



Universiteit
Leiden
The Netherlands

Development of life cycle assessment for residue-based bioenergy

Wiloso, E.I.

Citation

Wiloso, E. I. (2015, October 29). *Development of life cycle assessment for residue-based bioenergy*. Retrieved from <https://hdl.handle.net/1887/35987>

Version: Corrected Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/35987>

Note: To cite this publication please use the final published version (if applicable).

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/35987> holds various files of this Leiden University dissertation

Author: Wiloso, Edi Iswanto

Title: Development of life cycle assessment for residue-based bioenergy

Issue Date: 2015-10-29

Development of life cycle assessment for residue-based bioenergy
(Ontwikkeling van levenscyclusanalyse voor op residuen gebaseerde bio-energie)

Edi Iswanto Wiloso

© 2015 Edi Iswanto Wiloso

Development of life cycle assessment for residue-based bioenergy

ISBN: 978-94-6182-603-9

PhD Thesis, Faculty of Science, Leiden University, The Netherlands

Cover design: Edi I. Wiloso and Nandang Sutiana

Layout: Arief A.R. Setiawan

Printed by: Off Page book design (www.offpage.nl)

Development of life cycle assessment for residue-based bioenergy
(Ontwikkeling van levenscyclusanalyse voor op residuen gebaseerde bio-energie)

Proefschrift

ter verkrijging van
de graad van Doctor aan de Universiteit Leiden,
op gezag van Rector Magnificus prof.mr. C.J.J.M. Stolker,
volgens besluit van het College voor Promoties
te verdedigen op donderdag 29 oktober 2015
klokke 13.45 uur

door

Edi Iswanto Wiloso
geboren te Malang, Indonesië
in 1962

Promotiecommissie:

Promotor: Prof. dr. G.R. de Snoo

Co-promotor: Dr. R. Heijungs

Overige leden: Prof. dr. P. van Bodegom

Prof. dr. A. Tukker

Prof. dr. M.A.J. Huijbregts (Radboud University)

Dr. C. Bessou (CIRAD, France)

Dr. H. Stichnothe (Thünen Institute, Germany)

This PhD thesis has been produced in the context of a project funded by the Dutch Ministry of Foreign Affairs through the Netherlands Fellowship Programme (grant number CF7412/2011)

Dedicated to Bapak, Ibu, Istri, Kakak, Adek, and Keponakans

Contents

Chapter	Title	Page
1	General introduction	1
2	Key issues in conducting life cycle assessment of bioenergy	11
3	Life cycle assessment of second generation bioethanol	33
4	Effect of biogenic carbon inventory on the life cycle assessment of bioenergy	67
5	A novel life cycle impact assessment method on biomass residue harvesting	83
6	Methodological issues in comparative life cycle assessment	100
7	Answers to the research questions	131
	Summary	139
	Samenvatting	142
	Acknowledgements	145
	Curriculum vitae	146
	List of publications	147