

# **4th Scientific and Technical Conference on Modern Technologies and Energy Systems (WTiUE 2016)**

E3S Web of Conferences Volume 13 (2017)

Cracow, Poland  
12-14 October 2016

## **Editors:**

**Jan Taler**  
**Tomasz Sobota**

**Bohdan Weglowski**

ISBN: 978-1-5108-3653-2

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

This work is licensed under a Creative Commons Attribution license:  
<http://creativecommons.org/licenses/by/2.0/>

**You are free to:**

**Share** – copy and redistribute the material in any medium or format.

**Adapt** – remix, transform, and build upon the material for any purpose, even commercial.

The licensor cannot revoke these freedoms as long as you follow the license terms.

**Under the following terms:**

You must give appropriate credit, provide a link to the license, and indicate if changes were made.

You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use. The copyright is retained by the corresponding authors.

Printed by Curran Associates, Inc. (2017)

For additional information, please contact EDP Sciences – Web of Conferences  
at the address below.

EDP Sciences – Web of Conferences  
17, Avenue du Hoggar  
Parc d'Activité de Courtabœuf  
BP 112  
F-91944 Les Ulis Cedex A  
France

Phone: +33 (0) 1 69 18 75 75

Fax: +33 (0) 1 69 28 84 91

[contact-edps@webofconferences.org](mailto:contact-edps@webofconferences.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

<b>Comparative Study of Operation of Condensing and Traditional Boilers Equipped with the ORC Module for Electricity Generation .....</b>	<b>1</b>
<i>Mikielewicz Dariusz, Mikielewicz Jaroslaw</i>	
<b>Exploitation Problems and Diagnostic of Heat Recovery Steam Boiler OU-192 .....</b>	<b>5</b>
<i>Olewicz Grzegorz, Sobczyszyn Adrian, Staszalek Kamil, Syty Przemyslaw</i>	
<b>Thermal Comfort Conditions and Polish Legal Requirements Regarding Temperatures in Residential Rooms .....</b>	<b>11</b>
<i>Damian Muniak</i>	
<b>Experimental Stand for Investigation of Fluid Flow in Heat Exchangers with Cross-flow Arrangement .....</b>	<b>20</b>
<i>Lopata Stanislaw, Oclon Pawel, Nowak-Oclon Marzena</i>	
<b>Modelling of Flow Boiling Heat Transfer in a Cylindrical Annulus Mini Gap .....</b>	<b>25</b>
<i>Piasecka Magdalena, Hozejowska Sylwia, Musial Tomasz</i>	
<b>Selected Soil Thermal Conductivity Models .....</b>	<b>29</b>
<i>Rerak Monika</i>	
<b>The Effect of Soil and Cable Backfill Thermal Conductivity on the Temperature Distribution in Underground Cable System .....</b>	<b>33</b>
<i>Rerak Monika, Oclon Pawel</i>	
<b>Experimental and Theoretical Investigations of Special Type Coil Heat Exchanger with the Nanofluid Buffer Layer .....</b>	<b>39</b>
<i>Smusz Robert, Wilk Joanna</i>	
<b>Generalization of Martinelli-Nelson Method of Pressure Drop Calculation in Two-phase Flows .....</b>	<b>44</b>
<i>Trela Marian, Kwidzinski Roman, Lackowski Marcin</i>	
<b>Determination of Transient Temperature Fields in Thick-walled Elements Using the Inverse Method .....</b>	<b>51</b>
<i>Jaremkiewicz Magdalena, Cebula Artur</i>	
<b>Simple Heat Transfer Correlations for Turbulent Tube Flow .....</b>	<b>57</b>
<i>Taler Dawid, Taler Jan</i>	
<b>Variability of Photovoltaic Panels Efficiency Depending on the Value of the Angle of Their Inclination Relative to the Horizon .....</b>	<b>64</b>
<i>Majdak Marek</i>	
<b>Application of ORC Power Station to Increase Electric Power of Gas Compression Ignition Engine .....</b>	<b>69</b>
<i>Mocarski Szymon, Borsukiewicz-Gozdur Aleksandra</i>	
<b>Analysis and Selection Criteria of Photovoltaic Panels for DHW .....</b>	<b>76</b>
<i>Nems Artur, Nems Magdalena</i>	
<b>Heat Transfer Model for PV Module with Cooling Channel .....</b>	<b>83</b>
<i>Opiela Anna, Zapalowicz Zbigniew</i>	
<b>Small Scale Gasification of Biomass and Municipal Wastes for Heat and Electricity Production using HTAG Technology .....</b>	<b>89</b>
<i>Stasiek Jan, Jewartowski Marcin, Yang Weihong</i>	
<b>Reference Diameter in Calculations of Creep Strain for Steam Pipelines .....</b>	<b>93</b>
<i>Lopata Stanislaw</i>	
<b>Numerical Simulations of Fluidization Dynamics in a Hot Model of a CLC Process .....</b>	<b>99</b>
<i>Zylka Anna, Krzywanski Jaroslaw, Czakiert Tomasz, Idziak Kamil, Kulicki Krzysztof, Jankowska Sylwia, Nowak Wojciech</i>	
<b>Issues to Improve the Safety of 18K370 Steam Turbine Operation .....</b>	<b>108</b>
<i>Bzymek Grzegorz, Badur Janusz, Ziolkowski Pawel</i>	
<b>Increasing the Performance and Reliability of Power Boiler by Monitoring Thermal and Strength Parameters .....</b>	<b>114</b>
<i>Sobota Tomasz</i>	
<b>Analysis of Role of Erosion Process of Coal Particles in Generation of Loss of Incomplete Combustion in Fluidized Bed Boilers .....</b>	<b>123</b>
<i>Pelka Piotr</i>	
<b>Experimental Verification of a CFD Model Intended for the Determination of Restitution Coefficients Used in Erosion Modelling .....</b>	<b>128</b>
<i>Hernik Bartlomiej, Pronobis Marek, Wejkowski Robert, Wojnar Wacław</i>	
<b>Shape Optimization of a Thick-walled Power Boiler Component .....</b>	<b>137</b>
<i>Duda Piotr, Mrzyglód Mirosław W.</i>	

<b>Analysis of Coal Dust Combustion and Gasification in the Cyclone Furnace</b> .....	142
<i>Zarzycki Robert, Bis Zbigniew</i>	
<b>Swirl Chamber for Vitrification of Fly Ashes</b> .....	148
<i>Zarzycki Robert</i>	
<b>Author Index</b>	