

**LIFE CYCLE ASSESSMENT OF ENVIRONMENTAL IMPACTS  
OF END-OF-LIFE (EOL) MANAGEMENT OF E-WASTE:  
A CASE STUDY OF CRT-TELEVISION**

Sutthichai Khampheeraphakul

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**Thesis Title:** Life Cycle Assessment of Environmental Impacts of End-of-Life (EoL) Management of E-waste: A Case Study of CRT-Television


**By:** Sutthichai Khampheeraphakul

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**Thesis Advisors:** Asst. Prof. Pomthong Malakul  
Dr. Ampira Charoensaeng


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Accepted by The Petroleum and Petrochemical College, Chulalongkorn University, in partial fulfillment of the requirements for the Degree of Master of Science.

  
..... College Dean  
(Asst. Prof. Pomthong Malakul)

**Thesis Committee:**

  
.....  
(Asst. Prof. Pomthong Malakul)

  
.....  
(Dr. Ampira Charoensaeng)

  
.....  
(Asst. Prof. Kitipat Siemanond)

  
.....  
(Assoc. Prof. Metta Chareonpanich)

## ABSTRACT

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Sutthichai Khampheeraphakul: Life Cycle Assessment of Environmental Impacts of End-of-Life (EoL) Management of E-waste: A Case Study of CRT-Television.

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According to the Pollution Control Department (PCD), Thailand has about 2 to 2.5 million sets of TV being discarded in every year. At present, most of these wastes are still treated improperly which could cause severe impacts to the environment and human health. An effective tool to identify and quantify the impacts from product is life cycle assessment (LCA). In this study, LCA is used to assess environmental impacts of CRT television with a focus on its end-of-life management. The data for the analysis were gathered from secondary data sources in available database and primary data obtained from walk-thru survey at the existing sites in Kalasin and Bangkok provinces. The data were analyzed using commercial LCA software, SimaPro 7.1, with Eco-Indicator 95 and CML 2 baseline 2000 methods. For end-of-life study, the CRT-TV waste management (incineration, recycling, and landfilling) from other countries such as China and Japan were explored and developed as references to generate various scenarios for CRT-TV end-of-life management. From the results, it was found that the current situation defined as Base Case had the highest impacts in all impact categories studied, while the improved base case and modified scenarios showed much better environmental improvement. The results obtained from this work provide useful information and guidelines for sustainable e-waste management in Thailand.

## บทคัดย่อ

สุทธิชัย คัมภีร์ภาพกุล : การประเมินวัฏจักรชีวิตผลกระทบต่อสิ่งแวดล้อมของการกำจัดซากโทรทัศน์ประเภทจอคู่ (Life Cycle Assessment of Environmental Impacts of End-of-Life (EoL) Management of E-waste: A Case Study of CRT-Television) อ. ที่ปรึกษา: ผศ. ดร. ป๋มทอง มาลากุล และ ดร.อัมพิรา เจริญแสง 122 หน้า

จากข้อมูลของกรมควบคุมมลพิษพบว่า ซากโทรทัศน์มีปริมาณเพิ่มขึ้นทุกปี โดยในปัจจุบันมีซากโทรทัศน์ประมาณ 2-2.5 ล้านเครื่องและยังไม่มีวิธีการกำจัดที่เหมาะสม ซึ่งจะทำให้ส่งผลกระทบต่อสิ่งแวดล้อมและสุขภาพของมนุษย์ ในงานวิจัยนี้จะประเมินและแสดงปริมาณผลกระทบที่เกิดขึ้นบนพื้นฐานของวิธีการประเมินวัฏจักรชีวิต (LCA) โดยการวิเคราะห์จะมุ่งเน้นวิธีการกำจัดซากโทรทัศน์ ข้อมูลที่ใช้วิเคราะห์ในการศึกษามาจากแหล่งข้อมูลทุติยภูมิและข้อมูลปฐมภูมิจากการลงพื้นที่จริงในจังหวัดกาฬสินธุ์และกรุงเทพมหานคร สำหรับการวิเคราะห์ตลอดวัฏจักรชีวิตใช้โปรแกรม SimaPro 7.1 ด้วยวิธี Eco-Indicator 95 และ CML 2 baseline 2000 วิธีการจัดการกำจัดซากที่ใช้จะมีด้วยกัน 3 วิธี ได้แก่ การเผา การนำกลับมาใช้ใหม่ และการฝังกลบ จากการศึกษาในต่างประเทศ ได้แก่ จีน และญี่ปุ่น และมีการนำเทคโนโลยีในต่างประเทศมาปรับปรุงเพื่อสำหรับการกำหนดวิธีการจัดการกำจัดในประเทศไทย ผลการวิจัยพบว่า วิธีการจัดการกำจัดซากที่ใช้ในปัจจุบันในประเทศไทยส่งผลกระทบสูงที่สุดในทุกด้าน ในขณะที่วิธีการกำจัดซากที่มีการพัฒนาโดยการเพิ่มปริมาณการนำกลับมาใช้ใหม่ และนำเทคโนโลยีจากต่างประเทศมาปรับใช้ในการกำจัดซากจะส่งผลกระทบต่อสิ่งแวดล้อมที่น้อยกว่า โดยในงานวิจัยนี้สามารถเป็นข้อมูลที่เป็นประโยชน์สามารถในการนำมาเป็นต้นแบบในการหาวิธีการจัดการกำจัดซากโทรทัศน์ที่เหมาะสมสำหรับประเทศไทย

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