PIETRO QUAGLIA

Residenza **Segrate**

E-mail [redacted]

Data e luogo di nascita 27 febbraio 1989 – Segrate (MI), Italia

- Intraprendente, determinato e affidabile
- Ottime capacità comunicative/relazionali e di lavoro di squadra
- Esperienza di coordinamento/organizzazione di gruppi di persone
- **Volontario Scout AGESCI** nel gruppo di **Segrate** dal 2007 al 2018
- **Papà** dal 2019

ESPERIENZA LAVORATIVA: EFFICIENZA ENERGETICA E RINNOVABILI

DA MARZO AD OGGI

Technical Performance Management Team

Impianti efficienti di produzione di energia elettrica, termica e frigorifera per la generazione distribuita

DA GIUGNO A OTTOBRE 2019

Abilitazione alla Professione di Ingegnere Industriale

Politecnico di Milano - I sessione 2019, Ingegnere Industriale Sezione A

DA AGOSTO 2018 AD OGGI **Bosch Energy and Building Solutions**

Contract Manager – Operational Management Support Engineer

- Contract Manager commesse Private cogenerazione
- Auditor Energetico di Grandi Stabilimenti industriali – Preparazione e presentazione relative Diagnosi Energetiche
- Persona di riferimento contatti con BOSCH KWK SYSTEME, gruppi di cogenerazione
- Coordinamento del gruppo di Operational/Technical Support Staff della divisione OPM
- Responsabile dell'analisi dati delle commesse OPM Private necessari ai fini della reportistica e della fatturazione ai clienti
- Supporto ai CM del gruppo nell'identificazione e nella gestione di KPI, calcolo risparmi ottenuti, creazione modelli gestione Budget, definizione dei fornitori per le diverse commesse in gestione alla divisione OPM

DA NOVEMBRE 2017 AD AGOSTO 2018 **Bosch Energy and Building Solutions**

Operational Management Support Engineer

- Persona di riferimento contatti con BOSCH KWK, gruppi di cogenerazione
- Responsabile dell'analisi dati delle commesse OPM Private necessari ai fini della reportistica e della fatturazione ai clienti
- Supporto ai CM del gruppo nell'identificazione e nella gestione di KPI, calcolo risparmi ottenuti, creazione modelli gestione Budget, definizione dei fornitori per le diverse commesse in gestione alla divisione OPM

DA MAGGIO A NOVEMBRE 2017 **Bosch Energy and Building Solutions**

Technical Sales Support Engineer

- Diagnosi energetica comprensive dell'individuazione di interventi migliorativi anche in relazione all'impiego di fonti energetiche rinnovabili
- Analisi tecnico-economiche di impianti ed eventuali interventi migliorativi

DA GENNAIO 2016 A MAGGIO 2017 POLITECNICO DI MILANO – RSE S.P.A.
DIPARTIMENTO DI ENERGIA
Assegnista di Ricerca nel gruppo di ricerca **Sviluppo Efficienza Energetica**

Pubblicazioni

P. Quaglia, L. Croci, L. Molinaroli (2017) "Dual source solar assisted heat pump model development, validation and comparison to conventional systems", 50° AiCARR International Congress Beyond NZEB buildings, Matera, Italia, 10 – 13 maggio 2017, ABSTRACT RIPORTATO IN ALLEGATO 1

P. Quaglia, F. Madonna, "Influence of comfort expectation and household characteristics on energy saving of a deep renovation", 50° AiCARR International Congress Beyond NZEB buildings, Matera, Italia, 10 – 13 maggio 2017, ABSTRACT RIPORTATO IN ALLEGATO 2

P. Quaglia, F. Bazzocchi, L. Croci, S. Viani (2016) "Ottimizzazione e controllo di un sistema integrato con pompa di calore e pannelli solari ibridi" Atti 33° Convegno Nazionale AiCARR, Padova, Italia, 9 giugno 2016, ABSTRACT RIPORTATO IN ALLEGATO 3

Relazioni

"Energy Efficiency in Italy: general trends, drivers and barriers", res4med: Enhancing energy efficiency solutions in the Mediterranean Region, 1st Edition, Torino – Lingotto, 16-20 maggio 2016

DA MARZO A DICEMBRE 2015 POLITECNICO DI MILANO - RSE S.P.A.

Tesi sperimentale sullo sviluppo di un sistema di pompa di calore dual source integrata da pannelli fotovoltaici ibridi e della sua logica di controllo. Lavoro svolto in collaborazione con RSE S.P.A..
ABSTRACT RIPORTATO IN ALLEGATO 4

2008 – 2012 ON STAGE MAGAZINE

Coordinamento di team di hostess/steward per concerti negli stadi/locali di Milano e altre città italiane. Gestione della contabilità.

ISTRUZIONE

21 NOVEMBRE 2016 ORDINE DELI INGEGNERI, PROVINCIA DI MILANO

Attestato Corso: Diagnosi e progettazione di interventi di riqualificazione energetica

18 DICEMBRE 2015 POLITECNICO DI MILANO

Laurea Magistrale in Ingegneria Energetica – corso di studi in Produzione di Potenza

LUGLIO 2008 LICEO NICCOLÒ MACHIAVELLI, PIOLTELLO (MI)

Diploma Scientifico

ALTRO

SETTEMBRE 2015 SODALITAS, in collaborazione con **ASSOLOMBARDA** e **MIUR**
Attestato di partecipazione al corso di formazione "Management Socialmente Responsabile"

21 GIUGNO 2010 ENERGY LAB FOUNDATION

"**Premio** speciale per la qualità del contenuto tecnico" nel concorso: "L'energia al 2020: IDEE E PROGETTI PER LA MOBILITA' MILANESE"

INTERESSI

- **Volontariato** educatore Scout AGESCI formato e attivo fino al 2018
- **Sport** canoa olimpica Idroscalo Club, arrampicata sportiva
- **Hobby** musica (batteria), montagna
- **Viaggiare**

ALLEGATO 1

Dual Source Solar Assisted Heat Pump Model Development, Validation and Comparison to Conventional Systems

Abstract

The 2010 Energy Performance of Buildings Directive gives to European Member States mandate to draw up national plans to increase the number of nearly zero-energy buildings (NZEBs). Residential energy consumption has to be significantly reduced in terms of space heating, space cooling and by providing domestic hot water (DHW). As it results from the International Energy Agency (IEA) Task 44 "Solar and Heat Pump Systems", combining solar energy and heat pumps (HPs) to build a Solar Assisted Heat Pump (SAHP) system is a promising solution.

Can it be interesting and sustainable also for yearly building energy needs (space heating and cooling, DHW production) in Mediterranean area?

This paper presents a new SAHP system integrated with hybrid photovoltaic/thermal panels (PVT). When building thermal energy request increases with the decrease of external air temperature, standard air-to-water heat pumps (AWHP) lose efficiency in heating mode. In summer, the high temperature reached by PV cells brings to a reduction in panels electricity generation. These are the main reasons which lead optimal configuration and control strategy choice, together with years of experimental know-how and data on HP studies collected in RSE research centre and Politecnico di Milano University. Main components are a dual-source HP, PVT panels and two storage tanks (one for DHW and one, from now called "cold" tank, between solar panels and the heat pump). Solar heat absorbed by PVT is directly stored for DHW if water reaches the set temperature, otherwise it is sent to the cold one. In both cases photovoltaic cells are cooled so their electricity generation increases. By having two different heat exchangers on source side, the investigated configuration can switch from air to the cold tank, with cold weather, increasing system's performances.

In this work the developed system were compared with two conventional systems: an AWHP integrated with standard photovoltaic panels; an AWHP integrated with hybrid PVT panels for DHW production only. Those systems were investigated for a single family house, through one year simulation in the TRNSYS software. The main components of the models (HP, Storage tanks, PVT) were validated with experimental data. Control strategy, size of the tanks and number of panels were investigated with parametric studies. With 12 PVT panels solar field and a 0.9 m3 cold storage, the combined system decreased the total electric energy consumption by 12% and the withdrawal from the grid by 34% in Milan, compared to a conventional AWHP combined with 12 standard photovoltaic panels. Relating the same systems with simulations in Rome, a decreased electric energy consumption of 18% was obtained together with an increased electric energy surplus of 76%. The studied system's performance was compared also to a conventional AWHP, with in addition 12 PVT panels for DHW production only. The results showed a decreased electric energy consumption of 6% in Milan and of 12% in Rome, and a decreased grid consumption by, respectively, 29% and 71%. Thanks to these results an experimental prototype is about to be built and tested.

Key words: SAHP; NZEB; PVT; Dual Source; Heat Pump

ALLEGATO 2

Influence of comfort expectation and household characteristics on energy saving of a deep renovation

Abstract

Increasing thermal comfort is considered as one of the main benefits of a deep renovation right after energy saving. However an increase in thermal comfort could be seen as a behavioural change caused by the energy efficiency improvement that reduces expected energy saving: the so-called rebound effect. This paper shows how building energy need is correlated to comfort category. The study is conducted via dynamic simulation performed by TRNSYS 17 software using 3D multi-zone models. Simulations are tailored on occupant behaviour and driven by thermal comfort constraints. Calculation of energy need for space heating and space cooling is done both before and after a deep renovation. The effect of building and user characteristics is evaluated too. Four different buildings are considered in order to take into account variation in climate and building typology. Users are differentiated by number of persons and occupancy schedule. The relation between thermal comfort, set-point temperature and energy need is investigated, focusing attention on changes that occur after the building has been thermal insulated. Computational results are critically discussed and compared with an empirical study on building renovation that includes a survey on thermal comfort perception and user behaviour. Finally rebound effect is discussed and its magnitude is evaluated.

Key words: Rebound effect; Building renovation; Occupant behaviour; Building simulation

ALLEGATO 3

Optimization and control of a combined heat pump – PV/T system

Abstract

Heat pump systems are emerging as a sustainable way to reduce yearly residential energy consumption. Different solutions of combined heat pumps and solar collectors (SAHP) have been recently investigated. As it is clear from different works, how to match and harmonize components together with right control logic remains the main matter. In this study, an integrated system consisting of an air/water heat pump and different kinds of solar collectors, which provide domestic hot water to a storage tank, was investigated. Performances of standard photovoltaic panels, hybrid PV/T and solar flat plate collectors it has been compared. The experimental system, called SINCLER, was placed in the city of Terni, after it has been modelled using the TRNSYS dynamic simulation software. In this paper results from the experimental measured data, for a cooling and a heating season, and for the dynamic simulation, will be presented.

Key words: Heat Pumps, SAHP, PVT

ALLEGATO 4

Analisi energetica di sistemi integrati pompa di calore – pannelli ibridi a servizio di un edificio monofamiliare

Abstract

In this work different heating, cooling and DHW systems are compared and investigated for a single family house, through one year simulation in the TRNSYS software. One particular combination of hybrid photovoltaic/thermal panel (PVT) and dual-source heat pump is examined. For the purposes of the study, a heat pump model was created and validated successfully with experimental data. With a 12 PVT solar field and a 0.9 m3 "Cold" storage, the combined system decreased the total electric energy consumption by 6.84% and the energy absorption from the grid by 20.64% in Milan, compared to a conventional AWHP combined with 12 standard photovoltaic panels. Relating the same systems with simulations in Rome, a decreased electric energy consumption of 12.08% was obtained and an increased electric energy surplus of 19.05%. The studied system's performance was compared also to a conventional AWHP, with in addition 12 PVT panels for DHW production. The results showed a decreased electric energy consumption of 2.7% in Milan and of 3.34% in Rome, a decreased grid consumption by 17.24% and by 15.22% for the same cities. By an optimization of the components parameters and of the strategy control, these first tentative results can be increased significantly.

Key words: SAHP; Indirect; PVT; Dual-source; Heat pump