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Result 2.1

Analyses and recommendations

Analysis of Economic Developments, Demography, Education and Labour Markets

Prepared by:

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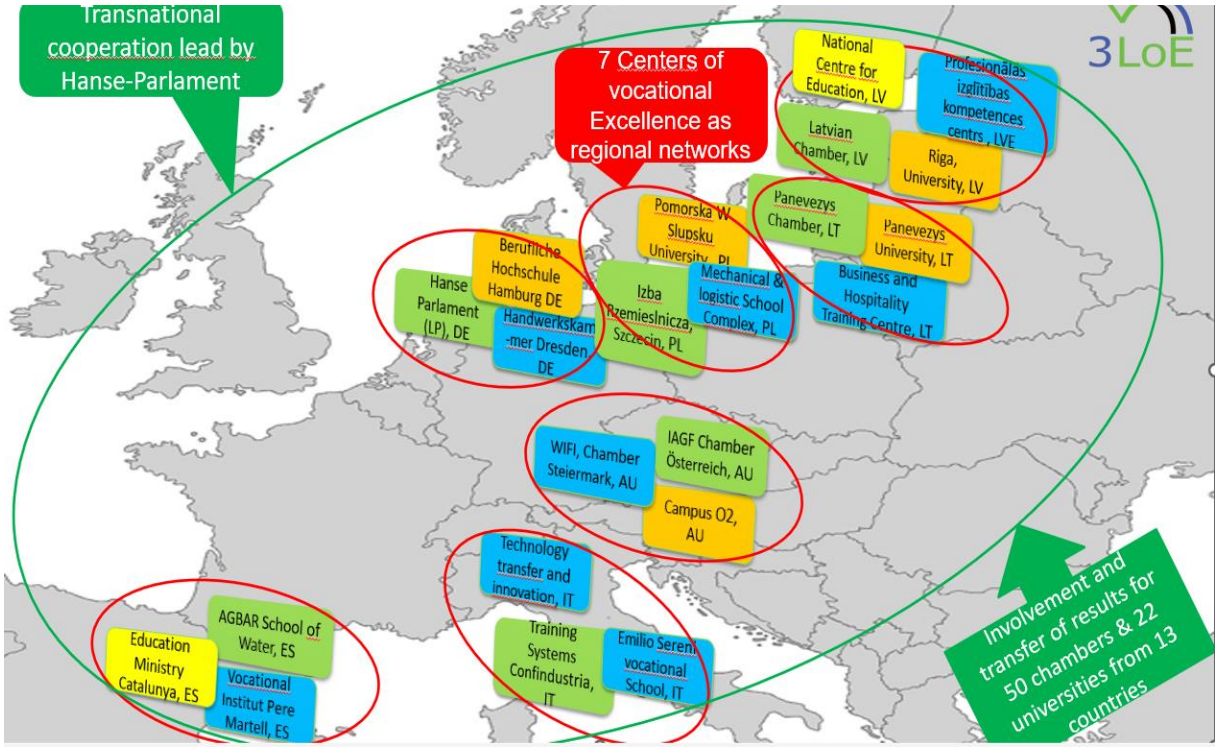
Partner



Language

English

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Introduction

As part of the Erasmus+ funded project "Three-level centers of professional excellence: Qualification, entrepreneurship and innovation in the Green Economy" (2020 – 2024), an analysis of the project partner countries' demography, economy, labour as well as education and qualification requirements in the Green economy sector has been conducted. The majority of the data is taken from the Eurostat database of the European Union, the Eurydice - National Education Systems platform by the European Commission and ReferNet - Cedefop's European network. When needed, additional sources have been consulted as well.

About the project 3LOE

Around 99% of all EU businesses are SMEs, creating up to 70% of all jobs. In general, SMEs have good growth prospects for the future and are particularly well equipped to solve environmental problems and to enhance the green economy. However, in most of the project countries, SMEs are confronted with a shortage of skilled workers and young entrepreneurs. This shortage of skilled workers is even more alarming taking into account that due to aging of current entrepreneurs, a large and growing number of companies will have to be handed over to the next generation. Furthermore, young specialists and entrepreneurs often lack the qualifications and skills needed in order to respond to contemporary developments in the fields of energy, climate and environmental protection. The following problems have been identified in SMEs working in the fields of green economy, energy and environmental protection:

- Blatant and growing shortage of skilled workers.
- Large qualification deficits, especially in the Green Economy.
- Loss of attractiveness and low qualification of school-based VET.
- Low rates of further training and insufficient orientation of offers to SME needs.
- Ageing of entrepreneurs and increasing shortage of young people (demographic change).
- Failure of business transfers and low rates of business start-ups.
- Low innovation rates and insufficient productivity.
- Not enough cooperation between universities and SMEs and a lack of teaching geared to SME needs.
- Comparably low internationalization of SMEs and vocational training providers.
- lack of national level support for SMEs".

To meet these challenges, work-based learning and new paths in vocational training must be provided through cooperation between educational institutions, economic chambers and SMEs. University graduates are often well-qualified in theory, but lack practical knowledge, skills and abilities that are crucial for SMEs. For this reason, VET reforms must also involve higher education, and should implement dual bachelor's degree programs that combine a bachelor's degree with vocational training and on-sight work in companies.

In the 3LOE project, an innovative and complex project structure with 22 project partners from 7 countries as well as 60 associated partners from 13 countries was designed. In each country, centers of vocational excellence (COVEs) in Green Economy will be established, managed and their permanent continuation ensured. A transnational cooperation of the centers will be developed, extended to 60 education stakeholders from 13 countries and operated permanently in an institutionalized form. The centers will offer a wide range of dual education measures in vocational training, further education and higher education, that are being developed, tested and evaluated in the project. These educational measures on EQF levels 3-7 focus on Green Economy, Digitalization and Entrepreneurship. Furthermore, vocational and educational consulting and innovation support for SMEs will be developed and implemented. In total, seven Train-the-Trainer programs will be developed and implemented permanently by the project partners. All results will be transferred to the 60 associated partners together with implementation advice.

The objectives and aimed outcomes of the 3LOE project can be summarized as following:

1. Foundation of a three-level Center in each project country

1.1 Building the "Green Economy" skills alliance for qualifications in SMEs with educational and economic actors from the 7 project countries; development of information and cooperation tools.

1.2 Expansion of the skills alliance to the 60 associated partners from 13 countries, comprising chambers of commerce, SME associations, as well as universities of applied sciences/colleges.

1.3 Development, testing and evaluation of a curriculum and teaching materials for Train the Trainer courses for personnel and center management (vocational schoolteachers, trainers in SMEs and lecturers in further and higher education institutions).

1.4 Evaluation of the construction and operation of the seven centers of Excellence and of the transnational cooperation.

1.5 Development of business and financing plans and ensuring the long-term continuation of the seven centres and transnational cooperation.

1.6 Development, consulting and introduction of political strategy program.

2. Implementation and realization vocational training

2.1 Development and implementation of a tool for vocational and qualification counselling as well as a training for consultants and teachers to use the tool.

2.2 Implementation of the dual system, so that work-based learning is put into practice in the project countries.
Preparation and transfer of curricula and examination regulations for dual vocational training for different professions and implementations in Poland, Lithuania, Latvia and Spain.
Development, test and implementation Trainings for teachers to conduct dual vocational training as well as Training of trainers in SMEs.

2.3 Development political concept for the training and integration of young people with learning difficulties for young people with learning difficulties (EQF level 3).
Development, test and implementation of a dual vocational training "Specialist for Building Insulation”.

2.4 Development, testing and evaluation of education programme, teaching materials and examination regulations for the provision of sector-specific qualifications already during the initial vocational training for stronger learners. Implementation in the dual system, so that work-based learning is put into practice in the project countries.

2.5 Development and implementation five-year technician training „Ecologic Solutions in Logistics”.

3. Implementation and realization of further vocational training

3.1 Development and implementation of concepts and instruments for the management of continuing vocational training.

3.2 Development, test and implementation of a Train-the-Trainer program for teachers to conduct further training.

3.3 Development and implementation of a concept "SME-fair digitalization” as well as development, test and implementation of two train the trainer programs “Basic and advanced digital skills”.

3.4 Transfer and implementation of four further trainings Energy Saving and Renewable Energies.

3.5 Preparation, transfer and implementation of six further trainings in the Green Economy.

3.6 Development, testing and evaluation of different training programs and teaching material for owners, managers and qualified workers of SMEs (EQF level 5 and 6). The trainings are specifically tailored to SME needs and different qualification levels and combine the transfer of technical, professional and management know-how.
- Training Enterprise and Entrepreneurship in Green Economy
- Training Energy Service Manager
- Trainings vocational Master Carpenter and Electric
- Training Construction Technician
- Training Service Technician
- Training Sustainability in foodservice industry

3.7 Development of regulations for new continuing education occupational profiles with a focus on the green economy.

3.8 Development of an integration programme for the unemployed (EQF level 4) in order to be able to place the unemployed in permanent jobs through further training seminars and a further training qualification.

4. Implementation and realization of higher education

4.1 Preparation and transfer of curricula, evaluation and examination regulations for two existing dual Bachelor degree programmes "Management of Renewable Building Energy Technology" and "Business Administration for SMEs".

4.2 Development and beginning of implementation of new dual Bachelor degree programs
- Business Administration & Sustainable Management of SMEs
- Entrepreneurship and Innovation in Green Economy
- Logistics - Green Supply Chains
- Service technician
- Tutorial "Sustainable management Climate neutrality for companies"

4.3 Development, test and implementation of four study modules (EQF level 6) on SME management in the Green Economy sector, which will be carried out in the dual study system and integrated into existing Bachelor degree programmes.

4.4 Development and implementation of concept for innovation promotion Solutions for manageable R&D tasks of SMEs and conducting manageable R&D projects for SMEs-

4.5 Development, testing and implementation of Training program for university lecturers and SME advisors.

5. Dissemination, transfer and use of the project results

5.1 Development of a concept and summary evaluation of the dissemination results of all partners

5.2Transfer of all educational measures to 60 educational institutions in 13 countries and needs-oriented implementation consultations as well as realization of a bundle of measures for further dissemination of the project results.

5.3 Further dissemination activities such as presentations online, at third-party events, press releases and conferences.

5.4 Book with all results of the project and distribution via book trade.

For each of the three levels of educational measures there will be:

- Target-group-specific educational programs.

- Curricula, teaching materials, etc. developed in a leading role by the educational institutions of the respective level, whereby the educational institutions of the other levels (in particular universities) participate in an advisory and supportive manner.
- Representatives of the participant target groups involved in the development work.

All educational measures will be tested with the respective target groups under different national conditions in the countries, evaluated and completed on the basis of the evaluation results with application notes.

About the analysis

In the project 3LOE the data analysis was carried out under the two following aspects:

- G*eographical aspects:* the analysis refers to the seven countries of the project, all of them EU members: Germany, Poland, Latvia, Lithuania, Austria, Italy, and Spain.
- *Aspects of the project 3LOE:*
  - Analysis of the current socio-economic situation in the countries, covering the demographic and economic aspects of the seven European countries.
  - Comprehensive overview of education markets and national education systems in the project partner countries.
  - Qualification requirements in the Green Economy sector.

The results of these analyses provide:

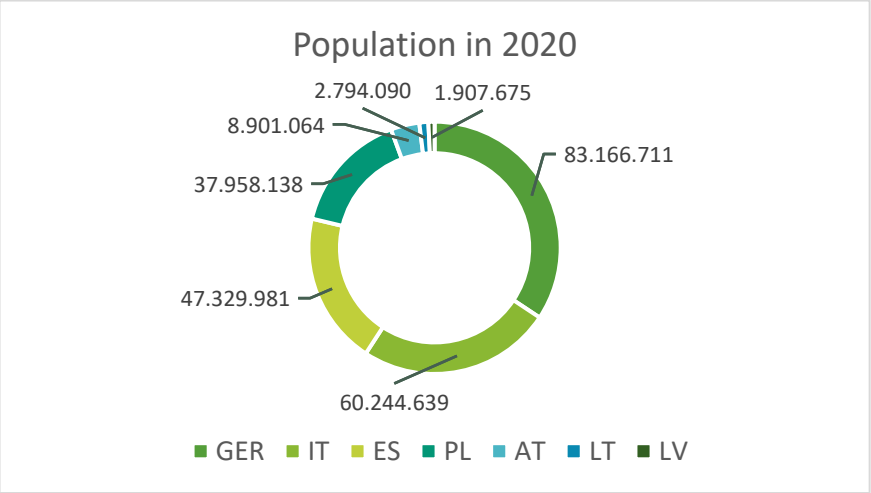
a) country-specific information and needs for the development of the respective centre of vocational excellence.

b) standardised basic data for all partners for all development and implementation work.

Mapping the project countries

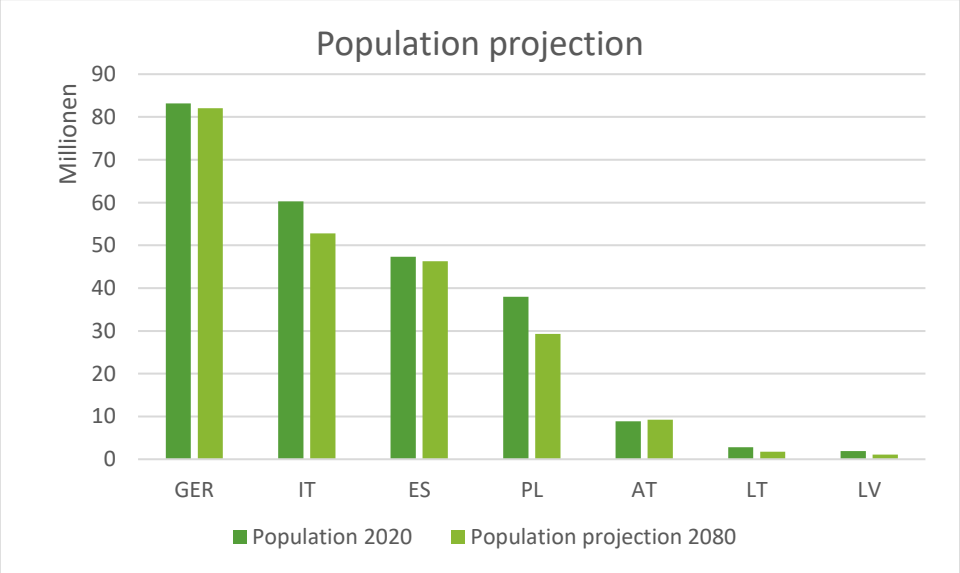
Demography

The project countries vary widely in their population size. Germany being the most populated with currently 83,2 million inhabitants, followed by Italy with 60,2 million inhabitants, Spain with 47,3 Million inhabitants, Poland with 38,0 million inhabitants, Austria with 8,9 million inhabitants, Lithuania with 2,8 inhabitants and Latvia with 1,9 million inhabitants.



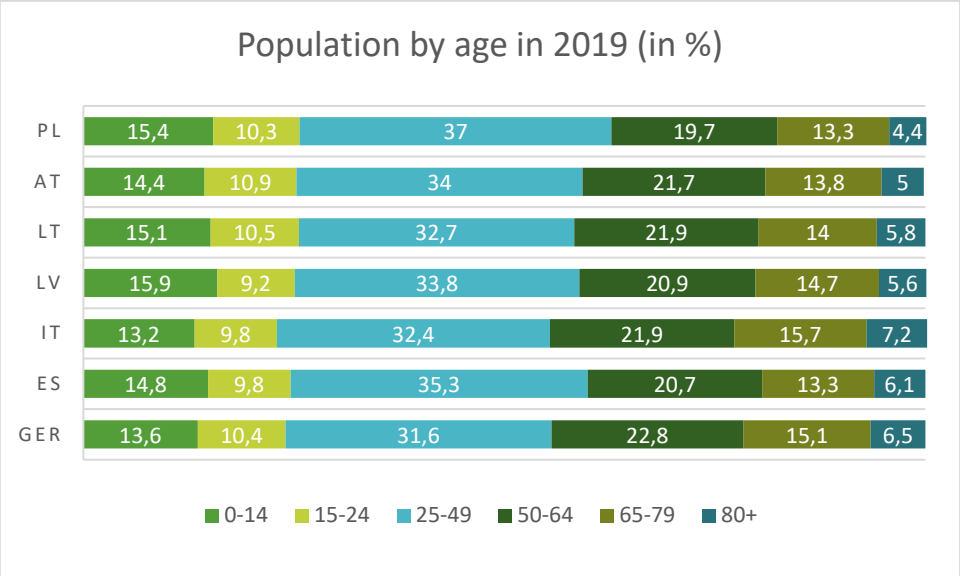
Source: Eurostat (2020)

The projections made by Eurostat for 2080 indicate a decrease of the overall population number in all project partner countries, except Austria. This is due to several demographical developments, above all population ageing and a decreasing fertility rate.



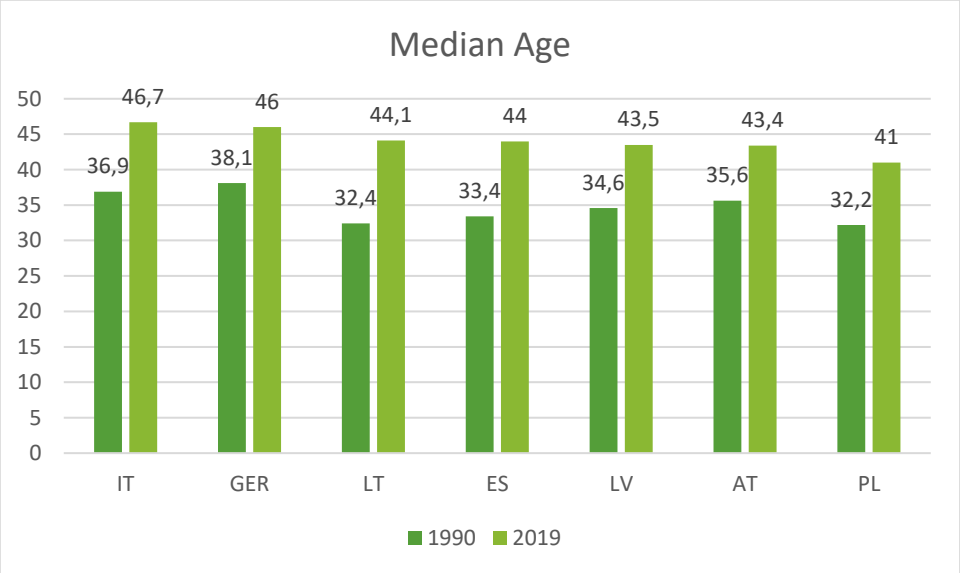
Source: Eurostat (2020)

The following graph is showing the different age structures within the countries in 2019. The largest portions of the population are aged 25 to 49 and 50 to 64 in all countries, which hints to the overall ageing number of people.



Source: Eurostat (2020)

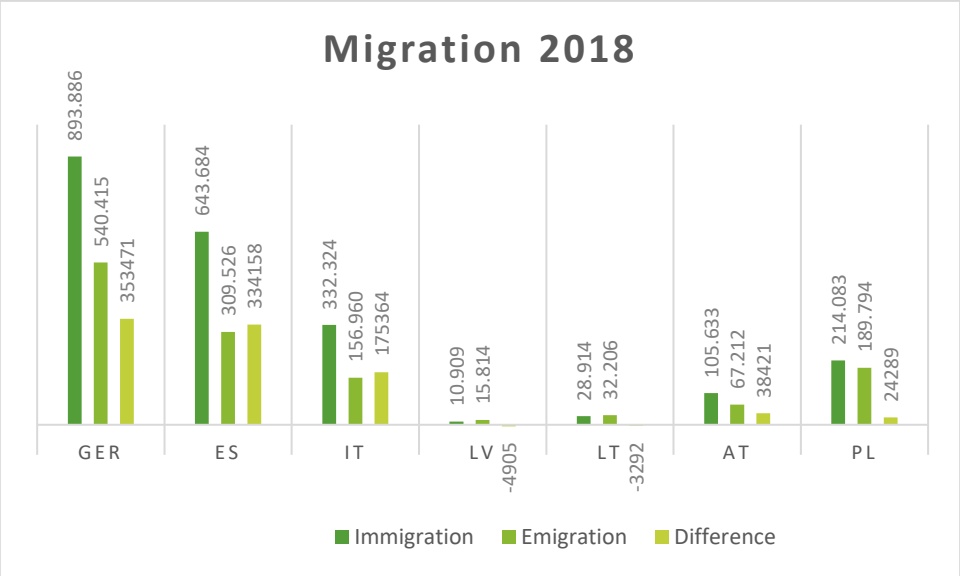
The graphic shown below, depicts the Median Age in 1990 and 2019, proving that the population in all project partner countries is aging significantly. Italy is showing the highest Median Age number with an average Median Age of 46,7 years old. The reasons for this significant increased life expectancy are namely due to improved socioeconomic and environmental conditions, changes in working conditions, jobs, lifestyles, and better medical treatment and care.



Source: Eurostat (2020)

Migration

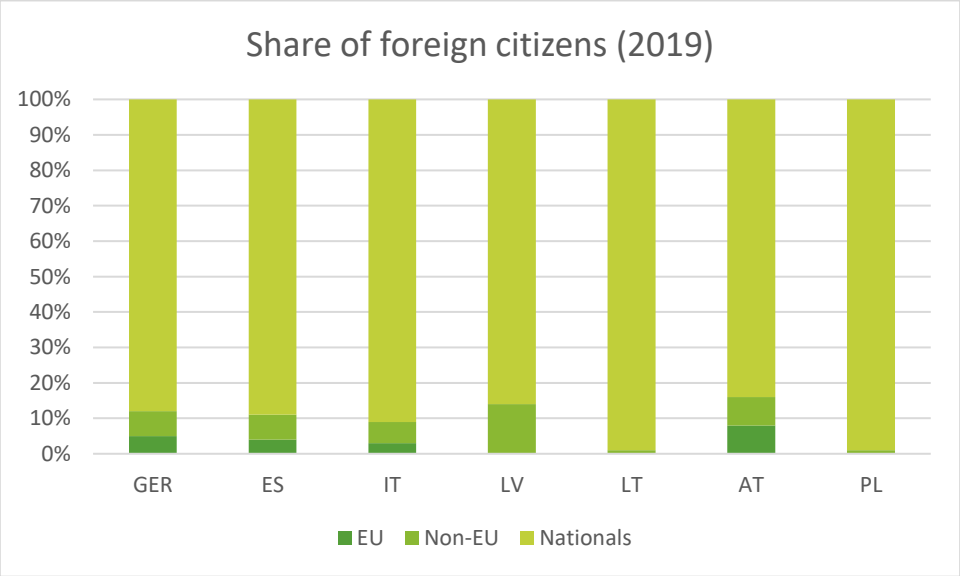
Considering the effect aging societies have on the labour market, i.e. increase scarcity of skilled workforce, and the pension system, i.e. disequilibrium of people paying into the pension fund and people living off it, all countries increasingly depend on migration. With the exception of Latvia and Lithuania, all project partner countries have had positive net-migration in 2018, i.e. more immigration than emigration, the front-runners being Germany (surplus of 353,471 people) and Spain (surplus of 334,158 people).



Source: Eurostat (2020)

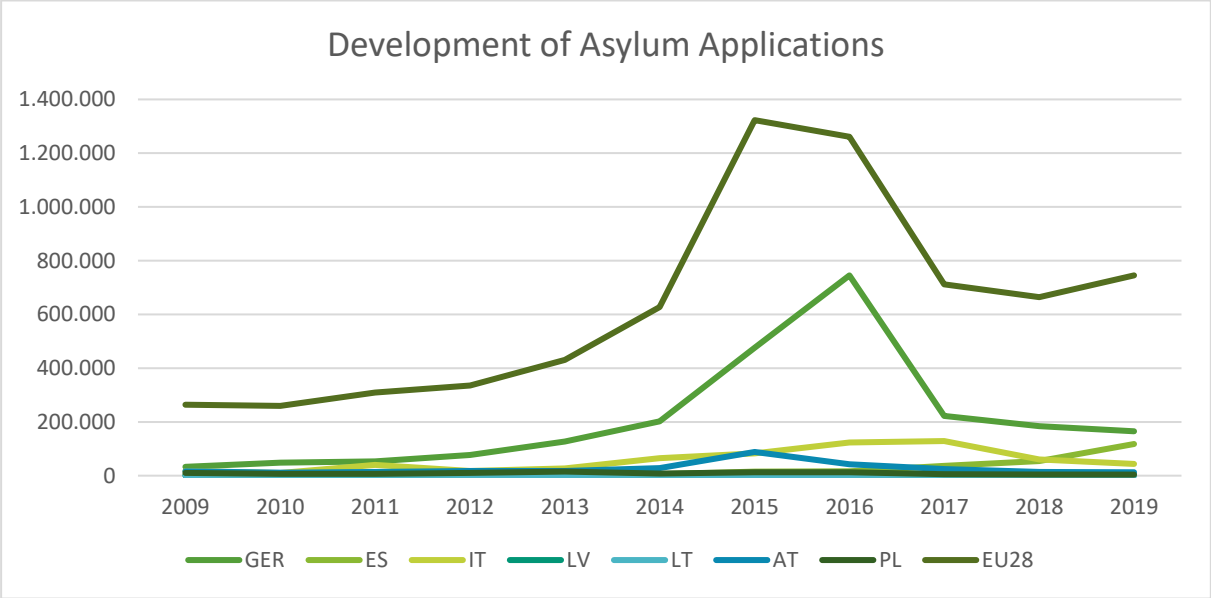
In broad terms, migration flows follow east-west, south-north and rural-urban schemes. Skilled workforce between 15 and 64 years is likely to move to northern countries such as Sweden, Denmark, Finland and Germany (Cavallini, S. et al., 2018).

As for the share of foreign citizens, Austria has the largest number of foreign citizens, followed by Germany, Spain and Italy. Latvia has by far the highest number of non-European citizens, while Lithuania and Poland have the lowest share of foreign citizens.



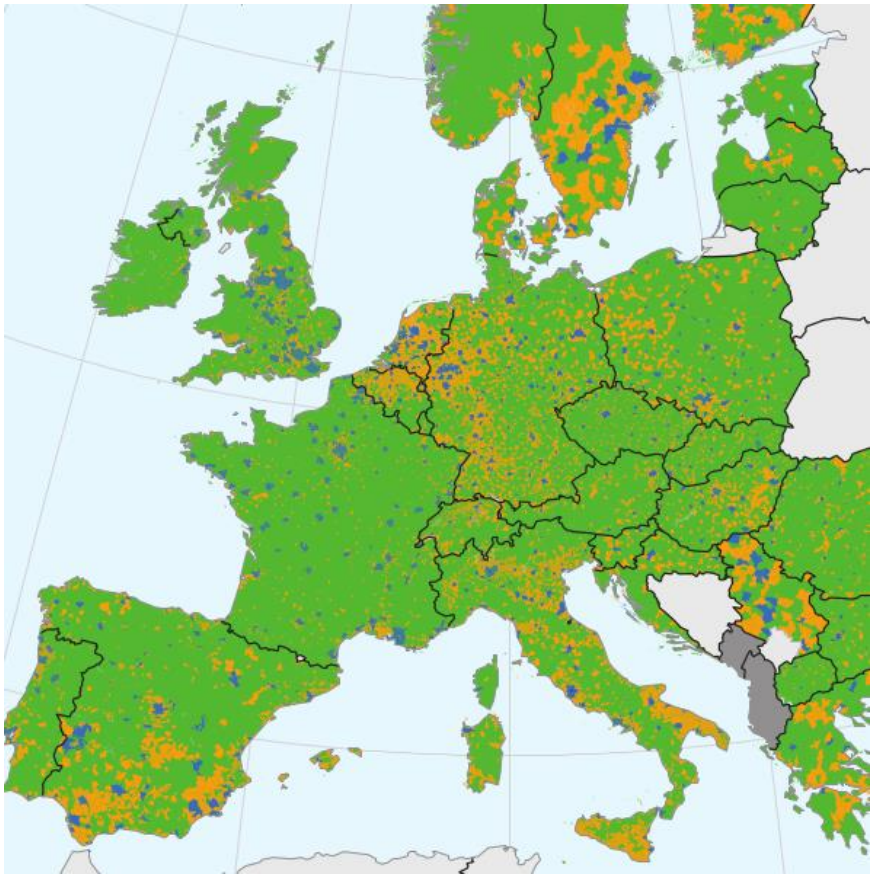
Source: Eurostat (2020)

The graphic below shows the amount of asylum applications between 2009 and 2019. After the peak of asylum applications in the EU in summer of 2015, the total number of asylum applicants has declined and slowly increased again in 2019. The highest amount of asylum applications of the project countries was registered in Germany, followed by Italy. The largest communities of asylum applicants come from Syria, Iraq, Iran and Turkey.



Urbanisation

As can be seen in the graph presented below, the number of metropolitan areas differs greatly between the regions. The EU defines a metropolitan area as an area "where at least 50 % of the population lives inside a functional urban area (FUA) that is composed of at least 250 000 inhabitants".



Cities (Densely populated areas: at least 50% of the urban population lives in urban centres)

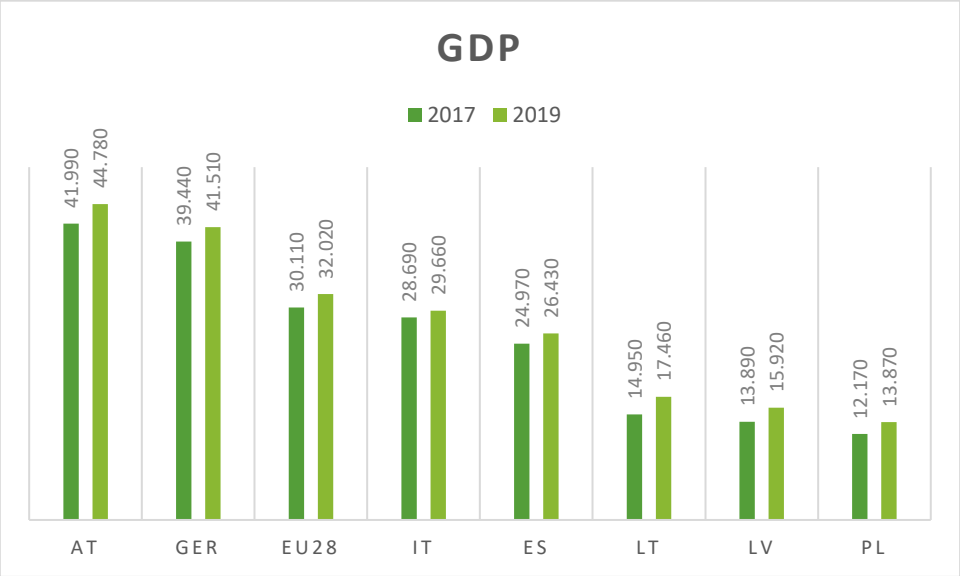
Towns and suburbs (Intermediate density areas: less than 50% of the population lives in rural grid cells and less than 50% of the population lives in urban centres)

Rural areas (Thinly populated areas: more than 50% of the population lives in rural grid cells)

Source: Eurostat – GISCO, 05/2018, based on population grid from 2011 and LAU 2016

Macroeconomic Conditions and Trade

The average real Gross Domestics Product (GDP) (chain-linked volumes 2010) in 2019 ranged from 44.780 in Austria to 13.870 in Poland. Comparing the GDPs a clear divide between the Eastern and Western countries can be made.



Source: Eurostat (2020)

Gross Value Added

Gross Value Added (GVA) is an indicator measuring economic output. On the one hand, it provides information on the productivity of the overall economy of a country in comparison to other countries. Additionally, it also provides inside into the relative strengths of the different economic sectors within the domestic economy. Lastly, GVA divided by population size shows a country's or region's labour productivity. GVA at basic prices is defined as output at basic prices (goods and services bought by the final consumer) reduced by intermediate consumption (inputs bought and used by producers to produce the final product) at purchaser prices.

As with most economic indicators, it is advisable to put them into relation to the number of inhabitants of the geographic area in question, since it is only natural that a country with the size of Lithuania or Latvia has a significantly lower gross value added than a country with the size of Germany. GVA divided by the number of people employed in a country reflects the country's labour productivity. However, this does not differentiate between full-time and part-time positions. Therefore, it is more appropriate to relate the GVA to the number of hours worked. High levels of labour productivity can be linked to an efficient use of labour or can be caused by a mix of activities of the domestic economy, since all sectors have a different need for labour input, i.e. the business sector and financial services need relatively little labour input in comparison to the agriculture sector.

Economic Sectors

In order to get a better overview of the economic structure of the different project countries, a closer look is paid to the gross value added of the individual economic sectors. The economy of a country can be divided into four sectors: primary, secondary, tertiary and quaternary. The primary sector includes any economic

activity involving the extraction and collection of raw material, i.e. agriculture, mining, forestry etc. The secondary sector is comprised of activities producing tangible goods, whereas activities in the tertiary sector provide intangible goods, i.e. services. The quaternary sector is relatively new to economic theory and is basically a sub-section of the tertiary sector. Activities in this sector are all part of the so-called knowledge economy, i.e. knowledge- and information-based services such as consultation, IT, communication etc.

The EU's own classification system (NACE) is very detailed. For clarity reasons, the main categories were therefore grouped together in the four economic sectors plus public administration as follows:

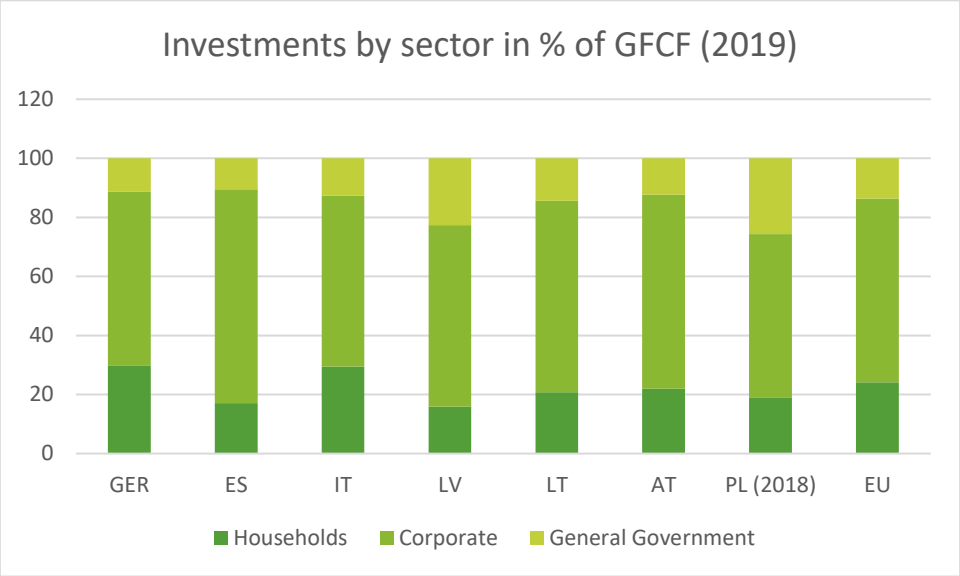
Primary Sector	Secondary Sector	Tertiary Sector	Quaternary Sector
Agriculture, forestry, fishing	Electricity, gas, steam and air conditioning supply	Repair of computers and personal and household goods	Information and communication
Mining and quarrying	Water supply; sewerage, waste management and remediation activities	Wholesale and retail trade, transport, accommodation and food service activities	Financial and insurance activities
	Construction	Real estate activities	Education
	Manufacturing	Administrative and support service activities	Professional, scientific and technical activities
		Human health and social work activities	Arts, entertainment and recreation
		Other (personal) service activities	
		Activities of membership organisations	
		Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	

In line with the three-sector model developed by Allan Fisher, Colin Clark and Jean Fourastié[1] that foresees the main economic activity shifting from the primary through the secondary to the tertiary sector according to a country's state of overall development, the main activities in all project countries are in the 3rd and 4th sector. Compared to the EU28 average, especially the Eastern countries have a stronger primary sector though. While Poland and Lithuania have an especially large agriculture industry, Latvia is more forestry heavy.

[1] Developed by the authors in their works between 1935 – 1949; for more information, visit http://www.economicport.com/concepts-all/three-sector-model.html

Investment

Gross Fixed Capital Formation (GFCF) measures the amount of money residents invest in fixed assets produced as outputs from production processes that are used repeatedly. It is differentiated between household corporate and central government investments.



Source: Eurostat (2020)

Labour Market Development

Employment[2]

Employment and other labour market-related issues are at the heart of the social and political debate in the EU. Paid employment is crucial for ensuring sufficient living standards and it provides the necessary base for people to achieve their personal goals and aspirations. Moreover, employment contributes to economic performance, quality of life and social inclusion, making it one of the cornerstones of socioeconomic development and well-being[3].

The EU's labour force is shrinking as a result of demographic changes that have led to a greater share of older people than younger people in the population. Because of these changes, a smaller number of workers are now supporting a growing number of dependent people, putting the sustainability of Europe's social model, welfare systems, economic growth and public finances at risk[4].

To face the challenges of an ageing population and rising global competition, the EU needs to make full use of its labour potential. The Europe 2020 strategy, through its 'inclusive growth' priority, places a strong emphasis on job creation. One of its five headline targets address employment, with the aim of raising the employment rate of 20 to 64-year olds to 75 % by 2020[5].

In 2017 the overall employment rate in the EU reached 72.2 %. As a result, the distance to the Europe 2020 employment target of 75 % narrowed to 2.8 percentage points.

Definition of Employment rate by age group: OECD

"The employment rate for a given age group is measured as the number of employed people of a given age as a percentage of the total number of people in that same age group. Employed people are defined as those aged 15 and over who report that they have worked in gainful employment for at least one hour in the previous week or who had a job but were absent from work during the reference week while having a formal job attachment. Employment rates are shown for four age groups: people aged 15-64 (the working age population): people aged 15 to 24 (those just entering the labour market following education); people aged 25 to 54 (those in their prime working lives); people aged 55 to 64 (those passing the peak of their career and approaching retirement). This indicator is seasonally adjusted and it is measured as a percentage in same age group."

The highest employment rates are in Germany's rural regions. Overall, the employment rate in rural regions is either higher than in cities, towns and suburbs in western countries like Germany. The opposite

[2] Employment rates represent the share of employed persons in the total population in the same age group; they are typically published for the age group 15 to 64 years. The earliest age that a person can leave full-time compulsory education in the EU is 15 and in many Member States this is also the minimum employment age. However, in a majority of Member States it is rare to attain secondary education while working (even part-time). Therefore, most 15 to 19-year olds who are still in education or training are not seeking employment. Students that attain higher levels of education tend to enter the labour market later. As a result, the lower age limit of the Europe 2020 strategy's employment target has been raised to 20 years. The upper age limit for the employment rate is usually set to 64 years, taking into account statutory retirement ages across Europe (European Commission (2012), The 2012 Ageing Report: Economic and budgetary projections for the EU27 Member States (2010–2060), p. 99.

[3] European Union (2018): STATISTICAL BOOKS. Smarter, greener, more inclusive? Indicators to support the Europe 2020 strategy. 2018 edition: https://ec.europa.eu/eurostat/documents/3217494/9087772/KS-02-18-728-EN-N.pdf/3f01e3c4-1c01-4036-bd6a-814dec66c58c (accessed April 2019), p. 24.

[4] European Union, 2018, p. 24

[5] Ibid.

is true in eastern and southern region countries - Lithuania, Poland, Latvia, Italy and Spain, where the employment rate in cities, towns and suburbs is significantly higher than in rural regions.

Part-time Employment and Temporary Contracts

There is a distinct split between eastern and western regions, with much lower part-time employment rates generally recorded in the former. These patterns probably reflect the maturity of labour markets and the impact of national employment legislation alongside a high degree of conformity within each Member State as regards attitudes to part-time work.

Involuntary Part-Time Employment

One in four part-time workers in EU-28 countries is involuntarily employed part-time; in the Baltic Sea region this is one in five.

Part-time Employment by Gender

The main reasons for part-time work vary from country to country. It is interesting to take a closer look at the gender gap of part-time employment. In 2018, the most frequently cited reason for part-time work in Germany is "looking after children" with 26.2 percentage. In Denmark, for example, the main reason for part-time work is being in education or training - 26.8%. However, in many countries the main reason for part-time work is “could not find a full-time job”.

Youth in Part-time Employment

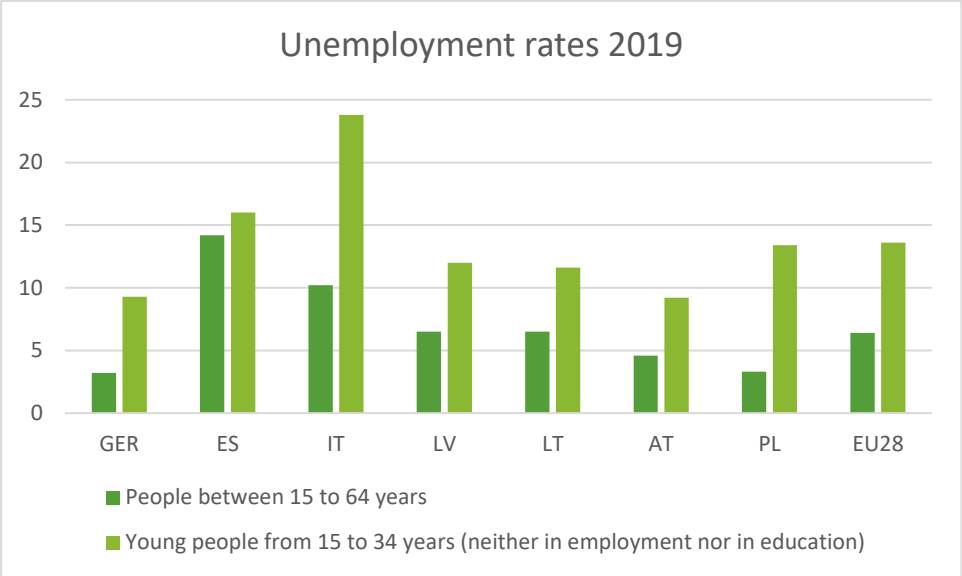
Youth in part-time are two times more likely to be employed than the age group of 20 – 64 years old. 56.5% are employed in Poland and one in two in Germany on the basis of temporary contracts.

Unemployment[6]

Unemployment can have an impact not just on the economic well-being of a country (unused potential labour input and higher social protection payments) but also on the well-being of individuals who are without work. The personal and social costs of unemployment are varied and include a higher risk of poverty, debt or homelessness, while the stigma of being unemployed can cause a reduction in self-esteem, a breakdown in family/personal relations, or social exclusion[7].

[6] Based on the ILO definition, unemployed persons are aged 15 to 74 who: -are without work; -are available to start work within the next two weeks; -and have actively sought employment at some time during the previous four weeks.

[7] Eurostat statistics explained: labour market statistics at regional level: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Labour_market_statistics_at_regional_level#Unemployment (May 2019).



Source: Eurostat (2020)

In 2019, the recovery of the European labour market continued at a rapid pace, with employment in the EU in 2018 exceeding pre-crisis levels and unemployment rates approaching pre-recession levels. The graph below shows the unemployment rates from 2019.
Source: Eurostat (2020)

Educational Markets[8]

While the responsibility for education and training systems lies with the Member States, the role of the European Union is to support and supplement their action and capacity. The EU supports Member states though policy cooperation within the ET 2020 framework and individual funding actions (e. g. Erasmus+ programme and the European Structural and Investment Funds).

The European Strategy 2020 for Education and Training (ET 2020) pursues the following four common EU objectives:

- Make lifelong learning and mobility a reality;
- Improve the quality and efficiency of education and training;
- Promote equity, social cohesion, and active citizenship;
- Enhance creativity and innovation, including entrepreneurship, at all levels of education and training[9].

Moreover, the ET 2020 also supports the achievement of the following benchmarks at European level by 2020:

- At least 95% of children should participate in early childhood education;
- fewer than 15% of 15-year-olds should be under-skilled in reading, mathematics and science;
- the rate of early leavers from education and training aged 18-24 should be below 10%;
- at least 40% of people aged 30-34 should have completed some form of higher education;
- at least 15% of adults should participate in learning;
- at least 20% of higher education graduates and 6% of 18-34-year-olds with an initial vocational qualification should have spent some time studying or training abroad;
- the share of employed graduates (aged 20-34 with at least upper secondary education attainment and having left education 1-3 years ago) should be at least 82%[10].

The ET 2020 strategy has encouraged action in individual EU countries by making national plans and country specific recommendations, which, after only a few years, are already reflected not only in figures set as benchmarks, but also in more efficient education that is accessible to all, of better quality, anchored in work-based learning, adapted to labour market needs and permanently changing environment of knowledge based societies. The “old” educational systems have been reorganised. Many restructurings have been carried out, which can be described as reforms of the education systems: establishment of competence centres, introduction of work-based learning in vocational education and training, efforts to make education systems more permeable, new forms of learning by incorporating digital technologies and promoting intense mobility of teaching staff and young people in education and training.

Of further relevance is the Council Resolution on a strategic framework for European cooperation in education and training with a view to the European Education Area and beyond (2021-2030) (2021/C 66/01), published in February 2021.

In the Council Resolution the Strategic priority 2: Making lifelong learning and mobility a reality for all highlights inter alia that „Education and training systems should become more flexible, resilient, future-

[8] European cooperation in education and training
https://ec.europa.eu/commission/presscorner/detail/en/ip_20_1743?utm_campaign=5909a45073a6a379cd02bf17&utm_content=5f74ab9996e1a7000109f38b&utm_medium=smarpshare&utm_source=facebook
https://ec.europa.eu/education/policies/european-policy-cooperation/et2020-framework_en
https://ec.europa.eu/education/node/63
https://ec.europa.eu/eurostat/web/education-and-training/eu-benchmarks

[9] European Commission, Education and Training, European Policy Cooperation (ET 2020 framework), https://ec.europa.eu/education/policies/european-policy-cooperation/et2020-framework_en (May 2019)

[10] European Commission, Education and Training, European Policy Cooperation (ET 2020 framework), https://ec.europa.eu/education/policies/european-policy-cooperation/et2020-framework_en (May 2019)

proof and appealing, reaching out to a more diverse learner body and offering recognition and validation of prior learning, upskilling and reskilling training opportunities, including at higher qualification levels and throughout the working life, supported by initiatives such as the European Universities and Centres of vocational excellence, which were launched through the Erasmus+ programme."[11]

3 LOE Project activities are also in line with another Council document „Council Recommendation of 24 November 2020 on vocational education and training (VET) for sustainable competitiveness, social fairness and resilience"[12] which would be worth mentioning in the Analysis document.

Educational Level of Population in Countries

''Tomorrow belongs to those who can hear it coming', said David Bowie forty years ago. Jobs, labour markets and economies are rapidly changing - globalisation, technology and a growing services sector are both causes and symptoms. Ageing populations and dwindling youth cohorts, on the one hand, and labour migration, on the other, are affecting workforce composition. And that's not to mention the lingering impact of the financial crisis[13].

Early Leavers from Education and Training

In general, low educational attainment — at lower secondary education — influences other socioeconomic factors. The most important of these are employment, unemployment and the risk of poverty or social exclusion. Fortunately, the statistical data show a positive trend: early leaving from education and training has been falling continuously in the EU since 2002, for both men and women. Additionally, this development represents steady progress towards the Europe 2020 targets of 10%.

Adult Learning[14]

Adult learning is crucial for maintaining good health, remaining active in the community and being fully included in all aspects of society, as well as improving and developing skills, adapting to technical developments, advancing a career or returning to the labour market.

The Education and Training 2020 (ET 2020) framework includes the benchmark to increase the share of adults participating in learning to 15 %. Adult learning is the key subject of the Council Resolution[15] on a renewed European agenda for adult learning and the ET 2020 framework. It also plays a crucial role in the Europe 2020 flagship initiative "New Skills Agenda for Europe". The recently adopted Recommendation Upskilling Pathways: new opportunities for adults, aims to improve adult learning provision in order specifically to address the needs of low-skilled, low-qualified adults.

In addition to tertiary educational attainment, adult participation in learning is also crucial for providing Europe with a highly qualified labour force. Adult education and training cover the longest time span in the process of learning throughout a person's life. However, the share of adults participating in learning did not

[11] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021G0226(01)&from=EN
[12] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020H1202(01)&from=EN
[13] CEDEFOP, briefing note – what future for vocational education and training in Europe? http://www.cedefop.europa.eu/en/publications-and-resources/publications/9133 (May 2019)
[14] According to the Eurostat glossary adult learning means the participation of adults in lifelong learning. Adult learning usually refers to learning activities after the end of initial education and is a vital component of the EU's lifelong learning policy.
The main indicator to measure adult learning is the participation rate in education and training, which covers participation in formal and non-formal education and training. The target population of Eurostat's adult learning statistics is the population aged 25-64.
[15] Council Resolution on a renewed European agenda for adult learning (2011/C 372/01), Official Journal of the European Union, 20 December 2011:
https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2011:372:0001:0006:EN:PDF (May 2019)

increase fast enough to meet the ET 2020 benchmark at EU level. Women are more likely to participate in adult learning than men and this trend is stable over time.

Vocational Education and Training

Participation of Young People in Vocational Education and Training

Within lower secondary education (ISCED level 2), vocational programmes are relatively rare: in 2016 they accounted for 3.3 % of the total number of pupils at this level in the EU-28. A somewhat higher proportion of male pupils (3.7 % in EU-28) followed vocational programmes within lower secondary education, as the corresponding share among female pupils was 2.9 % in EU-28.

In 2016, close to half (49.3 %) of all upper secondary (ISCED level 3) school pupils in the EU-28 followed vocational programmes, with the share for males (54.0 %) clearly higher than that recorded for females (44.5 %).

Within post-secondary non-tertiary education (ISCED level 4), the vast majority of pupils followed vocational programmes, an average of 91.5 % across the EU-28. Unlike the two secondary education levels, the share (92.1 % in EU-28) of females following vocational post-secondary non-tertiary programmes was somewhat higher than that for males (90.7 % in EU-28). In a majority of the EU Member States (17 of the 23 with post-secondary non-tertiary education) all of the pupils at this educational level were enrolled in vocational programmes.

Education Systems in the Project Partner Countries

In the following, the different education systems will be described in each project partner country, from early childhood, pre-kindergarten education to tertiary education respectively. Furthermore, vocational and education training (VET) systems will be described in detail.

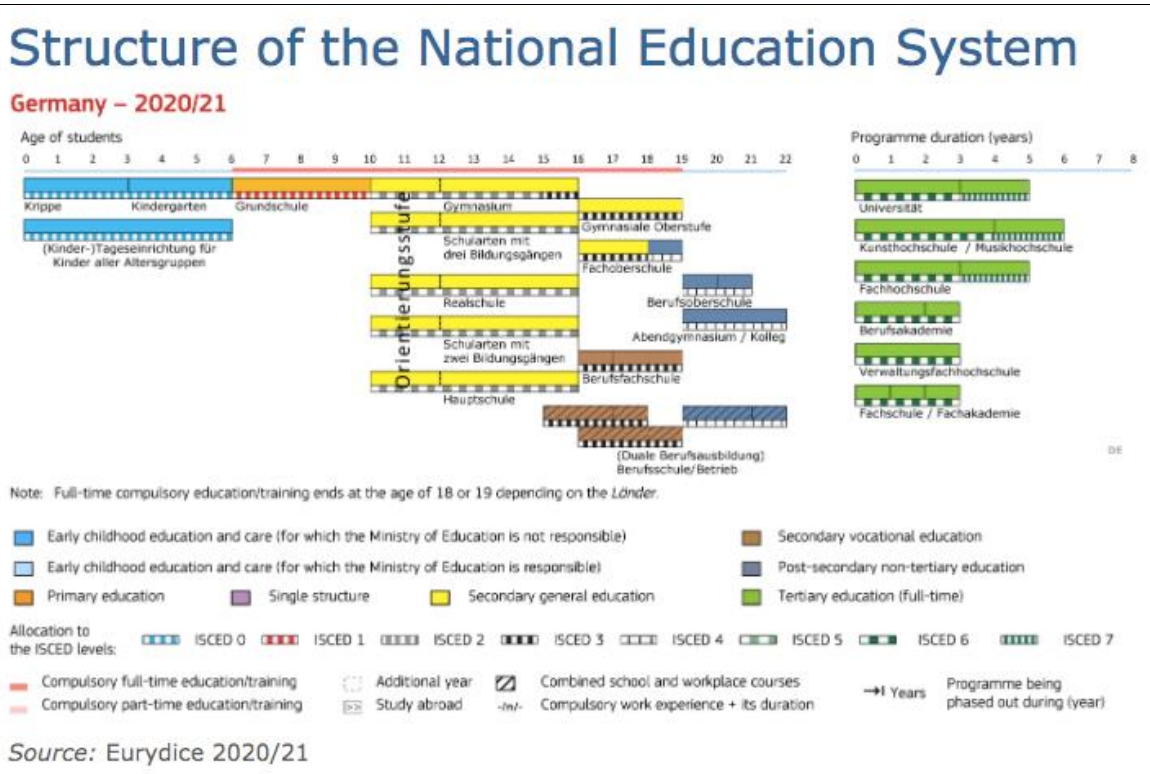
The information on education systems is based on sources such as CEDEFOP, European Commission/EACEA/Eurydice or publications of the relevant ministries in the respective countries.

The country specific general information about the education systems in the tables have the online source: Eurodyce, National Educational Systems: https://eacea.ec.europa.eu/national-policies/eurydice/national-description_de (Accessed December 2020).

An overview on the national VET systems delivers: Cedefop (2019), *Spotlight on VET – 2018 compilation: vocational education and training systems in Europe.* Luxembourg: Publications Office. https://www.cedefop.europa.eu/en/events-and-projects/networks/refernet/vet-in-europe-country-reports (Accessed December 2020).

The schematic diagrams on education systems are provided by European Commission/EACEA/Eurydice, 2018. *The Structure of the European Education Systems 2018/19: Schematic Diagrams.* Eurydice Facts and Figures. Luxembourg: Publications Office of the European Union.

The source of the flags images for each country is the following: www.pixabay.com, international website for sharing photos, illustrations, vector graphics, and film footage under a proprietary license.



Source: Eurydice 2020/21

In the Federal Republic of Germany, the responsibility for the education system is divided between the Federation and the 16 states (*Länder*). The scope of the Federal Government's responsibilities in the field of education is defined in the Basic Law (*Grundgesetz*). Unless the Basic Law awards legislative powers to the Federation, the Länder have the right to legislate. Within the education system, this applies to the school sector, the higher education sector, adult education and continuing education. Administration of the education system in these areas is almost exclusively a matter for the Länder.

Early childhood education and care is not part of the state-organised school system in Germany but almost exclusively assigned to the child and youth welfare sector.

Compulsory Education

As a rule, general compulsory schooling begins for all children in the Federal Republic of Germany in the year in which they reach the age of six and involves nine years of full-time schooling. Those young people who do not attend a full-time general education school or vocational school at upper secondary level once they have completed their period of compulsory general schooling must still attend part-time schooling (compulsory *Berufsschule* attendance – *Berufsschulpflicht*). This usually lasts three years.

Early Childhood Education and Care	Early childhood education such as in nursery schools (*Kindergarten*) is optional until the age of six, after which school attendance is compulsory. Children of school age who have not yet attained a sufficient level of development to attend a school have a further option in some Länder, namely *Schulkindergärten* and *Vorschulen*. These institutions are either assigned to the early childhood or the primary sector according to the particular Land.

Primary Education	As a rule, in the year in which children reach the age of six, they are obliged to attend the primary or elementary school (*Grundschule)* from age 6 to 9. In almost all Länder this covers grades 1 to 4 (in Berlin and Brandenburg grades 1 to 6).
Secondary education	After the primary school stage, the secondary education in the Länder is characterised by a division into various educational paths with respectively different leaving certificates and qualifications. Once the pupils have completed the compulsory lower-secondary education, generally when they reach the age of 15, they move into upper secondary education. The upper secondary education comprises five different types of school: *Gymnasium, Realschule, Hauptschule, Gesamtschule and Förderschule.* The type of school that can be attended depends on the qualifications and entitlements obtained at the end of lower secondary education. The range of courses on offer includes full-time general education and vocational schools, as well as vocational education and training within the *duales System* (dual system). The *Gymnasium* prepares pupils for higher education and finishes with the final examination *Abitur*, mostly after grade 12 or 13, depending on the Land. The *Realschule* is rather targeted for intermediate pupils and leads to the final examination *Mittlere Reife*, after grade 10. The *Hauptschule* aims to prepare pupils for vocational education and ends with the final examination *Hauptschulabschluss*, after grade 9 or the *Realschulabschluss* after grade 10. The *Gesamtschule* combines the *Gymnasium*, *Realschule* and *Hauptschule* under one roof. For pupils with special educational needs (*sonderpädagogischer Förderbedarf*), additionally various types of special schools (*sonderpädagogische Bildungseinrichtungen*) so called *Förderschulen* have been set up within the organisational framework of general and vocational education.
Tertiary Education	The tertiary sector encompasses different types of higher education institutions. While *Hochschule* is the general term to refer to a higher education institution, the term *Universität* refers to an institution with the right to confer doctorates. There is different branches of *Universitäten*, namely *Technische Universitäten*, *Pädagogische Hochschulen* (Universities of Education), *Kunsthochschulen* (Universities of Arts) and *Musikhochschulen* (Universities of Music).

	Universities of Applied Sciences are called Fachhochschulen and usually have a more practical approach than theoretical. In order to be able to attend a German higher education institution, one has to have completed the upper secondary level and obtained the *Abitur* or another kind of higher education entrance qualification *(i.e. Fachgebundene Hochschulreife*, *Fachhochschulreife, Begabtenprüfung).* Additionally, there are a number of special higher education institutions which only admit certain groups, e.g. higher education institutions of the Federal Armed Forces and *Verwaltungsfachhochschulen*, and are not considered below. Those with a higher education entrance qualification may also choose to enter a *Berufsakademie* offered by some Länder as an alternative to higher education. At state or state recognised *Studienakademien* (study institutions) and in companies students receive academic but, at the same time, practical career training. The *Fachschulen* and the *Fachakademien* in Bayern are institutions of continuing vocational education that, as a rule, call for the completion of relevant vocational education and training in a *anerkannter Ausbildungsberuf* (recognised occupation requiring formal training) and relevant employment. The qualification level achieved here is comparable to the first level of the tertiary sector in accordance with the International Standard Classification of Education ISCED.
Adult Education and Lifelong Learning	The activities of the state in the field of continuing education are, for the most part, restricted to laying down principles and to issuing regulations relating to organisation and financing. Such principles and regulations are enshrined in the legislation of the Federal Government and the Länder. State regulations are aimed at establishing general conditions for the optimum development of the contribution of continuing education to lifelong learning. As part of lifelong learning, continuing education is assuming greater importance and is increasingly becoming a field of education. In response to the vast range of demands made on continuing education, a differentiated structure has been developed. Continuing education is offered by municipal institutions, in particular *Volkshochschulen*, as well as by private institutions, church institutions, the trade unions, the various chambers of industry and commerce, political parties and associations,

	companies and public authorities, family education centres, academies, *Fachschulen*, institutions of higher education and distance learning institutions. Radio and television companies also provide continuing education programmes. It is usually possible to acquire school-leaving qualifications later in life at evening classes (*Abendhauptschulen*, *Abendrealschulen*, *Abendgymnasien*) and in what is called *Kollegs*.

VET in Germany

Vocational education and training (VET) in Germany is based on cooperation between the State, companies and social partners. The Federal Ministry of Education and Research (BMBF) is responsible for general VET policy issues and has a coordinating and steering role for all training occupations in cooperation with the respective ministries. The BMBF also works closely with the Federal Institute for Vocational Education and Training (BIBB),

which conducts research and advises the Federal Government and VET providers. The *Länder* (federal states) are responsible for school-based parts of VET and have VET committees with employer and employee representatives.

The apprenticeship programme (dual system) at upper secondary level (EQF level 4) is the main pillar of VET and also attracts upper secondary graduates: more than one in four apprentices had achieved a higher education entrance qualification before enrolling in apprenticeship. Programmes usually last three years and combine two learning venues, companies and vocational schools (workbased learning share approximately 75%). There are no basic access requirements for participating in the dual VET programme, but an apprenticeship contract must be concluded between learner and company. Enterprises bear the costs of company-based training and pay learners a wage. Those successfully completing training are qualified to be employed as skilled workers. Progression is possible through various VET programmes offered at post-secondary and tertiary level.

Parallel to the apprenticeships are schoolbased VET programmes at upper secondary level (EQF level 2 to 4), which differ in terms of access, length, types and levels of qualification they lead to.

These include:

- programmes at full-time vocational schools (*Berufsfachschule*, duration one to three years depending on the type and level of qualification), leading, for example, to a qualification as nurse or childcare worker. The minimum entrance requirement is the lower secondary general school certificate (*Hauptschulabschluss*);
- general upper secondary programmes with a vocational component, which usually lead to the general higher education entrance qualification (*Berufliches Gymnasium/Fachgymnasium*, duration two to three years). Entrance requirement is the intermediate level certificate (*mittlerer Schulabschluss*).

Young people with social disadvantages, learning difficulties or handicap, or insufficient German language skills (migrants) have the possibility to qualify further through different transition programmes: the pre-vocational training (secondary school leaving certificate can be acquired) or basic vocational training year.

At post-secondary level, specialised programmes (*Berufsoberschulen* and *Fachoberschulen)* build on the intermediate school leaving certificate (*mittlerer Schulabschluss*) or initial VET and impart deeper

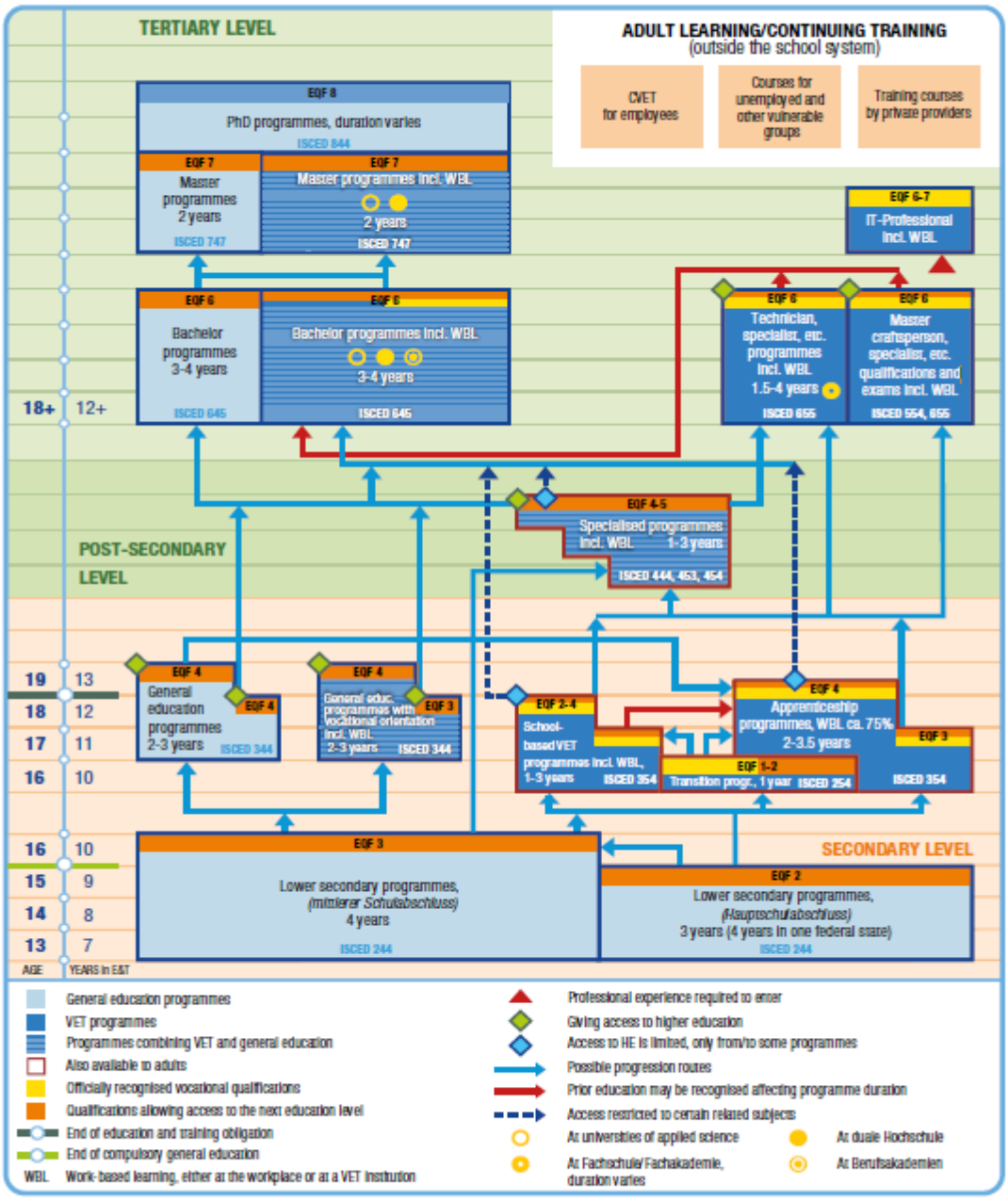
occupational knowledge. They last one to three years and lead to entrance qualifications for universities of applied sciences

or universities.

At tertiary level, vocationally qualified applicants can access advanced vocational training (AVT) leading to qualifications at EQF level 6, including master craftsperson, technician, and specialist (*Meister, Techniker, Fachwirt*). AVT confers the right to exercise a trade independently, to hire and train apprentices and to enrol in subject related bachelor programmes. It also facilitates the acquisition of middle management qualifications in companies. AVT is a major factor contributing to the attractiveness of the VET pathway. Courses to prepare for these AVT qualifications are offered by chambers or schools (*Fachoberschulen*, master craftsperson schools). Access to the respective assessment generally requires several years of practice in the related occupation.

Practice-oriented learning is also an important element of higher education (EQF levels 6 to 7). Dual study programmes provide a blend of vocational and academic training, offered by universities of applied sciences bachelor programmes) and other higher education institutions (*Berufsakademien, duale Hochschule*). Some of them lead to double qualifications (vocational qualification and bachelor or master's degree). Enterprises bear the costs of company-based training and pay learners a wage based on a contract.

Continuing training is playing an increasingly important role in improving employability. It is characterised by a wide variety of training providers and a low degree of State regulation.



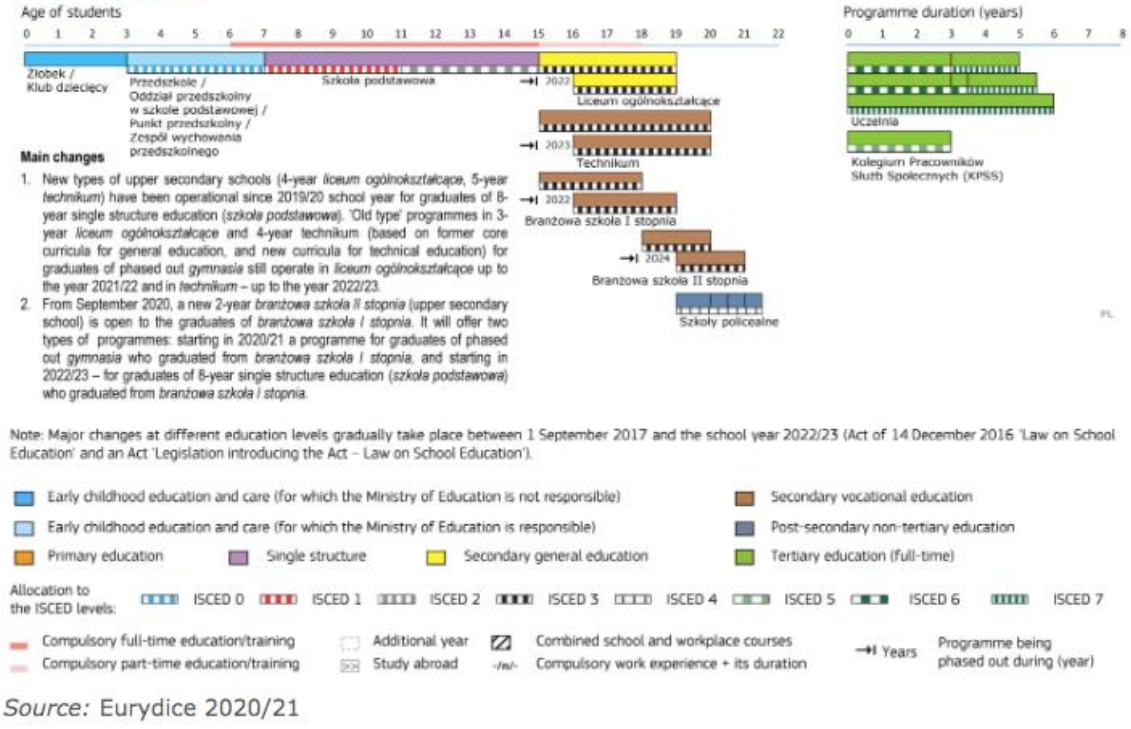
NB: ISCED-P 2011. This is a simplified chart, based on the unified approach used for the spotlights on VET in all EU-28 countries plus Iceland and Norway.

Source: Cedefop and ReferNet Germany.

Poland

Structure of the National Education System

Poland – 2020/21



Source: Eurydice 2020/21

Structural reform in 2017

Educational reform in Poland is being implemented since the beginning of 2017. Its main goal is to offer students a solid background of general education required for further personal development and the needs of contemporary labour market.

The key elements of the reform are as follows:

- change in the school structure: introduction of a long, 8-year primary school, 4-year general and 5-year technical upper-secondary school
- an obligation for 6-year olds to attend one year of pre-primary education in order to acquire basic skills before they start school at 7; (this education, as it is the case for the school education, is financed from the general subvention from the State budget)
- provision of textbooks free of charge
- strengthening secondary education - both general and vocational -through the extension of secondary programmes by one year (see point 1)
- introduction of 3-year sectoral vocational learning (to obtain a professional qualification) with a possibility to continue education for further 2 years at the second stage of sectoral vocational school in order to upgrade qualifications and to prepare for the matriculation exam promotion of dual vocational training in cooperation with the business sector

- extending the participation of employers in co-financing of vocational education through the establishment of the Fund for Vocational Education Development.

The reform will be implemented between 1 September 2017 and the school year 2022/23. On the 1 September 2017 pupils graduating from year 6 of the primary school become pupils of grade 7. At the same time *gimnazja* (lower secondary schools) will be gradually phased out. In the school year 2018/19 *gimnazja* will cease to operate as the last cohort of pupils will graduate.

The new structure includes:

- 8-year primary school
- 4-year general upper secondary school
- 5-year technical upper secondary school
- Stage I 3-year sectoral vocational school
- 3-year special school preparing for employment
- Stage II 2-year sectoral vocational school
- Post-secondary school

The restructuring takes place on the basis of an act of 14 December 2016 "Law on School Education" and an act "Legislation introducing the Act – Law on School Education".

Stage I sectoral vocational school has been introduced since September 2017, and introduction of Stage II sectoral vocational school is scheduled for the school year 2020/21.

In the following text we refer to two different structures of the school education system (old and new which was initiated in September 2017).

Compulsory education

In the old structure full-time compulsory education lasts for 10 years and comprises the last year of pre-school education, 6 years of primary school education and 3 years of lower secondary school education. Starting 2017 a new structure of school education is being implemented in which full-time compulsory education will last for 9 years (the last year of pre-school education and 8 years of primary school education).

In the Polish educational system full-time compulsory education and part-time compulsory education are defined:

- Full-time compulsory education (obligation to attend primary and lower secondary school- old structure, and primary school – new structure) applies to pupils aged 7-16 years (7-15 in the new structure)
- Part-time compulsory education (obligation to be in education) concerns pupils aged 16-18 (15-18 in the new structure) and it may take place either in school settings (a student attends upper secondary school) or in non-school settings (e.g. a student follows vocational training offered by employers).

Early school education and care	Institutions for children aged 0-3 years: - crèche (*żłobek*) - kids club (*klub dziecięcy*). Attending a crèche is not obligatory, crèches are not a part of education system as they are supervised by the Ministry of Family, Labour and Social Policy. Institutions for children aged 3-6 years:

	- pre-school (*przedszkole*) - pre-school class in a primary school (*oddział przedszkolny w szkole podstawowej*) - pre-school unit (*zespół wychowania przedszkolnego*) - pre-school centre (*punkt przedszkolny*). Pre-schools are optional for 3, 4 and 5-year- old children and obligatory for 6-year-olds. Every 3-, 4- and 5-year old has an entitlement to a place in a pre-primary setting. As of the school year 2016/17 compulsory education in grade one of primary school starts at the age of 7. Parents of 6-year olds have a choice - they can enroll their children in the first grade of primary school or keep them in a pre-school institution.
Primary education	***Old structure*** 6-year primary school (*szkoła podstawowa*) was compulsory for all pupils who are usually aged 6/7-13. It included two stages: grades 1-3 (early school education) grades 4-6 where teaching is done by subject. A compulsory external exam at the end of grade 6 of primary education is cancelled due to the introduction of the new structure. ***New structure*** (single structure education ISCED 1+ISCED 2) 8-year primary school (single structure education) is compulsory for all pupils who are usually aged 6/7-15. It includes two stages: grades 1-3 (early school education) grades 4-8 where teaching is done by subject. At the end of grade 8 of primary school pupils will take a compulsory external exam and its results will influence admission to secondary schools.
Lower and upper secondary education	***Old structure*** Lower secondary school 3-year *gimnazjum* for students aged 13-16 is another stage of compulsory education. At the end of lower secondary school pupils take a compulsory external exam and its results influence admission to upper secondary schools. Starting in 2017 the 3-year *gimnazjum* (lower secondary school) is being phased out. Pupils graduating from the 6th grade of primary school become pupils of grade 7 in a new 8-year primary school. Upper secondary school

	Although this stage of education is not compulsory (or in fact compulsory part time up to the age of 18) a vast majority of students continues education in upper secondary schools. In the old structure there are three types of upper secondary schools: - 3-year general upper secondary school (*liceum ogólnokształcące*) - 4-year technical upper secondary school (*technikum*) - 3-year basic vocational school (*zasadnicza szkoła zawodowa*) (already replaced by stage I 3-year sectoral vocational school (*szkoła branżowa I stopnia*). Pupils attend upper secondary schools at the age of 16-19 (16-20 years in case of the technical upper secondary school). ***New structure*** New structure is being introduced gradually starting in 2019/20 to be completed in 2023/24. The level of lower secondary school (ISCED 2) will be included in a single structure called an 8-year primary school. The new reformed structure of upper secondary education (ISCED 3) envisages the following types of schools: - 4-year general secondary school (*liceum ogólnokształcące*) - 5-year technical secondary school (*technikum*) - stage I 3-year sectoral vocational school (*szkoła branżowa I stopnia*) - stage II 2-year sectoral vocational school (*szkoła branżowa II stopnia*). Examinations Students of vocational schools - sectoral vocational schools and technical upper secondary schools - may take exams confirming vocational qualifications in a given occupation during the course of study or upon completion of school to receive a diploma confirming their vocational qualifications. Graduates of general upper secondary schools and technical upper secondary schools may take the external upper secondary school leaving examination (*egzamin maturalny*) to obtain the *Matura* certificate, which gives access to higher education.
Post-secondary education	Post-secondary education is considered to be a part of secondary education. Post-secondary schools (*szkoła policealna*) are intended for graduates of general upper secondary schools who wish to obtain a diploma confirming vocational qualifications. The schools offer courses lasting from 1 to 2.5 years. The students of post-secondary schools and students of sectoral vocational schools and

	technical upper secondary schools take vocational exams of the same type. Post-secondary schools will continue their functioning within the new structure of school education.
Higher education	There are two types of Higher Education Institutions: university-type (*uczelnia akademicka*) non-university-type (*uczelnia zawodowa*). They both offer first- and second-cycle programmes as well as long-cycle master's degree programmes while only university-type HEIs can offer third-cycle programmes (doctoral studies) and are authorized to award doctoral degrees. Studies are organized in the form of full-time (*studia stacjonarne*) or part-time (*studia niestacjonarne*) programmes. First-cycle programmes lead to two types of degrees: - *licencjat* (equivalent of bachelor's degree) - 3-4-year programmes - *inżynier* (equivalent of bachelor's degree) - 3.5-4-year programmes. Holders of the bachelor's degree can enter second-cycle programmes, which take 1.5-2 years depending on the area of study. Only several fields of study offer long-cycle master's degree programmes that last for 4-6 years. First-cycle, second-cycle and long-cycle master's programmes end with a diploma examination and students who have passed it are granted a relevant degree. The Master's degree (*magister* or its equivalent) entitles its holder to practice a given profession and provides access to third-cycle studies. They are organised in HEIs or research and development institutions other than HEIs and last for 3-4 years. Colleges of social work These institutions operate in the framework of school education system (not the higher education system) offering education at tertiary level (short-cycle higher education).
Adult education	Adult education is open to adults who wish to complete school education on primary and secondary level or acquire new vocational qualifications and skills for professional or personal reasons. It is organised, in school and non-school settings, by: - continuing education institutions - practical training institutions, - in-service training centres - HEIs as non-degree postgraduate programmes.

	Training is offered also to the unemployed and to certain categories of people searching for a job.

VET in Poland

Vocational education and training (VET) has three governance levels: national (ministries), regional (school superintendents, mainly in pedagogical supervision) and county (governing schools). The Ministry of National Education is in charge of VET policy at secondary level, supported by other ministries responsible for particular occupations. The Ministry of Science and Higher education is responsible for higher VET. Social partners advise policymakers on necessary changes in VET.

Since September 2017 the Polish education system has been undergoing substantial restructuring, which will be finalised in the 2022/23 school year. Key elements of the reform include: restructuring the current six- year primary education into eight years, divided into two four year programmes (basic and lower secondary level); phasing out the lower secondary school (gimnazjum), and extending the general upper secondary school (four instead of three years) and the technical upper secondary school (five instead of four); and introducing a two-level 'sectoral vocational school'.

VET is provided at upper secondary and postsecondary levels that are mainly school based. Upper secondary programmes combine general and vocational education. Learners can acquire vocational qualifications in the following:

- three-year sectoral programmes (szkoły branżowe I stopnia, ISCED 353). Graduates can enrol in general education programmes bridging VET and higher education. For graduates of these programmes, the reform foresees introduction of new two-year programmes that will give access to tertiary education from 2020/21;
- five-year upper secondary technical programmes (technika, ISCED 354). Graduates can also acquire an upper secondary school leaving certificate (matura) giving access to tertiary education;
- three-year special job training programmes (szkoły specjalne przysposabiające do pracy, ISCED 243) for learners with special education needs (SEN), leading to a certificate of job training;
- work preparation in classes, available for SEN learners already at lower secondary level in primary schools at age 15 and above (oddziały przysposabiające do pracy, ISCED 243).

At post-secondary non-tertiary level, vocational qualifications can be acquired in one- to two-anda-half-year school-based programmes (szkoły policealne, ISCED 453). These programmes are strictly vocational and do not include general education. Basic or upper secondary education is required to enrol.

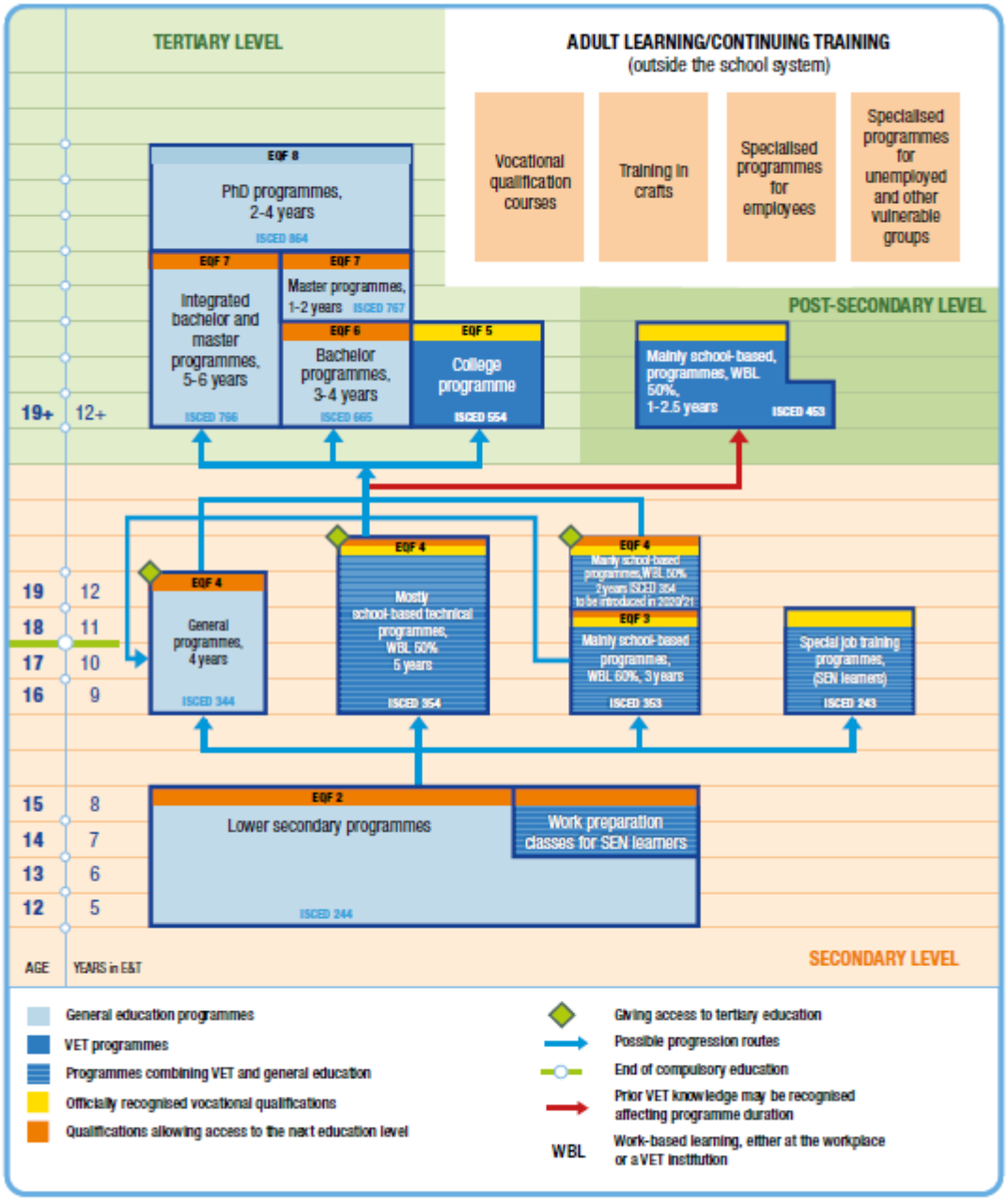
Work-based learning (WBL) is compulsory for all VET- oriented programmes. WBL takes place in school workshops, at continuing education centres, practical training centres, as contract-based practical training organised by an employer and as in-company training from 4 to 12 weeks, depending on the occupation. The last of these is compulsory for upper secondary technical and post-secondary VET programmes.

Adult learning and CVET

Adult learning and continuing VET is available in continuing education centres, practical training centres, further training and professional development centres, and initial VET schools. These offer:

- vocational qualification courses based on curricula for a qualification in a given occupation; learners can take the State vocational examination and attain a vocational qualification certificate;
- vocational skills courses based on the core VET curriculum, including learning outcomes for a qualification or common learning outcomes for all occupations;
- minimum 30-hour general skills courses based on the general education curriculum;
- courses for juvenile employees in the crafts sector.

Adults, including the unemployed, may also undertake vocational training through courses provided by training companies and other non-formal education institutions. Since 2016, qualifications based on the curricula of such courses can be included in the national qualifications' framework.



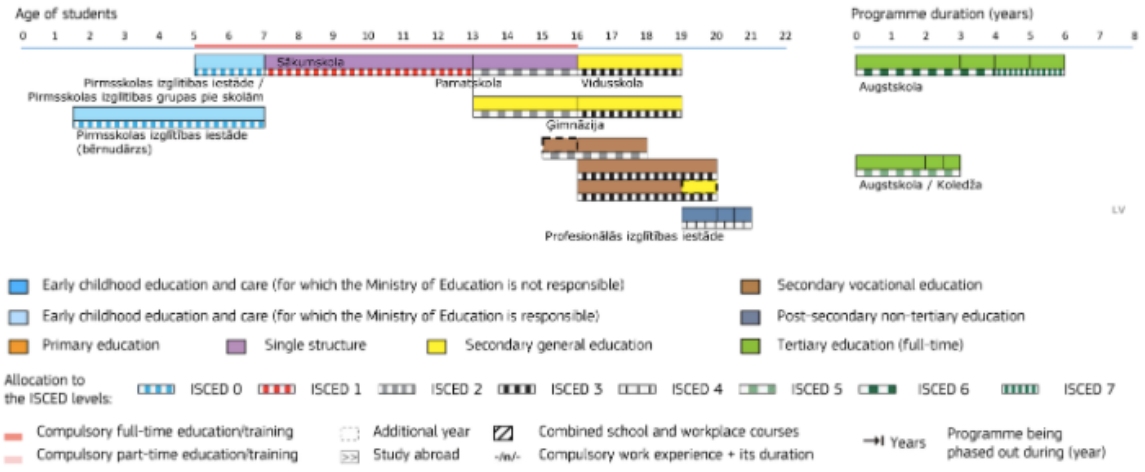
NB: ISCED-P 2011.

Source: Cedefop and ReferNet Poland.

Latvia

Structure of the national education system

Latvia – 2020/21



Source: Eurydice 2020/21

Main aim of education policy in Latvia is **qualitative and inclusive education for personal development, human welfare and sustainable development of the country**. Among the EU countries Latvia follows Estonia and Finland in rather equitable distributions of low achievers across socio-economic groups.

Public investment in pre-primary education (for children 3 years and older) as a percentage of gross domestic product is one of the highest among European countries, and public expenditure on education in total in recent years has increased. Having low teachers' salaries - compared to international standards -the government has started in 2016 to implement teachers' salaries reform with the aim to rise teachers' salaries to internationally (regionally) competitive levels.

Comprehensive reforms are initiated in general and vocational education, too. In general education a new competence-based education content will be fully introduced in 2019-2023. As a result of modernization of vocational education and training proportion of upper-secondary students in general education and VET should reach 50/50% in 2020. It was 60/40% in 2016 respectively. In 2017, share of population aged 30–34 with tertiary education attainment in Latvia was above the EU average, but adults' participation in lifelong learning is below the EU average.

Early childhood education	Latvia provides a legal entitlement to early childhood education and care (ECEC, pirmsskolas izglītība) for all children from 1.5 years of age. Municipalities are obliged to ensure that children whose residence is declared in the administrative territory of the municipality are able to access ECEC the institution (pirmsskolas

	izglītības iestāde) closes to their home. ECEC for five- and six-year-old children is compulsory.
Primary and lower secondary education	Primary and lower secondary education is organised as a single structure system (pamatizglītība or basic education), beginning at the age of 7 and consisting of nine years of compulsory schooling. Basic education ends after grade 9 with final examinations in student's first language, the Latvian language for students in ethnic minority programmes, mathematics, history of Latvia and a foreign language, leading to the award of a certificate which is needed to entry into upper-secondary education.
Upper secondary education	Upper secondary education (vidējā izglītība) begins at the age of 16 and ends at the age of 19 and is provided in general and vocational pathways by vidusskola, ģimnāzija and profesionālās izglītības iestāde. Although upper-secondary education is not compulsory, the proportion of population with completed upper secondary education is still high and above the OECD average. Various vocational upper-secondary education programmes take between two to four years to complete and led to different qualification levels. Most of vocational programmes start at upper-secondary level and only a few schools offer lower-secondary vocational education.
Higher education	Higher education is provided by rather autonomous public and private higher education institutions (augstskola): these are universities (universitāte), offering both academic and professional tertiary programmes; other augstskola, akadēmija or koledža offer professional tertiary programmes. The degree structure follows the three-cycle structure: bachelor's, master's and doctoral level studies.
There is a spectrum of formal and non-formal education programmes and courses for the adult learners. Within formal education system, adult education extends over general education provided in pamatskola and vidusskola, vocational and further-vocational training offered by profesionālās izglītības iestāde, and higher education in augstskola. There are also various non-formal adult education opportunities provided by public and private education institutions and organizations. Informal learning acquired through working and personal life can be validated as professional competences acquired outside formal education.	

VET in Latvia

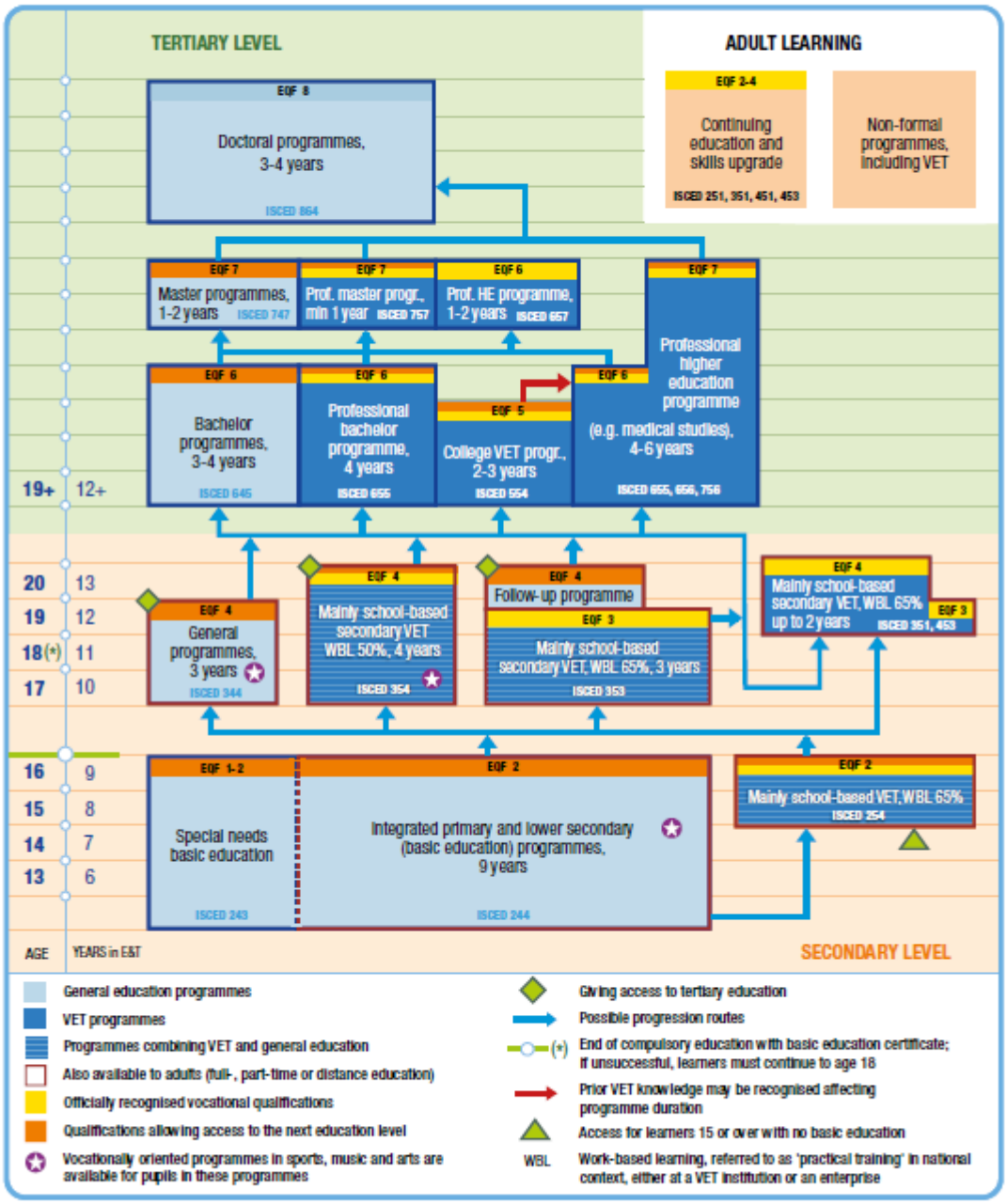
Vocational education and training (VET) in Latvia is offered at three (4) levels: integrated primary and lower secondary (called 'basic' nationally); upper secondary (secondary); and tertiary (professional higher) education. It includes practical training (50% to 65% of curricula) at schools and enterprises. In 2015, an apprenticeship scheme (called 'workbased learning' nationally) was introduced with alternating study periods at school and in an enterprise. To acquire a VET qualification at EQF levels 2 to 4, learners take a State qualification exam at the end of the programme.

Basic VET programmes (one to three years, ISCED 254) lead to qualifications at EQF level 2 and involve around 1% of the VET population (2017/18 data). Learners must be at least 15 years old to enrol. Those without completed basic education are admitted to three-year programmes (ISCED 254) that include a compulsory basic general education course.

At upper secondary level, VET enrols 40% of learners in:

- three-year programmes (ISCED 353) leading to a qualification at EQF level 3 and involving 4% of VET learners. To enrol in higher education graduates should attend an additional one-year bridging programme;
- four-year programmes (ISCED 354) leading to a secondary VET qualification at EQF level 4 and involving 73% of VET learners. Graduates take four State exams in general subjects; if successful, they are also awarded a certificate of general secondary education giving access to higher education;
- one- to two-year programmes (ISCED 351 and 453) leading to a qualification at EQF levels 3 and 4. These programmes are designed for 17 to 29-year-old with or without completed upper secondary education. They involve 21% of VET learners and focus on vocational skills, so they are shorter. Professional higher education programmes are provided at two levels:
  - first-level college programmes (two to three years; ISCED 554, EQF 5) targeted mainly at the labour market, though graduates can continue their studies in second-level professional higher education;
  - second-level higher education programmes (two to six years) (ISCED 655, 656, 657, 756 and 757, EQF 6 and 7) leading to a professional qualification and either professional bachelor or master's degree or a professional higher education diploma.

Formal continuing VET (CVET) programmes enable adults with education/work experience to obtain a State-recognised professional qualification in 480 to 1 280 hours, depending on the field of study. Shorter professional development programmes (at least 160 hours) enable learners to acquire or upgrade their professional knowledge and skills regardless of their age, education and professional background but do not lead to a qualification. Craftsmanship exists on a small scale, separate from the rest of the education system. The Ministry of Education and Science is the main body responsible for the VET legal framework, governance, funding and content. Social dialogue and strategic cooperation are arranged through the national Tripartite Sub-Council for Cooperation in Vocational Education and Employment, founded in 2000 by the State, employer and employee representatives. Since 2011, 12 sectoral expert councils have ensured that vocational education provision is in line with labour market needs; they participate in developing sectoral qualifications frameworks, occupational standards, qualifications requirements, education and training programmes and quality assessment procedures. Since 2015, collegial advisory bodies, including representatives from employers, local governments and the supervising ministry – conventions – have been established at each VET school contributing to strategic development and cooperation with the labour market.

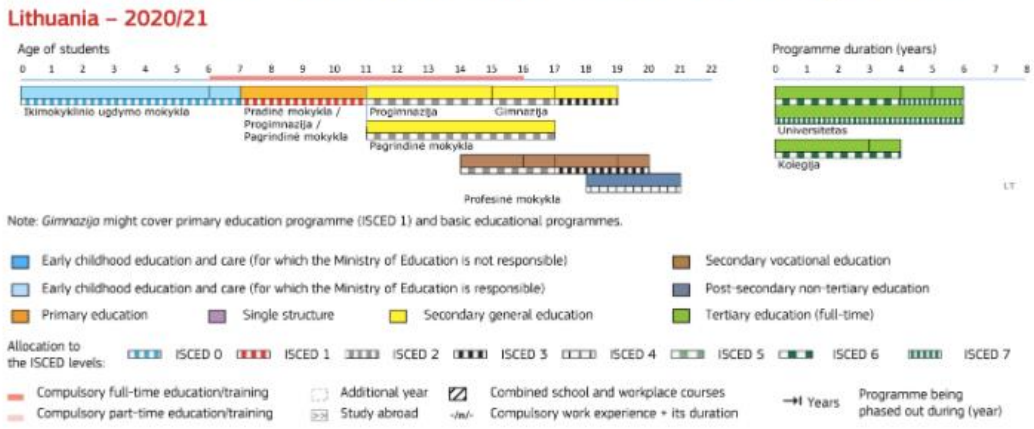


NB: ISCED-P 2011.

Source: Cedefop and ReferNet Latvia.

Lithuania

Structure of the national education system



Source: Eurydice 2020/21

Lithuania's education system is decentralized, or at least more decentralized than centralized. National institutions, municipalities and educational institutions all share responsibility for the quality of the education provided. Education policy is formed at the national level by the Seimas (Parliament), adopting laws and declarations on policy changes. The Government *in corpore* and the Ministry of Education and Science (and other related ministries) also formulate and implement education policy and adopt and implement legal acts other than laws and declarations.

The main laws and legal acts, such as the Law on Education or the Description of the Primary, Lower Secondary and Upper Secondary Curriculum are adopted at the national level. The municipalities set and implement their own strategic education plans that are in accordance with the national documents. The municipalities are responsible for ensuring formal education up until the age of 16, organizing non-formal education, transportation to educational institutions and other aspects. The school organizes the education process – for example, teachers are able to adapt the core curriculum to individual children's needs. Formal education is typically provided by public entities. However, private sector education providers are recognised and regulated by national legal acts.

Education is a priority of the state and is publicly funded at all levels. Education is free at all stages, with one exception – higher education.

Early childhood education and care	Early childhood education and care is composed of pre-school (ikimokyklinis ugdymas) and pre-primary (priešmokyklinis ugdymas) education and is attributed to the type of non-formal education. Pre-school education is not compulsory. At the request of the parents, the child can be educated according to the pre-school curriculum. Pre-school education is provided for children from birth to pre-primary education. In order to help the child to prepare for the successful completion of the primary education curriculum, pre-primary education

	groups are set up. Attendance is compulsory for pre-primary education when a child turns 6 years of age in the calendar year. Pre-school and pre-primary education can be offered at pre-primary classes in ECEC settings, general education schools or provided by licensed freelance teachers or other education providers in accordance with the legal acts. Pre-school and pre-primary educational institutions fall under the authority of local governments.
Primary and basic education	Children must start attending primary schools when they turn 7 years of age during the calendar year. Primary and lower secondary education is free of charge in public educational institutions. Primary education lasts for 4 years, providing children with the fundamentals of learning, literature and social and cultural skills. It is delivered by primary schools (pradinė mokykla, an institution that provides education for grades 1 to 4), progymnasium schools (progimnazija, a general education institution that provides education for grades 1 to 8) or school-multifunctional centres (daugiafunkcis centras, an institution that provides early childhood education and care, education from grades 1 to 12, and other formal and non-formal education, cultural and social services). Children usually enter lower secondary education when they are 10 to 11 years of age. Lower secondary education lasts for 6 years and is also compulsory by law. It is delivered by pro-gymnasiums (progimnazija, see above), lower secondary education schools (pagrindinė mokykla, a lower secondary education school and general education institution providing education for grades 5 to 10), gymnasiums (gimnazija, a general education institution that provides education for grades 9 to 12), school-multifunctional centres and vocational schools (profesinė mokykla). Education is compulsory until 16 years of age and by that time the learner will have usually finished the course of lower secondary education (10 grades).
Upper-secondary and post-secondary level	The two-year upper-secondary curriculum is implemented by gymnasiums, secondary, vocational and other (e.g., The International Baccalaureate) schools for students typically aged from 17 to 19.
Higher education	Higher education comprises two types of institutions: universities (universitetas) and colleges (kolegija). Learners can begin their higher education after gaining an upper secondary general education. The degree structure follows a three-cycle structure: Bachelor's, Master's and Doctoral-level studies. The first cycle of studies (Bachelor's) usually lasts 4 academic years, the second cycle (Master's) 2 years and the third cycle (Doctoral) 4 years.

VET in Lithuania

The Ministry of Education and Science is the main body responsible for shaping and implementing vocational education and training (VET) policy. The Ministry of Economy participates in human resources development and VET policy. Following the new VET Law, in force since February 2018, the Research and Higher Education Monitoring and Analysis Centre (MOSTA) ensures the monitoring framework for VET

and higher education, research and innovation. It plans human resources and forecasts new qualification requirements in line with national policies and the needs of the economy.

Vocational education and training in Lithuania is offered from lower secondary to post-secondary education (ISCED levels 2 to 4). To acquire a VET qualification, learners take a specified exam, after which a VET diploma is awarded. VET-oriented programmes in higher education lead to a professional bachelor's degree (ISCED 655); they are provided by colleges, a type of higher education institution.

Lower secondary level VET programmes (two to three years, ISCED 252 and 254) lead to qualifications at EQF level 2. They are open to learners over 14 and training is mandatory until age 16. Those without completed lower secondary education can study VET along with general education.

At upper secondary level:

- two- to three-year programmes (ISCED 352) lead to a VET qualification at EQF level 3 and prepare students for entering working life;
- three-year programmes (ISCED 354) lead to a VET qualification at EQF level 4 and a matura diploma giving access to higher education and post-secondary ISCED 454 programmes. To receive a matura diploma a learner must take at least two matura exams. Graduates who apply to higher education ISCED 645 and ISCED 655 programmes in the same field of studies are awarded additional entrance points.

Post-secondary level VET programmes (one to two years, ISCED 454) lead to a VET qualification at EQF level 4 in specific fields. Implementation of EQF level 5 programmes is under discussion.

Formal continuing VET (CVET) is for learners who want to improve an existing qualification, acquire a new one or gain a competence needed to do jobs specified in regulations. CVET is designed for people with different education attainment levels, from primary to post-secondary; in some cases, a vocational qualification or work experience is a prerequisite. CVET programmes last no longer than one year and lead to qualifications at EQF levels 2 to 4, recognised by the State.

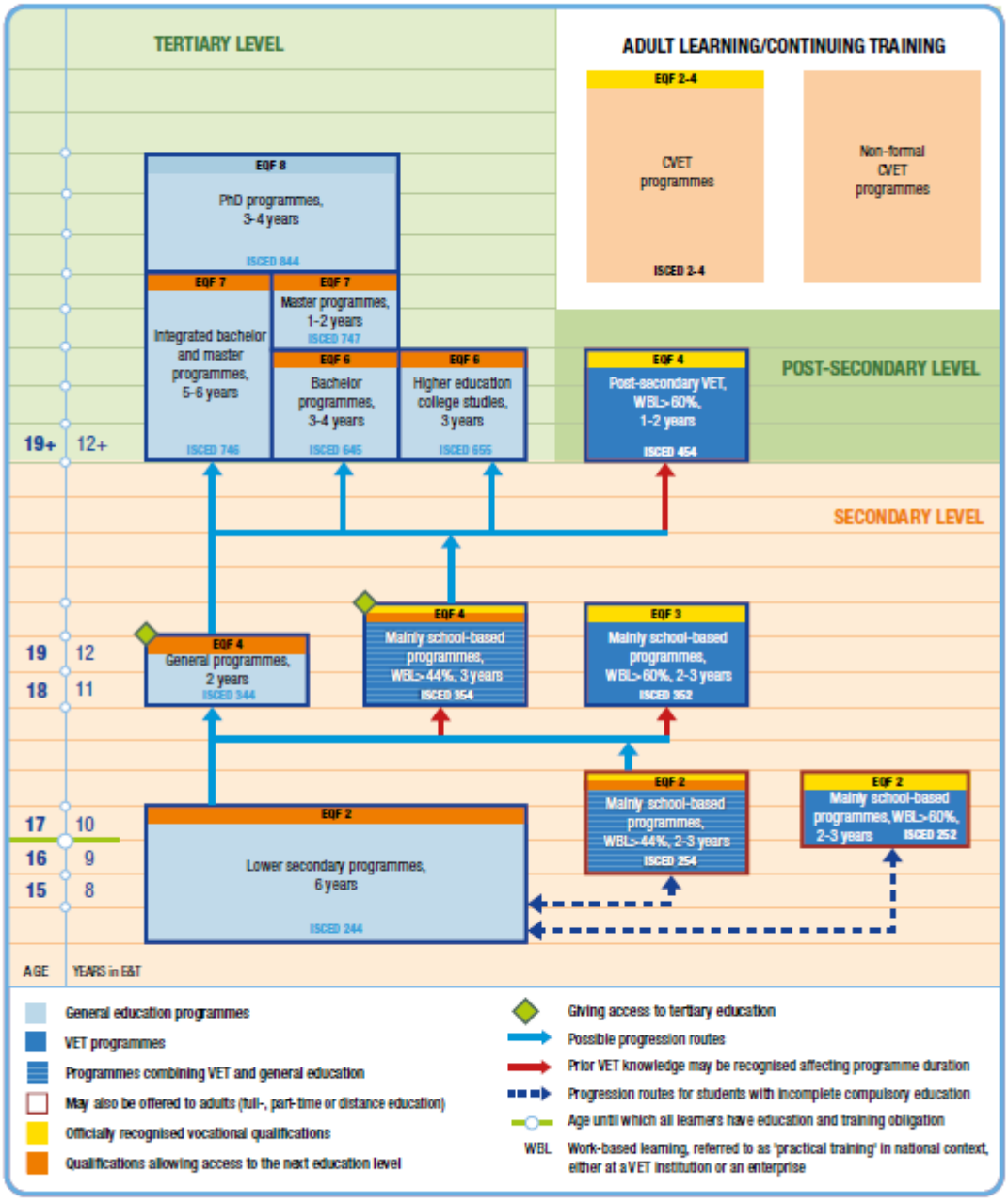
Non-formal CVET for the self-employed and employee training are organised in various settings. Some companies have their own training units and qualifications frameworks or apply internationally recognised sectoral qualifications and programmes.

Although VET in Lithuania is school-based, work-based learning (WBL), in workshops at school and at a workplace, is a significant part. In IVET, WBL takes place in school settings, with 8 to 15 weeks preferably spent in a company. To improve the quality of WBL in a school environment, 42 sectoral practical training centres have been established. In CVET, WBL corresponds from 60% to 80% of the programme, half of it preferably taking place in companies. Progressing implementation of apprenticeship is a national priority and policy initiatives are in process.

Qualification exams are detached from the training process and are carried out by accredited institutions. Social partners, enterprises and employers' associations may apply for accreditation.

Social partners participate in developing new qualifications, standards and VET programmes: the 2018 VET law boosted the role of sectoral professional committees in shaping VET qualifications and planning future apprentice intake.

Reforming VET management, financing schemes and quality assurance mechanisms are part of policy priorities and developments in progress to raise the prestige of VET and its attractiveness to VET stakeholders.

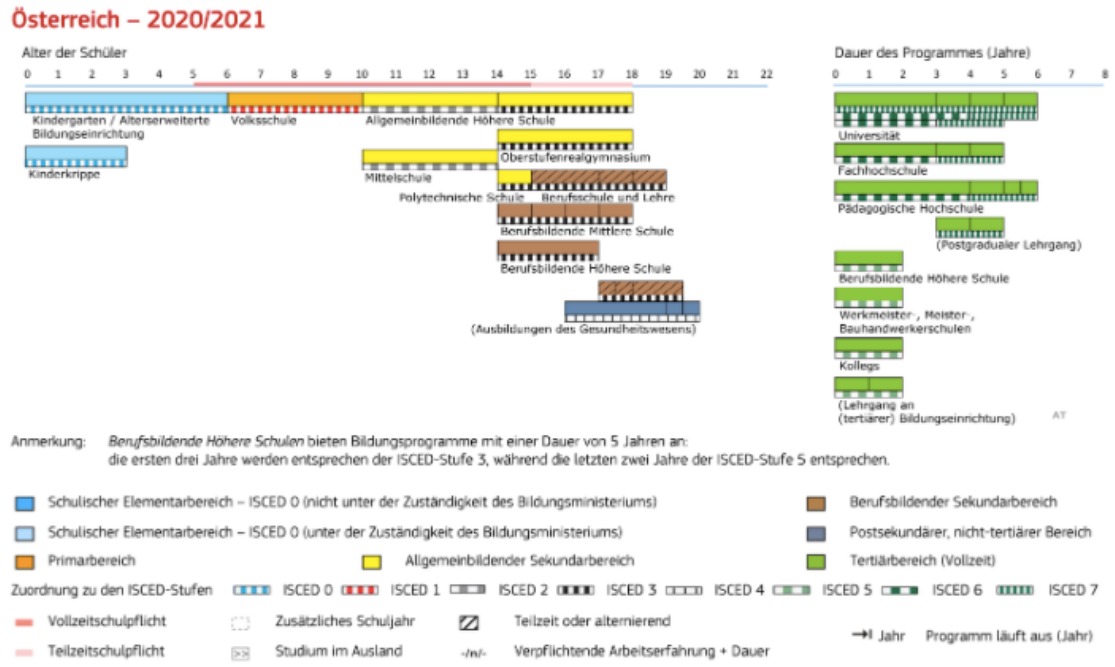


NB: ISCED-P 2011.

Source: Cedefop and ReferNet Lithuania.

Austria

Schematic Structure of the National Education System



source: Eurydice 2020/21

An important aspect of the Austrian school system is the strong diversification of programmes at all levels of education. Austria has put in place a strong vocational education sector.

The Austrian education system is characterised by a strongly federalist structure. It comprises of an obligatory school education of minimum eight years which is made up of four years of obligatory elementary school (Volksschule) and then four years of obligatory of lower secondary level (Hauptschule/Neue Mittelschule/Gymnasium). The lower secondary level (years 5 to 8) is split up into general secondary school (Mittelschule) and lower level of academic secondary school (Allgemein bildende Höhere Schule).

The upper secondary level (years 9 to 13) comprises a general education branch and a vocational branch. Students do one year of polytechnic institute and, if the student wants to continue with an apprenticeship, they attend a vocational school for three years.
In order to enter higher education (public universities, private universities, universities of applied sciences, university colleges of teacher education) the students need to obtain the „Matura“.

Adult education includes a number of different so-called “second-chance programmes” which allow students to obtain qualifications by adults in the formal education sector (e.g. the compulsory schooling qualification (Pflichtschulabschluss), the apprenticeship-leave certificate (Lehrabschlussprüfung) and the final certificate from schools for people in employment (Berufsreifeprüfung)

Preschool class and elementary school	The preschool class (Vorschule) is not obligatory but can be attended voluntarily by children between three and six. However, Kindergarten attendance for a minimum of 20 hours over a minimum of 4 days per week is obligatory for these children (age 5 - 6). When children turn six years old they enter the compulsory elementary school (Volksschule) for four years.
Lower secondary level	Different lower secondary school models exist in Austria. Pupils have to attend a minimum of four years of lower secondary level when they are between eleven and fifteen years old. General secondary school is a comprehensive school for 10 to 14-year-olds. Mittelschule ist the new name of the former New secondary school (Neue Mittelschule) since school year 2020/21. They build on individualised learning and a competence-based approach. Students who have successfully completed receive an end-of-year report and certificate, which entitles them to be admitted to upper secondary general and vocational education and training. Allgemeinbildende höhere Schulen are academic secondary schools, they impart a comprehensive and in-depth general education, and lead to university entrance qualifications. The education culminates in a matriculation examination. Academic secondary schools consist of a lower and an upper cycle. They start after the fourth grade of primary school and cover eight years (grades 5 - 12). There are also academic secondary schools consisting only of an upper cycle. They start after grade 8 and cover four years (grades 9 to 12), a 1-year transitional grade may be set up.
Upper secondary level	The Upper Secondary Level is split up into a general education branch and a vocational branch. Vocational branch: The Austrian education system places a strong focus on helping young people with disabilities and disadvantages integrate into the job market. As part of the vocational branch, students can undergo one pre-vocational year (for young people with disabilities and disadvantages) or otherwise to attend the Pre-vocational School (Polytechnische Schule) for two years should they wish to complete 10 years of education. The general education, vocational orientation and basic vocational education in vocational areas selected by the pupil. Afterwards, a student may transfer to an apprenticeship or a subsequent type of education. After finishing their pre-vocational school or pre-vocational year if they wanted to attend one or straight after having completed all nine years of compulsory education, a student can enter into the apprenticeship training system. This usually means that the apprentice is in a training relationship with their training company and a student at a part-time vocational school at the same time. The student will usually be in the training phase for 2-4 years. At the end of the training, the young person takes the Apprenticeship Examination in front of professional experts.

	Alternatively, students can also attend a School for Intermediate Vocational Training which lasts 1 to 4 years, depending on the duration of training of (partially) completed vocational training. A student may then attend further training courses (three years) up to the Higher Education Entrance Examination and Diploma examination, after completing a programme lasting at least three years at a School for Intermediate Vocational Education (BMS). Students may also attend a College for Higher Vocational Education (BHS) as well as Colleges for Early Childhood Pedagogy or a College for Social Pedagogy. This is a five year course and students may only be admitted if they have already required a Leaving qualification of a Middle School, of the 4th year or the Upper Level of an Academic Secondary School or of the Pre-vocational School (Polytechnische Schule). The course gives them a leaving qualification including Reifeprüfung and Diploma examination and allows them access to legally regulated professions in accordance with the Trade and Industry Code. Alternatively, students can also pursue study at a higher education institution after completion if they should wish to do so. <u>Academic Branch:</u> As an alternative to the vocational branch, students may also pursue the Academic Secondary School (AHS) for four years. Students take the Reifeprüfung examination ("Matura") upon completion which entitles them to study at University Colleges of Teacher Education, Universities of Applied Sciences, Universities or Academies as well as to attend higher occupationally oriented Continuing Education Courses and Post-secondary VET Courses. The types of institution available are the Classical Academic Secondary School (Gymnasium), the Academic Secondary School emphasizing Mathematics and Science (Realgymnasium) and the Academic Secondary School emphasizing Economics (wirtschaftskundliches Realgymnasium).
Higher education	The Austrian Higher education sector is made up of Public Universities (which are the biggest sector), Private Universities, Universities of Applied Sciences (Fachhochschulen) and University Colleges of Teacher Education (Pädagogische Hochschulen). Students can obtain a Bachelor's degree after 3-4 years and may choose to go on to complete a Master's degree (2 years) and even choose to complete a doctoral (PhD) programme at any of these higher education institutions. Austria also offers integrated Bachelor and Master programmes which allow you to obtain a joint degree in 4-6 years.

VET in Austria

Austrian vocational education and training (VET) starts after compulsory education and includes programmes at upper secondary, post-secondary and tertiary levels. Austria's VET path is very popular with 70% of each age cohort opting for a VET path at the end of their compulsory education. 92.7% of a students complete their VET course which is not only due to the in 2017 introduced training obligation which says that all people under the age of 18 must either be in education, training, have a job or participate in a mainstream school-based programme or apprenticeship.

The variety of VET programmes is big and covers nearly every sector, making it an attractive option for both people leaving compulsory education and adult learners alike. There VET programmes for many fields of

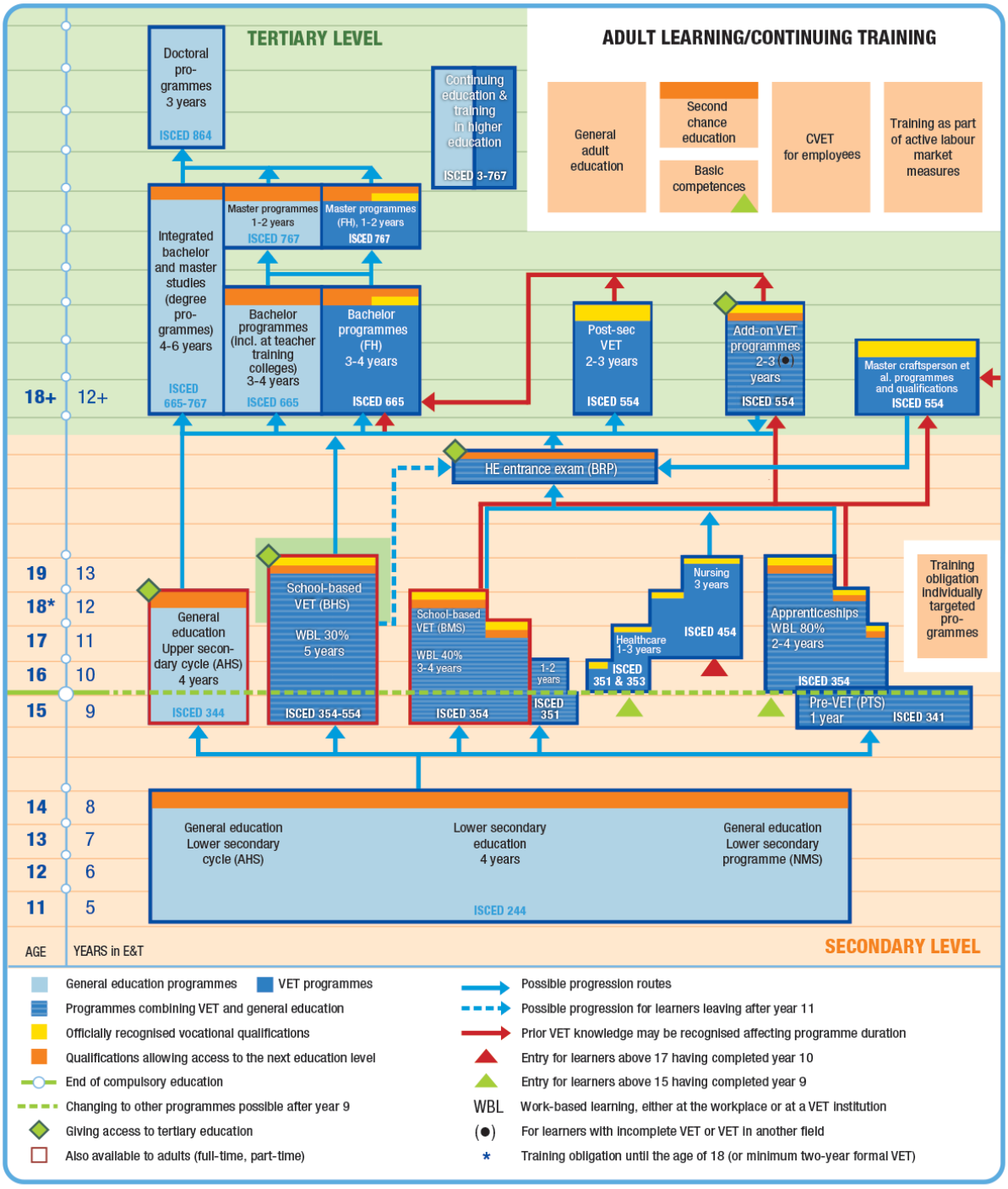
study and education levels which can also be adapted to regional economic contexts and skill needs and can range from fashion to business or agriculture.

All upper secondary programs, whether school-based or dual-track, combine VET and general education, along with theory and practice. Work-based learning is essential in VET, especially in apprenticeships, where learners spend 80 percent of their training time in the workplace. School-based VET is also practice-oriented, including learning in workshops, labs, training restaurants and practice firms, complemented by mandatory work placements in companies. Project and diploma assignments as part of the final exam of the five-year VET programme (EQF 5) are often set by companies or carried out with their collaboration.

A lot of attention is paid to key competences such as teamwork and digital, entrepreneurial skills and the learning of at least one foreign language. The number of apprentices (within the dual VET-track) being trained is driven by company demand. After completing compulsory education, young people apply for apprenticeship positions in businesses and sign a training contract with them. Apprentices are also assigned to the respective school-based programme, as attendance of such a programme is mandatory. Many VET programmes are offered outside of the formal education with a wide range of institutions offering offers continuing training and progression opportunities to complement or programmes to upgrade people's initial qualifications.

The education ministry is responsible for pre-vocational schools and the bulk of the predominantly school-based VET programs at the upper secondary level. This ministry is in charge of preparing essential school legislation, designing framework curricula, hiring and paying teachers, and providing additional training for them, as well as maintaining the schools. The Ministry of Agriculture is in charge of establishing and maintaining five-year school-based VET programs in agriculture and forestry, as well as hiring and compensating teachers at these schools. The Ministry of Agriculture and the provinces split the expenses of teachers at three- to four-year VET schools of agriculture and forestry. The provinces' education directors are in charge of enforcing school legislation, including quality assurance, school supervision, and education control.

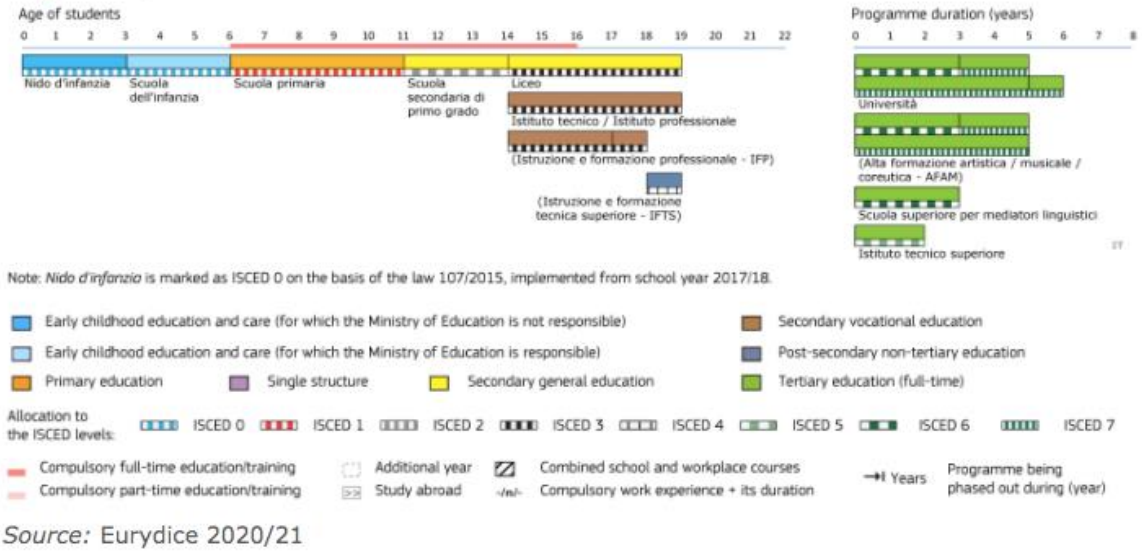
The Ministry of Economy, which is responsible for the legal bases and content of the company-based component, and the Ministry of Education, which is responsible for the complementary school-based training, have dual VET competences (curricula, selection of staff). The social partners are also heavily active in the apprenticeship training governance system (designing the training regulations, carrying out the assessment procedures). The training companies cover the cost of the company-based portion of apprenticeship training; state incentives are also available. The Ministry of Education finances the school-based component, while teachers' wages are divided between the provinces. Dual VET in agriculture and forestry is overseen by the Ministry of Agriculture and the provinces. The legislative foundation of healthcare programs is the responsibility of the Ministry of Health. Teachers working in these training facilities are compensated by the provinces. The provinces are solely responsible for their building and maintenance on behalf of the Federation.



NB: Simplified. ISCED-P2011.
Source: Cedefop and ReferNet Austria, 2019.

Italy

Structure of the national education system



Source: Eurydice 2020/21

The Italian education system is structured around the values of subsidiarity and institutional autonomy. In Italy compulsory education spans from 6 to 16 years of age and is free of charge. The bulk of the Italian education system is run by the government. Private individuals and public bodies, however, may create educational institutions. It is coordinated by the Ministry of Education.

Compulsory schooling begins at the age of six and continues for ten years, ending at the age of sixteen. It encompasses the whole first cycle of education as well as the first two years of the second cycle of education. The final two years of compulsory education can be completed at an upper secondary school or through a regional technical education and training programme.

All, including Italian residents and international minors from both EU and non-EU countries, must have access to education at all levels. Compulsory education is given free of charge. The concept of inclusion also extends to students with disabilities, students from low-income families, and students from other countries.

Pre-school education (age 3 to 6)	Participation in three years of pre-school education is non-compulsory for children aged 3 to 6 but very common.
Primary education (scuola primaria/elementare)	Primary school for children from 6 years old, lasts five years and is compulsory.
Lower secondary education (scuola secondaria di primo grado/scuola media)	It is compulsory to attend 3 years of lower secondary education, usually when the pupils are aged 11 to 14. Lower secondary school seeks to develop students' ability to learn independently as well as their attitudes

	toward social contact, organize and expand knowledge and skills, and provide students with appropriate instruments to continue their education and training programmes.
Upper secondary education (scuola secondaria di secondo grado/scuola superiore) • Liceo • Instituto tecnico • Instituto professionale	The second cycle of education consists of the state-run upper secondary school and the district vocational education and training scheme (IFP). The first two years of the second cycle of education and training are required and can be completed at any of the institutions that provide second cycle education and training. There are three institutional types of compulsory upper secondary education with different specializations. While the liceo has a theoretical focus, the instituto professionale is very practically oriented. Licei are in charge of general upper secondary education. They strive to prepare students for higher-level studies and the workplace by equipping them with the necessary skills and experience, as well as cultural and methodological tools for learning their own life skills, such as strategic thinking and planning. Technical institutes provide technical education with the aim of equipping students with a solid science and technological foundation for careers in the economic and technological sectors. Vocational institutes provide students with a good professional and vocational general history in the sectors of services, industry, and handicraft, easing their transition into the labour market. Tertiary education is available via general, technological, and vocational pathways. The upper secondary education lasts 2 to 5 years and is compulsory until the age of 16. Completing the final exam after 5 years grants access to university.
Higher education	There are various types of universities and colleges in Italy. Universities (polytechnics included), High level Arts and Music Education institutions (Alta formazione artistica e musicale - Afam), Higher schools for language mediators (Scuole superiori per mediatori linguistici - SSML), and Higher technical institutes all provide higher education in Italy (Its). Universities are self-governing institutions, with their own laws, governing bodies (such as the rector, council, and board of management), and teaching and research systems.

	The Afam institutions are the following: Academies of Fine Arts, the National Academy of Drama, Higher institutes for Artistic Industries (ISIA), Conservatoires, the National Dance Academy and officially recognised music institutes. Afam institutions have legal status and statutory, teaching, scientific, administrative, financial and accounting autonomy. Higher technical institutes (ITSs) are highly specialized technical schools founded to meet the demand for new and advanced skills in the workplace, especially in the technical and technological sectors. After 2011/2012, ITSs have provided short-cycle non-university higher education, which has become part of the education system. Holders with an upper secondary education diploma are qualified to enroll in courses. Courses usually last four semesters and progress to the designation of 'Higher technician' (Diploma di tecnico superiore).

VET in Italy

In Italy, the education and jobs ministries set the rules and general principles, but VET programs and apprenticeship-type schemes are the responsibility of the regions and autonomous provinces. There are three types of apprenticeships, one of which (Type 2) does not correlate to any educational standard and only leads to marketable occupational qualifications. Continuing VET is mostly aimed at working people. The national qualifications framework, which was adopted in January 2018, is a catalyst for re-designing qualifications.

The participation of multiple institutional players at national and regional levels, as well as the important role of social partners, characterizes the Italian context. In relation to the form of training supply, Title V (article 117) of the Constitution provides for ownership by the state, the regions, or mechanisms for cooperation between the various institutions: The state sets general guidelines and defines education's basic values; vocational education and training (VET) is regulated by the regions and education is governed by corresponding regulations, with the exception of educational institutions' autonomy.

Within the State-regions conference, ministries of education and labour, as well as the regions, establish structured agreements in light of the interweaving of the various intervention areas. The aim is to identify issues of common concern at various levels of responsibility. Title V has not yet been fully implemented, which adds to the interweaving and difficulty of the various layers of system governance. The areas of operation that primarily belong to the education ministry's jurisdiction and those that primarily apply to the labour ministry's jurisdiction, as well as the regions and autonomous provinces, must be kept separate. Many activities and initiatives, on the other hand, necessitate consultation among the various institutional players.

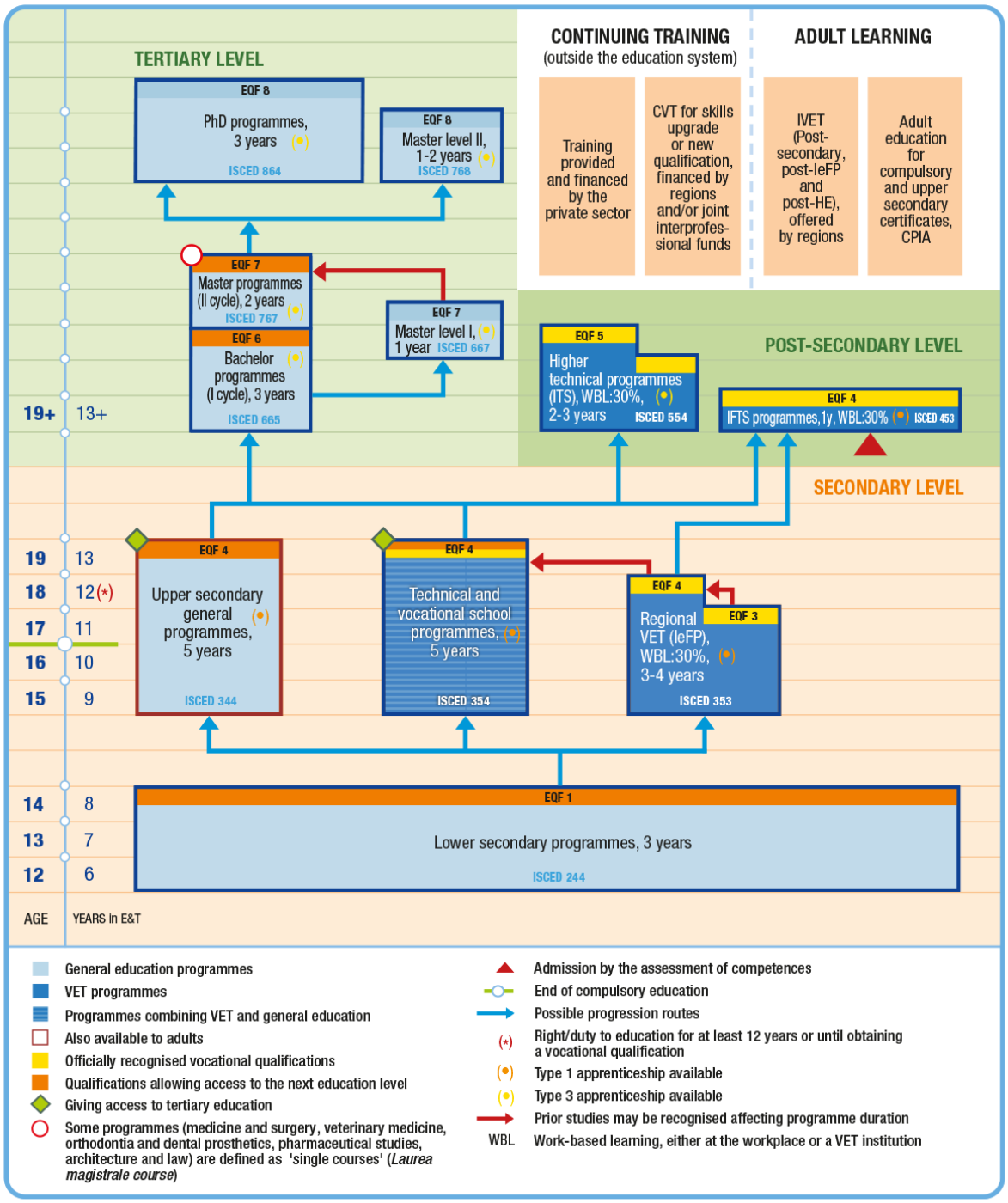
In collaboration with the employment ministry, the education ministry establishes the VET framework in national school pathways (technical and vocational institutes) for higher technical education and training courses. It is primarily responsible for higher technical institute programs in terms of producing guidance documents as well as tracking and reviewing the training chain. The education ministry is also in charge of redefining the national repertory of occupational profiles at higher technical institutes, including the inclusion of new technical profiles and the upgrading of those already in the inventory. The repertory is a set of occupational profiles that are taken into account when designing training courses. Monitoring of

higher technical institute courses is carried out by the National Institute for Documentation, Innovation and Educational Research (INDIRE).

The national institute for public policy research keeps track of vocational education and training pathways, higher technical education and training courses, apprenticeship training pathways, and ongoing training interventions at the national level. For the majority of apprenticeship-based trainings, the regions and autonomous provinces are responsible for the preparation, curriculum, organization, and implementation of initiatives offered within the framework of vocational education and training pathways, higher technical education and training, post-vocational education and training pathways, post-university education and for publicly-funded continuing training interventions (in agreement with the social partners).

Higher technical education, as well as higher technical education and training interventions, are specifically designed in three-year plans. The regions and autonomous provinces describe their post-secondary education and training policy through these documents, which put together and incorporate the various supply chains of higher technical education, higher technical education, and training hubs.

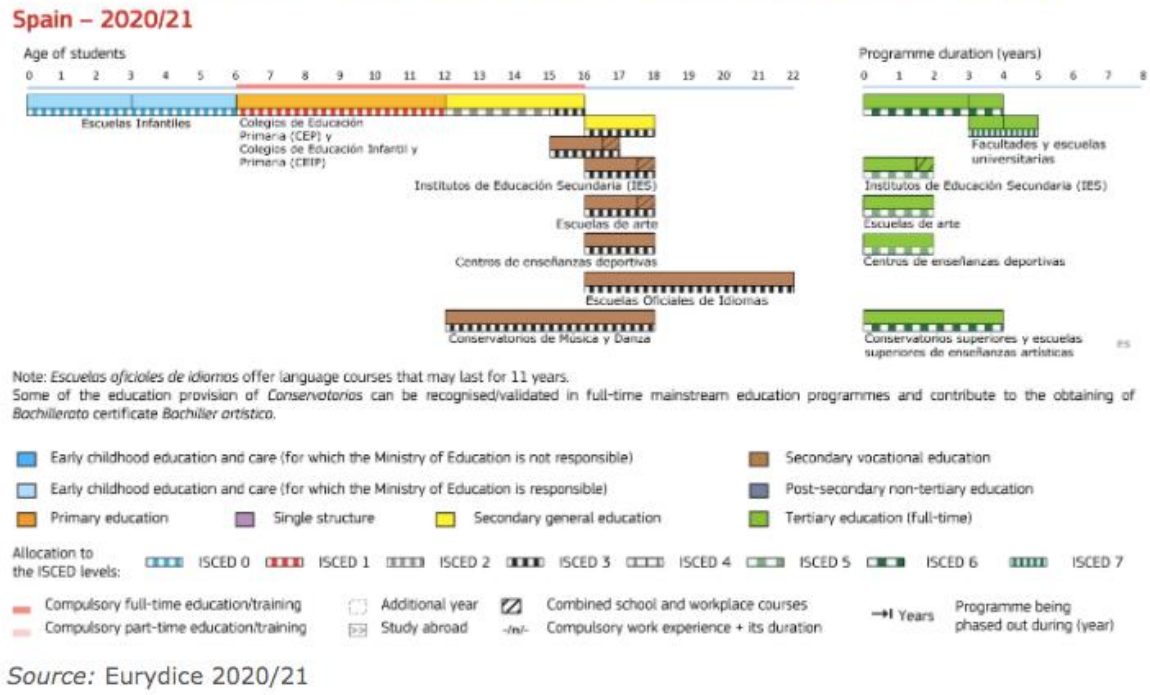
Social partners advise on the development of training policies and contribute to their understanding into the processes that make up the training offer. They also assist in the development and implementation of active labour market policies by supporting in-company, sectoral, and territorial training programs supported by the regions or realized by joint interprofessional funds for continuing education. Social partners play an important role in vocational apprenticeship legislation, in addition to their advisory role at the national and local levels.



NB: ISCED-P 2011.
Source: Cedefop and ReferNet Italy, 2019.

Spain

Structure of the national education system



Source: Eurydice 2020/21

The Spanish school system is free of charge and compulsory for children between 6 and 16 years old. The education system is organised by the national government as well as each of the 17 autonomous communities (Comunidades autónomas). The General State Administration (Ministry of Education and Vocational Training) and the authorities of the autonomous communities coordinate educational competences (Departments for Education).

The central education administration carries out the government's general education policy directives and controls the system's basic elements and facets. Regional education authorities draft state laws which provide executive and regulatory control over the education sector in their jurisdiction. For their tools, schools have pedagogical, operational, and administrative control. Participation of the education system in the planning, policy, administration, and assessment of colleges.

Early school leavers are on the decline (19.0 percent in 2016), but they are also well below the European average (10.7 percent in 2016) and the 15 percent target set for 2020 in Spain (10 percent in

<table>
<tr><td colspan="2">the EU). Spain has been working hard to reform its educational system by emphasizing information and communication technology, multilingualism, and vocational training modernisation.

Aside from these reports, the Spanish educational system also provides specialized education:
1) Language education, which involves the teaching and learning of numerous languages at the levels A1, A2, B1, B2, C1, C2, and C2 of the Standard European Framework of Reference for Languages (CEFR). Official language schools have these lessons.
2) Elementary music and dance education, technical creative education, and specialized artistic education are also examples of artistic education. These studies are offered in a number of contexts, depending on the form and level of schooling.
3) Sports education, organized into intermediate and advanced training periods and administered in the same facility as technical education.</td></tr>
<tr><td>Pre-primary education (Escuelas Infatiles)</td><td>Pre-primary education is up to 6 years of age. The second cycle is free in all publicly funded schools, despite the fact that it is not a compulsory education level (public schools and publicly-funded private schools). Pre-primary schools are public schools that provide it, and pre-primary and primary schools are public schools that also provide primary education.</td></tr>
<tr><td>Primary education (Colegios de Educación and Colegios de Educación Infantil y Primaria)</td><td>In primary schools, students receive a basic education. Students typically attend them between the ages of 6 and 12 years and it spans six school years.</td></tr>
<tr><td>Compulsory secondary education
• Secondary general education (Bachillerato)</td><td>Higher schooling is compulsory between the ages of 12 and 16 and is studied in secondary schools. Students earn their first formal diploma, the Lower Compulsory Secondary Education Certificate, at the completion of this stage, allowing them to resume their education or join the workforce.</td></tr>
<tr><td>• Upper secondary education:
Secondary vocational education
- Institutos de Educación Secundaria
- Escuelas de Arte
- Centros de enseñanzas deportivas
- Escuelas Oficiales de Idiomas
- Conservatorios de Música y Danza</td><td>High schools also provide post-secondary education. It is normally studied between the ages of 16 and 18 and lasts two academic years. There are two options: Bachillerato (general branch) and Intermediate Vocational Training (professional branch). The latter is also available in integrated vocational training institutions and national reference institutions, such as Escuelas de Arte, Centros de enseñanzas deportivas, Escuelas Oficiales de Idiomas and Conservatorios de Música y Danza.
The establishment of basic vocational training cycles, which can be taken by students aged 15-17, among other entry requirements that have been developed, and the development by education authorities of dual vocational training in the education system are among the reforms of vocational training provision.</td></tr>
<tr><td>Higher education:</td><td>University and professional studies make up higher education. Universities offer university education, and colleges that offer specialized vocational training also provide intermediate vocational training.

Higher education can be obtained at Universities (Facultades y escuales universitarias), Institutos de</td></tr>
</table>

	Educaciópn Secundarias (IES), Escuelas de Arte, Centros de enseñanzas deportivas and Conservatorios superiores y escuealas superiores de enseñanas artísticas.
Adult education and training	Adult education and training encompasses a wide range of services rendered by educational and work authorities, as well as institutions of various forms. Ordinary schools or special schools for adults offer classroom-based instruction leading to the awarding of official education system degrees. Adult education and training is aimed at people aged over 18 and, as an exception, workers aged over 16 who cannot attend school in ordinary regime or high performance athletes.

VET in Spain

VET participation has risen by more than 70% in the last ten years. During the same time span, early abandonment of education and training has decreased dramatically, but remains below the national target. Males make up the bulk of students in education authorities' VET programs: 71.1 percent in simple VET, 56.9% in intermediate VET, and 52.4 percent in higher VET programs. Health, administration, and management, as well as information and communications technology and sociocultural and community services, account for half of all VET students. Apprenticeships/dual VET learners are on the rise, but they remain a minority choice as compared to school-based programs.

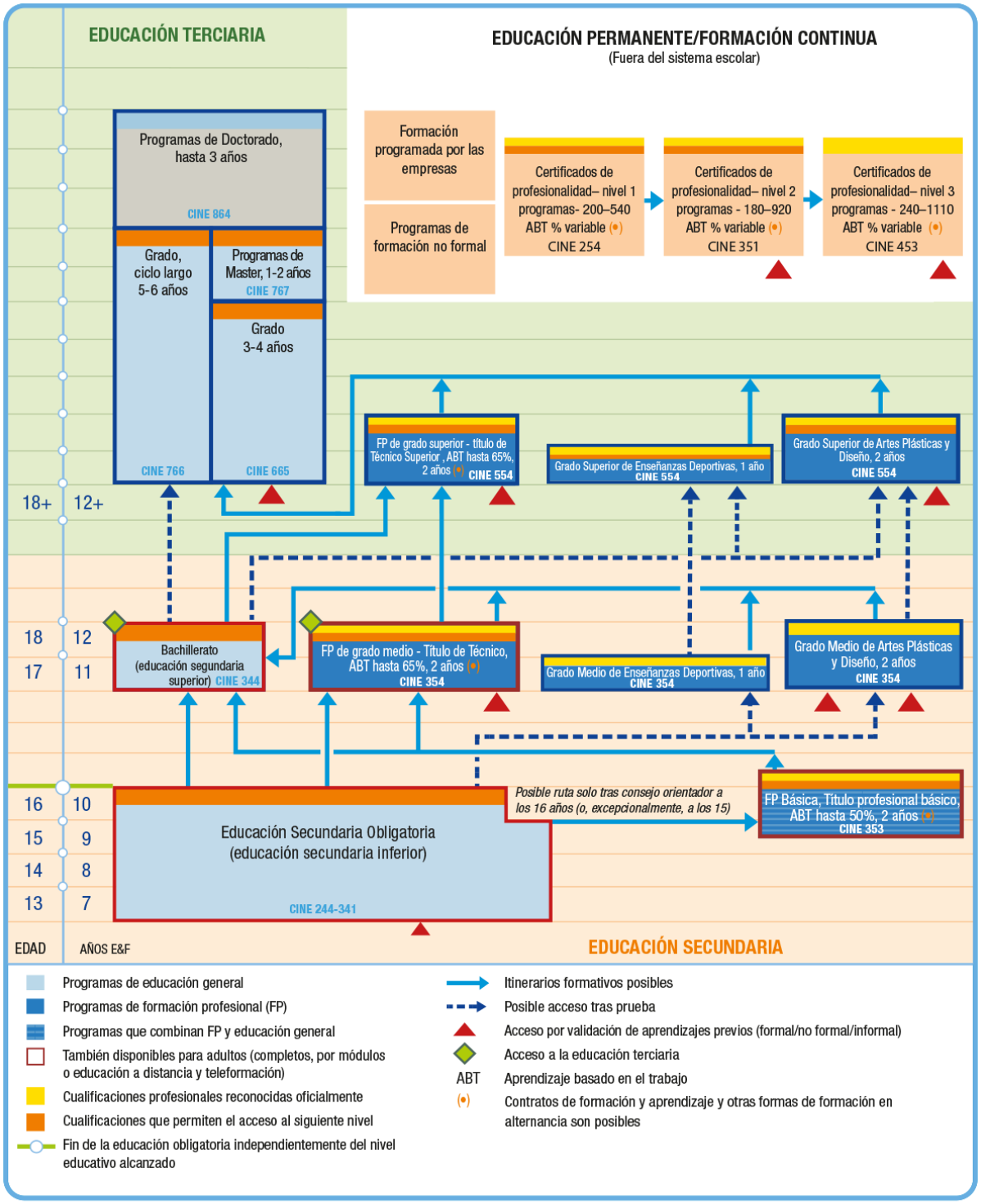
In upper secondary, the implementation of basic VET (ISCED 353) and direct access to intermediate VET (ISCED 354) programs has opened up pathways for students at risk of dropping out of school and, in some cases, adults with low or no qualifications. Adults may have their abilities recognized or prepare for a formal certification. For advanced VET programs and skilled credential access, key competences tests have been established. To make VET more available, online or virtual learning environments and platforms are being created.

As a result of the recent substantial rise in youth unemployment, current VET policy focuses on reducing the number of people who drop out of school or training too soon; raising citizens' educational attainment and employability; putting the dual concept into practice (apprenticeship-style training) and e-learning implementation, as well as acceptable evaluation requirements and quality control. The policy further focuses on evaluating the VET system to increase its consistency and efficiency; increasing the attractiveness of VET, by attracting companies to participate in VET and ensuring its labour market relevance and by aligning VET qualifications with labour market needs and skills predictions, as well as sectoral needs.

The right to education and retraining is guaranteed by the Spanish constitution, and public authorities are required to facilitate it. Education authorities are in charge of initial vocational education and training (VET); jobs authorities are in charge of continuing training. The national framework for qualifications and vocational training is the umbrella for VET programs that contribute to formal qualifications awarded by either the education or job authorities: all consult the same bodies, but their VET qualifications and programs have different governance and goals.

The Ministry of Education and Research has overall responsibility for education and training at all levels. In upper secondary VET, both curricula and the VET system structure are laid down in national regulations, and providers are required to comply with them. There is cooperation on upper secondary

and tertiary VET, both formal and informal, between education and training authorities and the social partners. The social partner representatives hold the majority of seats in all advisory bodies in the decision-making system for upper secondary VET. This enables technological and labour market changes to be continuously communicated to decision-makers; the overall aim is to provide relevant VET skills.



Nota: ISCED-P 2011. El sistema educativo español no está referenciado a los niveles del MEC.
Fuente: Cedefop y ReferNet España.

Synopsis of education systems

The different cultures, educational systems and achievements of the various project partner countries provide an excellent basis for learning from one another and with one another. The major concern is to promote this, to identify points for further development in the educational policy and develop proposals regarding the specific development and quality of education.

General education

Kindergartens exist in all the countries – with significant differences in the levels of care. They are open form children from 3 to 6 or 7 years of age (depending on the starting age), attendance is voluntary.

Conclusions: Learning begins at a very early age; kindergartens should be understood not as mere storage sites, but as early learning and development while playing.

Preschools exist in almost all countries, mostly they are meant for children of the last year before starting school. In principle, the preschool attendance is voluntary. A compulsory preschool attendance exists in Latvia (for 5-6-year-olds) and in Poland in the form or the so-called zero classes, which are attended by 6-year olds who learn the basic skills in reading, writing and arithmetic.

Conclusions: A mandatory 1-year pre-school (from 5 years) is desirable.

The compulsory education in the countries is between 8 and 10 years. It begins with the enrolment (6- or 7-year-olds).

Conclusions: As regards the compulsory school attendance, the general educational law provides for the age of up to 18 years.

The middle school education (primary or secondary school) is in all countries between 9 and 10 years. The primary school in Poland encompasses 6 years. In Germany and Lithuania, the primary school attendance is much shorter with a period of 4 years. In these countries primary school is followed by middle school education in many various forms. In Germany there is a choice between high school, junior school, secondary school and grammar school. In Poland the 6-year primary school is followed by a 3-year middle school.

The biggest difference between the school systems are the integrated and selective approaches. In the integrated school system, all 9- to 10-year students undergo school education (mostly referred to as basic education). In selective school systems, division of students takes place after the primary school.

Conclusions: The selective system is expected to be better targeted and specific strengths will be supported, though actually the promotion of individual strengths may only be a small-scale experience. In some countries there is an impression that all people should learn by means of the same methods. It results in strong uniformity. In selective education systems everything is strongly divided and marginalised. However, the targeted elite promotion and sustainable support of weaker students is rather limited. In many countries, too high a proportion of school leavers are unable to complete vocational training. They are excluded and have no chance for their whole life. However, each person has at least one strong point which can give them a good chance if it is supported within the framework of education and encouraged in the economy, can be put in the right place.

Individual support will be primarily determined by an appropriate education and appear in principle in all schools (with and without selection). Small and medium-sized enterprises demand from general education no narrow economic focus, no general vocational orientation, but the preparation for life in general. The graduates must have mastered the basic cultural techniques such as reading, writing and

arithmetic well and they must have personal-social skills such as readiness to learn, openness, cooperation and motivation. But these skills and characteristics are needed not only in the economy but also they are generally required for mastering life. The acquisition of personal-social skills and learning from one another in integrated school systems is generally possible.

The secondary stage encompasses 2-3 years in average. In many countries there is a choice between general and vocational secondary schools. The secondary stage, high school is completed with the diploma entitling to a university degree; in different countries also complementary or additional entrance exams for studies are needed.

Conclusions: The various forms of pedagogy and content taught are much more important than the different school structures. Educational systems are often excessively intellectualised and become too heavy. In many areas, they only support certain unilateral ability and threaten to become a special institution which fails to educate young people in a holistic and supportive way. The general character of vocational education has to be compared to the one-sided ideal of education. Even in the general educational the intellectual, musical and manual skills are taught to the same extent. The introduction of technology education, learning in the practical action and a holistic education is essential. Education must include all the senses. If this prerequisite is not met, there can be no real learning.

For the students and for their future career, it is advantageous when vocational elements are taught in secondary schools. In this way, interest in choosing a career can be increased also in the case of high school graduates and the learning of a profession also becomes attractive. A polytechnic focus in general education is the best approach to encourage all the young people and the people of all abilities.

Vocational education

The training duration is between 2 and 4 years. In almost all the project partner countries the training takes place at full-time schools. Practical elements are acquired by means of vocational practice, project works and training workshops. An exception is the dual training in Germany and Austria (about 60 per cent of vocational training courses are conducted in this way). In this case the apprentice training contract needs to be made with one or more companies; the theory can be obtained in an external state vocational school.

Conclusions: A significant expansion of the practical training periods in companies, a further improvement of the theoretical teaching, and better coordination between practical and theoretical training seem to improve the quality and increase the attractiveness of training which is particularly important.

Majority of the countries have no entry requirements for vocational training.

Conclusions: The introduction of uniform access conditions in countries which would be profession-specific should be examined.

In some countries, courses are offered at different levels (e.g. in Latvia and Lithuania). The lowest level is open to young people without qualifications, with duration of 1 - 2 years and provides simple professional qualifications. The middle level encompasses 2 - 3 years and provides practical and theoretical qualifications. The upper level provides advanced skills for stronger students (e.g. for high-school graduates).

Conclusions: In particular, the crafts are destined to train young people with learning difficulties. They are willing and committed to this social problem. But craft businesses may not be the sole specialist for the training and integration of weaker students. Crafts need also the best students to a large and still

increasing extent. The creation of differentiated training courses with different entry requirements and different levels of training in an open, transparent system is a priority for targeted development of professional training.

In most countries vocational training ends with a recognised qualification examination on the basis of state examination regulations.

Conclusions: In all the countries, vocational training should be completed with formal degree examinations, which are based on comparable standards and mutual recognition. The right of ruling the vocational education as well as all intermediate and final examinations should be transferred as sovereign tasks to the chambers in all countries. Due to its closeness to the enterprises the economic self-administration can perform these tasks in a more proper and cost-efficient way. An appreciation of the professional education with strong gender equality in higher general qualifications and a higher permeability is needed between vocational education and studies.

In the majority of the countries, training has lost much of its attractiveness; too low levels, poor quality and limited practical skills and experience are the subject of complaints. For example, in Poland only around 11 per cent of school graduated decided to pursue vocational training. In some countries (e.g. in Germany), efforts are intense in order to improve the situation. In addition to the appreciation, the vocational training and quality improvement of the theoretical instruction in particular, expansion and optimisation of practical training is pursued.

Conclusions: A major problem in all the countries is the declining popularity of vocational education. For young people it is desirable to go to high school and pursue university education. Demographic trends exacerbate this problem. Craft businesses are especially affected in this case. Young people prefer a course of study or training in other sectors in the so-called "white collar" occupations. Any increase in the attractiveness and quality improvement of professional education are the overriding tasks for the promotion of crafts and SMEs within the Baltic Sea Region.

There are much differentiated systems within the framework of vocational training. In Germany, vocational training is not regulated predominantly by the state. The organisation of training and acceptance tests are in principal task of the economic self-government (chambers). In most States there are public or private systems with vocationally oriented higher educational institutions like vocational schools, technical schools, technical universities and colleges, which offer higher professional qualifications and include more or less smooth transitions to universities and colleges.

Conclusions: Vocational training should in the first place be the responsibility of the business and economic authorities and it should be regulated by the state in a very limited way. Very important, however, are the quality improvements, greater transparency, smooth transition to general education and study, as well as mutual recognition of qualifications based on comparable standards. The work of the EU on the creation of a European education system within the Baltic Sea Region with the European Qualifications Framework (EQF) and Credit System (ECVET) could be a good basis for the creation of innovative, non-bureaucratic systems with high quality.

Within the framework of the pronounced harmonisation of European educational systems, the introduction of Bachelor and Master Degrees is already at an advanced stage. The Bachelor can be obtained only 3-4 years of studies; on the basis of it, a 1-2-year scientific study takes place, which is completed with a Master's degree. In addition to this, promotion is also possible.

In a number of countries already the completed high-school education is an entitlement to enrol for studies at a university or college. In some countries it is possible to apply to a non-scientific university

or academy after graduating a vocational school. However, these are not university or college studies with recognised academic qualifications, but training courses which are situated between vocational training and studies.

<u>Conclusions:</u> In connection with the far-reaching reforms under the Bologna process and the widespread introduction of the Bachelor and Master's degrees, Bachelor courses should be much more practice-oriented and offered as a dual system.

The vocational further education with high permeability and flexible transitions for the study will gain an increasing importance and needs to be established as a separate training area. The project partner countries can perform the pioneering role with its innovative and business-related concepts.

Qualification requirements in the Green Economy

Some of today's biggest challenges are the shortage of entrepreneurs and the lack of qualified workers, specifically in the field of green economy. In result, companies are less innovative and competitive than they could and should be. This has been widely discussed in the EU for some time now, especially in light of achieving sustainable, environmental perspectives. But what exactly are the qualifications needed to make the transition to an environmentally friendly, low-carbon and resource-efficient economy?[16]

The consensus is that the transition to a green economy is changing skill requirements. However, there are few studies about which professions are affected and which qualifications are needed, although this knowledge is essential for responding to changing requirements in green economy and the skilled workers shortage at an early stage. The authors mainly consulted a large-scale study commissioned by the Federal Environment Agency in Germany[17] that was carried out in Germany. Hence, the following information is somewhat limited to one national perspective. Nevertheless, the results reveal a lot about the qualification requirements in the green economy that are also valuable for other project partner countries. The researchers in the above-mentioned study conducted interviews with interest groups from various sectors of the economy and evaluated job advertisements (nearly 700.000) according to the terms of a keyword catalogue, e. g. "renovation of old buildings", "bio-shop", "landscape protection", "retail trade with food and beverages"[18].

First, they concluded that qualification requirements vary widely. These determine not only the industry the company represents, but also the company's position in the value chain as well as its size. "It is important to note that it is not formal initial training or further training content, but rather skills and competencies that are missing. Moreover, everyone also agreed that there was no need for new training occupations or courses of study. It was more important to make use of existing possibilities. Multipliers such as trainers at vocational schools or training companies play an important role here"[19]. The authors here refer to Mohaupt et al. 2011 or Build Up Skills 2013 (listed in the bibliography).

From the experts interviewed, further and continuing training is well suited to acquiring the skills necessary for the changeover to a new form of economic activity. However, participation in continuing training is still relatively low, especially among small companies. Therefore, corresponding offers should be made more attractive for companies, especially for small and medium-sized enterprises. [20]

Researchers of the European Centre for the Development of Vocational Training (CEDEFOP) came to a similar conclusion following an analysis of skills needs for green jobs in six countries: Denmark, Germany, Estonia, Spain, France and UK. "The view across all countries is that there are few green occupations per se; the impact of the greening of the economy and employment mainly takes the form of new green skills within existing occupations. As a result, training is mainly a question of adding green

[16] Helmrich, Robert / Schandock, Manuel et. al. (2014): Arbeit und Qualifikation in der Green Economy, in: Umwelt, Innovation, Beschäftigung 03/2014; im Auftrag von Bundesministerium für Umwelt, Naturschutz, Bau und Reaktionssicherheit, p. 10: http://www.umweltbundesamt.de/publikationen/arbeit-qualifikation-in-der-green-economy [accessed July 2019]

[17] Cf. ibid., pp. 10

[18] The researchers carried out guideline-based interviews with representatives of associations and umbrella organisations from the fields of "resource efficiency", "smart cities" and "construction and renovation", "biodiversity and natural capital", "consumption" and "training". They assessed the current situation on the labour market as well as obstacles and future challenges in relation to changing qualification requirements for their thematic focus.

[19] Helmrich, Robert / Schandock, Manuel et. al., pp. 14

[20] Ibid., p. 15

components to existing qualifications or programmes". [21] For example, the insulation of buildings with thermal insulation composite systems has become a focus of painters' activities.

As part of the Green Jobs Initiative, the ILO Department of Skills and Employability has launched a global research project identify the skills needed for a transition to greener economies. The ILO collaborated with CEDEFOP, whose study with 6 EU countries was included in the results[22]. The following 21 countries participated in the study: Australia, Denmark, Estonia, France, Germany, Spain, United Kingdom, United States (developed/advanced economies); Brazil, China, Costa Rica, Egypt, Indonesia, Philippines, Republic of Korea, South Africa, Thailand (developing and emerging countries); Bangladesh, Mali and Uganda (least developed countries).

Some findings of the synthesis report are presented below[23]:

- Environmental protection is about reducing the negative effects of economic activity and increasing the positive effects. This includes a broad spectrum of knowledge and technical, business and conceptual skills. Some of these skills are not green in themselves, but only as green as the context.
- All in all, economies need well-qualified and broadly-based professionals who can apply their skills in different contexts - green or not green. Green jobs need installers, roofers, engineers and chemists with a wide range of technical skills that go far beyond specific sustainability or green skills.

Using the example of the United Kingdom, a list of Green Skills is presented. It is worth noting that this list only includes technical skills that are crucial for green jobs. These skills, too, are certainly not "green" in themselves, but are in great demand as the professions become more environmentally friendly.

The checklist contains 10 large groups of skills (Tier 1) that are relevant across industries and are divided into general qualification categories (Tier 2) and more specific skills (Tier 3)[24].

[21] Cedefop (2019). *Skills for green jobs: 2018 update. European synthesis report.* Luxembourg: Publications Office. Cedefop reference series; No 109. http://data.europa.eu/doi/10.2801/750438 [accessed July 2019]

[22] Cf. Strietska-Ilina, Olga; Hofmann, Christine; Durán Haro, Mercedes; Jeon, Shinyoung, Skills for green jobs: a global view: synthesis report based on 21 country studies; International Labour Office, Skills and Employability Department, Job Creation and Enterprise Development Department. - Geneva: ILO, 2011; pp. 103 https://www.greengrowthknowledge.org/sites/default/files/downloads/resource/Skills_for_green_jobs_global_view_ILO.pdf [accessed August 2019]

[23] Cf. Strietska-Ilina, Olga et.al. Skills for green jobs, pp. 103

[24] The table ist to be find in: Strietska-Ilina, Olga et.al. Skills for green jobs, pp. 103

The yellow marked skill groups, categories and skills relate to the environmental sectors of the project 3LOE.

Tier 1	Tier 2	Tier 3
1. Design skills	Eco-design	Design for disassembly, design for recyclability, design for the environment, design for effective energy use, legislation and regulatory compliance
	Green manufacturing	Legislation and regulatory compliance, integration of process waste
	Materials specification	
	Life-cycle assessment/costing	
2. Waste skills	Waste quantification and monitoring	Waste production calculations, mass balance, waste audit
	Waste process studies	Material/substance flow analysis, resource utilization mapping, life-cycle assessment
	Waste management systems	Objective setting, legislative and regulatory compliance, collection systems, segregation, waste cycle management, 3R implementation (reduce, reuse, recycle), hazardous waste management, landfill requirements, communications/implementation campaigns
	Waste minimization	Industrial symbiosis, integration of process waste
	Waste technologies	Recycling, waste-to-energy
3. Energy skills	Energy minimization	Energy reduction programmes, heat recovery and re-use, energy-efficient technologies, energy-efficient practices, communications/ implementation campaigns, enhanced capital allowance technologies and schemes
	Energy management systems	Objective setting, legislative and regulatory compliance, energy base loads and variable loads, energy audit, energy review, communications/implementation campaigns
	Energy quantification and monitoring	Monitoring targeting and reporting, use of half-hourly data, use of sub-meters, computer-based data logging and energy management systems, energy data manipulation software systems
	Energy costs and trading	Energy markets and pricing, carbon trading schemes, climate change levy agreements, energy price trends, enhanced capital allowances, peak oil and impact on energy supplies and prices
	Renewable energy (RE) technologies	Solar, wind, biomass, combined heat and power, photovoltaic, ground source heat pump, air source heat pump, hydro, hydrogen, fuel cell, integration into energy supply
	Non-renewable technologies	Nuclear, incineration with energy recovery, clean fossil fuel technologies, carbon sequestration, waste-to-energy

4. Water skills	Water use minimization and water re-use	Grey water, water harvesting, wastewater recovery, recycling, cascading, waste/water recovery, effluent treatment, sludge/slurry dewatering, leak detection
	Water management systems	Objective setting, legislative and regulatory compliance, water audit, water consumption review, communications/implementation campaigns
	Water quantification and monitoring	Sub-metering, data collection, water use calculations
5. Buildings skills	Building energy management	Monitoring targeting and reporting, use of half-hourly data, use of sub-meters, computer-based data logging and energy management systems, energy data manipulation software systems, building energy assessment
	Integration of renewable energy	Photovoltaic, solar, wind turbines, combined heat and power, fuel cell
	Energy-efficient construction	Insulation (cavity wall, loft, paperwork), regulatory compliance, passive heating, building regulations
	Facilities management	Building energy management systems, management and maintenance of water, waste management
	Calculating building energy efficiency and carbon ratings	U value calculations, building energy assessment, carbon rating
6. Transport skills	Transport impact minimization technologies	Hybrid vehicles, biodiesel, electric vehicles, fuel-efficient vehicles
	Transport impact minimization processes	Alternative transport strategies, communication/implementation campaigns, car-sharing schemes, public transport planning, public transport implementation, cycle network planning, cycle network implementation, transport modelling
	Transport management in business	Transport modelling, route planning and management, distribution and collection system
7. Materials skills	Sourcing	Sources of low-energy materials, sources of low-mileage materials, recyclates (secondary materials), energy-efficient raw material extraction, industrial symbiosis, transport mileage
	Procurement and selection	Use and properties of low-energy materials and of recyclates, industrial symbiosis, low-carbon and resource-efficient procurement, cost impact of climate change on material procurement
	Material use and impact quantification	Material usage calculations, life-cycle assessment and costing
	Management systems	Material use planning, material flow process design and implementation, energy-efficient process design and implementation
	Impact and use minimization	Life-cycle assessment and costing, energy-efficient process implementation, material flows analysis
8. Financial skills	Investment models	Energy technologies investment models, carbon derivatives investment models, calculation of payback/return on investment
	New/alternative financial models	Carbon trading, EU Emissions Trading Scheme, UK Emissions Trading Scheme, enhanced capital allowances
	Quantification of climate change impacts	Impact assessment of climate change on business finances, impact of climate change on materials availability and cost, carbon neutrality and associated cost/opportunities (costs of doing nothing), risk/opportunity assessment models for adaptation and mitigation, insurance risks/opportunities of a low-carbon economy
	Principles of low-carbon and resource-efficient economies	Polluter pays principle, externalities
	Tools of low-carbon and resource-efficient economies	Climate Change Levy agreements, enhanced capital allowances, cost – benefit analysis, low-carbon and resource-efficient procurement

	Impact assessment	Energy use calculations, water use calculations, waste production calculations, carbon footprinting calculations, emissions measurement
	Business planning	RE planning, low-carbon planning, integration of RE and low carbon into business planning cycles, climate change risks, climate change adaptation and mitigation responses (as part of business risk management), understanding low-carbon and resource efficiency skills requirements and long-term planning
9. Management skills	Awareness raising	Communication/implementation campaigns
	Opportunities management	Identification of low-carbon and resource efficiency opportunities, cost–benefit analysis
	Risk management	Identification of low-carbon and resource scarcity risks, cost–benefit analysis
	Day to day management	Low-carbon and resource-efficient procurement, integration of low-carbon and resource efficiency skills, due diligence, management systems, low-carbon and resource efficiency skills requirements for recruitment
	Built environment master planning and implementation	Low-carbon spatial planning, zero waste planning, resource-efficient planning, low-carbon and resource-efficient urban design, building regulations, public transport planning and implementation, cycle network planning and implementation
10. Policy and planning skills	Strategy development	Impact assessment and modelling, principles of low-carbon and resource efficiency
	Strategy implementation	Understanding of skills needs for HR managers, low-carbon and resource-efficient material sourcing and procurement, awareness raising/communications skills

The list below presents the core skills necessary for green jobs identified in the country reports:

- "strategic and leadership skills to enable policymakers and business executives to set the right incentives and create conditions conducive to cleaner production, cleaner transportation etc.;
- adaptability and transferability skills to enable workers to learn and apply the new technologies and processes required to green their jobs;
- environmental awareness and willingness to learn about sustainable development;
- coordination, management and business skills to facilitate holistic and interdisciplinary approaches incorporating economic, social and ecological objectives;
- systems and risk analysis skills to assess, interpret and understand both the need for change and the measures required;
- entrepreneurial skills to seize the opportunities of low-carbon technologies;
- innovation skills to identify opportunities and create new strategies to respond to green challenges;
- communication and negotiation skills to discuss conflicting interests in complex contexts;
- marketing skills to promote greener products and services;
- consulting skills to advise consumers about green solutions and to spread the use of green technologies; and
- networking, IT and language skills to perform in global market"[25].

[25] Strietska-Ilina, Olga at. al. Skills for green jobs, pp. 107

The country reports show that green transition skills are necessary in all economic sectors and in all industries[26].

Based on the results of the 21 countries, waste and water management as well as recycling and material management are among the key sectors for green jobs and will become increasingly important in the future as natural resources become scarcer. In France, for example, almost half of all green jobs already account in this sector (around 400,000 - 450,000). In developed countries, new activities are slowly replacing traditional activities such as the collection and disposal of waste through storage or incineration. These require a higher level of training because they are more demanding: detection of leaks, quality measurements, flow measurements, closure of circuits or consumer information.

Other new occupations that have emerged in waste management are those of waste prevention manager and recycling industry operators employed by municipalities or waste management companies.

There is a big difference in the recycling industry between the developed and developing countries, namely that in the developed countries this industry is part of the formal economy; in the developing countries, however, it is part of the informal economy, which implies many risks and disadvantages for people working there. For example, the sorting and collection of plastic bags, bottles and other valuable components of waste is mainly carried out by women and children. Many of these jobs often entail health risks and are very poorly paid.

But here, too, the demands on competencies and skills change and become more demanding. For example, separation of organic waste so that it can be used for composting. Other innovative uses of organic waste also require new skills, such as the production of charcoal briquettes from residues of charred cotton, millet, maize and Tiph (a wild herb) stems. A new occupation in developing countries is the recycler of electronic waste.

In Europe, the waste management professions are more complex, each involving several of the tasks that seem to be distributed across different professions in developing countries. State-of-the-art technologies in the sector also determine occupational requirements. For operators in the recycling industry, initial training programmes provide the skills needed to: sort waste, recycle material into raw materials, manage and monitor recycling processes, and maintain machinery and equipment.

In Germany, for example, in 2007 around 55,000 people (of whom only 3 per cent were women) worked in waste disposal and street cleaning: 55.9 per cent of them completed dual vocational training and only 0.7 per cent passed their university entrance diploma.

Environmentally conscious handling of materials not only means recycling, but also considering the composition of the materials themselves. Materials science, and in particular green chemistry, is a growing field in which technological progress is creating new skills. Cleaner and healthier materials would protect consumers from the harmful effects of toxic substances in the products they use; there would be fewer floating, non-biodegradable deposits that would help marine life and make beaches cleaner; and fewer landfills and hazardous landfills would be required. The scientific and technical workforce for this aspect of a green economy needs highly qualified technicians, lab technicians and other staff who can apply the principles of green chemistry in their professions. For example, updating the O*NET taxonomy in the United States lists biochemists as an emerging green profession; other

[26] Cf. Ibid.

related professions where skills are likely to change include chemical engineers, chemical plant operators and tenderers, chemical plant and system operators, chemical engineers and chemists.

Circular Economy

The promotion of individual environmental sectors such as water, wastewater and waste was also anchored in the "Closing the loop – the EU action plan for the Circular Economy (COM(2015)614final) that proposes actions to support circular economy in each step of the value chain – from production to consumption, repair and remanufacturing, waste management, and secondary raw materials that are fed back in to the economy.

The EU Action Plan for Circular Economy assigned the central role in the circular economy to waste management. The following steps of the value chain are identified and promoted in the circular economy[27]:

1. Production
    a. Production design
    b. Production processes
2. Consumption
3. Waste management
4. From waste to resources: boosting the market for secondary raw materials and water reuse
5. Sectoral measures - priority areas
    a. Plastics
    b. Food waste
    c. Critical raw materials
    d. Construction and demolition
    e. Biomass and bio-based products
6. Innovation, investment, and other horizontal measures
7. Monitoring progress towards a circular economy

This action plan was accompanied by numerous concrete measures in the individual defined steps of the circular economy. The first of these began at the end of 2015. These range from the development of guidelines, European standards, proposals, work programmes, programme audits, evaluations of pilot actions, exchange of best practices, initiatives such as "Energy generation from waste" to strategies, e.g. "Strategy for plastics in the environmental service branch", to name a few.

Three years after its adoption, the circular action plan has been completed. The 54 measures have already been implemented, although work on some of them will continue beyond 2019. On 4 March 2019, the European Commission adopted a comprehensive report on the implementation of the Action Plan for the Circular Economy[28]. The report presents the main results of the Action Plan and outlines

[27] EU ACTION PLAN FOR CIRCULAR ECONOMY https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52015DC0614 [accessed August 2019]

[28] Report form the Commission to the European Parliament, the Council, the European Economic ad Social Committee and the Committee of the regions on the implementation of the Circular Economy Action Plan COM(2019)190final. https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1551871195772&uri=CELEX:52019DC0190

future challenges for the governance of our economy, paving the way for a climate-neutral circular economy that minimises pressure on natural and freshwater resources and ecosystems.

"The circular economy is now an irreversible, global mega trend"[29]. "Green jobs are seen as a real solution not only for environmental but also for economic and social challenges and offer real income opportunities. Green jobs have become a central part of the political agenda"[30].

However, much remains to be done to intensify action at EU and global level, to fully close the loop and to exploit the competitive advantage it brings to EU businesses. The long-term vision for a prosperous, modern, competitive and climate-neutral economy conceals new markets and market advantages for companies in the European Union, and increases their competitiveness, because "new circular business models, recycling, energy and material efficiency and new consumption patterns have significant potential to reduce global greenhouse gas emissions. Promoting this common approach in companies - including SMEs - and municipalities can simultaneously reduce production costs and support new forms of business interaction such as industrial symbiosis. In addition, circularity and sustainability in the procurement, use and treatment of raw materials (especially critical raw materials) will be crucial to ensure the necessary security of supply, a level playing field for industry and the EU's global leadership in the production of key and low carbon technologies"[31].

Conclusion and implications for the project 3LOE

- "Moving towards a greener economy is creating opportunities for new technologies, investment and jobs"[32].
- "Greening jobs goes hand in hand with improving skills"[33].
- Every job can potentially become greener. The understanding of green jobs varies from country to country. Whatever the understanding of green jobs in each country is, however, one must be given meeting the criteria of a decent job - decent wages, secure conditions, workers' rights, social dialogue and social protection[34].
- Improved quality and availability of training can stimulate a positive cycle in which skills development drives innovation, productivity growth and enterprise development, technological progress change, investment, economic diversification and competitiveness - all factors that in turn contribute to the creation of more and better jobs[35].
- Multiskilling requirements seem to be particularly prominent in greener economies.
- Waste and water management, recycling and materials management sectors are key areas for green jobs, which are gaining in importance due to the scarcity of natural resources.

Based on the country studies and statistical data, climate policy developments in Europe, EU-wide measures initiated by the European Commission (e.g. EU-wide ban on single-use plastic items since 2021) and the growing awareness of the climate importance of EU citizens, specialists for greener jobs are in demand as never before. Nowadays there are 3 types of skill changes:

[29] COM(2019)190final
[30] Strietska-Ilina, Olga at. al. Skills for green jobs, p. 161
[31] COM(2019)190final
[32] Strietska-Ilina, Olga at. al. Skills for green jobs, p. 23
[33] Ibid.
[34] Ibid., p. 4
[35] Cf. Ibid.

1) creation of new jobs (e. g. waste prevention manager or operators in recycling industries),
2) employment shifts within and across sectors as the consequence of green restructuring,
3) skill requirements are changing within occupations that is the most widespread type of skills change (e. g. the insulation of buildings with thermal insulation composite systems has become a focus of painters' activities).

It will indeed be ubiquitous and will require major efforts to revise existing curricula, qualification standards and training programmes at all levels of education and training.

Adapting training programmes to green changes in the labour market is a cross-cutting task across levels and types of education and training: so far, compulsory and higher education levels have caught up quite well, while technical and vocational education and training are lagging behind in adapting to the needs of the green economy. Improving adaptation can give new impetus to employment-oriented and fair green transitions when mastering further challenges[36].

By evaluating the existing information on qualification needs in the project environment areas, the project consortium identified individual qualification measures at three levels of vocational education and training, which are developed and implemented according to work-based learning principles:

1. Initial vocational training

- training program for strong learners and learners with learning difficulties in initial vocational training

2. Further vocational training

- program of further vocational training courses
- train-the-trainer program
- inclusive programme for the unemployed

3. Higher education

- Bachelor's degree program with 4 modules

These programmes are designed to provide sector-specific skills in both environmental technologies and management. In addition, three countries with predominantly school-based vocational training will introduce dual education systems for initial, continuing and continuing training.

Training programs in initial vocational training

The project aims at promoting work-based learning by introducing dual vocational education and training, especially in countries with school-based vocational training. Dual training has proven to be particularly effective, however, attention should be paid to observe individual abilities and possibilities and better adapt to youth with different educational backgrounds, competencies, skills and learning progress, such as:

Level 1: Two-year training for youth with practical talents with a recognised degree (EQF Level 3)

[36] Cf. Strietska-Ilina, Olga at. al. Skills for green jobs, p. XXV

Level 2: Three-year practical and theoretical training, completed with a recognised qualification as skilled worker/journeyman (EQF Level 4)

Level 3: Three- to three-and-a-half years training for overachievers, including additional qualifications, completed with a recognised qualification above the examination level of skilled worker/journeyman (EQF Level 4 and 5)

Within the framework of the 3 LOE project, the following dual vocational training programs are being introduced and implemented in partner countries where school-based training has predominated to date.

- Poland “Electrician” and „Fitter of fixtures and fittings in building industry"
- Lithuania “Cook”
- Latvia “Motor vehicle mechanic/Car mechanic”
- Spain “Electromecanico”

Two-year trainings for youth with practical talents with a recognised degree are developed and implemented in the 3 LOE.

- Specialist for Building Insulation
- Sustainable restaurant worker

Strong learners as well as trainees with proper training achievements in intermediate examinations can be granted a shortening of the regular vocational training time by up to one year. Such shortening is to be limited to half a year, while the second half of the year should be invested in transferring skills in technology and management of waste, wastewater, water treatment and to circular economy. In a sense, this is comparable to an early training, delivered already during vocational training.

Regardless of ways of shortening the training period, additional qualifications can be imparted during the regular training period or, alternatively, upon completion of vocational training.

Imparting additional qualifications allows for

a) attracting skilled workers who have already acquired in-depth knowledge and skills in environmental techniques during or immediately upon vocational training,

b) prompting stronger learners (e.g. with Matura (Abitur) or school leaving certificate (intermediate level)) towards completing vocational training that will be equivalent to advanced training qualifications and will serve as a door-opener to perfect career opportunities.

Learning results are based at EQF Level 4 or 5. Additional competencies and skills imparted during vocational training (EQF Level 3) are largely inter-occupational. Only selective modules are job specific. The project will address in particular young people who are undergoing vocational training in relevant occupations, for example:

- specialists in wastewater technology
- specialists in recycling and waste management
- specialists in water supply technology
- plant mechanics for sanitary, heating and air conditioning technology
- gas and water filters
- plumbers

Following the example of VET, additional qualifications should be offered in a dual VET-system. Within the framework of the project, six training courses for the imparting of additional qualifications for the stronger learners within the framework of vocational training will be developed and implemented.

A Technologies in water supply 60 – 80 hours

B Technologies in water saving 80 – 100 hours

C Greywater and rainwater utilisation technologies 80 – 100 hours

D Decentralised wastewater treatment technologies 100 – 120 hours

E Fundamentals of the circular economy 80 – 100 hours

F Systemic solution-oriented consulting 60 – 80 hours

Participants may complete selective or all main modules, and for each completed main module an attendance certificate will be issued. Participants who complete all five main modules are entitled to an advanced training exam with the degree "Environmental Consultant in... (followed by the name of the qualified occupation)".

In addition, the project is developing and implementing a five-year training program that combines initial vocational training with further vocational training, namely technician training „Ecologic Solutions in Logistics".

Further vocational training

In the 3 LOE project, four shorter trainings in the energy field will be developed and implemented for owners and managers of SMEs.

- Energy Efficiency and Renewable Energies
- Solar Energy – Technology and Applications
- Energy Efficient Construction and Application of Renewable Energies
- Waste and Wastewater Management and Energy Production

Six different advanced training courses in green technologies will be offered to trainees with vocational training and several years of professional experience, to acquire skills in water, wastewater, waste and circular economy. Selective courses are specifically tailored to the needs of the target groups "SME-owners and managers" and "SME professionals". The imparted learning content is cross-occupational, experts and interested companies from all lines of trades will be addressed. The learning results are rated at EQF level 5.

During the project six different trainings shall be developed and applied, such as to match, to the greatest possible extent, specific SME demands as well as individual trainees` needs. Such approach also encourages readiness to further education, both among SMEs and among participants, in as much as most of the countries involved in the project, should improve employee participation in professional development and upgrade trainings with respect to imparted skills and competencies

During the project, six advanced training courses of each 30 to a maximum of 50 hours of classroom teaching will be implemented:

A Preparation and management of SME to embark on Green Economy

B Waste reduction and recycling management

C Wastewater treatment and recycling management

D Water supply and water saving

E Cradle-to-Cradle in SME

F Energy generation from wastewater and waste

In addition, the following long, comprehensive continuing education programs with recognized continuing education degrees (EQF level 5 & 6) will be developed and implemented in the 3 LOE project.

- Enterprise and Entrepreneurship in Green Economy
- Energy Service Manager
- Environmental Manager & consultant
- Vocational Master Carpenter
- Construction Technician
- Service Technician

The developed curricula and teaching materials will be tested and evaluated in all seven centers of excellence. Thus, different national conditions are included at the stage of development and project completion, thus significantly encouraging their use in different countries.

The offered advanced training courses may be supplemented by an integrative program for the unemployed with relevant pre-qualifications, thus, improving their chances on the labour market.

Higher education

SMEs need leaders and entrepreneurs with sound theoretical and in-depth practical job-related knowledge and skills. Graduates of traditional study programs are un-suitable as they lack professional practice and experience, and they need two to three years of on-the-job training upon completing their study. Thanks to dual bachelor`s programs, a combination of a Bologna-compliant study with complete vocational training or professional on-hands-practice, SMEs, being the competent partner of choice for about 50 percent of the training time, may thus win much-needed junior staff as potential future managers and entrepreneurs.

In the project, module manuals for two dual Bachelor`s degree programs will be de-signed based on programs that for many years have already been successfully implemented by German universities and colleges, including

a) management and technology, energy efficiency and renewable energy

b) management and business administration for SME

Both programs will be transferred to colleges and universities in nine Baltic Sea region countries. The transfer recipients will receive comprehensive consultation on implementation of work-based learning by introduction of dual study programs delivered in colleges/universities and at SME.

Furthermore, students of technical and business study programs are expected to be trained in SME-related green technologies and skills in technologies and management in the fields of water/sewage/waste treatment and in Circular Economy. Transfer will take place under a dual system; the university study modules are interdisciplinary, while the on-the-job training in the companies will

be specifically focused on SME-related occupations and branches. Learning results are rated at EQF Level 6.

The project will develop, test and evaluate four main modules, each covering 150 to a maximum of 175 teaching lessons:

A Management & water, wastewater technologies

B Waste management & technologies

C Management & technologies of Circular Economy

D Management concepts for sustainable economic activity

In addition, the following dual study programs are being developed and implemented in the 3LOE project, so that dual systems are thus also being realized in higher education in the 7 centers of vocational excellence.

- Business Administration & Sustainable Management of SMEs
- Entrepreneurship & Innovation in Green Economy
- Logistics - Green Supply Chains
- Service technician
- Tutorial “Sustainable management Climate neutrality for companies”

Under dual study programs, close collaboration between academia and small medium-sized enterprises is achieved. In that regard, further welcome features are active exchanges of knowledge and experience as well as implementation of manageable research and development tasks for and by SMEs. Students will implement their semester or bachelor`s theses at companies where they complete their practical training. They will select topics that are particularly business-relevant, thus ensuring notable benefits to SMEs.

All results and qualifications will be transferred to the associated partner countries, who will also receive implementation advice. Extensive dissemination activities are carried out for free use of project outcomes by all interested parties.

Train-the-trainer programme

In order to ensure that well-qualified teachers become available for implementation of the planned educational measures in the participating countries, the project will develop different train-the-trainer programs for the target groups “VET teachers and teachers of continuing and higher education institutions”.

- Training program for personnel and center management
- Training for consultants & teachers to use Tool for vocational and qualification counselling
- Training for teachers to conduct dual vocational training
- Training of trainers in SMEs
- Training program for teachers to conduct further training
- Train the Trainer A Basic Digital Skills
- Train the Trainer B Advanced Digital Skills
- Training program for university lecturers and SME advisors

During the project term, the train-the-trainer programs will be tested and evaluated by teachers and staff of all project partners from all participating countries. Following a review and completion based

on the evaluation results, the train-the-trainer program will be transferred to all associated partners, which will receive comprehensive implementation consultation. The objective hereby is to ensure that by regular training at all transfer recipients and implementation partners across the countries, well-qualified trainers are always available for the ongoing realisation of all educational project measures.

Outlook

The current educational system is in a number of countries strongly focused on direct recoverability. It lacks many individual grants and elite education as well as a comprehensive training for all mental, manual and social skills. The education system and also the economy run the risk that the systems will lay off their children and more and more people will not be able to meet the requirements due to the uniformity or leaving existing skills unused and eventually often outsourced. Similarly, the learning skills of stronger learners within the framework of the pronounced elite education experience need to be promoted. In principle, the man should not necessarily adapt to the existing systems. The systems have again become more suitable for a human and understand that every person is a unique human being, and as such deserve promotion and appreciation.

The education sector is often discussed primarily within the framework of structural reforms. Certainly, new educational structures are necessary, but used alone they can bring very little results. But the creation of new structures cannot bring lasting improvement if not preceded by far-reaching cultural reforms. For further development of the cultures almost inevitably, new structures need to be developed.

Early childhood education

The educational policy must focus much more on the children under six years old. Learning begins at a very early age and it is primarily the central role in the family. All family members, especially the grandparents, should be intensively integrated in a way that adults learn together with the children, e.g. languages. The number of families are growing which are not able ensure appropriate learning at this age at home. The deficiencies at home are forwarded to schools which can barely cope with or compensate these issues. Finally, within the framework of vocational education, enterprises become a repair workshop for families and schools and are less and less ready to meet the changing requirements and increasing cost pressure.

Families need to be strengthened with all the power in all policy areas.

This includes the rediscovery of extended families and the strengthening of the three-generation-families. The development of recent years has resulted in nuclear families. In the three-generation family the grandparents take over the educational responsibilities and relieve the parents particularly on weekdays. In addition, the development of family-like structures and forms of cooperation among not related persons should be supported. The widespread introduction of full-time care ensures that both parents can continue with their career. This will have a positive impact on the declining birth rate, since childlessness is often the choice between family and professional life and in the case of two earners also the financial base is secured. Among Scandinavian countries this model is implemented largely in Denmark and it is possible for all children older than one year to attend day care centers.

At kindergartens and schools as a platform for exchange of experiences among each other as well as educators and for further development should be created in the form of a parents- and family-school.

A sufficient number of nurseries and kindergartens are required which do not perceive themselves as mere storage sites, but as early learning and development while playing. Carefree play of the children decides on the future. Playing is for children a serious process which provides pleasure. Also, learning - regardless of the age - should bring joy and make children hungry and not full, has to open instead of

closing, awaken curiosity, and provide impulse for continuation, so that all the former students finally find out in their life that there were things of which their teachers had no idea.

The ability of learning by playing needs to be used more actively. Early access to foreign languages is ensured through the introduction of bilingual kindergartens. This simplifies learning further languages and is significant for future close cooperation. The highest priority should also embrace the early promotion of languages especially among children whose mother tongue is different, so that language barriers are broken down before the school admission.

An obligatory one-year preschool with smooth transitions into the school system according the linguistic abilities and the standard reached by each individual should be introduced. It would ensure that children from disadvantaged families are supported in early learning and social behavior. Further, it leads to the situation in which children having different mother tongue can master the language of the country before going to school.

The best and best-paid teachers, small group sizes and most attention will be required by the very young and not the older age groups.

School education

Schools should not be an isolated place of learning that is not intensively involved in the social, economic and social environment. The school must be strongly interwoven in decentralized structures, to be a central point of daily life for everyone, sponsorships with companies that include master craftsmen and trainers from the enterprises in the teaching course.

Individual schools and individual teachers in those schools must have a high degree of independence and personal responsibility. On the basis of the total budget, the schools can decide on their own to a considerable extent on the use of their resources. The teaching staff may not be chosen and imposed by superior institutions. The schools also decide on the recruitment and dismissal of teachers. Temporary employment contracts for teachers might be appropriate and gives rise to being aimed at a more intensive exchange between activities at school and in the economy. A performance-based remuneration should be granted.

Teachers are entrusted with the most important thing that a society can have, namely children. Teachers need support, respect and appreciation, and they earn trust. They have the freedom and responsibility to promote children's development and enforcement of their development.

A new pedagogical approach is necessary that requires new qualifications for teachers. Education is a development and qualification task and includes the responsibility of education. Teachers are exemplary trainers who train pupils but also at the same time learn from them. Transferred knowledge become quickly obsolete. This and the continuing development of pedagogics demand for an intensive further education of teachers.

A holistic education that is created individually and encourages each student according to his personal abilities and talents is required. This requires in particular the need to have distinct diagnostic competence of teachers in order to find out the individual strengths of students and what individual performance objectives can be pursued. These pedagogical elements need to be encompassed with teacher training in a strengthened form and lead to further education. In order to appeal to all senses of students, it is also vital to supply teachers with artistic and manual skills. Every teacher should demonstrate the professional training he or she obtains, which has the form of a dual degree in no way leading to longer training and academic studies.

The school should not give increasingly specialized knowledge, in the case of which growing material abundance requires more feedback. It is important to learn how to learn, how to promote individual strengths and thus strengthen self-confidence. Schools must prepare young people for life, not to a specific occupation. Polytechnic orientations should enable learning through the productive activity, entrepreneurship, independence and promote students' personal responsibility.

The mediation of a broad base of knowledge should be prioritized. A specialization can be taught at secondary schools, studies and during vocational training. The decisive factor is a good mastery of basic cultural techniques: languages, writing, arithmetic, and reading. In addition to the intellectual skills also artistic and manual skills need to be supported. The language is not only the native language, learning at least two foreign languages should be compulsory. They should not teach as an "isolated" subject but rather as language teaching, such as mathematics instruction in English. Enhanced establishment of bilingual schools, especially in border areas, allows attending school in the neighbouring country.

General educational school system needs to promote particular personal-social skills. For this purpose, specific subjects are hardly required, because education and learning develop these skills and qualities naturally. Students, who learn in the class together and from each other experience different strengths and weaknesses, develop tolerance, respect and cooperation skills. Individually applied education with specific learning objectives and steps also promotes self-confidence, trust in each other as well as a sense of achievement and motivation. Independent learning in practical action and the required separation in different groups of people promote independence, communication skills, placing in the overall context and mediation of meaning. Through project and group work, students can practice problem solving in a team and are trained in the autonomous learning. Besides the academic achievements by the end of basic education, social behavior will be evaluated.

School/training shall be mandatory until 18 years of age. Following the basic education, all young people shall attend a secondary school or participate in a professional training. School education should not exclude anyone. The high proportion school leavers with no qualifications must be reduced without necessarily reducing level of individual remedial education. The Baltic Sea-wide uniform quality and minimum standards concerning the description of what should be mastered in which class; skills are developed and tested by independent and impartial institutions. This test results should not be used as an evidence for the student or the exclusion criteria, but they should give teachers guidance about where they stand with their students, while encouraging competition between schools as well as the need to focus on the best and schools learning from one another.

School structures play a secondary role, also in a structured educational system good results can be achieved with the highest permeability. Long learning together is not a prerequisite for good school education, but it facilitates, however, the mediation of personal-social skills of stronger learners and promotes sustainable integration. The success in most of the Baltic Sea Region states suggests rather pursuing the mutual learning as long as possible.

All-day schools should be the norm. This could be done in different models, for example, after the regular lessons from 12.30 pm till 2.00 pm leisure time with common meal and leisure activities and from 2.00 p till 4.00 pm homework supervision and leisure activities, which could have the character of a game, crafts, sports, music or culture and would help to discover personal interests of children, their talents and abilities.

Parents and teenagers can freely choose a certain type of school, a certain professional training or a specific field of study. Children should not be robbed of their childhood. Parents must avoid determining the day's schedule of their children. Children need enough freedom for self-organization, personal discovery of the world, their own individual adventures and gaining experiences. It may not lead to a situation in which children and young people due to a false ambitions or misjudgements in the forms of education and courses of study are pressed to do something every day that is unwelcome and unloved by them. Such young people will continuously collect only negative experiences and failures, lose trust and it would be very difficult for them to entry the professional life.

With all respect for freedom to choose skills, also individual strengths, potential and progress in learning the crossings into further education have a decisive influence. In any case, the choice requires very intensive advice from parents and young people. The overall opening and permeability of the educational system is needed so that everyone can reach their personal potential in accordance with each degree in several ways. Detours will then lead to the optimal way according the individual possibilities and not to losing time. In this way detours increase the knowledge of the area.

For the crossings into a further training course the following conditions should be applied:

Transition from Kindergarten/preschool to the elementary school: Test on command of the native language and the individual level of development.

Transition from the elementary school to secondary school: Individual schools should determine a level of entrance requirement which needs to be achieved in the elementary school (or in the middle school) as a minimum. The respective minimum levels can be set individually by different schools.

Transition from the school to vocational education: For each profession different levels of achievement and eligibility criteria should be specified, which with the help of competence assessment method and potential analysis would be the basis for the career guidance of students.

Admission to university education: Each admission to university education (whether on the basis of the high school diploma or other rights) should necessarily be dependent on mandatory entrance examination. The level of requirements in the test should be determined by each college/university individually.

Vocational training

Within the framework of school education, it is still necessary to inform students comprehensively concerning the possibilities of vocational training, particular professions, requirements and future opportunities. Close contact with companies and institutions of economic self-management, presentations of companies, masters and trainers facilitate the information and identification process. Recurring internships and experience in entrepreneurial skills should be mandatory for all students.

The guidance requires significant intensification. This should be addressed not only in formal entry requirements and conditions such as school degree and grades. More important is the development of job-specific competency profiles, which are then compared with the carefully identified individual skills of each young person. Also a careful consultation and preparation for vocational training must achieve a significant reduction of too high ratios of exchanges and dropouts in professional training.

Different levels of performance and eligibility criteria should be set for the whole Baltic Sea Region as a basis for individual competence assessment and analysis of potential and then approved to be transparent. These criteria help trainers and trainees, and the companies to get employees who are ready for the performance of the task and develop a sense of achievement in the case of young people who can be thus motivated for further work. The high number of dropouts and the risk of dead-end jobs will be significantly reduced. Vocational training must adequately take into account individual skills and capabilities and require extensive differentiation. Through the introduction of different levels, young people from different educational backgrounds, with different competences and learning progress can have an opportunity to obtain education which matches their specific skills:

Level 1: Specific vocational training for learners with learning difficulties for a period of 2 years, enabling focused and practical learning, will be completed with an independent recognized qualification.

Level 2: Middle-level vocational training with theory and practice parts for a period of 3 years and a recognized qualification as a skilled worker or journeyman.

Level 3: Advanced vocational training courses for the study of skills with a duration of 3 - 3,5 years, which provide additional qualifications or training preferable in the initial training and which will be completed with recognized degrees above the present trade or journeyman's examination.

With such a differentiated system of professional training, high permeability is needed. Each graduate at a lower level needs to have an unlimited possibility to reach a higher level, according to their progress in learning and actual achievements; taking into account already completed parts of the training. And vice versa, there should be an exchange of courses of a higher level to a lower level courses taking into account the already covered training periods.

In an open and transparent system gradual learning according to individual skills and potential is realized in every respect. Depending on the learning achievements and developments, each individual can achieve in principle the completion of education and training, although in different ways.

Also in vocational training every young person deserves a second chance. This requires specific actions of preparation and support which need to be developed and implemented in close co-operation with enterprises, inter-company training workshops and vocational schools.

Vocational training should preferably ensue in the dual system which combines practical training in the enterprises with accompanying theoretical courses in vocational schools and ends with a recognized vocational education degree. For school-based vocational training, practical learning activities under field conditions and corporate learning times should include at least 50% of the total training time. The mediation of theory should be possible alongside the practical training. In the case of larger theoretical issues which require related presentation, longer teaching blocks can be chosen to provide theoretical training to a certain extent.

The teaching of the theory (vocational schools) and practice (companies) requires close coordination and integration of both. Vocational schools also in this case have to prove that they have a very high degree of responsibility and flexibility and the content as well as the presentation forms (block or day classes, block lengths, project work, etc.) should be designed in a way specific for a given profession and in cooperation with enterprises. Vocational schools should be supported with financing from public funds of the economic self-government; in doing so, intensive contacts to enterprises will be

made resulting in cost-reduction and concurrent increase of quality. If a sponsorship of vocational schools by economic self-administration is not feasible, enterprises or their representatives of the economic self-governance have at least to be involved in an instrumental way in the design and implementation of the tasks of vocational schools.

Vocational education must qualify for the future requirements of labor force. The superiority of the dual system is based – among others – on the fact that large parts of the education take place in the enterprises. Thus, there is a permanent orientation towards the actual and future economic challenges. Accordingly, school-based vocational training requires intensive contacts with enterprises. The teachers in vocational schools must cooperate intensively with the industry and should do internships in enterprises on a regular basis as well as realise intensive further education.

An internship abroad already during the studies needs to be further supported. In addition to the general broadening of international experience, gathered intercultural competence is strengthened, contacts are made, and work methods and practices are learned abroad. Parts of the training acquired abroad, and the periods of learning must be fully recognised for the vocational training in their home country.

The vocational qualifications of all the three levels must be proven in national examinations. On this basis, the system of professional training and the examinations will be transferred in the entire Baltic Sea area, just as a sovereign function of the chambers as responsible institution for vocational education. The acquired qualifications require mutual recognition in the Baltic Sea Region states.

For this purpose, the development of the European Qualifications Framework (EQF) and a European system of credit points is conducted. These approaches are based on transparency and mutual trust. The focus is on the qualifications of skills of stronger learners and learning outcomes. When implementation it is particularly important to provide non-bureaucratic systems, which would document acquired skills and competencies by certificates of the international recognition and equality, encourage continuous learning, facilitate education and activities abroad and to motivate as well as facilitate the enterprises which are liable for their personnel decisions, provide information and transparency. The chambers in the Baltic Sea Region can - on a solid basis of trust - perform the implementation of non-bureaucratic systems and a full introduction of a pioneering role and so reach innovation projections.

Not only the formal learning and knowledge, but also informal learning and skills of stronger learners acquired during training are crucial for a high level of qualification. They should therefore be documented in certificates, as well as assessments of enterprises and self-assessments. The Euro-Pass constitutes an orientational basis, which encompasses personal skills, competencies and recognized qualifications; it can be completed on the basis of the demand and should receive intensive support from the partners from the Baltic Sea Region.

The measures outlined above can also serve to enhance and increase attractiveness of the vocational education. In order to achieve these objectives complete outstanding permeability between vocational and higher education with recognition of competencies acquired earlier is needed. A Vocational degree including professional activity of 2 - 3 years should entitle to higher university education in all the Baltic Sea Region states.

Furthermore, all measures of quality improvement and assurance taken in the professional training and comprehensive information and image campaigns need to be conducted. In this context, it is also necessary to highlight and clarify the immense nature of general education and vocational training,

which demonstrates that particularly within vocational education new elite of responsibility, is created and an elite promotion of achievement of all sorts of educational attainments and professional activities needs to be implemented.

Young people and their parents must be aware that facing the large and increasing proportion of university graduates professionals and managers who have completed vocational training as the most limited factor and therefore in comparison to many academic degrees they have the best future prospects. However, vocational training may not lead to dead ends, but must be justified in an open and totally transparent system of continuous further education and university qualifications.

Further vocational further and studies

Vocational training does not require government regulation and should be primarily the responsibility of the industry and its local administration. Employers and employees need to recognize much greater extent of the high and growing importance of training and heavily invest in it. In this context, new models of burden sharing should be developed, in which for example the enterprises bear the cost of the training and the employees can have their leisure time.

However, in general vocational training requires intensive professional development and in particular some improvements. This includes various approaches, for example:

- Systematic development of certified training modules that can be combined and lead to accredited training qualifications.
- Creation of training professions and professional development of horizontal career paths.
- Establishment of equality of educational pathways and degrees of vocational, general and university education.
- Full permeability and enhanced links between vocational education, further training and general education, and in particular university education. Vocational training needs to be taken into account in relevant disciplines of study.
- Promotion of international exchange, implementation of professional activities and training abroad, while making the greatest possible transparency of the acquired skills.
- International recognition or equivalence of further education qualifications in the context of non-bureaucratic systems.

According to the regulation in Germany, the chambers in all Baltic Sea Region countries should maintain the authority of sovereign functions. The chambers should be able to issue official examination regulations with recognized degrees of further education programs (so called Chamber examination). Solely the chambers should be responsible for the examinations in further education programs.

The Qualification for Master Craftsmen has proved to be very successful. This qualification secures the theoretical and practical knowledge and skills of junior employees and managers. The Qualification for Master Craftsmen is essential for small and medium sized enterprises; it must be intensified and coherently provided in the entire Baltic Sea area. The Qualification for Master Craftsmen must entitle to start academic studies. The obtained qualification during the Master Craftsmen must be considered comprehensively for the study courses. It seems to be appropriate that achievements in the Qualification for Master Craftsmen will also be evaluated with Credit Points, which can then be considered for the study program. This creation of permeability will sustainably increase the attractiveness of vocational education in general and that of the Qualification for Master Craftsmen in particular. Any opening of the education systems with various educational carriers will satisfy

individual affinities and abilities. Furthermore, it provides an opportunity for enterprises to meet the increased demand for skilled workers. It corresponds to the dire necessity that employees from outside the profession can work in craft-based industries and small- and medium sized enterprises.

Bachelor courses should be much more practice-oriented and offered as a dual system. So, studying at the university would be linked to vocational training or practical work in enterprises. Vocational training is completed with a separate degree and in a certain scope would lead also to credit points which are required for passing the Bachelor examination. Dual study programs could be combined with the Qualification for Master Craftsmen. The achieved credit points must be taken into account completely for the Bachelor exam.

Within the framework of dual courses of studies, each student should be obliged to complete a part of their studies or vocational training abroad. Hereby, the focus should be laid on vocational training or employment in a foreign enterprise, since this at the same time allows making contacts between enterprises.

Colleges and universities need to cooperate in teaching and research much more closely with small and medium-sized enterprises. Dual degree programs can significantly contribute to meet the high and growing demand of young entrepreneurs, managers and of professionals in the future who have both practical and sound theoretical training. This training partnership between enterprises as well as colleges and universities is also an ideal starting point to knowledge sharing, technology transfer and implementation of practice-related research and development work.

Educational and regional economic policy

Further decrease in transport and communication costs increases the mobility of production factors. Enterprises migrate to locations with high potential of professionals and workers, to locations with attractive educational opportunities and diverse labour market.

The local competition for (highly) skilled workers and capital is as a result more intense.

Education programs are a key competitive factor. Education policy, therefore, enhances to a large extent the overall location, regional and spatial planning policy.

Education promotes innovation and competitiveness and includes the main support task for small and medium enterprises. Education policy must be organised and have the highest priority over other types of policies. Understood in this way Baltic-wide concerted education policy must

- increase the competitiveness of the entire Baltic Sea Region.
- promote and develop human capital and the existing advantages and strengths.
- specifically develop individual sub-regions, and optimally support the competition between locations within the Baltic Sea Region in order to support the best educational opportunities and qualified professionals.
- together with the overall attractiveness and competitiveness of the Baltic Sea Region compared with other regions, increase migration of workers and enterprises.
- be enshrined in the EU Baltic Sea strategy and have priority.

Politics, economy and society of the Baltic Sea Region must address their outstanding position of education policy and it is necessary to recognize that the investment in human capital is the safest and brings the best profits.

The German system of dual vocational education, which leads to a comparatively low youth unemployment, integrates enterprises in the task of ensuring the influx of junior staff, as well as

combines the requirements of the labour market with the enterprises in a much better way, can provide large contributions to the achievement of objectives with a lasting impact.

The introduction of dual systems of vocational education is the most innovative in the countries with school-based vocational education. This is connected with far-reaching reforms and extensive changes, which constitute a major challenge to these countries. The involved countries are in principle interested to implement dual vocational training; however, they are afraid of great expenses and risks connected with the conversion.

It is also impossible to simply transfer the existing dual systems (e.g. from Germany). It is rather necessary to consider the regional conditions, political conditions, cultural differences, experience, etc., as well as lead to appropriate changes and adjustments, and implement customized solutions which comply with the basic principles of dual vocational education.

In some countries, up to 15 – 20% of school graduates cannot start their professional education, since they lack general education knowledge and/or there are problems in social behaviour. This also includes a significant proportion of young people who cannot start their vocational education immediately despite the acquired training maturity. These young people wait in long queues or receive no vocational training, and as a result are prone to face unemployment.

Up to 30% of young people, who complete vocational education, break it up; only about a half of them begin a new vocational education course. A substantial proportion of dropouts fail in theoretical parts of education. The central reasons for this are that the academic knowledge for the selected profession is not sufficient; the career choice made does not correspond with the actual tendencies or competences due to the absence of relevant information and experience or problems or personal and social behaviours.

The vocational education has lost much of its attractiveness. Especially in the new countries of the EU (e.g. Poland, Lithuania, Latvia, and Estonia) with primarily school-based vocational education, the training participation is low, dropped to an alarmingly low level, and is perceived as a dead end by many young people. In a few countries (e.g. in Lithuania) only one- or two-year programs are carried out in the school-based vocational education, which open a faster entry to the labour market with a higher earning potential, however, they do not qualify in a sufficient way and increase the unemployment of young people on an ongoing basis. Only short internships take place in enterprises, so that work-based learning is conducted to a very limited extent. The consequence is the unemployment of 15 – 24-year olds at the level of 28 – 30% in Lithuania, Latvia, and Poland. Insufficient professional qualification leads to long-term unemployment which amounts to e.g. 20% in Poland, 28% in Latvia, and 40% in Lithuania for persons with only primary and lower secondary education.

At the same time, companies complain about the lack of skills of graduates. School-based vocational education can consider the conditions of the labour market and the qualification requirements of enterprises only to a very limited extent, since there are few aligning mechanisms between the number of training places and the development of the demand of workplaces. In the case of school-based education, there is little contact between schools and enterprises, so that the qualification requirements of enterprises can be included in the training only inadequately. The Students learn the everyday business life only in a very limited way, are not sufficiently involved as interns in the company's operations, and the increasingly important personal and social competences can be taught in the classroom only to a limited extent. After a survey conducted in enterprises by the Baltic Sea Academy in Lithuania, 70% of SMEs require additional skilled employees who are very difficult to acquire. 96% of SMEs require a better practical training, and 74% a better theoretical training.

Because of the demographic change, the number of school leavers in all Baltic States has dropped significantly, with the exception of Sweden. By 2030, the number of the working population aged 15 – 44 will decrease by 25%. Already today there is a shortage of skilled workers in most countries, which will have an even stronger effect in the future and will strikingly limit the developments. Simultaneously, we can observe shockingly high youth unemployment, in particular due to the lack/shortage of vocational qualification.

SMEs threaten to be a loser in the competition for qualified young employees. Due to a lack of qualified staff, innovations in SMEs are much smaller than they actually should and could be. The shortage of young entrepreneurs, managers, and professionals, as well as significant skill gaps is the factors which limit the growth of SMEs the most. The increase in the qualifications with the simultaneous elimination of the shortage of skilled workers is the most important promotional task and the central key to sustainable strengthening of innovations, competitiveness, and growth of SMEs in the Baltic Sea Region.

Given this, it is of crucial importance to

a) prioritize the integration of young people and reduction of youth unemployment as well as

b) the provision of qualified employees to SMEs and a significant reduction of the shortage of entrepreneurs and of skilled workers.

In dual vocational training, about 70 – 75 % of the total training time is spent in the company. This inevitably means that in the case of a transition from school-based into dual vocational education, personnel and spatial capacities are released. The fear of losing a job is a large inhibiting factor for appropriate reforms. It is necessary to develop new areas of activity for vocational schools; continuing education for example is offered, for which there is a large demand in the majority of Baltic States and so far, the supply has been very limited. Vocational schools must therefore be developed into regional education and innovation centers that are jointly supported by chambers, vocational schools and universities and all tasks from the transition of the general in vocational education, vocational education and training up to dual bachelor's degree programs.