Indoor environmental control and energy efficiency in livestock houses

Controllo ambientale ed efficienza energetica negli allevamenti zootecnici

February 21st and 22nd, 2019
21 e 22 febbraio 2019

Energy Department – Politecnico di Torino

Aula Magna sede Lingotto, via Nizza 230, 10126 Torino

In intensive livestock production, the control of the indoor climate is directly in relation with both energy consumption and animal welfare. To maintain adequate indoor climate conditions different mechanical systems are adopted entailing an energy consumption that can represent a considerable energy consumption.

This seminar addresses the nexus between climate control and energy use in livestock houses. It is intended to provide a discussion between academia and industry on the latest findings on highly energy performing livestock structures and set new paths for the increase of the energy efficiency of these houses.

The seminar consists of two different sections on February 21st (introduction of the topic with a lecture from an international speaker and discussion between research groups) and on February 22nd (presentation of the EPAnHaus project results and a discussion with industry and academia). This seminar is organized by the Energy Department of Politecnico di Torino in collaboration with the Italian Agricultural Engineering Association (AIIA) 2nd Section at the completion of the SIR 2014 EPAnHaus project funded by MiUR on the Energy Performance Certification of livestock houses.

Invited lecture: The role of climate control in livestock houses

The lecture by Dr. André Aarnink will focus on the relationship between indoor climate in livestock houses, mainly pigs, and the health, welfare and productivity of animals. The presentation will go into the background of climate control, the theory of thermo-neutral zone and comfort zone of the animals. The effect of heat stress on productivity and behaviour and ways to reduce heat stress will be shown. How present pig houses are climate controlled in the Netherlands and what the consequence is for indoor T/RH and indoor air quality will be presented with specific impact on the aerial pollutants concentrations and on the energy costs.

André J.A. Aarnink has been working for more than 30 years in livestock research at Wageningen University and Research in the area of emissions from animal houses and climate and air quality inside animal houses. He is author of more than 70 peer reviewed papers and contributed to more than 250 publications. He is member of the CIGR Working group on heat stress in livestock animals; member of the CIGR section II board; Section editor of the CIGR Journal.

POLITECNICO DI TORINO
Dipartimento Energia "Galileo Ferraris"

February 21st

Official language: English

13:00	**Registration & light lunch**
14:30 – 14:45	**Opening** Head of DENERG, Politecnico di Torino Prof. Enrico Fabrizio, Politecnico di Torino, DENERG
14:45 – 15:30	**Invited lecture** • **The role of climate control in livestock housing** Dr. André Aarnink, Wageningen University
15:30 – 15:40	**Q&A**
15:40 – 16:40	**Session 1 – Simulation and interpretation of results** Chair: Prof. Matteo Barbari – Università di Firenze, DAGRI • ***CFD modelling and simulation to improve natural ventilation inside a semi-open free-stall barn*** Nicoletta Tomasello, University of Catania • ***Numerical model of indoor environment effects on production and animal welfare in dairy livestock houses*** Stefano Benni, University of Bologna • ***Spatial and temporal distribution of enthalpy in a broiler house during the first week of life*** Patrícia Ferreira Ponciano Ferraz, Federal University of Lavras (Brasil) • ***Prediction of respiratory rate of broiler chicks using genetic fuzzy system*** Patrícia Ferreira Ponciano Ferraz, Federal University of Lavras (Brasil)
16:40 – 17:00	**Break**
17:00 – 17:45	**Section 2 – Monitoring and managing** Chair: Prof. Giorgio Provolo – Università di Milano, DISAA • ***Effect of indoor environmental conditions on dairy cow behaviour*** Gabriele Mattachini, Università degli Studi di Milano • ***Very shallow geothermal system for energy efficiency in dairy barns*** Alberto Barbaresi, University of Bologna • ***Evaluation of an innovative gasometric coverage system in reducing heat losses from the anaerobic digesters: preliminary results*** Elio Dinuccio, University of Turin
17:45 – 18:00	**Discussion**
18:00 – 19:00	**2nd Section AIIA Meeting** Chair: Prof. Patrizia Tassinari
20:30 – 22:30	**Social Dinner** Ristorante Il Circolo – Centro Congressi dell'Unione Industriale di Torino Via Vincenzo Vela, 15 Torino

Participation to both sessions of the seminar is free of charge / La partecipazione è libera fino ad esaurimento dei posti disponibli

For registrations / Per registrazioni click here

February 22nd

Official language: Italian

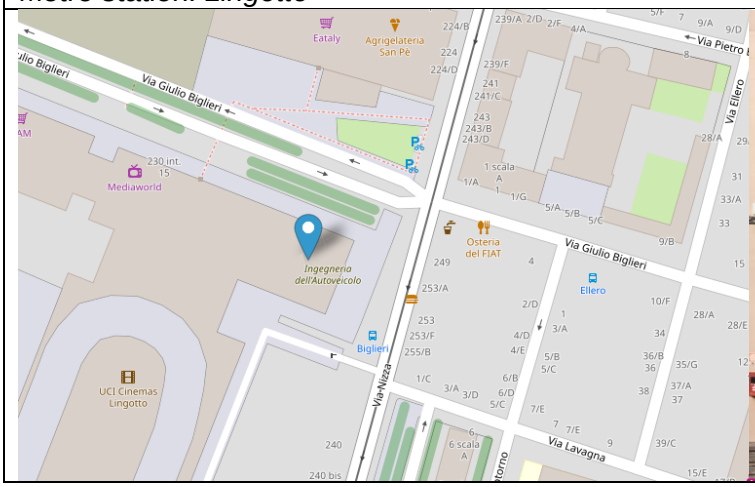
09:00 – 09:10	**Opening/Apertura** Prof.ssa Patrizia Tassinari, President of 2nd Section AIIA
	The results from EPAnHaus project /La prestazione energetica degli edifici per la produzione animale: i risultati del progetto EPAnHaus (in Italian) Chair: Prof. Giovanni Cascone – Università di Catania, Di3A
09:10 – 09:30	***Verso una certificazione della prestazione energetica degli edifici per l'allevamento intensivo*** Enrico Fabrizio – Politecnico di Torino, DENERG
09:30 – 09:50	***Modelli di simulazione del comportamento termoigrometrico delle strutture per la produzione animale*** Andrea Costantino – Politecnico di Torino, DENERG
09:50 – 10:10	***Monitoraggi energetici ed ambientali in strutture per l'allevamento intensivo: problematiche, tecniche innovative di analisi dei dati, risultati*** Lorenzo Comba – Politecnico di Torino, DENERG
10:10 – 10:20	***Il mercato suinicolo in Piemonte e le buone pratiche nell'ambito della suinicoltura*** Ugo Benedetto – Az. Agricola S. Bernardo Colombé s.s., Bra (CN)
10:20 – 10:40	***Benessere animale e condizioni climatiche: primi risultati di indagini in campo*** Paolo Cornale – Università di Torino, DiSAFA
10:40 -11:00	**Break**
11:00 – 12:00	**Speeches from industry/Interventi aziende (in Italian)** Chair: Prof. Enrico Fabrizio – Politecnico di Torino, DENERG - **Munters Italy AgHort**: L'innovazione nel controllo climatico delle strutture zootecniche – Mauro Bariani, Giacomo Sicardi - **Rota Guido s.r.l**.: Sistemi e tecnologie per il controllo del microclima nelle stalle da latte – Giuseppe Volta - **4eServizi**: Analisi dell'applicazione di materiali a cambiamento di fase negli allevamenti zootecnici – Mauro Papagni
12:00 – 13:00	**Academia vs Industry / Università ed aziende a confronto** Chair: Enrico Fabrizio, Politecnico di Torino Luca Battaglini, Università di Torino Giovanni Cascone, Università di Catania Marco Filippi, Politecnico di Torino Marcella Guarino, Università di Milano Giacomo Scarascia Mugnozza, Università di Bari Mauro Bariani, Munters Italy AgHort Mauro Papagni, 4eServizi Giuseppe Volta, Rota Guido s.r.l.

The EPAnHaus project

The EPAnHaus project (Energy Performance Certification of Livestock House) granted by MIUR through the SIR 2014 call, has aimed at proposing a new energy certification scheme developed specifically for the climate control of livestock houses. The project (2015-2018) was carried out in collaboration between the Department of Energy of Politecnico di Torino and the Department of Agricultural, Forest and Food Sciences of the University of Torino. During the project, new simulation models for the estimation of the energy consumption and the indoor environmental conditions in some types of livestock houses were developed and validated. These models could be used to test the effectiveness of new energy efficient products and to evaluate various solutions (at design or retrofit stages) to reduce the energy consumption and the costs related to the climate control in the livestock production.

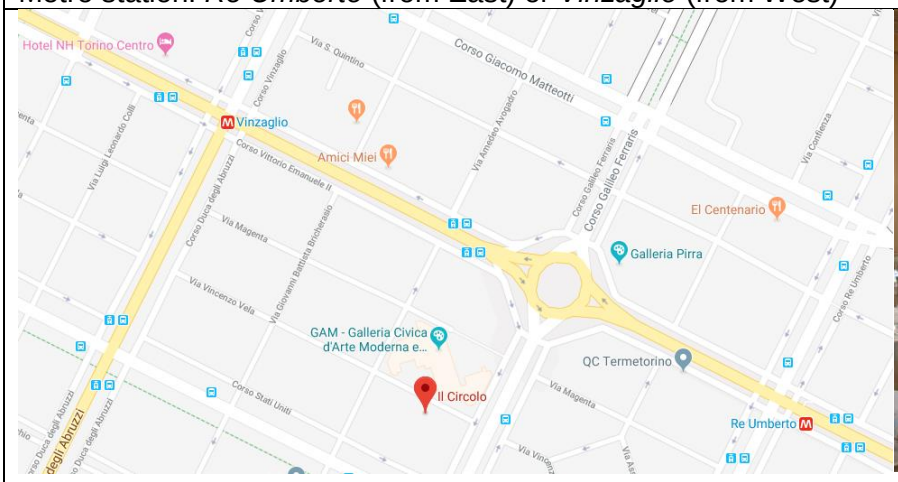
The venues

Aula Magna Lingotto, via Nizza 230, 10126 Torino
Metro station: *Lingotto*



Participation to both sessions of the seminar is free of charge / La partecipazione è libera fino ad esaurimento dei posti disponibili. Please register here.

Ristorante "Il Circolo" – Centro Congressi dell'Unione Industriale di Torino
via Vincenzo Vela 15, Torino
Metro station: *Re Umberto* (from East) or *Vinzaglio* (from West)



The social dinner (45 €) shall be in charge by each participant. Please register in advance (limited availability) by Saturday 16th February at https://doodle.com/poll/xxwzyipmh3z8nrc5 You will be contacted later and asked to pay at the registration desk.

For further details / Per informazioni: epanhaus@gmail.com

Scientific Committee

Matteo Barbari, *Università di Firenze*
Luca Battaglini, *Università di Torino*
Giovanni Cascone, *Università di Catania*
Andrea De Montis, *Università di Sassari*
Enrico Fabrizio, *Politecnico di Torino*
Andrea Galli, *Università Politecnica delle Marche*
Giorgio Provolo, *Università di Milano*
Giacomo Scarascia Mugnozza, *Università di Bari*
Patrizia Tassinari, *Università di Bologna*

Organizing Committee

Andrea Costantino, Enrico Fabrizio, Mariapia Martino – Politecnico di Torino, Energy Department