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Description of the professional education programme for Technican's of renewable energy

The aim of the professional education programme:

As a result of the educational process, a technician in the field of renewable energy should be trained who is able without assistance to ensure actual execution of the work on installation of renewable energy devices (further in the text REDs) such as solar collectors, photovoltaic systems, biogas plants, biomass incineration plants, wind generators, heat pumps. This embraces planning, organization, transportation, mounting, adjustment, control, and the work with the final user aimed at appropriate and efficient operational process of the REDs.

General education and professional tasks of the professional education programme:

To make it possible in the course of educational process to acquire the following knowledge and skills:

1. To receive and estimate the stocks and materials, instruments, technical means, individual and collective protection gears after having clarified and checked the availability of all materials needed for the work to be done at a using activity, with full information to be received from the work manager.

2. To transport the installations, to appreciate and evaluate the transportation process, to choose the optimal transportation type, time and means, having received the goods or installations at a storehouse or a shop after making certain that there are no damages; to place and strengthen the installations according to the accompanying instruction; to make certain that the installations and tools are securely fastened during transportation.

3. To prepare the working place, to become acquainted with a local briefing on the safety measures, to affix the signature in the corresponding logbook; if necessary, to coordinate the course of actions and accessibility of communications with the house manager or the executive in building works, to eliminate dangerous and harmful conditions in the working environment, to prepare working tools and individual protection means; to reliably position the devices and instruments at a temporary place.

4. To perform the mounting of installations:

4.1. to acquire a familiarity with the circuit design of a given solar system;

4.2. to mount the hydraulic elements, boilers, pumps, pump stations, storage tanks, expansion vessels, heat exchangers;

4.3. to mount pipes, cocks, valves, thermometers, manometers, temperature sensors, air bleeders, and other elements;

4.4. to check the hydraulic pressure of the system;

4.5. to make thermal insulation of pipes and its protective covering against mechanical damages; to fill the system.

5. To install the load-carrying structures:

5.1. to estimate the quality of the roof, to communicate and consult with a roofer or the work manager;

5.2. to become acquainted with the manufacturer's instruction on the installation of solar collector frame;

5.3. to reinforce the frame structures (in parallel with the roof plane or inclined to it, or on a horizontal roof);

5.4. to hydro-insulate the roof coating;

5.5. to make protection for the frame against the action of surroundings; to check and estimate the precision and quality of the frame installation.

6. To install a solar collector:

6.1. to render the instruments or devices operative for carrying the collector to the place of its installation (on the roof or ground);

6.2. to perform lifting of the collector to the roof and its positioning in a safe place;

6.3. to fix the collector on the frame;

6.4. to align the collector; in the case of flat vacuum collectors to perform vacuumization.

7. To mount the solar circuit:

7.1. to mount solar circuit pipes;

7.2. to earth the circuit, to perform its hydraulic testing;

7.3. to thermally insulate the circuit;

7.4 to cover the thermal insulation of circuit for mechanical protection.

8. To fill the solar circuit:

8.1. to calculate the volumes of heat carrier required for the system, solar circuit, and solar collectors;

8.2. to become acquainted with the instruction on the use of pump.

8.3. to connect the pipes together, to close valves, to connect the pump, to place a tank;

8.4. to start up the pump;

8.5. to remove air from the system;

8.6. to calculate and set the counter-pressure for the expansion vessel;

8.7. after the work is done, to disconnect the hose and close the valve.

9. To connect the solar collector's controller:

9.1. to make certain that the temperature sensors are in proper positions and that the outputs of the valves and pumps are connected according to the mounting line diagram;

9.2. to connect the controller;

9.3. to set the operational parameters, or otherwise to communicate with an electrician and to pass him the completed work.

10. To familiarize the system's user with the solar setup:

10.1. to familiarize the system's users with the instructions on solar system's, setup and operation;

10.2. to explain to the system's users: how to clear up the faults and familiarize them with the warranty terms.

11. To adhere to the basic principles of professional and general ethics and of professional contacts.

12. To observe the norms of legal relations at work.

13. To be occupied with self-education and to improve the professional competences.

14. To be able to work individually and in a team; to be responsible for the results of your work.

15. To estimate the quality of goods and installations when receiving them at a storehouse or a shop.

16. To place and strengthen an installation for its safe transportation.

17. To prepare the working place.

18. To mount the basic cables of the photovoltaic system.

19. To mount the load-carrying structures for the photovoltaic modules.

20. To install the photovoltaic modules.

21. To mount the inverter.

22. To test the photovoltaic system.

23. To make the base for the wind generator system.

24. To mount a gondola for the wind generator.

25. To perform the installation of the wind generator mast.

26. To perform the mounting of the blades.

27. To connect the system to the electricity grid.

28. To test the wind generator system.

29. To characterize the biomass fuel types.

30. To characterize the biomass preparation.

31. To perform the installation and attachment of the boiler.

32. To prepare fuel for the work.

33. To provide the fuel feed to the furnace.

34. To test and adjust the setup for biomass incineration.

35. To characterize the starting raw stuff for biogas production.

36. To characterize the collection of biogas.

37. To install a biogas setup.

38. To test and adjust the setup for biogas-fuelled heating system.

39. To install vertical and horizontal ground-water heat source.

40. To install a water-water heat source.

41. To install a heat pump.

42. To test and adjust the heat pump system.

43. To characterize the types of remote access.

44. To install the remote access control.

45. To perform connection to the electricity grid.

46. To test the remote access system.

Training methods used for accomplishment of the educational programme:

Lecture, discussion, work in a team, research work, explanatory-illustrative method, training excursion, presentation, situational analysis, play of roles, „exercises in training," practical work, using information technologies, etc..

Quality estimation of mastering the professional education programme:

Students who have mastered the professional secondary education programme and received final marks of their knowledge and acquired skills in all the education programme subjects, practical training and qualification practice, have passed all the examinations, the state concluding test in the professional secondary education programme – the professional qualification examination – with the mark not lower than „average 5," receive a diploma on the professional secondary education programme in compliance with the valid normative documents.

Further education possibilities:

- To continue education in a higher-level professional education programme
- To step-up the acquired professional level via diversified advanced professional programmes, corresponding branch courses, workshops, etc.