



Training Courses

for Trainers and Installers of

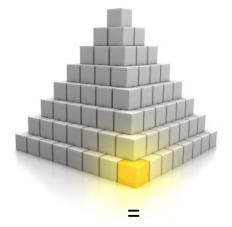
small-scale Renewable Energy Systems (RES) in buildings

Training Material & Didactical Approach

Strategic Workshop
Training and qualification of small-scale RES installers in Europe
Brussels, March 12th 2013
Manfred Wolf, ALP Dillingen



Qualification



Corner Stone of RES Quality



Teachers as Agents for Energy Change











Heat Pump System Installer







Bio Mass System Installer







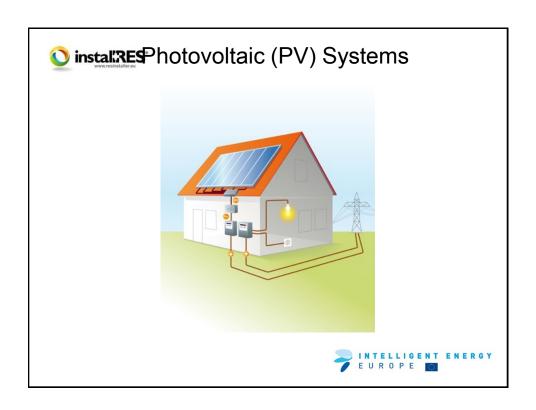
9 Train-the-Trainer Qualification Courses at the

BZS Munich - Training-Centre-of-Solar-Energy &

ALP Dillingen -

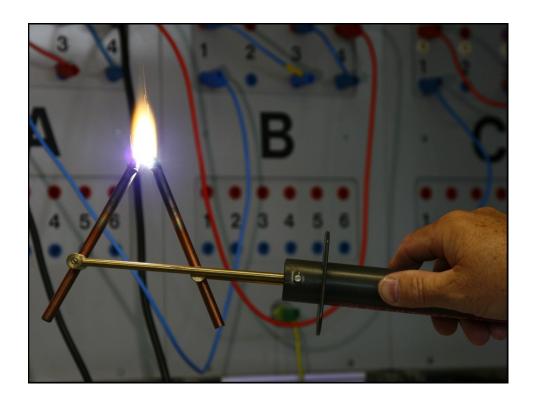
Academy for Teacher In-Service Training and Staff Development













Curriculum for Photovoltaic Systems Installer (PV-I)

Basic Technical Knowledge for Using Photovoltaic Solar Energy

Basic Knowledge of Solar Cells and Solar Modules

Equipment in Stand-Alone PV Systems

Planning a Stand-Alone PV System

Development and Basic Conditions for the Use of Solar Energy with Grid Parallel

Systems Inverter, Lightning Protection and Special Regulations

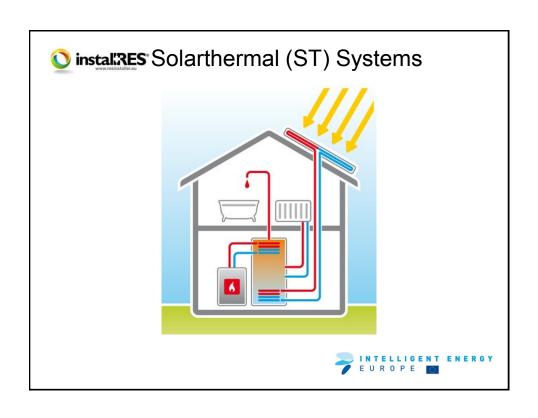
PV Laboratory Technology and Methodology

PV Systems Planning, Installation and Documentation

PV Lines, Connectors and Assembly Material

PV Meters and Inverter Test















Curriculum for Solarthermal Systems Installer (ST-I)

Fundamentals of solar thermal energy use

Fundamental functions of solar thermal collector technology

Fundamental functions of solar thermal storage technology

Structure and function of a solar circuit

Planning a solar thermal system for warm drinking water (WDW) preparation

Planning large solar thermal systems – storage concepts

Auxiliary solar heating and swimming pool heating

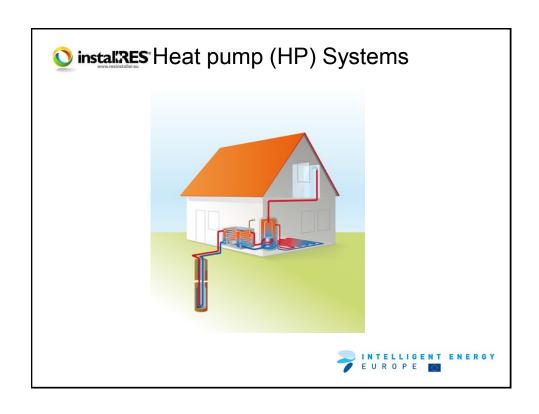
Control and measurement technology, sensors

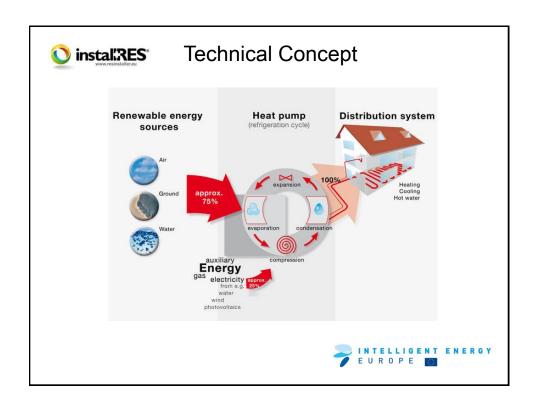
Operation and maintenance of solar thermal systems

Planning software and data analysis

Errors in designing and mounting ST systems











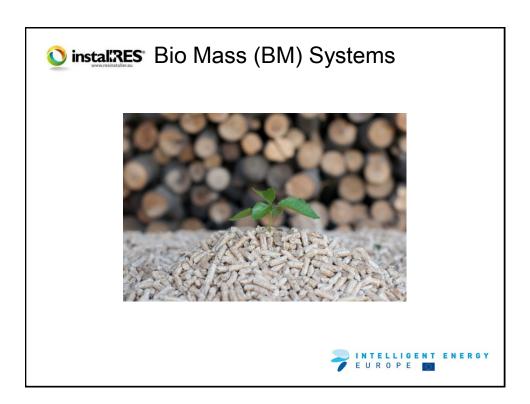


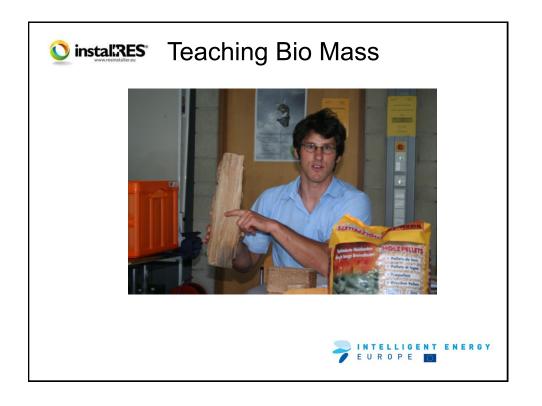


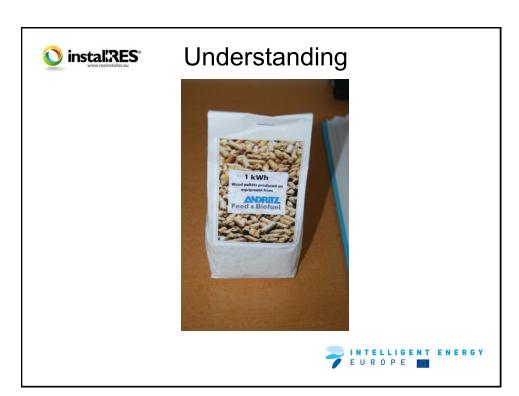
Curriculum for Heatpump Systems Installer (HP-I)

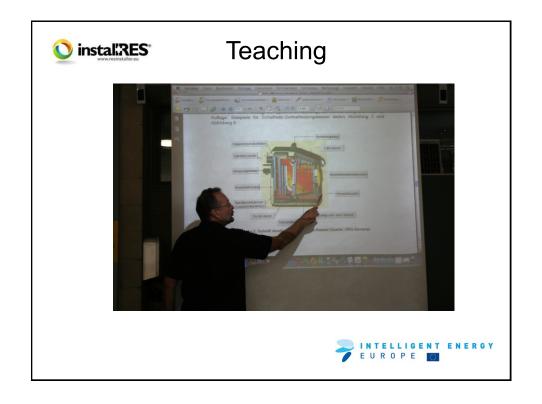
Fundamental Knowledge about Heat Pumps
Physical Basics of Heat Pumps
Planning Heat Pump Systems
Planning Groundwater and Geothermal Heat Pump Systems
Planning Air – Water Heat Pump Systems
System Technology of Heat Pumps
Heating Circuit Technology and Hydraulics
Electrical Connection and Regulation of Heat Pumps
Special Heat Pump Application Concepts
Supplementary Information on Heat Pumps























IEE/09/763/SI2.558302

Trainer-Course - Certificate for Qualifying Installers in Bio Mass Systems

Course 80/406A, July 12th - 15th 2011, at Educational Center for Solar Technology (BZS) in Munich, Germany

Mr. Kiril Konov

has successfully completed the course about

The Bio Mass System
Federal Emission Protection Act
Bio Mass Fuel
Combustion Technology
Bio Mass Fuel Storage
Exhaust Gas Routing
Facility Design

The trainer course was taught and administered by

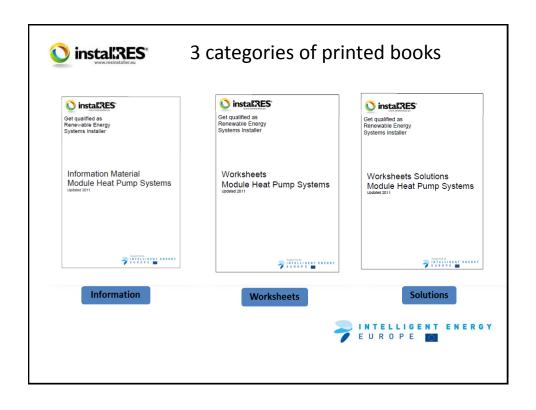
Ingrid Weiss (et al.) WIP Renwable Energies Munich Manfred Wolf
Academy for In Service Teacher Training and Staff Development (ALP)
Dillingen

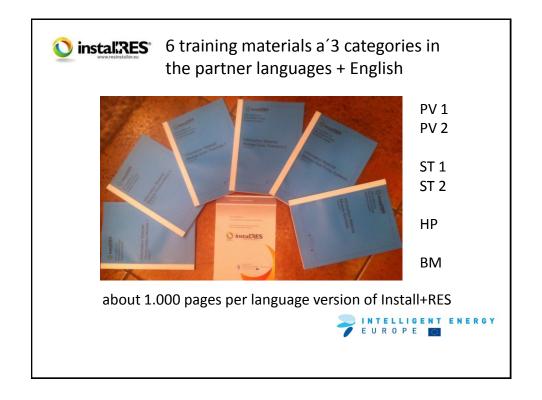


Install+RES Training Material

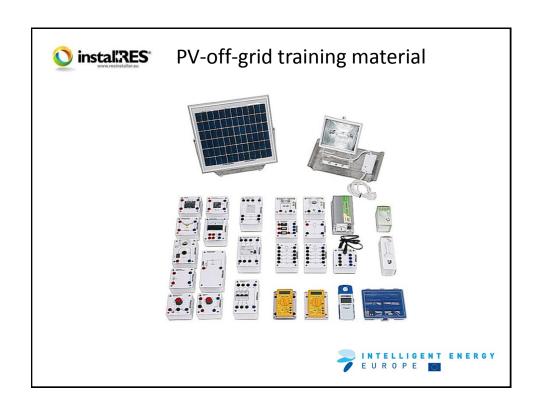
- Printed Books (18) per Language (7)
- Video Clips (14)
- Hands on training material (PV / ST / HP)
- http://www.resinstaller.eu



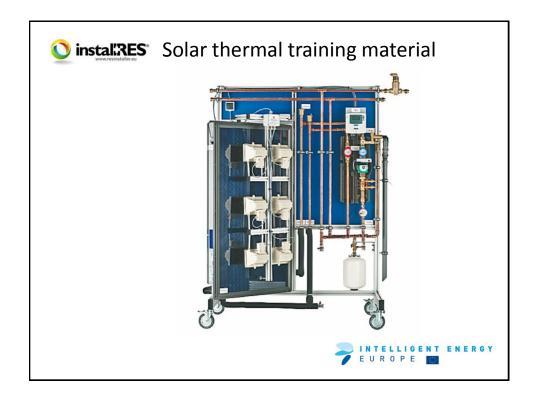




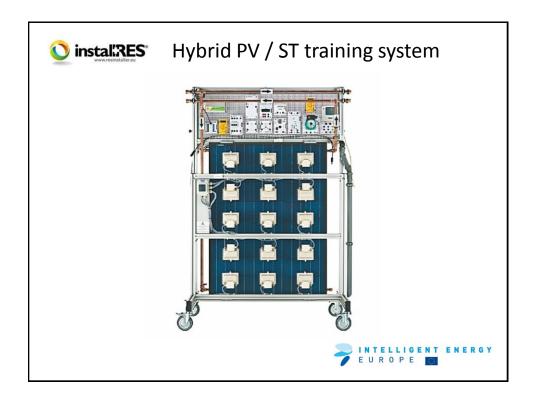
Title	MB	Duration
Photovoltaic source feeds basic electrical circuit	18,7	2 min 14 s
Photovoltaic source feeds simple illumination system	34,1	4 min 11 s
Photovoltaic stand alone system with charge regulator	29,2	3 min 35 s
Photovoltaic stand alone system with alternating current converter	9,9	1 min 11 s
Combined photovoltaic- and solarthermical system with internet remote control	31,8	3 min 54 s
Photovoltaic cells, mono and multi cristaline types, solar module	29,7	3 min 40 s
Intruducing the single elements of the laboratory equipment for photovoltaic experiments	69,9	8 min 27 s
Open circuit voltage and short circuit current of a photovoltaic module	46,4	5 min 36 s
Measurement of open circuit voltage and short circuit current with different irradiation strength	56,9	7 min 01s
Voltage and current diagramm - Maximum Power Point (MPP)	41,9	5 min 08 s
Charging an accumulator - Schottky diode as measure against discharge	37,4	4 min 32 s
Circuit with charge regulator	33,8	4 min 15 s
Backup PV circuit for hot stand by switching	144,1	17 min 55s
Grid connected power system	86,8	10 min 38 s













InterSolar Munich 2011: Hybrid & Heat Pump





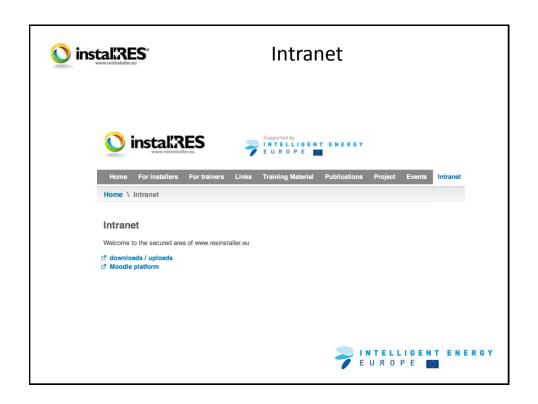


This is COOL!

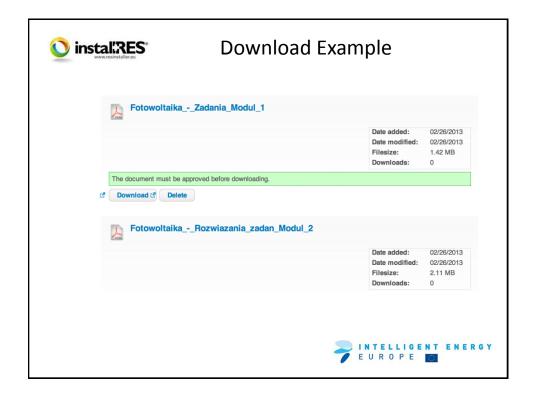
















OVER-ALL-QUALIFICATION-OBJECTIVES



PROFESSIONAL & PERSONAL COMPETENCES lead to trust of the customer





Purpose of

European Qualification Framework (EQF)

- Translation tool in order to create a common understanding of LEARNING OUTCOMES
- Reference point for the creation of National Qualification Frameworks (NQFs)



Learning Outcome

Descriptors

KNOWLEDGE	SKILLS	COMPETENCE
In the context of EQF, knowledge is described as theoretical and/or factual.	In the context of EQF, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) and practical (involving manual dexterity and the use of methods, materials, tools and instruments).	In the context of EQF, competence is described in terms of responsibility and autonomy.

8 qualification levels: basic → expert



Proposal

RES - Installer should meet Criteria of

EQF Level 5 and 6





Competence Matrix

Didactical Global Positioning System (GPS)



Work Tasks as Latitudes
Competence Levels as Longitudes
(Level 1 to 6 describe progession of competences)

The crossing intersection of WORK TASK and COMPETENCE LEVEL

COMPETENCE





Install-RES-Matrix - PV-Core Work Tasks (Latitude)



Providing **advice** to a customer while keeping in mind customerspecific requirements and conditions, in order to plan photovoltaic systems that meet demands, and to procure, install and maintain them.



Planning a consumer PV system, encountering the recognised rules of the technology, the legal requirements and the safety provisions.



Installation, start-up and handover of a consumer PV system inclusive of briefing the customer, documentation and maintenance reports.



Maintain, repair, extend and adjust a consumer PV system in accordance with the guidelines of legislators, energy suppliers and manufacturers.



Plan, document and **evaluate** the commercial considerations keeping in mind financial assets, ethical and social principles and the fundamental importance of sustainability, in order to be economically successful.





Providing **advice** to a customer while keeping in mind customer-specific requirements and conditions, in order to plan photovoltaic systems that meet demands, and to procure, install and maintain them.

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He/she can provide, determine, document and evaluate basic information for PV system customer service with the help of instruments (e.g. specific software, forms, measurements devices, etc.).

1.

2.

He/she can create and present
Standard planning layouts for
customer service, and can then
adapt these to the needs of the
customer.

