advanced degrees, and about the right number of bachelor's degrees. For a variety discussed above (e.g., the impacts of migration and decisions of degree recipients to participate in the workforce on supply) these conclusions are inappropriate, but the numbers do lead to two, more qualitative, conclusions.

First, the state will not meet anticipated demand for workers with postsecondary training short of an associate's degree simply by producing certificate-holders at 2012 levels. Whether the state's institutions should aspire to meeting this target requires deeper analysis, and the answer will likely vary by program. For example, OED projects openings for 4,787 registered nurses

[6] Specifically, we assume the following: (1) based on analysis of national survey data, we assume that 9% of certificate recipients will receive a more advanced degree and therefore reduce the supply of certificates by this amount; (2) based on analysis of national survey data, we assume that 21% of associate's degree recipients will earn a bachelor's degree; and (3) every new advanced degree reduces the supply of bachelor's degrees by one. Individuals can also complete postsecondary programs after having achieved a higher attainment level (e.g., earning a certificate after an Associate's). We do not account for this phenomenon in our analysis.

through 2017, an average of 798 openings in each year 2012-2017. The IPEDS data indicate that in 2012, institutions in Oregon awarded 918 nursing degrees. While close to the anticipated need overall, 59 percent of the awards were associate's level, short of the competitive education level for this occupation. Furthermore, 2012 ACS data suggest that several hundred of Oregon's employed registered nurses lived in another state in 2011, suggesting a quantitatively important net flow of nurses into the region. Policymakers should consider these and other factors in setting goals for nursing award production in Oregon. OED compiles and analyzes a significant amount of information relevant to these issues and should serve as a resource for the HECC as it develops goals for higher education.

Second, current production could meet the anticipated labor market need for individuals with more advanced degrees. Encouraging large shares of Oregon's adult population to return to school primarily for the purpose of reaching 40-40-20 for all adults could, if successful, result in a labor market flooded with individuals overqualified for the available jobs and possibly burdened with significant debt acquired in pursuit of a degree. A better, alternative approach for increasing attainment among older adults would, in addition to assessing total production, focus attention on specific types of postsecondary—those projected as in high demand in the workforce.

Figure 9: Projections of degree production and anticipated job openings 2012-2017

	Certificate	Associate's	Bachelor's	Advanced
Adjusted production projection 2012-2017	24,738	46,389	47,360	50,340
Projected openeings by competitive education level	61,122	26,794	50,352	29,491
Production as a share of openings	40%	173%	94%	171%

Source: ECONorthwest analysis of 2011-12 IPEDS, NCES Beyond Postsecondary Survey, and OED data.

Conclusions and recommendations

The information provided above provides broad context for setting output targets for Oregon's public institutions of higher education. OED routinely produces occupational projections that characterize the educational requirements of the future workforce for "the economy we have." These data provide guidance in setting overall and occupation-specific targets. Data from ACS and other sources can provide additional information about how institutional output translates into additional labor force supply to meet anticipated need.

At the same time, tying aggregate targets directly to the projections will not necessarily drive the state successfully to the 40-40-20 vision, and policymakers must walk a fine line between

setting degree output targets to achieve the vision and ensuring that degree recipients have a reasonable probability of gainful employment after investing in postsecondary education.

To establish and refine specific goals, we recommend the HECC consider the following issues in detail:

- Beyond baseline occupational projections and anticipated postsecondary enrollment, assess potential pool of candidates for training (e.g., older adults with some college but no degree may have an easier time acquiring an in-demand postsecondary degree than those with no college).
- In establishing output targets related to specific occupations, leverage data incorporated into OED's occupational prioritization model to consider the relative importance of local degree production, interstate migration, the untapped supply of qualified but not employed individuals, and labor market churn.
- Implement policy to support reaching 40-40-20 quickly for younger adults while supporting more targeted approaches to increasing educational attainment and economic stability for older populations.
- Investing in individual unit-level data systems to track and analyze individual outcomes from K-12 through postsecondary education and into the workforce to provide concrete evidence about the effectiveness of specific programs in training and placing individuals into the occupations for which they are being trained. Oregon has undertaken related efforts through such projects as the state's Advanced Longitudinal Data for Education Reform (ALDER) project, and should continue to support this and related efforts.