

Supporting Information for
Reskilling and Upskilling for Decarbonization:
Analyzing Micro-credential Programs for Energy Workforce Development

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Table S1. Participation statistics by program across the three studies (all values in %)

	CCUS	DAPI	ESG	Hydrogen	SED	UEDA
Pre-study	2.1	8.3	20.8	35.4	33.3	0.0
Post-study	0.0	0.0	28.1	0.0	34.4	37.5
Panel study	25.8	0.0	0.0	38.7	35.5	0.0

Table S2. Gender distribution across the three studies (all values in %)

	Female	Male
Pre-study	38.8	61.2
Post-study	29.0	71.0
Panel study	34.4	65.6

Table S3. Age distribution across the three studies (all values in %)

	18-30	31-45	46-60	61-75
Pre-study	16.3	51.0	26.5	6.1
Post-study	25.0	31.2	31.2	12.5
Panel study	16.1	38.7	32.3	12.9

Table S4. Educational attainment distribution across the three studies (all values in %)

	Bachelor's degree (BA, BS, etc.)	Master's degree (MA, MS, etc.)	Doctorate degree (Ph.D., Ed.D., etc.)	Professional degree (MD, JD, etc.)
Pre-study	42.9	40.8	10.2	2.0
Post-study	34.4	50.0	15.6	0.0
Panel study	35.5	51.6	9.7	3.2

Table S5. Employment status distribution across the three studies (all values in %)

	Employed, full-time	Employed, part-time	Self- employed	Student	Not employed, looking for work	Not employed, not looking for work	Retired	Others
Pre-study	77.6	6.1	10.2	4.1	0.0	0.0	0.0	2.0
Post-study	65.6	0.0	3.1	21.9	9.4	0.0	0.0	0.0
Panel study	80.6	3.2	12.9	0.0	0.0	0.0	3.2	2.0

Table S6. Job title distribution across the three studies (all values in %)

	Intern	Entry- level	Analyst/ Associate	Manager	Senior Manager	Director	Vice- President/ Senior Vice- President	C-Level Executive
Pre-study	0.0	0.0	31.0	11.9	21.4	21.4	9.5	2.4
Post-study	0.0	8.3	29.2	25.0	20.8	8.3	8.3	0.0
Panel study	3.9	0.0	38.5	7.7	7.7	23.0	11.5	3.9

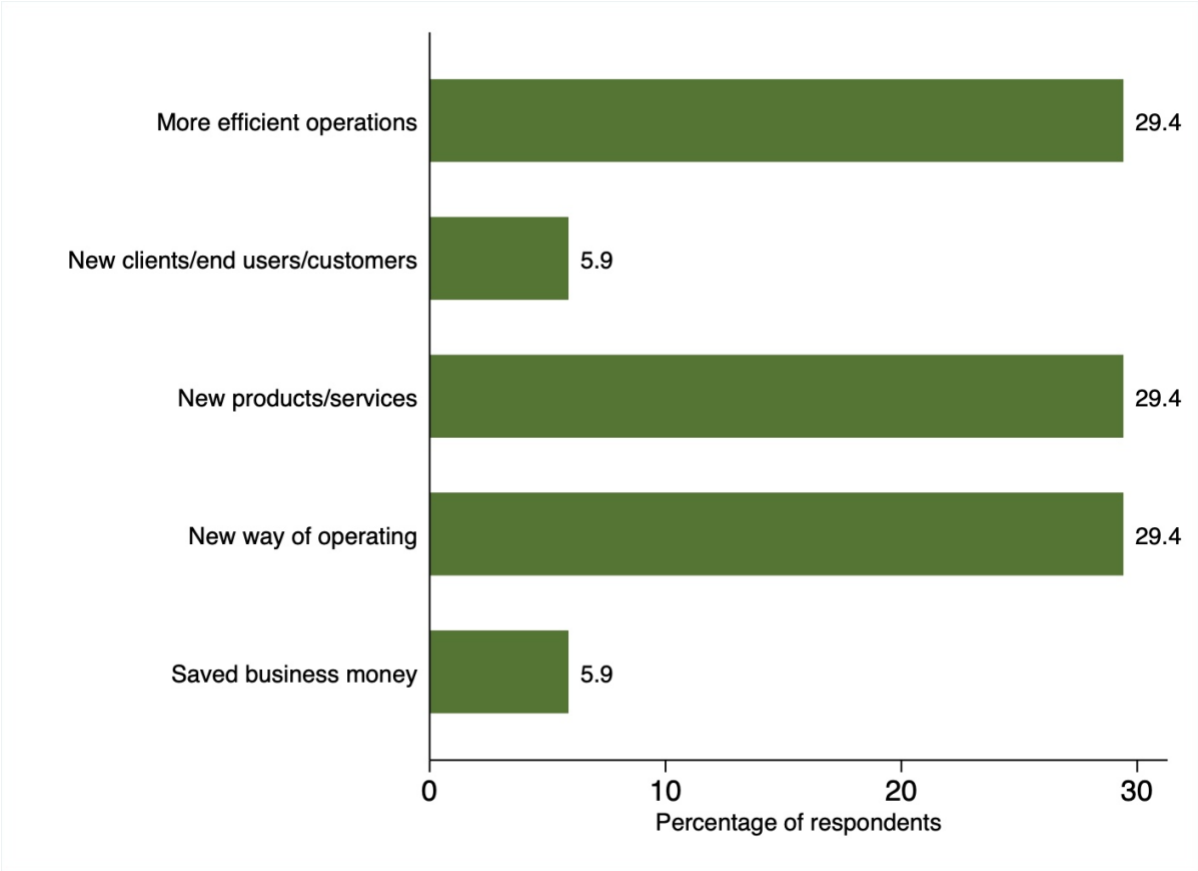


Figure S1. Impact of micro-credentialing programs on energy companies three months after students had been credentialed by the programs (n=40).

Survey Questionnaires

Pre-Test Survey – standalone and panel pilot studies

Q1 Which UH Energy Microcredentialing programs have you enrolled in?

- Sustainable Energy Development Program (SED)
- Upstream Energy Data Analytics Program (UEDA)
- Energy ESG Program
- Hydrogen Economy Program
- Data Analytics for the Process Industry Program (DAPI)
- CCUS Executive Education Program

Q2 Which of the following best describes your current employment status?

- Employed, Full-time
- Employed, Part-time
- Self-employed
- Not employed, looking for work
- Not employed, not looking for work
- Student
- Retired
- Others

Q3 What is your current job title?

- Intern
- Entry-level
- Analyst/Associate
- Manager
- Senior Manager
- Director
- Vice President/ Senior Vice President
- C-level Executive (CIO, CTO, CMO etc.)
- President or CEO
- Owner

Q4 How often do you currently use or consider the principles of the Microcredentialing program in your current job?

- Never - It's a new area of knowledge for me
- Seldom
- Sometimes
- Most of the time
- Always

Q5 What contribution do you hope the program will make to your career immediately and over the next two years?

- Promotion within company
- Increased opportunity/improved candidacy for new job
- Increased knowledge base
- Increased chances at getting a raise
- Increased ability to do current job/work in current industry better
- More opportunities with current company
- Acquisition of skills/knowledge to transfer to different industry
- Networking opportunities with people in your field
- Other
- None

Q6 If you had not enrolled in the program, do you expect you will achieve similar results . . .

- In the same time frame
- A longer time frame
- A shorter time frame
- Would not have achieved similar results

Q9 Why did you enroll in UH Energy Microcredentialing program?

- My manager requested I enroll in the program
- My manager approved my request to take the course
- I took the course on my own time to help me in my career growth
- I took the course for fun/ to explore a personal interest

Q10 Do you expect to be able to apply the skills/knowledge acquired during the course in your current role?

- Not at all
- To a small extent
- To some extent
- To a moderate extent
- To a large extent

Q11 What impact do you expect this would make at your current organization?

- More efficient operations
- New way of operating
- Saved business money
- New products/services
- New clients/end users/customers

Q12 What gender do you identify as?

- Male
- Female
- Prefer to self-report
- Prefer not to say

Q13 What is your age?

- 18-30
- 31-45
- 46-60

- o 61-75
- o Above 75

Q14 What is the highest level of education you have completed?

- o Less than high school diploma
- o High school diploma or GED
- o Some college, no degree
- o Associates degree (AA, AS, etc.)
- o Bachelor's degree (BA, BS, etc.)
- o Master's degree (MA, MS, etc.)
- o Professional degree (MD, JD, etc.)
- o Doctorate (PhD, EdD, etc.)

Q15 We want to follow up when you graduate from the program and evaluate if we matched up to your expectations from the program. Please help us create a unique identifier for you which can be used to tally your responses to the second study by answering the following questions. This information is being collected only to match up your responses and to ensure that your responses remain anonymous and confidential.

Q16 Please enter the first initial of your middle name. Please respond with 'X' if you do not have a middle name.

Example-

Respondent Name: Jane Anne Doe

Response to question: A

Respondent Name: Jane Doe

Response to question: X

Q17 Please enter the day of your birth in two-digits.

Example-

Respondent birthday: February 29, 1920

Response to question: 29

Respondent birthday: March 1,1920

Response to question: 01

Q18 Please enter the first three letters of the city you were born in.

Example-

Respondent city of birth: Houston

Response to question: HOU

Post-test Survey- standalone and panel pilot studies

Q1 Which UH Energy Microcredentialing programs have you enrolled in?

- Sustainable Energy Development Program (SED)
- Upstream Energy Data Analytics Program (UEDA)
- Energy ESG Program
- Hydrogen Economy Program
- Data Analytics for the Process Industry Program (DAPI)
- CCUS Executive Education Program

Q2 Which of following best describes your current employment status?

- Employed, Full-time
- Employed, Part-time
- Self-employed
- Not employed, looking for work
- Not employed, not looking for work
- Student
- Retired
- Others

Q3 What is your current job title?

- o Intern
- o Entry-level
- o Analyst/Associate
- o Manager
- o Senior Manager
- o Director
- o Vice President/ Senior Vice President
- o C-level Executive (CIO, CTO, CMO etc.)
- o President or CEO
- o Owner

Q4 How often do you use or consider the principles of the Microcredentialing programs in your current job?

- o Never
- o Seldom
- o Sometimes
- o Most of the time
- o Always

Q5 What contribution did the program make to your career or you expect it would make in the next two years?

- Promotion within company
- Increased opportunity/improved candidacy for new job
- Increased knowledge base
- Increased chances at getting a raise
- Increased ability to do current job/work in current industry better
- More opportunities with current company
- Acquisition of skills/knowledge to transfer to different industry
- Networking opportunities with people in your field
- Other

Q6 If you had not enrolled in the program, would you have achieved the similar results . . .

- In the same time frame
- A longer time frame
- A shorter time frame
- Would not have achieved similar results

Q7 Do you plan to enroll/have you enrolled in other education opportunities besides the program to improve your career growth?

- Yes
- Maybe
- No

Q8 Which of the following would you enroll in?

- Microcredentials in this topic
- Microcredentials in another topic
- Degree program (AA/AS, BA/BS, Masters, PhD)
- Free online courses
- Industry/ trade organization training
- Other

Q9 Why did you enroll in the program?

- My manager requested I enroll in the program
- My manager approved my request to take the course
- I took the course on my own time to help me in my career growth
- I took the course for fun/ to explore a personal interest

Q10 Were you able to apply the skills/knowledge acquired during the course?

- Not at all
- To a small extent
- To some extent

- o To a moderate extent
- o To a large extent

Q11 How quickly were you able to apply the skills/ knowledge acquired during the course?

- o While enrolled
- o Immediately after program completion
- o Sometime after program completion

Q12 What impact did it make at your current role?

- o More efficient operations
- o New way of operating
- o Saved business money
- o New products/services
- o New clients/end users/customers

Q13 What gender do you identify as?

- o Male
- o Female
- o Prefer to self-report
- o Prefer not to say

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- o Master's degree (MA, MS, etc.)
- o Professional degree (MD, JD, etc.)
- o Doctorate (PhD, EdD, etc.)