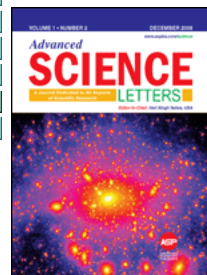


Aims and Scope
Editorial Board
Instructions for Authors
Contact Information
Subscription Information
Copyright Transfer Agreement
Indexed/Abstracted
Cover Library
Contents

Advanced Science Letters

ISSN: 1936-6612 (Print); EISSN: 1936-7317 (Online)
Copyright © 2000-2020 American Scientific Publishers. All Rights Reserved.



Recommend this
Journal to a Library

ADVANCED SCIENCE LETTERS is a multidisciplinary peer-reviewed journal with a very wide-ranging coverage, consolidates fundamental and applied research activities by publishing proceedings from international scientific, technical and medical conferences in all areas of (1) Physical Sciences, (2) Engineering, (3) Biological Sciences/Health Sciences, (4) Medicine, (5) Computer and Information Sciences, (6) Mathematical Sciences, (7) Agriculture Science and Engineering, (8) Geosciences, and (9) Energy/Fuels/Environmental/Green Science and Engineering, and (10) Education, Social Sciences and Public Policies. This journal publishes both general research articles by individual authors as well as conference proceedings.

Editor-in-Chief: [Professor Ahmad Umar](#)

MANUSCRIPT SUBMISSION:

Submit manuscript online to the [Manuscript Tracking System](#)

2019

[Volume 25, Number 1 \(January 2019\)](#)

2018

[Volume 24, Number 12 \(December 2018\)](#)

[Volume 24, Number 11 \(November 2018\)](#)

[Volume 24, Number 10 \(October 2018\)](#)

[Volume 24, Number 9 \(September 2018\)](#)

[Volume 24, Number 8 \(August 2018\)](#)

[Volume 24, Number 7 \(July 2018\)](#)

[Volume 24, Number 6 \(June 2018\)](#)

[Volume 24, Number 5 \(May 2018\)](#)

[Volume 24, Number 4 \(April 2018\)](#)

[Volume 24, Number 3 \(March 2018\)](#)

[Volume 24, Number 2 \(February 2018\)](#)

[Volume 24, Number 1 \(January 2018\)](#)

2017

[Volume 23, Number 12 \(December 2017\)](#)

[Volume 23, Number 11 \(November 2017\)](#)

[Volume 23, Number 10 \(October 2017\)](#)

[Volume 23, Number 9 \(September 2017\)](#)

[Volume 23, Number 8 \(August 2017\)](#)

[Volume 23, Number 7 \(July 2017\)](#)

[Volume 23, Number 6 \(June 2017\)](#)

[Volume 23, Number 5 \(May 2017\)](#)

[Volume 23, Number 4 \(April 2017\)](#)

[Volume 23, Number 3 \(March 2017\)](#)

[Volume 23, Number 2 \(February 2017\)](#)

[Volume 23, Number 1 \(January 2017\)](#)

2016

[Volume 22, Number 12 \(December 2016\)](#)

[Volume 22, Number 11 \(November 2016\)](#)

[Volume 22, Number 10 \(October 2016\)](#)

[Volume 22, Number 9 \(September 2016\)](#)

[Volume 22, Number 8 \(August 2016\)](#)

[Volume 22, Number 7 \(July 2016\)](#)

[Volume 22, Number 6 \(June 2016\)](#)

[Volume 22, Number 5 \(May 2016\)](#)

[Volume 22, Number 4 \(April 2016\)](#)

[Volume 22, Number 3 \(March 2016\)](#)

[Volume 22, Number 2 \(February 2016\)](#)

[Volume 22, Number 1 \(January 2016\)](#)

2015

[Volume 21, Number 12 \(December 2015\)](#)

[Volume 21, Number 11 \(November 2015\)](#)

[Volume 21, Number 10 \(October 2015\)](#)

[Volume 21, Number 9 \(September 2015\)](#)

[Volume 21, Number 8 \(August 2015\)](#)

[Volume 21, Number 7 \(July 2015\)](#)

[Volume 21, Number 6 \(June 2015\)](#)

[Volume 21, Number 5 \(May 2015\)](#)

[Volume 21, Number 4 \(April 2015\)](#)

[Volume 21, Number 3 \(March 2015\)](#)

[Volume 21, Number 2 \(February 2015\)](#)

[Volume 21, Number 1 \(January 2015\)](#)

2014

[Volume 20, Number 10/11/12](#)

[\(Oct/Nov/Dec 2014\)](#)

[Volume 20, Number 7/8/9 \(Jul/Aug/Sep 2014\)](#)

[Volume 20, Number 5/6 \(May/Jun 2014\)](#)

[Volume 20, Number 3/4 \(Mar/Apr 2014\)](#)

[Volume 20, Number 2 \(February 2014\)](#)

[Volume 20, Number 1 \(January 2014\)](#)

2013

[Volume 19, Number 12 \(December 2013\)](#)

Volume 25, Number 1 (January 2019) **pp.1-224**

A SPECIAL ISSUE

Selected Peer-Reviewed Articles from the 5th International Conference on Advances Technology in Telecommunication, Broadcasting, and Satellite 2017 (5th TelSaTech 2017), Jakarta, Indonesia, 21–22 October, 2017

Guest Editor: *Ford Lumban Gaol*

Adv. Sci. Lett. 25, 1–4 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

RESEARCH ARTICLES

Analysis of Social Epidemic Phenomena on Social Media Using Social Physics Approach

Akira Ishii, Kana Fukui, Taigen Oda, Ayaka Miki, Shuta Fujiwara, and Yasuko Kawahata

Adv. Sci. Lett. 25, 5–9 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Applying Fuzzy Logic Rules to Predict Computer Attacks on Honeynets

Oscar Vicente Arias, Angel Julián González, Paulo Gaona-García, Carlos Montenegro-Marin, and Joaquín Sánchez Cifuentes

Adv. Sci. Lett. 25, 10–14 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

A Fuzzy Logic Model Based on Web of Trust to Access Linked Open Data Resources

Paulo Alonso Gaona-García, Jhon Francined Herrera-Cubides, Kevin Riaño, Jorge Iván Alonso, and Adriana Gómez-Acosta

Adv. Sci. Lett. 25, 15–20 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Evaluation of a Medical Alert Communication Infrastructure Based on Fuzzy Logic and IoT Devices

Paulo Gaona-García, Daniel Mendoza, Fredy Vargas, and Carlos Montenegro-Marin

Adv. Sci. Lett. 25, 21–24 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

The Causal Relationship Between the Human Evaluation Model (HEM) and Self-Regulation

Man-Ki Moon

Adv. Sci. Lett. 25, 25–32 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

An Unmanned Aerial Vehicle System for Detecting and Tracking Moving Objects

Seung-Yeop Lee, So-Yeon Kim, Ji-Hwan Lee, Tae-Kyou Park, and Jin-Tae Kim

Adv. Sci. Lett. 25, 33–37 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Objective Setting in Education and Training Process Management with Using the Situational Simulator (for Professional Training in the Sphere of Procurement Management)

Mamedova Natalia and Scherbakova Ksenia

Adv. Sci. Lett. 25, 38–41 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Proposal of an Offline Data-Processing Network Model for Flood Analysis

Jaime Alberto Parra Plazas and Paulo Alonso Gaona-García

Adv. Sci. Lett. 25, 42–46 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Rubric Validation for the Review of Didactic Planning in Initial Teaching Training

Maribel Brito-Lara, José López-Loya, and Sergio Tobón

Adv. Sci. Lett. 25, 47–49 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

The Administrative Process in the Implementation of the Medicine Curriculum in the Knowledge Society

Sergio Tobón, Haydeé Parra-Acosta, José López-Loya, Luis Gibran Juárez-Hernandez, and Bibiana Tobón

Adv. Sci. Lett. 25, 50–53 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Complex Thought and Quality Accreditation of Curriculum in Online Higher Education

Jorge Eduardo Martínez, Sergio Tobón, and Evangelina López

Adv. Sci. Lett. 25, 54–56 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Content Validity of a Scale to Assess the Curriculum in the Certification of University Study Programs

Sergio Tobón, Luis Gibran Juárez-Hernandez, Bibiana Tobón, Julio H. Pimienta-Prieto, Clara Guzmán, and Haydeé Parra-Acosta

Adv. Sci. Lett. 25, 57–61 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

d-Level (n, n) Quantum Secret Sharing Protocol

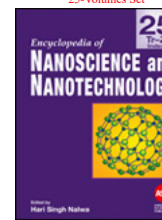
Nayereh Majd and Abdolmajid Nazari

Adv. Sci. Lett. 25, 62–65 (2019)

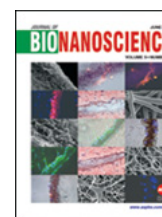
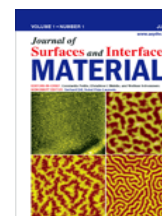
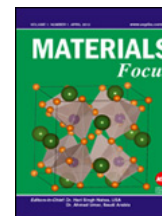
[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

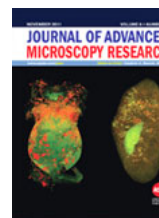
[Encyclopedia of Nanoscience and Nanotechnology](#)

25-Volumes Set



CALL FOR PAPER





[Volume 19, Number 11 \(November 2013\)](#)
[Volume 19, Number 10 \(October 2013\)](#)
[Volume 19, Number 9 \(September 2013\)](#)
[Volume 19, Number 8 \(August 2013\)](#)
[Volume 19, Number 7 \(July 2013\)](#)
[Volume 19, Number 6 \(June 2013\)](#)
[Volume 19, Number 5 \(May 2013\)](#)
[Volume 19, Number 4 \(April 2013\)](#)
[Volume 19, Number 3 \(March 2013\)](#)
[Volume 19, Number 2 \(February 2013\)](#)
[Volume 19, Number 1 \(January 2013\)](#)

2012

[Volume 18 \(Nov/Dec 2012\)](#)
[Volume 17 \(October 2012\)](#)
[Volume 16 \(September 2012\)](#)
[Volume 15 \(August 2012\)](#)
[Volume 14 \(July 2012\)](#)
[Volume 13 \(30 June 2012\)](#)
[Volume 12 \(15 June 2012\)](#)
[Volume 11 \(30 May 2012\)](#)
[Volume 10 \(15 May 2012\)](#)
[Volume 9 \(30 April 2012\)](#)
[Volume 8 \(15 April 2012\)](#)
[Volume 7 \(30 March 2012\)](#)
[Volume 6 \(15 March 2012\)](#)
[Volume 5, Number 2 \(February 2012\)](#)
[Volume 5, Number 1 \(January 2012\)](#)

2011, Volume 4

[Volume 4, Number 11/12 \(Nov/ Dec 2011\)](#)
[Volume 4, Number 8/9/10 \(Aug /Sep/Oct 2011\)](#)
[Volume 4, Number 6/7 \(June / July 2011\)](#)
[Volume 4, Number 4/5 \(April / May 2011\)](#)
[Volume 4, Number 3 \(March 2011\)](#)
[Volume 4, Number 2 \(February 2011\)](#)
[Volume 4, Number 1 \(January 2011\)](#)

2010, Volume 3

[Volume 3, Number 4 \(December 2010\)](#)
[Volume 3, Number 3 \(September 2010\)](#)
[Volume 3, Number 2 \(June 2010\)](#)
[Volume 3, Number 1 \(March 2010\)](#)

2009, Volume 2

[Volume 2, Number 4 \(December 2009\)](#)
[Volume 2, Number 3 \(September 2009\)](#)
[Volume 2, Number 2 \(June 2009\)](#)
[Volume 2, Number 1 \(March 2009\)](#)

2008, Volume 1

[Volume 1, Number 2 \(December 2008\)](#)
[Volume 1, Number 1 \(June 2008\)](#)

Business Processes of Managing Media Assets: Technology and Practice of Implementation MAM-Class Systems

Roman R. Veynberg and Valeriy A. Titov

Adv. Sci. Lett. 25, 66–69 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Performance of Temperature and Humidity Sensors with WSN Mesh Topology

Akhmad Zainuri, Rudy Yuwono, S. Raden Arief, and Mohammad Ghadafi

Adv. Sci. Lett. 25, 70–74 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Performance Modeling of DTN-Based File Transmission for Space Internet

Jin-Woo Kim, Kyung-Rak Lee, Jin-Ho Jo, and Inwhae Joe

Adv. Sci. Lett. 25, 75–78 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

How to Work with Comics: Innovation of Natural Science Education in Kindergartens

Adriana Wiegerová, Hana Navrátilová, and Marta Koutníková

Adv. Sci. Lett. 25, 79–82 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Gamified MALL: Are Game Elements Key to Learning Mandarin?

Mona Masood and Nurfitri Halimi

Adv. Sci. Lett. 25, 83–87 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Educational Factors Correlated to Ethnic Identity of Independent Chinese Secondary School Students in Malaysia

Pei Yao Ho, Fong Peng Chew, and Ker Pong Thock

Adv. Sci. Lett. 25, 88–90 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Social Participation Activities Towards Urban Wellbeing Among Multi-Ethnic Community in Malaysia

Juhari Ahmad, Abdul Razaq Ahmad, and Fong Peng Chew

Adv. Sci. Lett. 25, 91–94 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

A Two-Step Local Search Enhancement with the Novel Solution Representation for Solving Capacitated Vehicle Routing Problems

Asma Ull Hosna, A. K. M. Foysal Ahmed, and Ji Ung Sun

Adv. Sci. Lett. 25, 95–99 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Development and Validation of Smartphone Addiction Scale Based on the Human Evaluation Model (HEM)

Man-Ki Moon

Adv. Sci. Lett. 25, 100–107 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

The Effectiveness of Training for Parents in Improving the Social Skills of Children with Autism Spectrum Disorder

Herlina, Ishak Abdulhak, Zaenal Alimin, and Rudi Susilana

Adv. Sci. Lett. 25, 108–112 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Sight Word Reading Approach in Reading Syllables for Children with ASD: A Case Study

Yoga Budhi Santoso, Syihabbudin, Zaenal Alimin, Endang Rochyadi, Yeti Mulyati Ernie, C. Siregar, Budi Santoso, and Ranti Novianti

Adv. Sci. Lett. 25, 113–116 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Factor Analysis of the Companies Demands to the Polytechnic Graduates in Indonesia

Achmad Muhammad, Emma Dwi Ariyani, Supriyadi Sadikin, and Dede Sujana

Adv. Sci. Lett. 25, 117–121 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Effectiveness of Applied Behavior Analysis and Floortime Methods Combination in Enhancing Cognitive and Functional Emotions Ability Simultaneously of Children with Autism Spectrum Disorders

Ernie C. Siregar, Sunaryo Kartadinata, Zaenal Alimin, and Yoga Budhi Santoso

Adv. Sci. Lett. 25, 122–125 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

The Assessment of Communication Ability on Deafblind Students

Tati Nurul Hayati, Rahman, Juang Sunanto, and Toni Yudha Pratama

Adv. Sci. Lett. 25, 126–129 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Training Effectiveness of Differentiated Instruction to Enhance Teachers' Attitude Towards Inclusive School

Mira Aliza Rachmawati, Nur Widiasmara, and Thobagus Muh Nu'man

Adv. Sci. Lett. 25, 130–133 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Effectiveness of Collaborative Learning Model Based on Assessment in Dyscalculia Students

Tjutju Soendari

Adv. Sci. Lett. 25, 134–137 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Metacognitive Attitude and Knowledge of Biology Teacher Candidates

Yanti Herlanti, Zulfiani, Fanny D. Hutagalung, and Diana V. Sigit

Adv. Sci. Lett. 25, 138–142 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Exploring the Narratives on Domestic Violence Experienced by Married Immigrant Women in Korea

Youngsoon Kim, Haiying Huang, Gihwa Kim, Youngsub Oh, and Chunyang Li

Adv. Sci. Lett. 25, 143–146 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Exploring the Meaning of Care in the Teaching Case of North Korean Defector Elementary School Students

Hyunhee Yoon and Youngsoon Kim

Adv. Sci. Lett. 25, 147–150 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

The New Assessment of Social-Emotional Competences and Self-Determination in the Prediction of Gifted Enrollment

Eka Sakti Yudha, Sunaryo Kartadinata, and Nandang Rusmana

Adv. Sci. Lett. 25, 151–154 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Forgiveness Among Madureness Ethnic: The Relation Between Religiosity, Interpersonal Attachment and Personality Trait

H. Fuad Nashori, Hariz E. Wijaya, Raden Rachmy Diana, and Netty Herawati

Adv. Sci. Lett. 25, 155–157 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Designing Program to Improve Parent's Awareness Towards Autism Child

Endang Rochyadi, Rona Wulandari, Mayasari Manar, Endun Sunanda, and Yopi Yuliana

Adv. Sci. Lett. 25, 158–161 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Development of Vocational Programs Culinary Based on Competence of the World of Work

Sri Rizqi Widasari, Permanarian Somad, and Tjutju Soendari

Adv. Sci. Lett. 25, 162–165 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Inclusive Education as One of Best Solution for Bullying on Students with Special Need

Sunardi, Nadya Muniroh, and Mita Apriyanti

Adv. Sci. Lett. 25, 166–169 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Implementation Inclusive Education Through Ecological Approach

Zaenal Alimin, Nandi Warnandi, Riksma Akhlan, and Een Ratnengsih

Adv. Sci. Lett. 25, 170–174 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

A Study on the Need of Entrepreneurship Local Content Curriculum in Bandung Senior High School

Rudi Susilana, Laksmi Dewi, and Mohammad Ali

Adv. Sci. Lett. 25, 175–178 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Trauma Among Teachers Counseling and Religion Counseling at the High School in Banda Aceh City Post-Earthquake and Tsunami

Kusmawati Hatta

Adv. Sci. Lett. 25, 179–182 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Mathematics Assessment Design and Implementation in Inclusive School (Case Study at SMPN X Bandung)

Endang Rochyadi, Prima Dea Pangestu, Ika Karlina, and Nita Nitiya Intan Tanbrin

Adv. Sci. Lett. 25, 183–188 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Elderly's Thought About Nursing Homes: A Case Study of Vietnamese Elderly

Vu Dung, Hoang Ba Thinh, Nguyen Thi Mai Lan, Vu Thu Trang, and Le Minh Thien

Adv. Sci. Lett. 25, 189–193 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Patients' Satisfaction from Dental Services in Public University in Selangor, Malaysia

Ahmad Kamarul Juperi

Adv. Sci. Lett. 25, 194–198 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

The Role of Schools and Parents on the Process of Entrepreneurship Learning in Children with Special Needs

Edi Purwanta, Farida Harahap, Mumpuniarti, Hermanto, and Sukinah

Adv. Sci. Lett. 25, 199–203 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Effectiveness of Behavior Modification Models on Reducing of Non-Adaptive Behavior in Children with Intellectual Disability

Iding Tarsidi, Yuyus Suherman, and Setyo Wahyu Wibowo

Adv. Sci. Lett. 25, 204–207 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Holistic Wellness of Neglected Children

Linda Jamaludin, Ku Suhaila Ku Johari, and Salleh Amat

Adv. Sci. Lett. 25, 208–211 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Model of Differentiated Counselling on Teachers from Students Disability of Basic Education in District Bandung, Cimahi City, and Bandung City

Hidayat

Adv. Sci. Lett. 25, 212–215 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

Subjective Well-Being of Orphans

Tina Hayati Dahlan, Diah Zaleha Wyandini, and Viena Rusmiati Hasanah

Adv. Sci. Lett. 25, 216–220 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

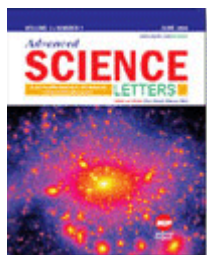
A Review of the Literature on the Issues and Roles of E-Learning in UAE Higher Education

Saeed Alblooshi and Nor Aziati Binti Abdul Hamid

Adv. Sci. Lett. 25, 221–224 (2019)

[\[Abstract\]](#) [\[Full Text - PDF\]](#) [\[Purchase Article\]](#)

[Terms and Conditions](#) [Privacy Policy](#), Copyright © 2000-2020 American Scientific Publishers. All Rights Reserved.

 THIS PAGE IS SECURE


Challenge in Household Energy Conservation Program: Analysis from Socio-Demographic Factors

Buy Article:

\$106.81 + tax
(Refund Policy)

ADD TO CART

BUY NOW

Authors: Susanti, Lusi¹; Zadry, Hilma R¹; Fithri, Prima¹; Matsumoto, Hiroshi²; Sukarno, Iwan¹

Source: Advanced Science Letters, Volume 23, Number 5, May 2017, pp. 4354-4358(5)

Publisher: American Scientific Publishers

DOI: <https://doi.org/10.1166/asl.2017.8337>



Abstract



References



Citations



Supplementary Data



Article Media



Metrics



Suggestions

A large proportion of Indonesia's electricity consumption is used by households. Indonesian electricity usage in household sector has been found covering 42.34% of total consumption and tend to increase in the future. Therefore, household has been identified as important target group for energy efficiency and conservation program. This paper explores the relationship between household electricity use and socio-demographic variables. The study was conducted among 2045 Indonesian households residing in five largest administrative regions for electricity consumers in Indonesia. Cluster sampling method was used to determine the number of sampling and the data analysis was done using Kruskal Wallis test. The results show that occupation was the main socio-demographic factors explaining variability in electricity consumption behavior at residential sector while other factors seemed have weaker correlation. These findings indicate that more comprehensive studies are needed on Indonesian household energy consumption behavior before designing energy efficiency scenarios for conservation policy.

Keywords: Electricity Consumption; Household; Policy; Socio-Demographics

Document Type: Research Article

Affiliations: **1:** Department of Industrial Engineering, Faculty of Engineering, University of Andalas, Kampus Limau Manis, Pauh, Padang 25163, West Sumatera, Indonesia **2:** Department of Architecture and Civil Engineering, Toyohashi University of Technology, Toyohashi, 441-8580, Japan

Publication date: May 1, 2017

More about this publication?





Source details

Advanced Science Letters

Scopus coverage years: from 2010 to 2017

(coverage discontinued in Scopus)

Publisher: American Scientific Publishers

ISSN: 1936-6612 E-ISSN: 1936-7317

Subject area: Energy: General Energy Environmental Science: General Environmental Science

Engineering: General Engineering Social Sciences: Education Social Sciences: Health (social science)

Mathematics: General Mathematics Computer Science: General Computer Science

CiteScore 2016

0.21



Add CiteScore to your site

SJR 2018

0.117



SNIP 2018

0.280



[View all documents >](#)

[Set document alert](#)

[Save to source list](#)

[CiteScore](#) [CiteScore rank & trend](#) [CiteScore presets](#) [Scopus content coverage](#)

CiteScore **2016**

Calculated using data from **31 May, 2017**

CiteScore rank

$$0.21 = \frac{\text{Citation Count 2016}}{\text{Documents 2013 - 2015*}} = \frac{455 \text{ Citations } >}{2,166 \text{ Documents } >}$$

*CiteScore includes all available document types

[View CiteScore methodology >](#)

[CiteScore FAQ >](#)

Metrics displaying this icon are compiled according to Snowball Metrics [↗](#), a collaboration between industry and academia.

Category	Rank	Percentile
Energy General Energy	#42/58	27th
Environmental Science General Environmental Science	#148/185	19th

[View CiteScore trends >](#)

About Scopus

- [What is Scopus](#)
- [Content coverage](#)
- [Scopus blog](#)
- [Scopus API](#)
- [Privacy matters](#)

Language

- [日本語に切り替える](#)
- [切换到简体中文](#)
- [切换到繁體中文](#)
- [Русский язык](#)

Customer Service

- [Help](#)
- [Contact us](#)

Challenge

by Lusi Susanti

FILE	CHALLENGE.PDF (271.99K)	WORD COUNT	3777
TIME SUBMITTED	15-MAY-2020 12:26PM (UTC+0700)	CHARACTER COUNT	21460
SUBMISSION ID	1324756965		



Copyright © 2015 American Scientific Publishers
All rights reserved
Printed in the United States of America

Advanced Science Letters
Vol. 23(5)

Challenge in Household Energy Conservation Program: Analysis from Socio-Demographic Factors

Lusi Susanti*¹, Ilma R. Zadry¹, Prima Fithri¹, Hiroshi Matsumoto², Iwan Sukarno^{1,2}

¹Department of Industrial Engineering, Faculty of Engineering, University of Andalas,

Kampus Limau Manis, Pauh, Padang 25163, West Sumatera, Indonesia

²Department of Architecture and Civil Engineering, Toyohashi University of Technology, Toyohashi, 441-8580, Japan
Tempaku-cho, Hibariga oka 1-1, Toyohashi, Aichi ken, Japan, 441-8580

A large proportion of Indonesia's electricity consumption is used by households. Indonesian electricity usage in household sector has been found covering 42.34% of total consumption and tend to increase in the future. Therefore, household has been identified as important target group for energy efficiency and conservation program. This paper explores the relationship between household electricity use and socio-demographic variables. The study was conducted among 2045 Indonesian households residing in five largest administrative regions for electricity consumers in Indonesia. Cluster sampling method was used to determine the number of sampling and the data analysis was done using Kruskal Wallis test. The results show that occupation was the main socio-demographics factor explaining variability in electricity consumption behavior at residential sector while other factors seemed have weaker correlation. These findings indicate that more comprehensive studies are needed on Indonesian household energy consumption behavior before designing energy efficiency scenarios for conservation policy.

Keywords: Electricity consumption, household, socio-demographics, policy

1. INTRODUCTION

Indonesian government has set a long-term target to reduce energy intensity of at least 1% per year until 2025 [1]. In accordance with the national energy policy targets, it means the total energy consumption in 2025 has decrease up to 50% with energy conservation scenario. It is therefore urgent for Indonesia to improve the efficiency of energy use and encourage energy conservation program. Household has been identified by researchers as an important target group of energy conservation. To illustrate, households account for 25% of the total energy consumption in the US, 26% in Japan, 50% in Saudi

*Email Address: susantilusi@gmail.com

Arabia [2] and 38% in Brunei [3]. From the report of Indonesia Energy Outlook 2015 [1], the largest share of energy demand in 2013 was industry sector (37.17%) followed by household (29.43%), transportation (28.10%), commercial (3.24%), and other sector (2.04%). As the number of consumption by household sector is quite big thus it is responsible for household to take part in energy conservation program.

Electricity still dominates the final energy use in housing sector. The State Electricity Company (PT. PLN Persero) as the only electricity supplier company in Indonesia has sold 42.34 % of its total production to household sector in 2013; the largest share compared to other sectors like industry (33.19%), commercial (18,27%), and other sector (6.21%) [4]. Since Indonesia is

one of the fastest growing and developing countries in Asia with a population over 250 million in 2015 then supported by an economic growth assumption of around 6-7% per year, has led to an increase of demand on electricity consumption. The growth in demand for electricity is expected to reach 8.5% per year with population growth of 1.1% per year [4]. If this consumption persists and if no energy saving efforts or implementation of policies related to energy conservation and energy efficiency are undertaken, no doubt Indonesia will be struggling with energy sustainability.

In adopting an approach towards energy conservation and efficiency, it is pertinent that one understands how electricity is being used. The knowledge about how households utilize electricity could be used for directing initiatives to reduce electricity consumption. It has been a long time discussed on what specific factors might explain the way households consume and conserve energy in their homes. Achieving energy conservation is a twofold challenge, partly technical and partly human [5]. The development of technological innovations, especially those introduced to home appliances and home insulation has increased energy efficiency over the last decades. As massive appliances are more available in the market, the number of appliances used by households also increase resulting in counterbalancing initial efficiency efforts. Therefore, energy efficiency and conservation attempts would not succeed unless significant contribution from consumer behavior is taken into account.

The behaviorally based changes that reduce energy consumption have major advantages. First, the benefits can be very fast, unlike major infrastructure changes that can take years, or even decades. Second, they can be highly cost-effective. Third, they can provide savings and other benefits directly to citizens [6]. Since households can make a great contribution to energy conservation, in order to effectively encourage household energy-saving behavior, it is necessary to identify what drives household energy consumption and conservation in order to determine how these behaviors can successfully be shifted to the desired direction toward more efficient and sustainable practices.

Even though there has been a fast-growing body of literature examining energy-saving potential in relation to electricity energy, however, those empirical studies focused on evidence from Western context [7-10]. To fill this gap, the present paper aims to examine the potential of electricity saving in household sector seen from energy saving or energy wasting behavior in Indonesian context. Focus of the current paper is on the socio-demographic predictors which are believed as one of the key determinants in driving consumers toward energy conservation [11].

The purpose of this research is to gain more reliable data on how the current energy consumption pattern goes for households when socio-demographic predictors take as the main driving factors for energy consumption and what can be done in helping policy maker in this country in designing innovative energy saving instruments, standards, strategy and policy for household energy conservation

Table 1 Deployment of research samples

No	Regions	Number of samples			Total samples/region
		1300 VA	2200 VA	3500-5500 VA	
1	DKI Jakarta dan Tangerang	261	100	50	411
2	Jawa Barat dan Banten	286	107	30	423
3	Jawa Timur	262	106	41	409
4	Jawa Tengah Dan Yogyakarta	257	111	34	402
5	Sumatera Selatan, Jambi, dan Bengkulu	352	38	10	400
Total Sampel		1418	462	165	2045

program. Once it is understood then appropriate energy conservation policy would be easy to develop.

2. RESEARCH METHOD

2.1 Participants and procedure

Sample size in this study was determined by Cluster Random Sampling technique [12] and Slovin equation [13] was used to calculate number of samples from total of PLN consumers residing in the five best administrative regions for electricity consumers: 1) West Java and Banten, 2) East Java, 3) Central Java and Yogyakarta, 4) Metropolitan Jakarta dan Tangerang, and 5) South Sumatra, Jambi and Bengkulu. It was found that 2045 participants were willing to take part in the survey. The samples were then categorized into three different power capacity consumers: 1300 VA, 2200 VA and 3500-5500 VA. Table 1 shows deployment of the number of research samples.

The survey was focused on homeowners, as we lack critical information on rental units, and the type of rental contract -- net or gross -- which may have a substantial influence on energy consumption. Collecting data used door-to-door survey technique. This method was chosen rather than online survey because based on survey conducted by Pew Research Center in 2014, only about 24% of Indonesian society has access to internet and just about 15 percent have smartphones [14]. The sample would not be able to represent Indonesian population of PLN consumers if the online survey used for collecting the data. For the door-to-door survey, the authors hired paid representative agents acted as surveyors to record or even to copy any necessary document related to the research need. However, to minimize cost and time consumed, the surveyors were asked to input the questionnaire results online through an application developed using Google Form [15].

2.2. Questionnaire Design

Search on relevant literatures was carried out to decide the most appropriate variables from socio-demographic factor to be included in the questionnaire [16-18]. The questionnaire was validated by expert from PLN and communication expert from Andalas University to determine main predictors presumed to be the most related to Indonesian household characteristics. Those predictors are described in Table 2. The validated questionnaire was then distributed to 30 respondents as a pilot survey. Evidences from the result of pilot survey were then used

to justify whether the variables should be included, dropped, or even added into questionnaire for the second round of the survey. A new version of revised questionnaire was then used for the final (actual) survey.

The questionnaire consisted of two parts: personal background and electricity consumption behavior. The first part, the personal background, gives information about socio-demographic variables (Independent variables) consisting of gender (X_1), age (X_2), occupation (X_3), education level (X_4), household size (X_5), and monthly income (X_6). While, the second part of the questionnaire lists trigger factors of energy-saving behavior related to electricity consumption (Dependent variables), as explained below:

1 Behavior related to Knowledge (Y_1)

Most of the studies in energy use assumes that the public are aware of the amount and the type of energy used. In fact, most of the households do not really know what kind of energy they pay when using a number of tools to support their daily activities, due to the lack of information received. Basically, people need information in order to have knowledge about saving energy consumption. Consistent information through social interaction within the community is able to trigger an effective energy-saving behavior. So that, it is important to study further the knowledge of households in using electricity.

2 Behavior related to Curtailment Attitude (Y_2)

Most of the literature that discusses the energy savings in households suggests that there is a relation between attitudes and behavior. The influence of behavior is on micro-personal level. The government policies will not run properly if each individual does not align with their own policy. Individual attitudes in using the energy are triggered by socio-economic factors. In this study, behavior related to curtailment attitude can be investigated from the household ongoing day-to-day actions to reduce electricity use in the peak load hours, to discharge the electrical equipment when not in use, and to encourage energy saving habits to the family members [18].

3 Behavior related to Price of Energy (Y_3)

This research will investigate the response of the family member to the household electricity tariffs and the actions taken when electricity rates fluctuate.

4. Behavior related to Ability to Pay (Y_4)

Behavior related to ability to pay includes the actions of household when they get a rise in average earnings, such as replace broken lamps with energy efficient lights, buy more efficient appliances, etc.

Each item of questions of the dependent variables is examined to investigate the relationship between socio-demographic factor and electricity consumption behavior. Respondents were asked to rate how agree each aspect of the behavior was to them, on a scale from (1-strongly disagree to 4-strongly agree).

2.2. Data Analysis

The questionnaire analysis were performed using SPSS (version 20.0). The Kruskal Wallis test with 0.05 significance level was used to test the hypothesis of whether there is a relationship between a dependent variable (Y_n) and an independent variable (X_n). The hypothesis in this study are:

H_0 : There is no relationship between variable X_n and variable Y_n

H_1 : There is a relationship between variable X_n and variable Y_n

3. RESULTS AND DISCUSSION

Table 3 shows the socio-demographic data of surveyed participants. The table shows that the study involved more female participants compared than male participants. More than 80% of participants are under 50 years old. Sixty percent of participants have full-time job and more than half of them are university graduates. The table also shows that 32% of participants have total four person in their house and 75% of participants have monthly income between 1-10 million rupiah per month.

Table 4 shows the results of hypothesis test using Kruskal Wallis in investigating the relationship between socio-demographic characteristics and electricity consumption behavior. Null hypothesis will be rejected if the p-value < 0.05, which means that there is no relationship between the differences of variable X to the variable Y. Analysis results in Table 4 illustrate that some of the differences in the socio-demographic variables have significant relationship with the behavior of electricity consumption and detail explanation will be discussed below:

1. Gender

Gender has been found to only have correlation with energy consumption behavior related to the curtailment attitude ($p = 0.000$). Women in this study have strong concern about the curtailment attitude toward electricity saving than men but not for other three behavior variables. Some previous studies also indicated that as overall gender did not consistently emerge as statistically predictor of household energy use [19-21]. However, some research seems to see women exhibit more pro-environmental behavior than men [22]. In Indonesian culture, women are socially positioned as the main author to manage family needs and utilities. If they are equipped with sufficient information on energy conservation actions and behavior, it is expected that the role of women in saving electricity at home will be dominant.

3 Age

Related to the relationship between age differences and the behavior of electricity consumption, it was found that the differences in age variable had significant relationship with the behavior of electricity consumption related to the knowledge and attitude ($p = 0.023$ and 0.003 , respectively).

It is interesting to know that when people gets older, they possess better knowledge and then tend to behave more pro-environmental attitudes than younger people.

Table 2. Socio-demographic variables as the predictors of electricity consumption behavior in Indonesia

Predictors	Characteristics		
Gender	a. Male	b. Female	
Age (years old)	a. 18-30	b. 31-40	c. 41-50
	d. 51-60	e. 60	
Occupation	a. Full time	b. Part time	
Education level	a. < =high school	d. Master	
	b. Undergraduate	e. Doctor	
	c. Diploma		
Household size	a. 1-2 persons	d. 5 persons	
	b. 3 persons	e. 6 persons	
	c. 4 persons	f. >6 persons	
Monthly Income (In Rupiah)	a. < 1 million	d. 10-15 million	
	b. 1-5 million	e. 15-20 million	
	c. 5-10 million	f. >20 million	

Table 3. Socio-demographic data of surveyed participants

Predictors	Characteristics	Percentage
Gender	Male	47
	Female	53
Age (years old)	18-30	34
	31-40	18
	41-50	31
	51-60	16
	> 60	1
Occupation	Full time	60
	Part time	40
Education level	< =high school	28
	Undergraduate	50
	Diploma	13
	Master	7
	Doctor	2
Household size	1-2 persons	9
	3 persons	23
	4 persons	32
	5 persons	23
	6 persons	8
	> 6 persons	5
Monthly Income (In Rupiah)	< 1 million	1
	1-4 million	38
	5-10 million	37
	10-15 million	14
	15-20 million	5
> 20 million	5	

possess better knowledge and then tend to behave more pro-environmental attitudes than younger people.

3. Occupation

Occupation, particularly the occupation of the head of the household, is found being the most significant predictor on household energy consumption behavior. The results demonstrate that the differences in the occupation

variables had a significant relationship with the behavior of electricity consumption related to the knowledge, **Table 4.** Kruskal Wallis Test Result of the Relationship between Socio-demographic Characteristics and Electricity Consumption Behavior (p-value)

Socio demographic Predictors	Electricity consumption behavior related to:			
	Knowledge	Curtailment Attitude	Price of Energy	Ability to Pay
Gender	0.106	0.000	0.991	0.978
Age	0.023	0.003	0.435	0.502
Occupation	0.000	0.000	0.018	0.125
Education	0.002	0.311	0.001	0.219
Household Size	0.362	0.142	0.636	0.539
Income	0.000	0.072	0.599	0.000

attitude, and price of energy. Full-time workers have a better knowledge about the electricity peak load time, the energy saving patterns, and the availability of energy-efficient appliances, compared than the part-time workers. It supports the study by Powers [23] stating that work affects the individual level of knowledge because the work is closely related to social interaction and cultural factors, while social interaction and culture is closely related to the process of information exchange.

The differences in the occupation variables was also associated significantly with the behavior of electricity consumption related to the attitude. Full-time workers have better adherence to the government policies on energy saving than part-time workers. It is influenced by the social environment of the workplace. Full-time workers get more information about energy-saving patterns in the work environment, therefore they are familiarized to the energy-saving behavior.

Regarding the behavior of electricity consumption related to the price of energy, individual with different occupation characteristics will also has different actions to the fluctuations in energy prices. Full-time workers have more energy saving actions despite there are changes in the electricity tariffs. Full-time worker reduces power usage when electricity rates go up and not buy other electrical appliances even though electricity rates down.

4. Education level

The electricity consumption behavior is also determined by the education level. Individual with a higher level of education will have a better knowledge about the use of electricity. In addition, the education level is also very influential on energy prices. The results of this study support Ma [24] study, which found that a person's education level affects the level of knowledge about energy-saving electricity. The lower the education level, the lower the level of awareness to the energy savings.

5. Household size

Most of previous studies informed that total household energy consumption is positively related to family or household size and composition; such that larger families/households typically consume more energy compared to smaller families/households. This may be because larger households generally have greater energy demands and requirements (i.e., more cooking, cleaning, washing, heating/cooling, etc.). While larger households tend to consume more energy overall, it is assumed that they may also make greater investments in energy efficiency measures, such as sharing of energy service among family members [25]. However, as opposed to energy consumption, the relationship between household size and energy conservation behavior is not correlated in this study. It means the larger the family size, the more difficult for them to conserve energy at home, unless the effects of other predictors can play significant role to promote energy conservation behavior.

6. Monthly income

Household income has correlation with electricity consumption behavior related to the knowledge and household income. It is found that middle-income families (monthly income 1-10 million/month) behave more energy conservation than lower or higher income families. As Indonesian household is dominated by middle income families, promote and encourage sufficient information, incentives and smart policy to this target group will result in powerful impact on energy conservation. On the other hand, higher income families normally have more disposable income to spend on energy thus this group is slightly unaware about energy bills resulting in less significant concern on energy conservation. Tax policy on energy use might be suitable to this type of income-based household.

5. CONCLUSION

This article has demonstrate the correlation between socio demographic factor and household energy consumption behavior related to knowledge, curtailment attitude, price of energy and ability to pay. It seemed only occupation had stronger correlation with household energy conservation behavior while other predictors were found medium or no correlation at all. Socio-demographic factor solely will not be sufficient to predict household energy saving behavior that determine energy consumption, therefore more comprehensive observations are needed for future research to draw empirical evidence in this sustainable issues.

ACKNOWLEDGMENTS

This work was fully supported by Ministry of Research, Technology and Higher Education under Grant Kerjasama Luar Negeri dan Publikasi International No. 05/H.16/KLN/LPPM/2016.

REFERENCES

- [1] A. Sugiyono, Anindhita, M. S. Boedoyo, and Adiarso, Indonesia Energy Outlook, Center for Energy Resources Development Technology, Agency for the Assessment and Application of Technology, Jakarta (2015).
- [2] Saidur, R. M. (2007). An application of energy and energy analysis in residential sector of Malaysia. *Energy Policy*, 35, 1050-1063.
- [3] Ahmad, A., & Othman, H. M. (2014). Electricity Consumption in Brunei Darussalam: Challenges in Energy Conservation. *International Energy Journal*, 14, 155-166.
- [4] PT. PLN (Persero), Statistik PLN, Sekretariat Perusahaan PT PLN (Persero), Jakarta (2015).
- [5] Costanzo, M.; Archer, D.; Aronson, E.; Pettigrew, T. Energy conservation behavior: The difficult path from information to action. *Am. Psychol.* **1986**, 41, 521–528.
- [6] Wang, Z. e. (2011). Determinants and policy implications for household electricity- saving behavior: evidence from Beijing, China. *Energy Policy*, 39, 3550–3557.
- [7] W. Abrahamse and L. Steg, *Hum. Ecol. Rev.* 18, 30–40 (2011).
- [8] R. Gaspar and D. Antunes, *Energy Pol.* 39, 7335-7346 (2011).
- [9] O. Guerra Santin, *Energy Build.* 43, 2662–2672 (2011).
- [10] E. R. Frederiks, K. Stenner, and E. V. Hobman, *Energies* 8, 573-609 (2015).
- [11] K. Gram-Hanssen, *Energ. Effic.* 6(3), 447–457 (2013).
- [12] Sugiyono, Agus. 2010. Metode Penelitian Kuantitatif, Kualitatif & RND. Bandung: Alfabeta (in Indonesian)
- [13] Setiawan, Nugraha. 2007. Penentuan Ukuran Sampel Memakai Rumus Slovin dan Tabel Krejcie-Morgan. Telaah Konsep dan Aplikasinya. Bandung: Universitas Padjajaran (in Indonesian)
- [14] Ryza, P. (2015, April 27). *Berita*. Retrieved April 24, 2016, from DailySocial.id: <https://dailysocial.id/post/pew-indonesia-internet-smartphone/>
- [15] <https://www.google.com/forms/about/>. (2015, April 30). Retrieved from <https://www.google.com/forms/about/>
- [16] D. Brounen, N. Kok, and J. M. Quigley. Residential Energy Use and Conservation: Economics and Demographics. *Eur. Econ. Rev.* 56(5), 931-945 (2012).
- [17] K. Mizobuchi and K. Takeuchi, 2013. The Influences of Financial and non financial factors on Energy Saving Behavior : A field Experiment in Japan. *Energy Pol.* 63, 775-787 (2013).
- [18] Frederiks, E.R, Stenner, K., Hobman, E.V. 2015. The Socio-Demographic and Psychological Predictors of Residential Energy Consumption: A Comprehensive Review. *Energies* 8, 573-609.
- [19] Abrahamse, W.; Steg, L. How do socio-demographic and psychological factors relate to households' direct and indirect energy use and savings? *J. Econ. Psychol.* **2009**, 30, 711–720.
- [20] Abrahamse, W.; Steg, L. Factors related to household energy use and intention to reduce it: The role of psychological and socio-demographic variables. *Hum. Ecol. Rev.* **2011**, 18, 30–40.
- [21] Sukarno, I. (2015). Urban Energy Consumption in a City of Indonesia: General Overview. *International Journal of Energy Economics and Policy*, 360-373.
- [22] Zelezny, L.C.; Chua, P.-P.; Aldrich, C. Elaborating on gender differences in environmentalism. *J. Soc. Issues* **2000**, 56, 443–457.
- [23] Powers, T.L.; Swan, J.E.; Lee, S.-D. Identifying and understanding the energy conservation consumer: A macromarketing systems approach. *J. Macromarket.* **1992**, 12, 5–15.
- [24] Ma, Guo, et.al. 2013. Chinese consumer attitudes towards energy saving: the case of household electrical appliances in Chongqing. *Energy Policy* 56, 591-602).
- [25] O'Neill, B.C.; Chen, B.S. Demographic determinants of household energy use in the United States. *Popul. Dev. Rev.* **2002**, 28, 53–88. J. Thøgersen and A. Grønhoj. (2010). Electricity saving

in Households – A social cognitive approach. Energy Pol. 38(12),
7732-7743.

Challenge

ORIGINALITY REPORT

% **19**
SIMILARITY INDEX

% **19**
INTERNET SOURCES

%
PUBLICATIONS

% **0**
STUDENT PAPERS

PRIMARY SOURCES

1 www.iaeng.org Internet Source % **6**

2 www.mdpi.com Internet Source % **3**

3 www.ceep.net.cn Internet Source % **2**

4 fairsnape.com Internet Source % **1**

5 worldwidescience.org Internet Source % **1**

6 www.scientific.net Internet Source % **1**

7 umexpert.um.edu.my Internet Source % **1**

8 fr.scribd.com Internet Source % **1**

9 www.pln.co.id Internet Source % **1**

10

www.jtrustbank.co.id

Internet Source

% 1

11

tochi.nla.go.jp

Internet Source

% 1

EXCLUDE QUOTES ON

EXCLUDE MATCHES < 1%

EXCLUDE
BIBLIOGRAPHY ON



Copyright © 2015 American Scientific Publishers
All rights reserved
Printed in the United States of America

Advanced Science Letters
Vol. 23(5)

Challenge in Household Energy Conservation Program: Analysis from Socio-Demographic Factors

Lusi Susanti*¹, Hilma R. Zadry¹, Prima Fithri¹, Hiroshi Matsumoto², Iwan Sukarno^{1,2}

¹Department of Industrial Engineering, Faculty of Engineering, University of Andalas,
Kampus Limau Manis, Pauh, Padang 25163, West Sumatera, Indonesia

²Department of Architecture and Civil Engineering, Toyohashi University of Technology, Toyohashi, 441-8580, Japan
Tempaku-cho, Hibariga oka 1-1, Toyohashi, Aichi ken, Japan, 441-8580

A large proportion of Indonesia's electricity consumption is used by households. Indonesian electricity usage in household sector has been found covering 42.34% of total consumption and tend to increase in the future. Therefore, household has been identified as important target group for energy efficiency and conservation program. This paper explores the relationship between household electricity use and socio-demographic variables. The study was conducted among 2045 Indonesian households residing in five largest administrative regions for electricity consumers in Indonesia. Cluster sampling method was used to determine the number of sampling and the data analysis was done using Kruskal Wallis test. The results show that occupation was the main socio-demographics factor explaining variability in electricity consumption behavior at residential sector while other factors seemed have weaker correlation. These findings indicate that more comprehensive studies are needed on Indonesian household energy consumption behavior before designing energy efficiency scenarios for conservation policy.

Keywords: Electricity consumption, household, socio-demographics, policy

1. INTRODUCTION

Indonesian government has set a long-term target to reduce energy intensity of at least 1% per year until 2025 [1]. In accordance with the national energy policy targets, it means the total energy consumption in 2025 has to decrease up to 50% with energy conservation scenario. It is therefore urgent for Indonesia to improve the efficiency of energy use and encourage energy conservation program. Household has been identified by researchers as an important target group of energy conservation. To illustrate, households account for 25% of the total energy consumption in the US, 26% in Japan, 50% in Saudi

Arabia [2] and 38% in Brunei [3]. From the report of Indonesia Energy Outlook 2015 [1], the largest share of energy demand in 2013 was industry sector (37.17%) followed by household (29.43%), transportation (28.10%), commercial (3.24%), and other sector (2.04%). As the number of consumption by household sector is quite big thus it is responsible for household to take part in energy conservation program.

Electricity still dominates the final energy use in housing sector. The State Electricity Company (PT. PLN Persero) as the only electricity supplier company in Indonesia has sold 42.34 % of its total production to household sector in 2013; the largest share compared to other sectors like industry (33.19%), commercial (18,27%), and other sector (6.21%) [4]. Since Indonesia is

*Email Address: susantilusi@gmail.com

one of the fastest growing and developing countries in Asia with a population over 250 million in 2015 then supported by an economic growth assumption of around 6-7% per year, has led an increase of demand on electricity consumption. The growth in demand for electricity is expected to reach 8.5% per year with population growth of 1.1% per year [4]. If this consumption persists and if no energy saving efforts or implementation of policies related to energy conservation and energy efficiency are undertaken, no doubt Indonesia will be struggling with energy sustainability.

In adopting an approach towards energy conservation and efficiency, it is pertinent that one understands how electricity is being used. The knowledge about how households utilize electricity could be used for directing initiatives to reduce electricity consumption. It has been a long time discussed on what specific factors might explain the way households consume and conserve energy in their homes. Achieving energy conservation is a twofold challenge, partly technical and partly human [5]. The development of technological innovations, especially those introduced to home appliances and home insulation has increased energy efficiency over the last decades. As massive appliances are more available in the market, the number of appliances used by households also increase resulting in counterbalancing initial efficiency efforts. Therefore, energy efficiency and conservation attempts would not succeed unless significant contribution from consumer behavior is taken into account.

The behaviorally based changes that reduce energy consumption have major advantages. First, the benefits can be very fast, unlike major infrastructure changes that can take years, or even decades. Second, they can be highly cost-effective. Third, they can provide savings and other benefits directly to citizens [6]. Since households can make a great contribution to energy conservation, in order to effectively encourage household energy-saving behavior, it is necessary to identify what drives household energy consumption and conservation in order to determine how these behaviors can successfully be shifted to the desired direction toward more efficient and sustainable practices.

Even though there has been a fast-growing body of literature examining energy-saving potential in relation to electricity energy, however, those empirical studies focused on evidence from Western context [7-10]. To fill this gap, the present paper aims to examine the potential of electricity saving in household sector seen from energy saving or energy wasting behavior in Indonesian context. Focus of the current paper is on the socio-demographic predictors which are believed as one of the key determinants in driving consumers toward energy conservation [11].

The purpose of this research is to gain more reliable data on how the current energy consumption pattern goes for households when socio-demographic predictors take as the main driving factors for energy consumption and what can be done in helping policy maker in this country in designing innovative energy saving instruments, standards, strategy and policy for household energy conservation

Table 1 Deployment of research samples

No	Regions	Number of samples			Total samples/ region
		1300 VA	2200 VA	3500-5500 VA	
1	DKI Jakarta dan Tangerang	261	100	50	411
2	Jawa Barat dan Banten	286	107	30	423
3	Jawa Timur	262	106	41	409
4	Jawa Tengah Dan Yogyakarta	257	111	34	402
5	Sumatera Selatan, Jambi, dan Bengkulu	352	38	10	400
Total Sampel		1418	462	165	2045

program. Once it is understood then appropriate energy conservation policy would be easy to develop.

2. RESEARCH METHOD

2.1 Participants and procedure

Sample size in this study was determined by Cluster Random Sampling technique [12] and Slovin equation [13] was used to calculate number of samples from total of PLN consumers residing in the five largest administrative regions for electricity consumers: 1) West Java and Banten, 2) East Java, 3) Central Java and Yogyakarta, 4) Metropolitan Jakarta dan Tangerang, and 5) South Sumatra, Jambi and Bengkulu. It was found that 2045 participants were willing to take part in the survey. The samples were then categorized into three different power capacity consumers: 1300 VA, 2200 VA and 3500-5500 VA. Table 1 shows deployment of the number of research samples.

The survey was focused on homeowners, as we lack critical information on rental units, and the type of rental contract -- net or gross -- which may have a substantial influence on energy consumption. Collecting data used door-to-door survey technique. This method was chosen rather than online survey because based on survey conducted by Pew Research Center in 2014, only about 24% of Indonesian society has access to internet and just about 15 percent have smartphones [14]. The sample would not be able to represent Indonesian population of PLN consumers if the online survey used for collecting the data. For the door-to-door survey, the authors hired paid representative agents acted as surveyors to record or even to copy any necessary document related to the research need. However, to minimize cost and time consumed, the surveyors were asked to input the questioner results online through an application developed using Google Form [15].

2.2. Questionnaire Design

Search on relevant literatures was carried out to decide the most appropriate variables from socio-demographic factor to be included in the questionnaire [16-18]. The questionnaire was validated by expert from PLN and communication expert from Andalas University to determine main predictors presumed to be the most related to Indonesian household characteristics. Those predictors are described in Table 2. The validated questionnaire was then distributed to 30 respondents as a pilot survey. Evidences from the result of pilot survey were then used

to justify whether the variables should be included, dropped, or even added into questionnaire for the second round of the survey. A new version of revised questionnaire was then used for the final (actual) survey.

The questionnaire consisted of two parts: personal background and electricity consumption behavior. The first part, the personal background, gives information about socio-demographic variables (Independent variables) consisting of gender (X_1), age (X_2), occupation (X_3), education level (X_4), household size (X_5), and monthly income (X_6). While, the second part of the questionnaire lists trigger factors of energy-saving behavior related to electricity consumption (Dependent variables), as explained below:

1. Behavior related to Knowledge (Y_1)

Most of the studies in energy use assumes that the public are aware of the amount and the type of energy used. In fact, most of the households do not really know what kind of energy they pay when using a number of tools to support their daily activities, due to the lack of information received. Basically, people need information in order to have knowledge about saving energy consumption. Consistent information through social interaction within the community is able to trigger an effective energy-saving behavior. So that, it is important to study further the knowledge of households in using electricity.

2. Behavior related to Curtailment Attitude (Y_2)

Most of the literature that discusses the energy savings in households suggests that there is a relation between attitudes and behavior. The influence of behavior is on micro-personal level. The government policies will not run properly if each individual does not align with their own policy. Individual attitudes in using the energy are triggered by socio-economic factors. In this study, behavior related to curtailment attitude can be investigated from the household ongoing day-to-day actions to reduce electricity use in the peak load hours, to discharge the electrical equipment when not in use, and to encourage energy saving habits to the family members [18].

3. Behavior related to Price of Energy (Y_3)

This research will investigate the response of the family member to the household electricity tariffs and the actions taken when electricity rates fluctuate.

4. Behavior related to Ability to Pay (Y_4)

Behavior related to ability to pay includes the actions of household when they get a rise in average earnings, such as replace broken lamps with energy efficient lights, buy more efficient appliances, etc.

Each item of questions of the dependent variables is examined to investigate the relationship between socio-demographic factor and electricity consumption behavior. Respondents were asked to rate how agree each aspect of the behavior was to them, on a scale from (1-strongly disagree to 4-strongly agree).

2.2. Data Analysis

The questionnaire analysis were performed using SPSS (version 20.0). The Kruskal Wallis test with 0.05 significance level was used to test the hypothesis of whether there is a relationship between a dependent variable (Y_n) and an independent variable (X_n). The hypothesis in this study are:

H_0 : There is no relationship between variable X_n and variable Y_n

H_1 : There is a relationship between variable X_n and variable Y_n

3. RESULTS AND DISCUSSION

Table 3 shows the socio-demographic data of surveyed participants. The table shows that the study involved more female participants compared than male participants. More than 80% of participants are under 50 years old. Sixty percent of participants have full-time job and more than half of them are university graduates. The table also shows that 32% of participants have total four person in their house and 75% of participants have monthly income between 1-10 million rupiah per month.

Table 4 shows the results of hypothesis test using Kruskal Wallis in investigating the relationship between socio-demographic characteristics and electricity consumption behavior. Null hypothesis will be rejected if the p-value < 0.05, which means that there is no relationship between the differences of variable X to the variable Y. Analysis results in Table 4 illustrate that some of the differences in the socio-demographic variables have significant relationship with the behavior of electricity consumption and detail explanation will be discussed below:

1. Gender

Gender has been found to only have correlation with energy consumption behavior related to the curtailment attitude ($p = 0.000$). Women in this study have strong concern about the curtailment attitude toward electricity energy saving than men but not for other three behavior variables. Some previous studies also indicated that as overall gender did not consistently emerge as statistically predictor of household energy use [19-21]. However, some research seems to see women exhibit more pro-environmental behavior than men [22]. In Indonesian culture, women are socially positioned as the main author to manage family needs and utilities. If they are equipped with sufficient information on energy conservation actions and behavior, it is expected that the role of women in saving electricity at home will be dominant.

2. Age

Related to the relationship between age differences and the behavior of electricity consumption, it was found that the differences in age variable had significant relationship with the behavior of electricity consumption related to the knowledge and attitude ($p = 0.023$ and 0.003 , respectively).

It is interesting to know that when people gets older, they

Table 2. Socio-demographic variables as the predictors of electricity consumption behavior in Indonesia

Predictors	Characteristics		
Gender	a. Male	b. Female	
Age (years old)	a. 18-30	b. 31-40	c. 41-50
	d. 51-60	e. 60	
Occupation	a. Full time	b. Part time	
Education level	a. <=high school	d. Master	
	b. Undergraduate	e. Doctor	
	c. Diploma		
Household size	a. 1-2 persons	d. 5 persons	
	b. 3 persons	e. 6 persons	
	c. 4 persons	f. >6 persons	
Monthly Income (In Rupiah)	a. < 1 million	d. 10-15 million	
	b. 1-5 million	e. 15-20 million	
	c. 5-10 million	f. >20 million	

Table 3. Socio-demographic data of surveyed participants

Predictors	Characteristics	Percentage
Gender	Male	47
	Female	53
Age (years old)	18-30	34
	31-40	18
	41-50	31
	51-60	16
	> 60	1
Occupation	Full time	60
	Part time	40
Education level	<=high school	28
	Undergraduate	50
	Diploma	13
	Master	7
	Doctor	2
Household size	1-2 persons	9
	3 persons	23
	4 persons	32
	5 persons	23
	6 persons	8
	> 6 persons	5
Monthly Income (In Rupiah)	< 1 million	1
	1-5 million	38
	5-10 million	37
	10-15 million	14
	15-20 million	5
> 20 million	5	

possess better knowledge and then tend to behave more pro-environmental attitudes than younger people.

3. Occupation

Occupation, particularly the occupation of the head of the household, is found being the most significant predictor on household energy consumption behavior. The results demonstrate that the differences in the occupation

variables had a significant relationship with the behavior of electricity consumption related to the knowledge,

Table 4. Kruskal Wallis Test Result of the Relationship between Socio-demographic Characteristics and Electricity Consumption Behavior (p-value)

Socio demograph ic Predictors	Electricity consumption behavior related to:			
	Knowled ge	Curtailme nt Attitude	Price of Energy	Ability to Pay
Gender	0.106	0.000	0.991	0.978
Age	0.023	0.003	0.435	0.502
Occupation	0.000	0.000	0.018	0.125
Education	0.002	0.311	0.001	0.219
Household Size	0.362	0.142	0.636	0.539
Income	0.000	0.072	0.599	0.000

attitude, and price of energy. Full-time workers have a better knowledge about the electricity peak load time, the energy saving patterns, and the availability of energy-efficient appliances, compared than the part-time workers. It supports the study by Powers [23] stating that work affects the individual level of knowledge because the work is closely related to social interaction and cultural factors, while social interaction and culture is closely related to the process of information exchange.

The differences in the occupation variables was also associated significantly with the behavior of electricity consumption related to the attitude. Full-time workers have better adherence to the government policies on energy saving than part-time workers. It is influenced by the social environment of the workplace. Full-time workers get more information about energy-saving patterns in the work environment, therefore they are familiarized to the energy-saving behavior.

Regarding the behavior of electricity consumption related to the price of energy, individual with different occupation characteristics will also has different actions to the fluctuations in energy prices. Full-time workers have more energy saving actions despite there are changes in the electricity tariffs. Full-time worker reduces power usage when electricity rates go up and not buy other electrical appliances even though electricity rates down.

4. Education level

The electricity consumption behavior is also determined by the education level. Individual with a higher level of education will have a better knowledge about the use of electricity. In addition, the education level is also very influential on energy prices. The results of this study support Ma [24] study, which found that a person's education level affects the level of knowledge about energy-saving electricity. The lower the education level, the lower the level of awareness to the energy savings.

5. Household size

Most of previous studies informed that total household energy consumption is positively related to family or household size and composition; such that larger families/households typically consume more energy compared to smaller families/households. This may be because larger households generally have greater energy demands and requirements (*i.e.*, more cooking, cleaning, washing, heating/cooling, *etc.*). While larger households tend to consume more energy overall, it is assumed that they may also make greater investments in energy efficiency measures, such as sharing of energy service among family members [25]. However, as opposed to energy consumption, the relationship between household size and energy conservation behavior is not correlated in this study. It means the larger the family size, the more difficult for them to conserve energy at home, unless the effects of other predictors can play significant role to promote energy conservation behavior.

6. Monthly income

Household income has correlation with electricity consumption behavior related to the knowledge and household income. It is found that middle-income families (monthly income 1-10 million/month) behave more energy conservation than lower or higher income families. As Indonesian household is dominated by middle income families, promote and encourage sufficient information, incentives and smart policy to this target group will result in powerful impact on energy conservation. On the other hand, higher income families normally have more disposable income to spend on energy thus this group is slightly unaware about energy bills resulting in less significant concern on energy conservation. Tax policy on energy use might be suitable to this type of income-based household.

5. CONCLUSION

This article has demonstrate the correlation between socio demographic factor and household energy consumption behavior related to knowledge, curtailment attitude, price of energy and ability to pay. It seemed only occupation had stronger correlation with household energy conservation behavior while other predictors were found medium or no correlation at all. Socio-demographic factor solely will not be sufficient to predict household energy saving behavior that determine energy consumption, therefore more comprehensive observations are needed for future research to draw empirical evidence in this sustainable issues.

ACKNOWLEDGMENTS

This work was fully supported by Ministry of Research, Technology and Higher Education under Grant Kerjasama Luar Negeri dan Publikasi Internasional No. 05/H.16/KLN/LPPM/2016.

REFERENCES

- [1] A. Sugiyono, Anindhita, M. S. Boedoyo, and Adiarso, Indonesia Energy Outlook, Center for Energy Resources Development Technology, Agency for the Assessment and Application of Technology, Jakarta (2015).
- [2] Saidur, R. M. (2007). An application of energy and energy analysis in residential sector of Malaysia. *Energy Policy*, 35, 1050-1063.
- [3] Ahmad, A., & Othman, H. M. (2014). Electricity Consumption in Brunei Darussalam: Challenges in Energy Conservation. *International Energy Journal*, 14, 155-166.
- [4] PT. PLN (Persero), Statistik PLN, Sekretariat Perusahaan PT PLN (Persero), Jakarta (2015).
- [5] Costanzo, M.; Archer, D.; Aronson, E.; Pettigrew, T. Energy conservation behavior: The difficult path from information to action. *Am. Psychol.* **1986**, 41, 521–528.
- [6] Wang, Z. e. (2011). Determinants and policy implications for household electricity- saving behavior: evidence from Beijing, China. *Energy Policy*, 39, 3550–3557.
- [7] W. Abrahamse and L. Steg, *Hum. Ecol. Rev.* 18, 30–40 (2011).
- [8] R. Gaspar and D. Antunes, *Energy Pol.* 39, 7335-7346 (2011).
- [9] O. Guerra Santin, *Energy Build.* 43, 2662–2672 (2011).
- [10] E. R. Frederiks, K. Stenner, and E. V. Hobman, *Energies* 8, 573-609 (2015).
- [11] K. Gram-Hanssen, *Energ. Effic.* 6(3), 447-457 (2013).
- [12] Sugiyono, Agus. 2010. Metode Penelitian Kuantitatif, Kualitatif & RND. Bandung: Alfabeta (in Indonesian)
- [13] Setiawan, Nugraha. 2007. Penentuan Ukuran Sampel Memakai Rumus Slovin dan Tabel Krejcie-Morgan. Telaah Konsep dan Aplikasinya. Bandung: Universitas Padjajaran (in Indonesian)
- [14] Ryza, P. (2015, April 27). *Berita*. Retrieved April 24, 2016, from DailySocial.id: <https://dailysocial.id/post/pew-indonesia-internet-smartphone/>
- [15] <https://www.google.com/forms/about/>. (2015, April 30). Retrieved from <https://www.google.com/forms/about/>
- [16] D. Brounen, N. Kok, and J. M. Quigley. Residential Energy Use and Conservation: Economics and Demographics. *Eur. Econ. Rev.* 56(5), 931-945 (2012).
- [17] K. Mizobuchi and K. Takeuchi, 2013. The Influences of Financial and non financial factors on Energy Saving Behavior : A field Experiment in Japan. *Energy Pol.* 63, 775-787 (2013).
- [18] Frederiks, E.R, Stenner, K., Hobman, E.V. 2015. The Socio-Demographic and Psychological Predictors of Residential Energy Consumption: A Comprehensive Review. *Energies* 8, 573-609.
- [19] Abrahamse, W.; Steg, L. How do socio-demographic and psychological factors relate to households' direct and indirect energy use and savings? *J. Econ. Psychol.* **2009**, 30, 711–720.
- [20] Abrahamse, W.; Steg, L. Factors related to household energy use and intention to reduce it: The role of psychological and socio-demographic variables. *Hum. Ecol. Rev.* **2011**, 18, 30–40.
- [21] Sukarno, I. (2015). Urban Energy Consumption in a City of Indonesia: General Overview. *International Journal of Energy Economics and Policy*, 360-373.
- [22] Zelezny, L.C.; Chua, P.-P.; Aldrich, C. Elaborating on gender differences in environmentalism. *J. Soc. Issues* **2000**, 56, 443–457.
- [23] Powers, T.L.; Swan, J.E.; Lee, S.-D. Identifying and understanding the energy conservation consumer: A macromarketing systems approach. *J. Macromarket.* **1992**, 12, 5–15.
- [24] Ma, Guo, et.al. 2013. Chinese consumer attitudes towards energy saving: the case of household electrical appliances in Chongqing. *Energy Policy* 56, 591-602).
- [25] O'Neill, B.C.; Chen, B.S. Demographic determinants of household energy use in the United States. *Popul. Dev. Rev.* **2002**, 28, 53–88.J. Thøgersen and A. Grønhoj. (2010). Electricity saving

in Households – A social cognitive approach. Energy Pol. 38(12),
7732-7743.

**LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW
KARYA ILMIAH : JURNAL ILMIAH***

Judul Karya Ilmiah (Artikel) : **Challenge in Household Energy Conservation Program: Analysis from Socio-Demographic Factors**

Jumlah Penulis : 5 Orang

Status Pengusul : Penulis Ke-3

Identitas Jurnal : a. Nama Jurnal : Advanced Science Letters
 b. Nomor ISSN : 1936-6612
 c. Volume, nomor, bulan, tahun : Vol. 23, No. 5, 2017
 d. Penerbit : American Scientific Publishers
 e. DOI artikel (jika ada) : [10.1166/asl.2017.8337](https://doi.org/10.1166/asl.2017.8337)
 f. Alamat web Jurnal : http://www.insightsociety.org/ojaseit/index.php/ijaseit/article/view/3451/pdf_690
 g. Terindeks di : Scimagojr

Kategori Publikasi Jurnal Ilmiah : Jurnal Ilmiah Internasional Bereputasi
 (beri tanda pada kategori yang tepat) : Jurnal Ilmiah Internasional
 Jurnal Ilmiah Nasional Terakreditasi
 Jurnal Ilmiah Nasional/ Nasional terindeks di DOAJ**

Hasil Penilaian Peer Review :

No.	Komponen Yang Dinilai	Nilai Maksimum Jurnal Ilmiah :				Nilai Akhir Yang Diperoleh (NA)
		Internasional Bereputasi	Internasional	Nasional Terakreditasi	Nasional***	
a	Kelengkapan unsur isi artikel (10%)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4
b	Ruang lingkup dan kedalaman pembahasan (30%)	4				10,5
c	Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	12				9
d	Kelengkapan unsur dan kualitas penerbit (30%)	12				10
Total = (100%)		40				33,5
Nilai Pengusul (NA X BP****) = $33,5 \times \frac{0,4}{1} = 3,35$						
Catatan Penilaian Artikel oleh Reviewer (wajib ada): <i>Similarity Index 27%, SJR 0,94. Pembahasan sangat baik. analisis belum komprehensif</i>						

Padang, 21 Februari 2020
 Reviewer 1 / 2

[Signature]
 Alizar Han

NIP: 195312181980021002
 Unit Kerja: TEKNIK

Bidang Ilmu: **TEKNIK INDUSTRI**
 Jabatan/Pangkat: **GB/Pembina Utama Madya**

* Dinilai oleh dua Reviewer secara terpisah
 ** Coret yang tidak perlu
 *** Nasional/terindeks di DOAJ
 **** Bobot Peran (BP) : Sendiri = 1; Penulis Pertama = 0,6; Anggota = 0,4 dibagi jumlah anggota

**LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW
KARYA ILMIAH : JURNAL ILMIAH***

Judul Karya Ilmiah (Artikel) : **Challenge in Household Energy Conservation Program: Analysis from Socio-Demographic Factors**
 Jumlah Penulis : 5 Orang
 Status Pengusul : Penulis Ke-3
 Identitas Jurnal : a. Nama Jurnal : Advanced Science Letters
 b. Nomor ISSN : 1936-6612
 c. Volume, nomor, bulan, tahun : Vol. 23, No. 5, 2017
 d. Penerbit : American Scientific Publishers
 e. DOI artikel (jika ada) : [10.1166/asl.2017.8337](https://doi.org/10.1166/asl.2017.8337)
 f. Alamat web Jurnal : http://www.insightsociety.org/ojaseit/index.php/ijaseit/article/view/3451/pdf_690
 g. Terindeks di : Scimagojr

Kategori Publikasi Jurnal Ilmiah : Jurnal Ilmiah Internasional Bereputasi
 (beri tanda ada kategori yang tepat) : Jurnal Ilmiah Internasional
 Jurnal Ilmiah Nasional Terakreditasi
 Jurnal Ilmiah Nasional/ Nasional terindeks di DOAJ**

Hasil Penilaian Peer Review :

No.	Komponen Yang Dinilai	Nilai Maksimum Jurnal Ilmiah :				Nilai Akhir Yang Diperoleh (NA)
		internasional Bereputasi <input checked="" type="checkbox"/>	internasional <input type="checkbox"/>	Nasional Terakreditasi <input type="checkbox"/>	Nasional*** <input type="checkbox"/>	
a	Kelengkapan unsur isi artikel (10%)	4				4
b	Ruang lingkup dan kedalaman pembahasan (30%)	12				10
c	Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	12				9
d	Kelengkapan unsur dan kualitas penerbit (30%)	12				10
Total = (100%)		40				33
Nilai Pengusul (NA X BP****) = $33 \times \frac{0,4}{4} = 3,3$						

Catatan Penilaian Artikel oleh Reviewer (wajib ada):

*SJR QA, similarity index 24%
Pembahasan mendalam tetapi proses analisis data belum disajikan secara komprehensif*

Padang, 24 Februari 2020

Reviewer 1 / 2 **

RIVA AMPUHA HAOLGUNA

NIP : 19730723 197703 1 003

Unit Kerja : TEKNIK

Bidang Ilmu : **TEKNIK INDUSTRI**
 jabatan/Pangkat : **PROFESOR/ PENGABDI KE I**

- * Dinilai oleh dua Reviewer secara terpisah
- ** Coret yang tidak perlu
- *** Nasional/terindeks di DOAJ
- **** Bobot Peran (BP) : Sendiri = 1; Penulis Pertama = 0,6; Anggota = 0,4 dibagi jumlah anggota