Available online at www.sciencedirect.com

ScienceDirect

Procedia CIRP 69 (2018) 66 – 71

www.elsevier.com/locate/procedia

25th CIRP Life Cycle Engineering (LCE) Conference, 30 April – 2 May 2018, Copenhagen, Denmark

Designing Future Visions of Sustainable Consumption and Production in Southeast Asia

Yusuke Kishita[a,*], Shogo Kuroyama[a], Mitsutaka Matsumoto[b], Michikazu Kojima[a,c], Yasushi Umeda[a]

[a]The University of Tokyo, 7-3-1, Hongo, Bunkyo-ku, Tokyo 1138656, Japan
[b]National Institute of Advanced Industrial Science and Technology,1-2-1, Namiki, Tsukuba, Ibaraki 3058564, Japan
[c]Institute of Developing Economies, Japan External Trade Organization, 3-2-2, Wakaba, Mihama-ku, Chiba, Chiba 2618545, Japan

* Corresponding author. Tel.: +81-3-5841-6478; fax: +81-3-5841-6478. *E-mail address:* kishita@pe.t.u-tokyo.ac.jp

Abstract

Much attention is being paid to sustainable development goals (SDGs), among which the focus of this paper is on sustainable consumption and production (SCP) in Southeast Asia. The key challenge here is to minimize resource and energy consumption while ensuring an appropriate level of quality of life (QOL). The research question is how visions of SCP in this region in 2050 look like and how the pathways to these visions from the present should be connected. To answer this question, we take a backcasting scenario design approach to gain insight into SCP visions using expert workshops. Generated ideas are represented in the form of logic trees to clarify the cause-effect chain between goals to achieve the vision and possible actions to be taken. Based on the results, the desirable linkage between consumers and producers is discussed.

Peer-review under responsibility of the scientific committee of the 25th CIRP Life Cycle Engineering (LCE) Conference

Keywords: Sustainable development goals; sustainable consumption and production; scenario; backcasting; Southeast Asia

1. Introduction

The United Nations General Assembly adopted sustainable development goals (SDGs) in 2015 [1]. Out of 17 goals described in SDGs, sustainable consumption and production (SCP) in Goal 12 aims to enhance resource and energy efficiency while providing a better quality of life (QOL). To address this, one of key challenges is to achieve the decoupling of resource and energy consumption from economic growth [2]. The focus of this paper is on Southeast Asia including Thailand, Malaysia, Indonesia, and Vietnam, which are often listed as emerging economies. Then, the research question is how visions of SCP in this region in 2050 look like and how the pathways to connect those visions and the present should be achieved by mobilizing various policies and technologies.

To answer this question, we have been working on a governmental project "Policy Design and Evaluation to Ensure Sustainable Consumption and Production Patterns in Asian Region (PECoP-Asia Project)" funded by Ministry of the Environment, Japan [3]. In this project, we take a scenario design approach to providing potential visions of, and pathways to, SCP in Southeast Asia. In this paper, we aim to gain insight into SCP visions based on the results of scenario workshops involving experts, through which the desirable linkages between consumption and production are to be sought. From a methodological viewpoint, we apply a backcasting scenario design process [4], while partially using a forecasting technique to take into account regional characteristics (e.g., demographics and cultures) of Southeast Asia. Backcasting is a concept that explores desirable futures (i.e., visions) after which the connection from the visions to the present is sought in a backward manner [5]. In this paper,

Peer-review under responsibility of the scientific committee of the 25th CIRP Life Cycle Engineering (LCE) Conference
doi:10.1016/j.procir.2017.11.150

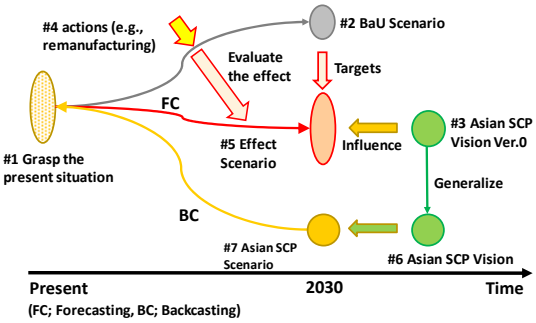


Fig. 1. Approach to designing SCP scenarios to 2050 (adapted from [6]).

we report on an expert workshop that was held in June 2017 to extract various ideas and suggestions for SCP visions.

The rest of this paper is structured as follows. Section 2 introduces the overview of the PECoP-Asia Project with a brief review of literature regarding SCP. Section 3 proposes a method for designing SCP scenarios using a backcasting concept. Section 4 shows prototype scenarios that were developed using the expert workshop, based on which suggestions and challenges to achieve SCP visions are discussed. Section 5 concludes the paper.

2. Designing SCP Scenarios in Southeast Asia for 2050

2.1. Project overview

The PECoP-Asia Project [3] is a five-year project (2016-2020) with the aim of contributing to policy design and evaluation for achieving SCP in Southeast Asian for 2050. As illustrated in Fig. 1, we take a scenario design approach because there are many uncertain factors that might affect SCP and many possible policy options and other measures to be taken. The idea here is to clarify SCP visions and viable pathways by designing SCP scenarios. Here, a scenario is an internally consistent story consisting of an SCP vision and the pathway to connect the vision with the present.

Roughly, the scenario design process in Fig. 1 is divided into two phases. The first phase uses forecasting to understand what might happen in the future in terms of resource and energy consumption. The second phase focuses on backcasting to craft SCP visions and possible pathways to realize the visions. In the previous paper [6], we attempted to develop a business-as-usual (BaU) scenario using a forecasting technique. In this paper, we describe SCP scenarios by drawing on the BaU scenario.

2.2. Business-as-usual (BaU) scenario

Historically, resource consumption is well-aligned with economic growth. In Japan, the possession rates of consumer durables (e.g., refrigerator, air conditioner, washing machine, and automobile) were increased in response to GDP growth from 1960 to 2015 (see Fig. 2). The market of most products including personal computer seems saturated, whereas the economic growth became slower around 2015. Interestingly, the possession rate of automobiles became lower in 2015 (80%) than before (e.g., 85% in 2000).

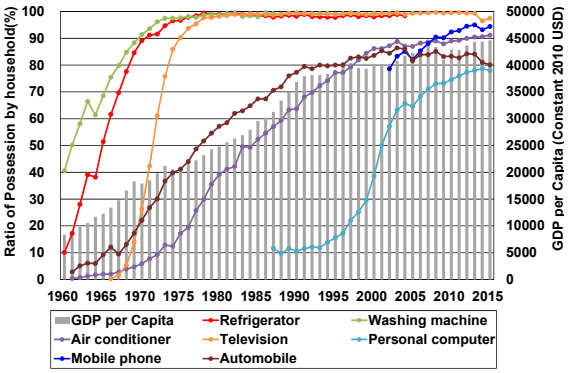
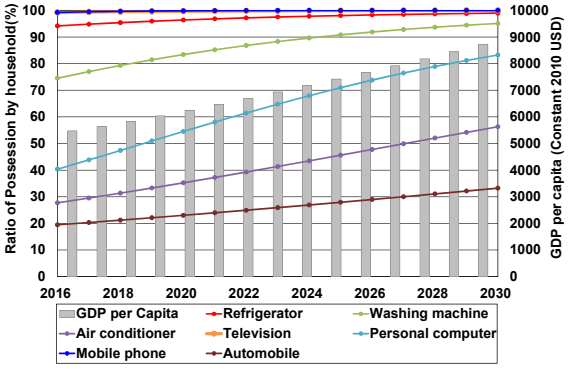
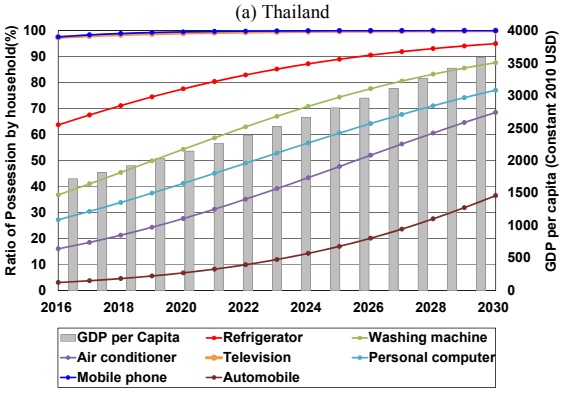


Fig. 2. Possession rate of consumer durables in Japan (1960-2015) (adapted from [6]).



(a) Thailand



(b) Vietnam

Fig. 3. Estimated possession rate of consumer durables (adapted from [6]).

Bao et al. [6] described a BaU scenario for Thailand and Vietnam in 2030. The Bass model [7] was applied to forecast the demand of consumer durables in the future. The GDP per Capita for both countries is expected to grow by 51% (Thailand) and 113% (Vietnam) in 2030 from the 2016 level. The estimated possession rates of consumer durables are described in Fig. 3. The possession rates of mobile phone and television are already saturated in 2016. Those of other products will increase to 2030 in both countries. Among others, the number of automobiles in 2030 is expected to increase twice (in Thailand) and 18 times (in Vietnam) larger than in 2016.