Fachhochschule Graubünden
University of Applied Sciences

Energy&Jobs:

The development of the Swiss labour market and the impact on education in the face of the energy transition and digitalisation

Project management: Peter Moser and Adhurim Haxhimusa

Bild: Wäger AG

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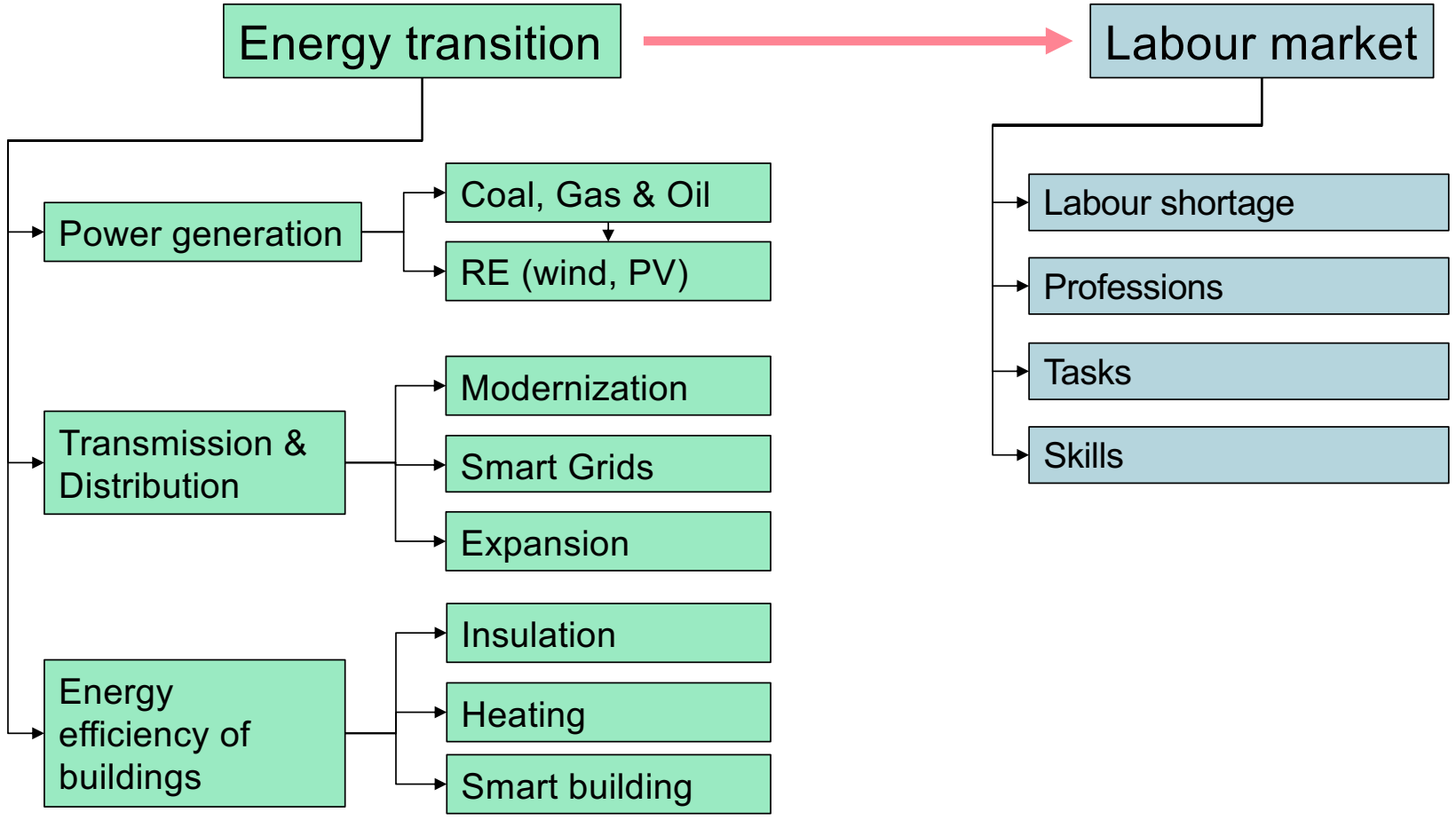
Project Objectives: Energy Transition & Labour Market

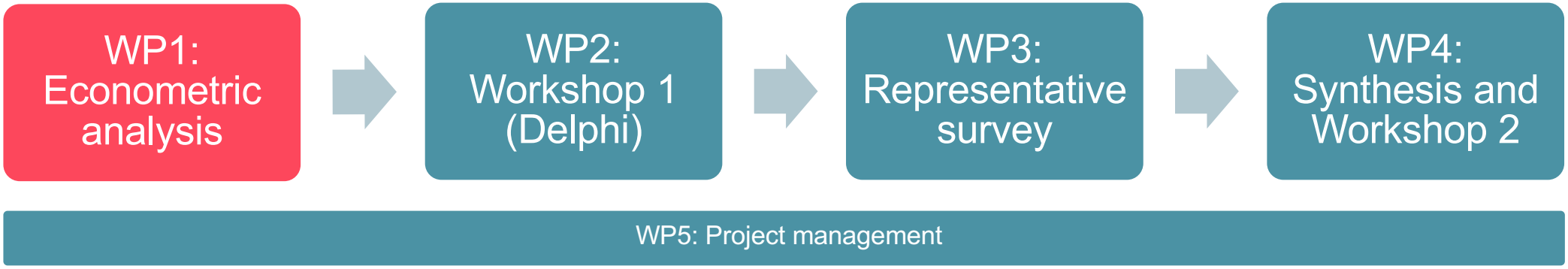
Impact of the energy transition on the labour market in Switzerland



Research Questions

1. Which **professions** in the energy and construction industry are most affected by the energy transition and the digitization of energy systems?
   - How are **tasks** and required **skills** changing in existing professions?
   - Are existing professions **disappearing**, are new professions **emerging**?
2. Which skills need to be promoted more strongly in **education** and **training programmes**?

Project Schedule



Project Partners

Financed by the Swiss Federal Office of Energy (BFE)

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- Swissolar (David Stickelberg)
- Suissetex (Daniel Stamm, Chantal Volz)
- Schweizerischer Verband für Kältetechnik SVK (Marco von Wyl)
- GebäudeKlima Schweiz (Marco von Wyl)
- Gebäudehülle Schweiz (Urs Hanselmann)

Programme

1. **Presentation: Adhurim Haxhimusa**
   Energy transition and jobs: Assessing labour market effects of green investments using firm-level data (2018–2024) in Switzerland
2. **Questions**
3. **Discussions in three parallel sessions**
4. **Feedback and discussion in the plenary session**
5. **Conclusions**

Parallel session1 - Industries

Skilled workers for the energy transition: What professions and skills do companies need in view of the energy transition?

Parallel Session 2 - Public sector

What professions and competencies do administrations, public services, regulators need in view of the energy transition?

Parallel Session 3 – Universities, educational institutions

Training for the energy transition: Which competencies will be crucial in the future – and where do the challenges lie?

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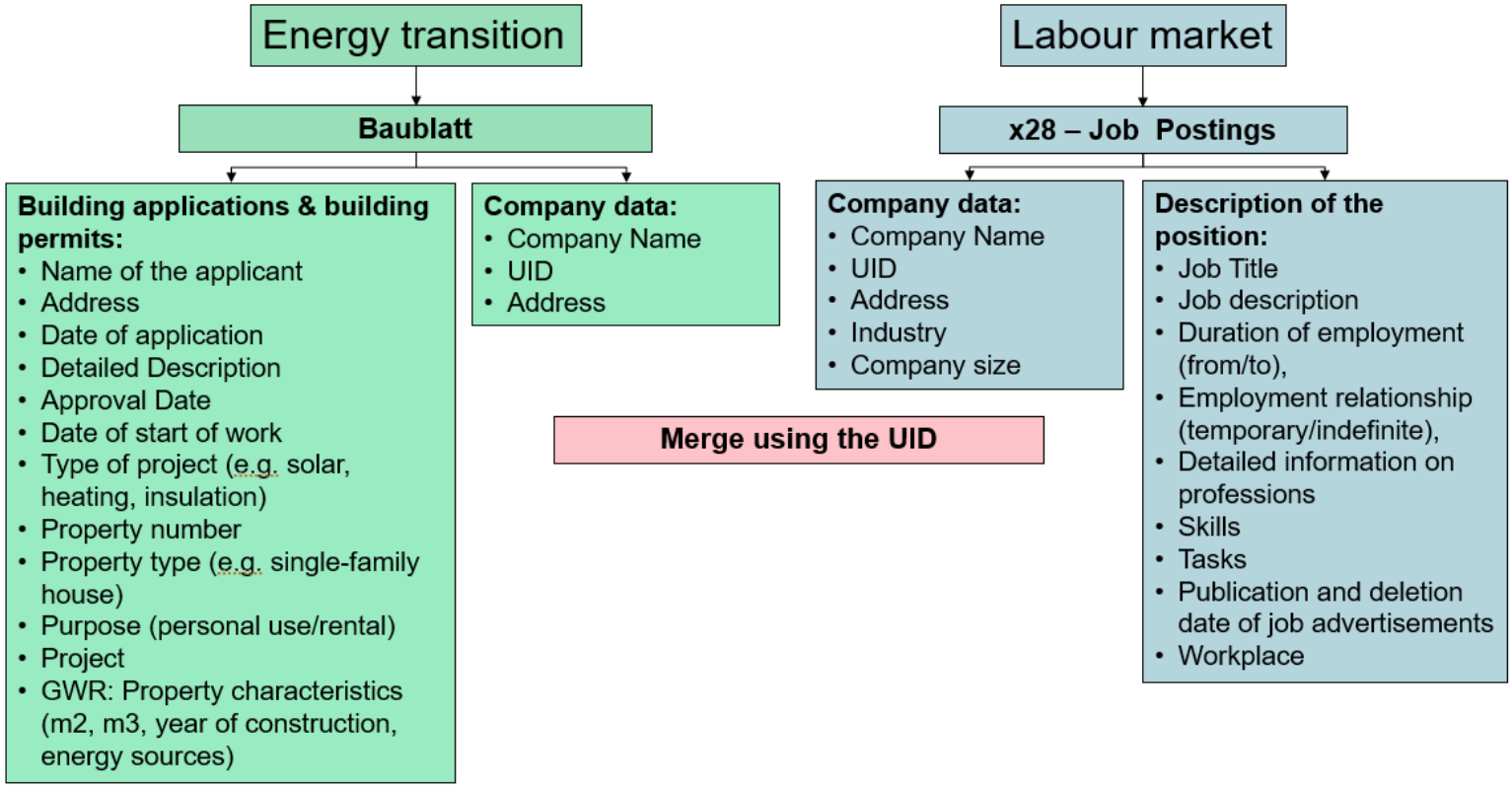
Energy transition and jobs:
Assessing labour market effects of green investments using firm-level data (2018–2024) in Switzerland

Adhurim Haxhimusa

Data innovation

Baublatt: universe of construction applications & permits (2018–2024)

x28: universe of job postings & vacancy durations (2018–2024)

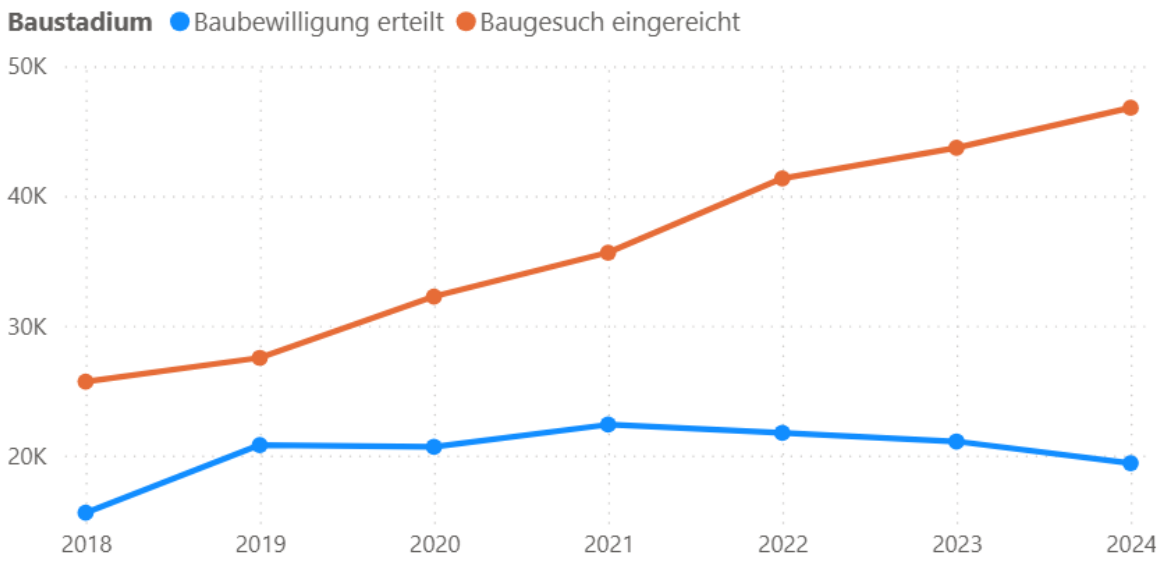


What is a “green project” and a “green job”?

- **Energy-related (green) projects**
  - Heating systems (e.g., heat pump, pellet, geothermal)
  - Insulation, windows, roofs
  - Solar, building automation
  - Identified via GACodes + multilingual text

- **Energy-related (green) jobs**
  - 126 occupations (e.g., Elektromonteur, Solartechniker, Netzelektriker) → 48 groups
  - 227 skills (e.g., Heizungs-, Klima-, Lüftungs- und Sanitärtechnik) → 9 skill groups
  - Number of job posting = labour demand
  - Vacancy duration = hiring difficulty

Trends: Applications vs permits

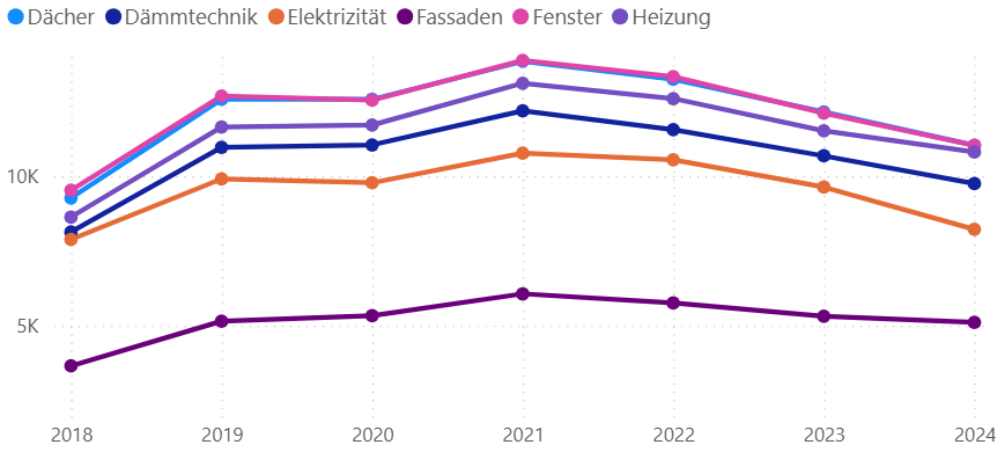


- Applications ↑ gradually
- Permits peak in 2021, then ↓
- Gap widens after 2019

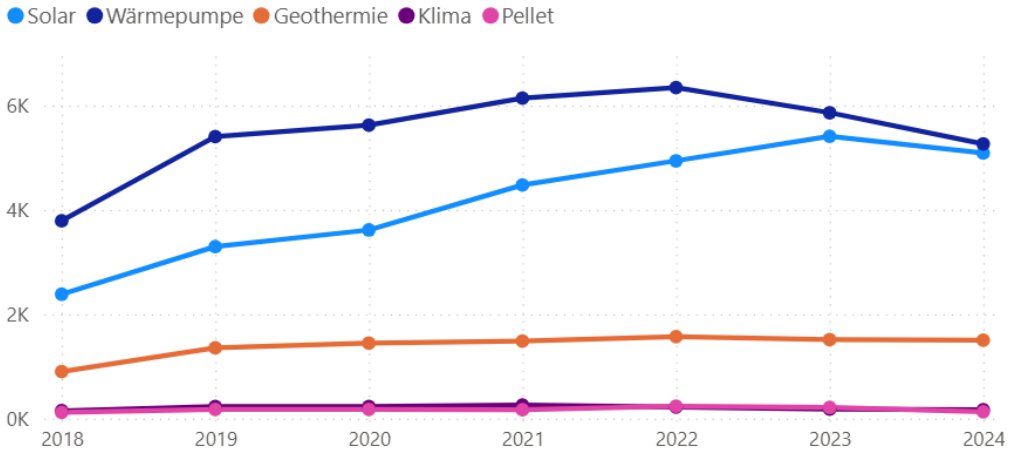
- This divergence signals administrative and regulatory bottlenecks
  → relevant for energy transition

Trends: permits by energy-related activity

The number of permits by energy-related activity



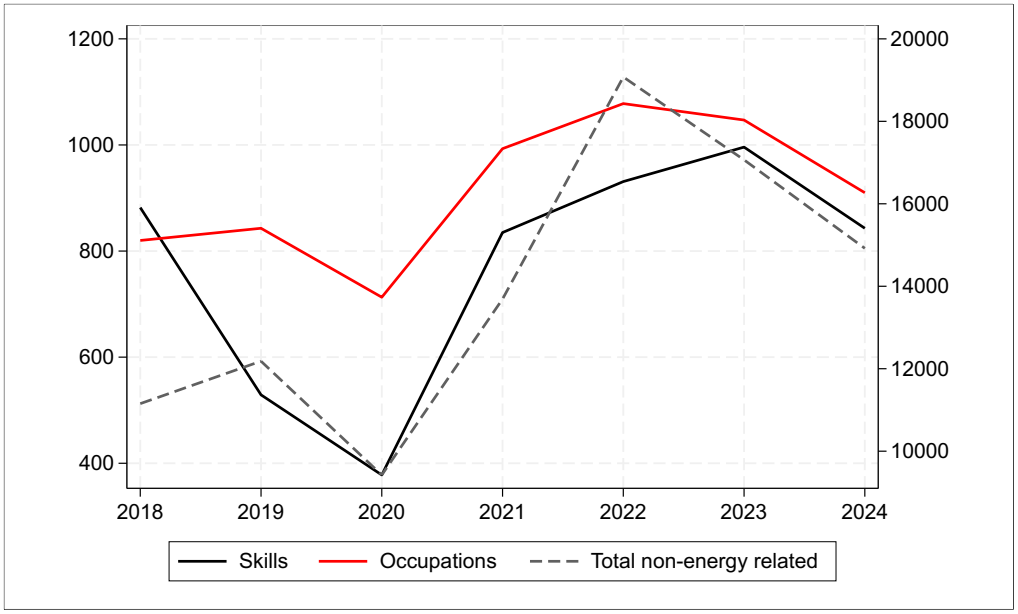
Number of permits related to green heating activities



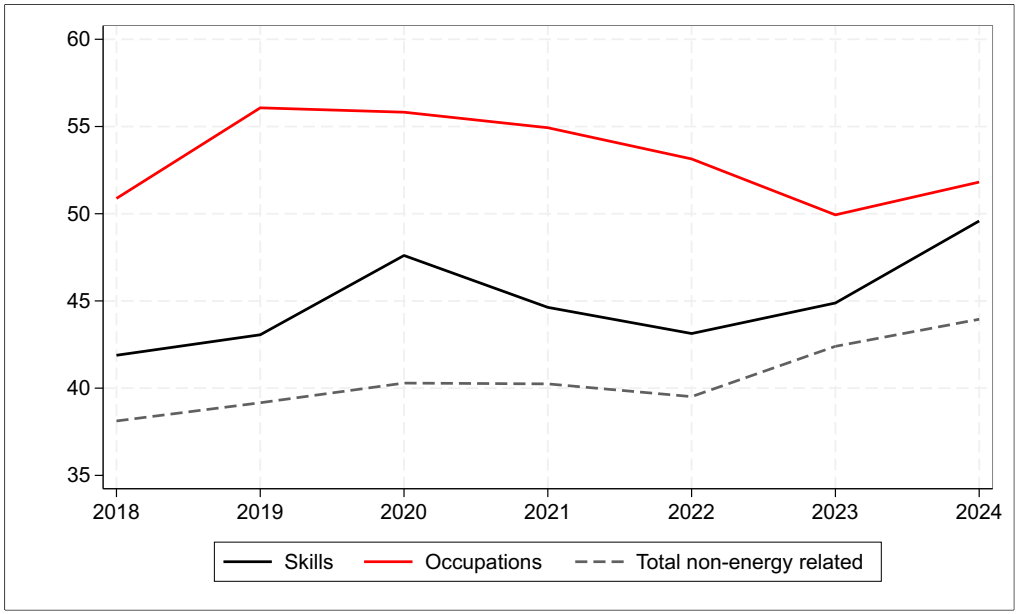
- Heat pump and solar dominate
  - Heat pump ↓ after 2022 (applications dropped too)
- Retrofitting is relevant for energy transition

Trends: green jobs follow the cycle, but frictions differ

Job postings



Vacancy duration



- Green jobs are pro-cyclical
- But:
  - Energy-related occupations → longest vacancy duration
  - Energy-related skills → medium
  - Non-energy jobs → shortest

  → This already hints at structural shortages

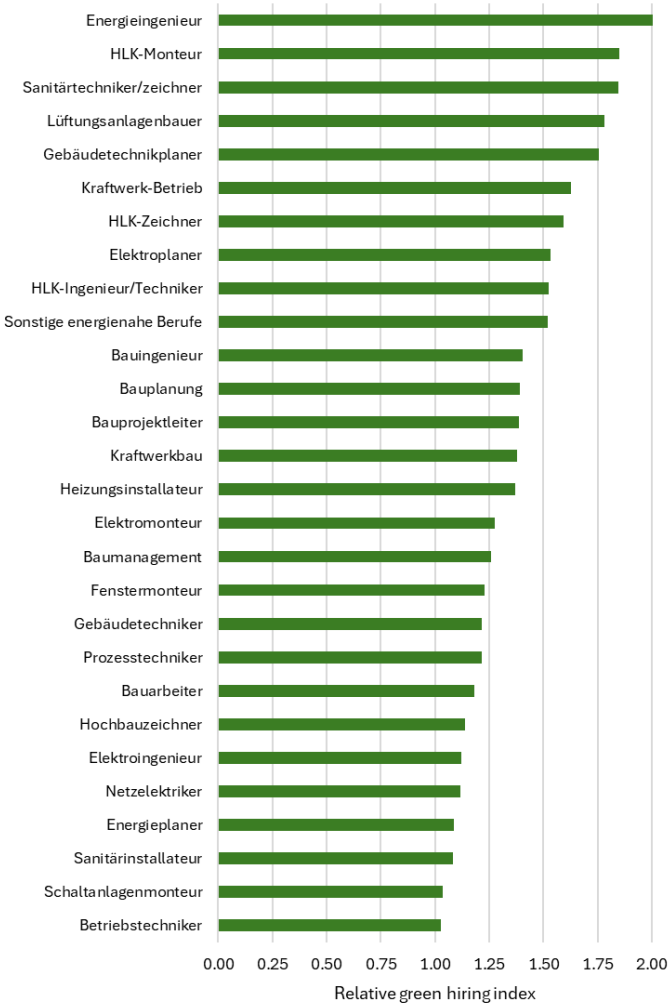
Identification strategy: how large green projects shape firms' hiring strategies

- Treatment definition: large green projects
  - Firm-year treated if annual energy-related project costs > CHF 7 million
  - Project costs proxy technological complexity, and labour intensity

- Job postings by treated firms vs. by non-treated firms
- Vacancy duration by treated firms vs. by non-treated firms
- Difference-in-Differences (PPMLHDFE)

Occupations most strongly demanded by firms with large green projects

Comparison of firms with and without large energy-related projects



- Relative green hiring index measures how strongly a given occupation appears in the job postings of firms with large green projects

- Firms implementing large green projects disproportionately rely on a very narrow set of occupations:
  - Energieingenieur,
  - HLK-Monteur/Zeichner,
  - HLK-Ingenieur/Techniker
  - Sanitärtechniker/zeichner,
  - Lüftungsanlagenbauer,
  - Gebäudetechniker, …

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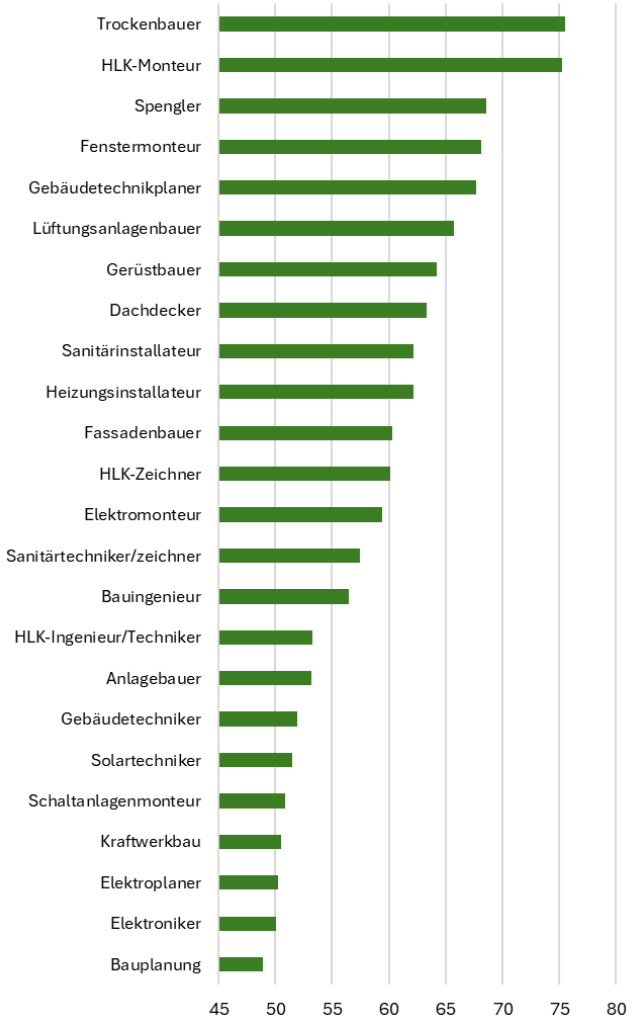
Occupations with the longest hiring times in large green projects

Average vacancy duration (in days)



- Same occupations
- Systematically longer hiring times for firms implementing large green projects

  - HLK-Monteur/Zeichner,
  - Spengler,
  - Lüftungsanlagenbauer,
  - Gebäudetechniker,
  - Heizungsinstallateur, …

Model specification & results

- Do large green construction projects cause higher labour demand and hiring difficulties?
- Approach:
  - Difference-in-Differences (PPMLHDFE) at the firm level
  - Firms are compared before and after a large green project
  - Firms without large green projects serve as a control group
  - Outcomes: number of job postings, and vacancy duration
  - We track outcomes before, during, and after project implementation

$$Y_{it} = exp\left(\sum_{k} \beta_k D_{i,t+k} + \alpha_i + \gamma_t\right) + \varepsilon_{it}$$

- Y_{it} is:
  - the number of job postings or
  - the average vacancy duration for firm *i* in year *t*,
- $D_{i,t+k}$ are the dynamic treatment dummies for event time $k \in \{-1, 0, 1+2, 3+\}$,
- α_i are firm fixed effects
- γ_t are year fixed effects

Dependent Variable	**over 7m., t-1**	over 7m., t	over 7m., t+1	over 7m., t+3
skill	10.61	21.68*	11.04	31.12*
occ	15.61***	13.22**	12.33**	-7.25
all_bau_arb	-5.75	20.05**	-0.28	-4.01
wärmedämmung	-54.28	-17.88	43.49	-24.88
heizung	66.09***	24.30*	26.15*	-16.32
elektro	22.95**	10.02	13.20	-8.33
energie	-31.71	-13.57	63.70	37.76
mechanich	-35.11	1.49	5.75	-17.08
gebäude	61.06**	-5.37	70.97**	-35.92*
metall	40.32	-32.58	-29.56	-3.28
bwl_admin	-57.59	73.09	481.37*	130.94
andere	7.02**	6.26	11.68	-6.95
gen_ener_eng	19.88**	8.02	18.70	-7.73
grid	-6.04	3.72	-1.63	2.28
buil_and_heat	8.12	15.79**	8.07	-9.94
bauarbeiter	-0.84	41.33	37.47	-35.51
hochbauzei	0.08	17.91	-32.14	-33.08
bauplanung	-1.67	43.65***	-4.96	13.85
bauprojektl	-5.55	5.32	5.87	-1.71
bauingenieur	-19.13	16.19	-6.73	-26.91
hlk_ing_tech	169.64***	14.48	-8.19	-26.75
hlk_zeich	137.67*	77.67	147.87	-27.44
heiz_inst	76.75**	39.23	33.02	11.26
sanitär_tech_zei	-17.78	-3.92	39.16	34.74
netzelektr	6.30	2.72	0.88	2.45
elektroing	2.14	-3.56	2.31	29.20
elektromont	26.66**	11.93	14.05	11.11
elektropl	12.92	-16.39	10.06	-35.96*
elektrotechn	-11.25	126.61	282.64	-93.65***
solartech	610.81***	245.81**	55.64	148.26
betriebselektr	-8.81	-8.45	-53.72	-57.58
energiepl	-35.75	17.00	105.63	75.20
anlagebauer	-75.89*	-29.29	-10.78	21.17
automation	-0.83	-23.60	-49.17	-35.13
gebäudetech	97.80**	-8.15	137.97**	-23.36
gebäudetechpl	36.99	-14.56	124.65**	10.67
metallbauer	-29.22	-51.44	-81.52**	29.67
sanitärinstall	22.57	5.83	12.36	-17.69
spengler	251.71***	8.67	29.06	-5.20

Results: occupations most affected by large green projects

Occupations	Job postings	Vacancy duration
Solartechniker	↑↑↑	↑/↓
HLK-Ingenieure/Techniker	↑↑↑	↑
Heizungsinstallateure	↑↑	↓/↑
Gebäudetechniker / Gebäudetechnikplaner	↑↑	↓/↑
HLK-Zeichner	↑↑↑	↑↑↑
Energieplaner	↑	↑↑
Elektromonteure	↑	↑/↔
Bauplanung	↑	↑
Sanitärinstallateure	↑	↑↑↑

Large green projects not only lead to more job postings, but also to significantly longer vacancy durations in **HLK-Zeichner, Energieplaner, and Sanitärinstallateure** occupations

- Indicator for labour-market frictions in occupations needed to implement energy (transition) projects

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Results: skills most affected by large green projects

Skill group	Job postings	Vacancy duration
Erneuerbare Energien	↑↑↑	↑↑↑
Wärmetechnik, Heizung & Klima	↑	↑↑↑
Elektrik	↑	↑
Energiewirtschaft & -management	↑	↑↑↑
Netzwerk & Digitalisierung	↑	↔/↑
Elektronik	↔/↓	↔/↓

Large green projects generate highly concentrated skill demand, with the strongest and most persistent bottlenecks in skills related to Erneuerbare Energien, Wärmetechnik, Heizung & Klima, and Energiewirtschaft & -management

Conclusions

- The energy transition in the construction sector faces two interrelated constraints:
  - (i) permitting frictions and (ii) labour-market bottlenecks
- Once large green projects are approved, they causally increase labour demand in energy-related occupations and skills
- Hiring responses are highly concentrated with strong demand for:
  - Solartechniker, HLK-Berufe, Heizungsinstallateure, and Gebäudetechnik
- These demand increases go along with significant increases in vacancy duration, indicating labour-market frictions
- Bottlenecks are most severe in:
  - Occupations related to HLK-, Heizungs-, Sanitär-, and Gebäudetechnik
  - Skills related to Erneuerbare Energien, and Wärmetechnik, Heizung & Klima
- Workforce constraints have become a limiting factor for the speed and scalability of the energy transition

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Q&A

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Parallel Sessions

In English and German language

Objectives

- Informal exchange
- Activate a variety of people with different perspectives and backgrounds

Rules

- It's about discussion and exchange. The sessions are as exciting as you design them.
- It's not rude to leave a session — it's rude to stay when it's no longer interesting.
- Treat everyone involved openly. Don't judge but develop ideas from others.
- Get involved! Immature ideas and food for thought can also be valuable.

Parallel session 1 - Industries

Skilled workers for the energy transition: What professions and skills do **companies** need in view of the energy transition?

Adhurim Haxhimusa

Parallel Session 2 - Public sector

What professions and competencies do **administrations, public services, regulators** need in view of the energy transition?

Reinhard Madlener

Parallel Session 3 – Universities, educational institutions

Training for the energy transition: Which competencies will be crucial in the future – and where do the challenges lie?

Werner Hediger

Feedback from the Parallel Sessions

Parallel session 1 - Industries

Adhurim Haxhimusa

Parallel Session 2 - Public sector

Reinhard Madlener

Parallel Session 3 – Universities, educational institutions

Werner Hediger

Grafik: energiezukunft

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Thank you for your cooperation.
Vielen Dank für Ihre Mitarbeit.
Grazia fitg per la collavuraziun.
Grazie per la collaborazione.

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Question für the Moderation of the Parallel Session

Time: Until 18:00

Parallel session 1 and 2: Industries and public sector

1. Which professions and which skills are increasingly in demand in your company due to the energy transition and digitization in the energy sector?
2. How do you assess the recruitment situation? For which professions or competencies is recruitment particularly difficult? Do the newly recruited employees have the required knowledge?
3. What measures are you taking to prepare the existing employee for the new requirements? What experiences do they have with it?

Parallel Session 3 – Universities, educational institutions

1. From the point of view of the training institutions, which competencies are becoming more important with regard to the implementation of the energy transition and digitization in the energy sector?
2. For which competencies is the education a particular challenge? Why?