E-ISSN : 2541-5794
P-ISSN : 2503-216X

Journal of Geoscience,
Engineering, Environment, and Technology
Vol 02 No 02 2017

Urban Green Space Development Strategy–Reconverting Gas Station To Public Parks In The City Of Surabaya, Indonesia

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Received: 2 May 2017. Revised : 25 May 2017, Accepted: 31 May 2017, 2016, Published: 1 June 2017
DOI: 10.24273/jgeet.2017.2.2.306

Abstract

Urban Green Space Development has become a challenging task for city governments especially in Indonesia, due to high prices of land around urban centers. On the other hand, there are inconsistencies between land use and land allocation within the city planning. In Surabaya City, quite a lot of gas stations were built on areas which are originally intended for green open spaces. Surabaya City Municipality is strongly committed to reconvert Gas Station Areas to green open spaces as determined in the plan. Innovative strategies have enabled the city government to reconvert 13 gas stations to public parks. This paper analyzes the implementation process of the Urban Green Space Reconversion Policy, describing the historical details of the issues, the taking over of land from gas station owners, and the park development and campaigning. Discussion also includes the most influential factors in this success story.

Keywords: Reconversion, Gas Station, Urban Green Space, Policy

1. Introduction

High urban growth is identified as the main reason of the lack of urban green space in the center of city, whereas city growth must consider the economic and environmental balance. Urban planning without considering environmental aspects will cause eco-living degradation like pollution, increased urban heat, higher vulnerability to disasters, etc.

The amount of green space close to where people live has a significant relation with their perceived health (Maas et al., 2006). Green space is suggested to promote health by providing the means for restoring the mind from mental fatigue (Kaplan, 2001), serving as a resource for physical activities (Björk et al., 2008). Furthermore, various studies have labeled urban green space as a resource that helps reduce stress level, e.g. (Grahn and Stigsdotter, 2003; Nielsen and Hansen, 2007; Ulrich, 2006).

The relation between green space and health is also becoming a visible political agenda (Schipperijn et al., 2010). Many recent national and local health policies, as well as city planning policies, are mentioning positive impacts of the use of urban green space. However, translating these aims into concrete actions for city planning or urban green space management is challenging while documentation and knowledge on how to implement this agenda is scarce to be found in any paper. So the question is how to effectively increase urban green space areas in city centers in an innovative way? What is the most influential factor that influence the success of such projects?

1.1 Surabaya city success story

Surabaya has experienced the worst environmental issues in 1990 when significant increase in air pollution and urban heat had made the city no longer comfortable for living. High urban development without considering the environmental effects had impacted the living quality of the residents. In facing the issues, the municipal government had decided to evaluate the city plan implementation and found out violations. Many commercial activities, mostly gas stations, were carried out on land that were supposed to function as green areas. To reconvert gas stations to their original land allocation, the municipal government had to deal with the facts that these gas stations have very high economic value because of their strategic location, and the land generally has lost its fertility to grow plants because of the concrete hardening and the pollutants caused by rusting or leaking tanks underneath.

This success story, policy, innovation, and the implementation process of how Surabaya increased its urban green spaces in city centers needs to be well documented for reference and good lesson to learn.

The objectives of this research are:

a. To analyze land use reconversion process from gas station to urban green space.
b. To analyze public green parks development from dismantled gas station and its impact to the environment.
c. To determine the most influential factor that influence successful implementation of reconversion policy in Surabaya City.

2. Literature review

Public policy is a proposed course of action of a person, group, or government within a given environment providing obstacles and opportunities which the policy was proposed to utilize and overcome in an effort to reach a goal or realize an objective or a purpose. Based on theories defined by experts, there are 7 factors that influence successful policy implementation: policy content & purpose, policy actor, communication, organization, supporting resources, leadership, and social-economy-political condition.

Urban Green Space is defined as all publicly owned and publicly accessible open space with a high degree of cover by vegetation, e.g. public parks, woodlands, nature areas and other green spaces (Schipperijn et al., 2010; Thaiutsa et al., 2008).

Public Parks in this paper is defined as urban green space that can be used for recreational purposes or outdoor activities, where 60% of its total area must be covered by vegetation (Municipal Regulation of Surabaya No. 7/2002).

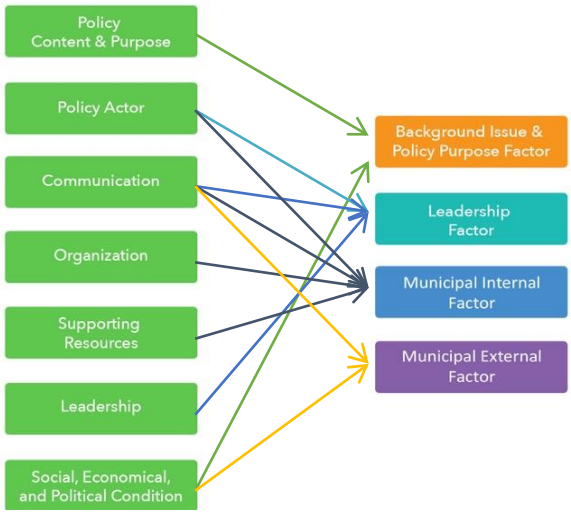

Fig 1. Synthesis of influential factors in policy implementation process.

Based on Fig. 1, the seven influential factors are synthesized into four new factors/indicators that are considered as the most influential factors in the implementation of reconversion.

a) Background Issue and Policy Purpose

A well defined issue serves as an important background/reason for decision makers in creating a policy that can effectively solve the said problem in the society.

b) Leadership

The role of a leader in the implementation of the policy, in this context is the major of Surabaya, is to act as initiator, resources manager, and value keeper.

c) Municipal Internal Factor

The success of the implementation is also influenced by the support of the city government's interntal organization, its communication pattern, and its resources.

d) Municipal External Factor

Planning and implementing a policy needs political and public support, and to ensure maximum public benefits these parties must also monitor the implementaion. Socio-economic-cultural aspects are also considered in the external factors.

These four factors above will be further synthesized to obtain specific parameters that are used as analysis benchmark.

The City Regulation No.7/2002 about urban green space management stated that the municipal government shall stop any permit of the use of urban green space area for any non-urban green area use and shall commit to expand urban green space.

3. Methods

3.1 Study area

The study area in this research is the whole Surabaya City administrative region, which administratively is the capital city of East Java Province. This research specifically will focus on 13 urban green spaces in Surabaya that were created from dismantled gas stations, of which 6 of them were developed as public parks. The substantial scope of this research will cover:

a. Issues that encourage municipality government to reconvert gas stations to public green spaces.
b. Reconversion implementation strategy; starting from decision making process, reconverson process, to development process of the parks so that they are ready to use.
c. Influential factors in the Surabaya successful implementation of its reconversion policy.
d. Impacts of the reconversion from socio-economic and environmental aspects.

3.2 Data collection

To achieve the research goal, data was collected through primary survey using in-depth interview and observation. Secondary survey in the forms of literature study and institutional survey was performed to complete the overall data.

Literatures reviewed in this research include books, regulations, and other references to develop the necessary theories/hypothesis and to gain understanding of the regulations before the primary survey was conducted. Survey was also carried out to institutions that have direct relation with the activities in this reconversion implementation.

In social sciences, Triangulation is often used to indicate that two (or more) methods are used in a study in order to check the results of one and the same subject. The purpose of triangulation in qualitative research is to increase the credibility and validity of the results. There are several types of triangulation (Denzin, 1978) where in this research actor triangulation (Government – NGO – Business Owners) and methodological triangulation (in-depth interview, documents, and observation) were used.

In-depth interview was arranged with stakeholders that have direct relation with this reconversion implementation. They were representatives from city government, former government, NGOs, and experts. Observations were made at the reconverted 13 urban green spaces to note the the physical condition and people activities in and outside the parks.

3.3 Analysis Method

To achive the main objectives, this research used two types of qualitative analysis, which are *descriptive-historic analysis* to evaluate the development process from gas station to urban green space and *Analytic Hierarchy Process (AHP)* to examine influential factors in Surabaya successful reconversion implementation, see Fig. 2.

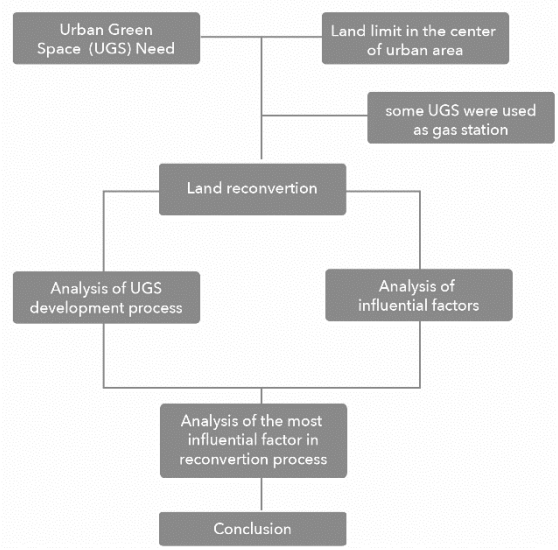

Fig 2. Research framework.

To analyze the development process of urban green spaces from dismantled gas stations using descriptive-historic analysis, every stage of the process is described by referring to the four synthesis factors that influence the successful reconversion.

Analytic Hierarchy Process (AHP) introduced by Thomas Saaty (1980) is used to determine the most influential factor. AHP helps to capture both subjective and objective aspects of a qualitative data by setting priorities and synthesizing the results (Becker et al., 2017).

It is a very flexible and powerful tool because the scores, and therefore the final ranking, are obtained on the basis of the pairwise relative evaluations of both criteria and the options provided by the user (Han et al., 2016). The AHP can thus be considered as tool that is able to translate the evaluations (both qualitative and quantitative) made by any user into a multicriteria ranking. In addition, the AHP is simple because there is no need of building a complex expert system with the user's knowledge embedded in it.

The AHP can be implemented in three simple consecutive steps:

a. Computing the vector of criteria weights
b. Computing the matrix of option scores
c. Ranking the options

With AHP, all factors that are influential to the successful implementation of this reconversion are ranked and one factor in the first rank is considered as the most influential.

Experts assign the cardinal scores using their own subjective judgments. According to previous studies, such as (Wey, 2015) the AHP method is useful for quantifying these subjective judgments when it is combined with fuzzy theory. Table 5 shows the result of AHP procedure for the determination of weights, which are estimated by expert based on each study criterion. For example, expert 1 makes pairwise comparisons to obtain weights for the four factors. Moreover, we donate the matrix by W_f where f is and index of weight for the criteria/factors and e for the expert, with each expert having different weights for each criteria, they have to reach concencus in the evaluation process.

4. Results and discussions

4.1. Public green park development from dismantled gas stations.

The purpose of this analysis is to describe in chronological order the Surabaya public parks reconversion stages from dismantled gas station. Details of this historical descriptive analysis will cover analysis of background issues that affected the creation of public park policy, policy formulation phase, implementation phase, and the development of the parks with their impacts to society. The analysis is structured in such a way that the implementation process can be divided to 2

parts: **land conversion process, and parks development process**.

Land Reconversion Process

This analysis consists of 5 phases, which is shown in Fig. 3. They are the emergence stage of issue, discussion stage of issue, decision taking stage, trial stage, and success land reconvertion stage. Here is the explanation of each step. Table 1 describes the analysis in every stage based on the synthesis of influential factors.

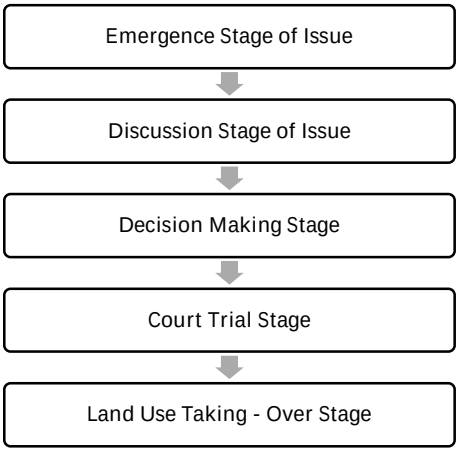

Fig 3. Land reconversion process.

i. Emergence Stage of Issue

The main issue that is being evaluated in this research is land reconversion and not land-use violation. When the land was initially utilized for gas stations, the former owners had obtained proper legal permits from the local government. Sanctioning of violations can only be imposed if goverment has issued non-renewable permit of the said land. Former owners had rented the land for commercial activities for decades, and had paid retribution based on legal permit issued by the government who has the authority to renew any land use rights/contracts for 10-20 years.

ii. Discussion Stage of Issue

An important step in ensuring successful implementation of reconversion policy is to gain approval from the concerned parties. The city government had started early in engaging representatives of the affected society, related governmental bodies, and several environmental non-governmental institutions (NGOs) in a dialogue forum to formulate issues and priorities. The Head of Bappeda (the Regional Development Planning Agency) had been strongly supportive of the reconversion plan, and as a result the Mayor of Surabaya was also convinced of the project. The combined team defined alternatives for implementing the policy.

iii. Decision Making Stage

Regulation Number 7/2002 about Urban Green Space Management in Surabaya was enacted on the December 2, 2002, after which the municipal government has the legal right to stop business activites of any gas station that violate the regulation. Announcement was made to gas station owners through municipal letter no. 540/2256/402.1.2/2002 issued on December 31, 2002. Because city government was not to renew commercial permit for land intended for green spaces, gas station owners were given one year leeway to relocate their bussiness when their permit expires.

iv. Court Trial Stage

Thirteen gas stations examined in this research were specifically selected because the owners had violated the regulation by keeping the operation of the stations when the permit expired. For not being cooperative, the municipal government closed down these stations, took over the land, and started the development of urban parks. Three of the gas stations were owned by the municipal cooperative (Koperasi Pegawai Negeri Sipil Pemkot Surabaya).

Owners of the remaining ten stations filed a lawsuit against the municipal government and the Head of Surabaya Civil Service (Pamong Praja). The plaintiffs also lodged an appeal to the Supreme Court who finally ruled that Surabaya municipal government reserved the right to reconvert the land in dispute and the ten owners had to relocate their business.

v. Land use taking-over stage

Based on Supreme Court ruling, in 2006 the municipal government of Surabaya took over the 13 gas stations and reconverted the land to public green spaces. Each of the parks were developed with different settings:

- Taman Flora (Flora Park)
- Taman Lansia (Senior Citizen Park)
- Taman Buah Undaan (Undaan Park)
- Taman Korea (Korean Park)
- Taman Persahabatan (Friendship Park)
- Taman Pelangi (Rainbow Park)
- Kombes M. Duryat Park
- Ngagel Jaya Utara Street – Manyar Park
- Krembangan Barat/Timur Park
- Indrapura – Tam Kalongan Park
- Jaksa Agung Suprapto Park
- Dr. Soetomo Street – Raya Darmo Park
- Sikatan Street – Veteran Park

Park Development Process Analysis

The development of urban green parks on the reclaimed land were broken down into four stages, see Fig. 4. They are collaboration phase, soil re-fertilization phase, park development phase, and maintenance phase. Table 2 describes the analysis in every stage based on the synthesis of influential factors.

Table 1. Land reconvertion analysis, analyzing every stage of land reconvertion process with the synthesis influential factors in policy implementation process.

Park Development Stages / Factors	2006-2010 *Partnership Engagement Stage*	2006-2008 *Land Refertilization Stage*	2006-2010 *Park Development Stage*	2010-now *Post Development & Maintenance Stage*
Background Issue & Policy Purpose	-	-	-	-
Leadership	Considering the very high cost needed to build parks and the limited amount of regional governmental budget, the Mayor decided to offer an innovative apporach in the form of public-private partnership.	Mayor instructed Head and staff of Environmental Departement to expedite development of parks	Mayor involved actively in the development and construction of parks	Mayor has been involved actively in campaigns on environmental awareness and the benefits of public parks
Municipal Internal Factor	The Environmental Department of Surabaya proposed Public Park Design to private sectors for public-private partnership	The Environmental Department of Surabaya collaborated with experts from Bogor Agricultural University (IPB) to restore soil fertiliy	The Mayor decided that park development was coordinated under the Environmental Department of Surabaya	The Environmental Department deploys security officers and cleaning officers to keep parks in good condition
Municipal External Factor	Several private institutions agreed to partner with the municipal government on parks development under grant or CSR schemes	Environmental experts from Bogor Agricultural University agreed to work with Surabaya Municipal Office in soil re-fertilization program	Residents of Surabaya and NGOs volunteered to help the local government planting trees	Local community living around the parks help to keep the park from public nuisance and reports violations to park security officers

Table 2. Park development analysis, analyzing every stage of park development process with the synthesis influential factors in policy implementation process.

Land Reconvertion Stages / Factors	1990-1995 *Issue Emergence Stage*	1995-2000 *Issue Discussion Stage*	2002 *Decision Making Stage*	2002-2006 *Court Trial Stage*	 *Land Use Taking Over Stage*
Background Issue & Policy Purpose	Decreasing environmental quality of the city had urged the municipal government to develop more urban green space	Municipal government evaluated land use to create more urban green space with limited land resources in the city	-	-	-
Leadership	Lack of concern of the Mayor and the city government for environmental aspects in city development	-	Based on City Regulation No. 7/2002 no permit issued for non-green area use on land allocated for green area, and he mayor was committed to expand urban green space	Despite lawsuit filed by owners of gas stations, the city government was committed to implement reconversion policy	Based on Supreme Court ruling, in 2006 the municipal government started to reconvert gas stations to public green spaces
Municipal Internal Factor	Head of the Regional Planning Agency (Bappeda) encouraged Mayor to develop more public parks	Head of Bappeda suggested land reconversion, espsecially for urban green areas	-	-	A team consisted of Head and staffs of Environmental Department, the Department of Public Works, and Civil Service Police Unit (Satpol PP) started to demolish gas stations
Municipal External Factor	Public parks are essential part of healthy urban cities. NGOs supported the municipal government to increase the numbers of public parks.	NGOs worked togehter with the municipal government in campaigning the importance of public parks	The city government received strong political support. The Mayor was of the same party as legislative majority of the Local House of Representatives.	Owners and workers of gas stations filed lawsuit against the city government. However, residents, NGOs, and media supported strongly the policy, giving more pressure to gas stations owners' for immediate relocation.	NGOs helped the government demolishing gas stations

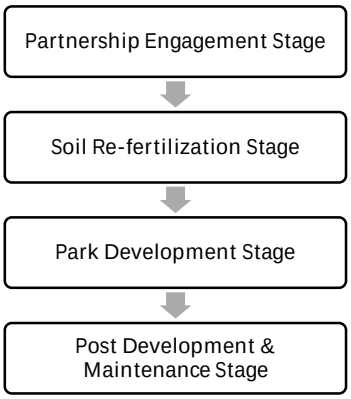

Fig 4. Park development process.

i. Partnership Engagement Stage

Given the limited Regional Government Budget allocated for development of public parks, the municipal government decided to fund parts of the project through public private partnership. This solution was considered as a new innovation because such scheme of funding was not yet common at the time.

The following funding options were applied to different types of parks:

- Municipal Fund (Municipal Budget and self-management)

  The municipal government allocates certain yearly budget for developing and maintaining parks. Parks that are financed by regional budget are passive parks which means that these parks are to function as green belt.

- Public Private Partnership

  The municipal government offered partnership to private sectors for financing development of parks. The common term used by the municipal government is for private companies to become 'foster father' of those parks. Foster fathers were expected to fund the development and maintenance of active parks, and jointly the government and foster father could assign a certain theme. Active parks are to be used by local residents for activities according to its theme. Companies and private organizations participated in this project as foster fathers are Pertamina, Bank Jatim, and Korean Businessmen Association in Indonesia.

ii. Soil Re-fertilization Stage

Surabaya municipal government collaborated with agricultural experts and the department of environmental studies of Bogor Agriculture University to restore soil fertility. Illustration of the re-fertilization process in parks constructed from dismantled gas stations can be seen in the Fig. 5 below.

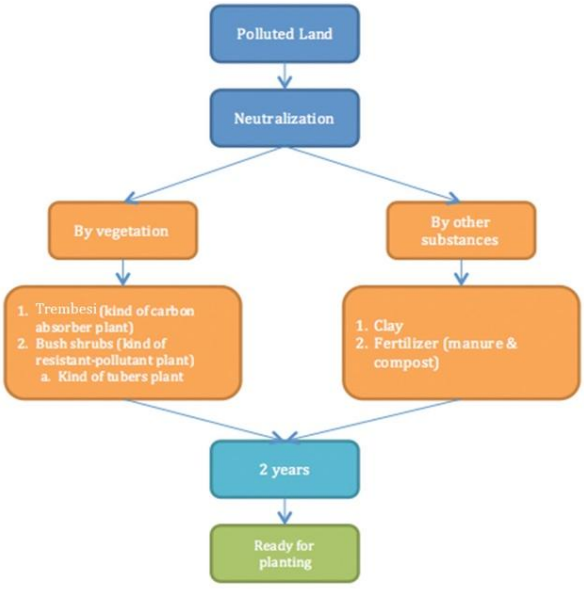

Fig 5. Illustration of land re-fertilization process.

iii. Park Development Stage

During the parks construction period in 2005, the Mayor of Surabaya assgined a former regional spatial development superintendent named Mrs. Tri Rismaharini as Head of Environmental Department of Surabaya. She had brought innovative ideas to attract investors to invest in the development of the parks, as well as to encourage people to take advantage of the newly built green spaces; especially the active parks (see Table 3).

Table 3. Park list and status.

No	Parks Name	Status
1	Taman Flora	Active
2	Taman Lansia	Active
3	Taman Buah Undaan	Active
4	Taman Korea	Active
5	Taman Persahabatan	Active
6	Taman Pelangi	Active
7	Kombes M. Duryat	Passive
8	Ngagel Jaya Utara – Manyar	Passive
9	Krembangan Barat/Timur	Passive
10	Indrapura – Kalongan	Passive
11	Jaksa Agung Suprapto	Passive
12	Dr. Soetomo – Jl. Raya Darmo	Passive
13	Sikatan – Jl. Veteran	Passive

Active parks were designed in such a way that local communities can perform various relaxing activities, recreation, and physical exercise. Each park features 60-90% vegetation cover of its total area, while the remaining 10-40% were constructed for park facitilites, public square, pathways, and seating areas. Passive park was created as urban green belt without any facility for public activities

because 90-100% of its area is covered by vegetation.

iv.Post Development & Maintenance Stage

Fig. 6 below shows increased budget allocation for green spaces maintenance for years 2010-2013. The city government has built more parks within this period, and the increased budget indicates that the municipal government is committed to keep public parks well maintained.

During the first few years of operation, the municipal government deployed security officers to guard and protect parks from obstructions, vandalism, nuisance, and thieves stealing park facilities. Reports showed that assignment of security guards were effective in reducing violations and criminal acts in the parks.

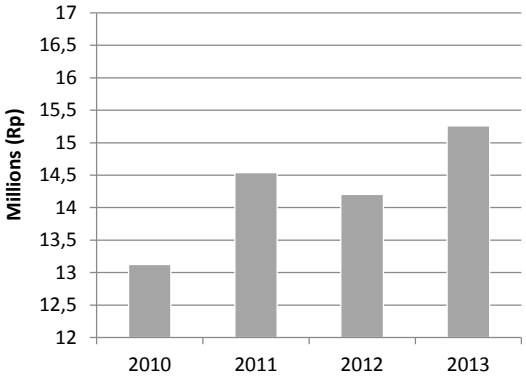

Fig 6. Budget allocation for park maintenance.

Existence of city parks enhances the natural beauty of urban areas and encourages people to care about the environment. Parks can also facilitate change in social behaviour where residents are more willing to do outdoor activities in the park rather than going to malls; and they are more aware of the importance of taking care of public facilities.

4.2. Analysis of factors influencing the successful implementation of reconversion.

This analysis examines factors affecting public green park reconversion by identifying components collected in the interview and secondary data. The aim is to gather information of collaboration culture, which will be presented in a descriptive summary.

Four influential factors that are listed in Fig. 1 are treated as factors, each with its designated numbers F1 to F4. The expert panel consists of 5 experts, first assigns scores/criteria weight to each factor. The four sets of scores / criteria weight are shown in Table 4. The matrix of AHP result can be seen in Table 5; and the final ranking of the criteria is shown in Table 6.

Table 4. The FAHP result: criteria weight (W_{id}) estimation by five experts.

Factor i (=1,...,4)	Experts				
	E1	E2	E3	E4	E5
F1	0.06	0.06	0.06	0.06	0.06
F2	0.31	0.26	0.56	0.56	0.56
F3	0.31	0.12	0.12	0.12	0.26
F4	0.31	0.56	0.26	0.26	0.12

Table 5. Matrix of AHP result related in between each factor.

Matrix	F1	F2	F3	F4
F1	-	1/6	1/4	1/5
F2	6 1/8	-	3	1 5/7
F3	3 2/3	1/3	-	4/7
F4	4 5/6	4/7	1 5/7	-

Table 6. Summary result of AHP analysis, ranked from the most to least influential factors.

Factors	Weight	Rank
F2 *(Leadership)*	46.6%	1
F4 *(Municipal External Factor)*	29.0%	2
F3 *(Municipal Internal Factor)*	18.2%	3
F1 *(Background Issue & Policy Purpose)*	6.1%	4

The most influential factor in this implementation process from AHP is Leadership which has 46.6% weight from the others. The second is Municipal External Factor (29%), followed by Municipal Internal Factor (18.2%), and Background Issue and Policy Purpose (6.1%).

5. Conclusion

Surabaya Municipality has succeeded in reconverting gas stations to public green spaces and at the same time in encouraging residents to visit public parks by creating different theme for every park.

Land conversion process was broken down into 5 stages, which are issue emergence stage, issue discussion stage, decision making stage, court stage, and land reconversion stage.

Based on Municipal Regulation about Green Space Management, the Mayor of Surabaya issued instruction letter no 540/2256/402.1.2/2002 on December 31, 2002 about green space use permit. The letter clarified details of non-extendable land use permits for gas stations and the one year leeway for gas stations owners to relocate their bussiness

Park development process, based on the different activities involved, were broken down into four stages which are cooperation stage, re-fertilization stage, park development stage, and maintenance stage.

The most innovative way from this policy policy implementation is how the municipality of Surabaya seek any opportunity from its limited land, by re-evaluating land use implementation in the city center. In this context, the municipality has legitimate public interest to increase its urban green space inside the city center. The municipality has strong commitment to reconvert the land that doesn't suppose to be urban green space, develop it, and gave interesting theme for every park to attract people.

The Surabaya Municipal also engaged its residents and other external parties in every stage of the process. Even the Mayor himself and the Head of Park and Cemetery Department were directly involved in the planting of vegetations in the parks and actively joined the environmental campaign. Today, these public green parks have become an important eco-life symbol of Surabaya City and have set a precedent for many cities in Indonesia and around the world. Existence of public parks in urban areas have changed people behavior to be more care about eco-lifestyle and have increased community awareness in maintaining public facilities well.

Based on Analytic Hierachy Process, factor that is regarded as the most influential in supporting implementation of public park policy is the Leadership factor. This conclusion is supported with data obtained from media sources and the numerous numbers of leadership awards and accolades received by the Mayor of Surabaya during the period of 2002-2013.

6. Recommendations

Municipality has a strategic role in increasing urban green spaces in the city. Central Government can develop an official documentation of the case in Surabaya to be used as a reference for other municipalities in increasing urban green spaces.

To balance urban growth with environmental sustainability, the Indonesian government needs to create an independent institution to help central and local government enforcing environmental laws. In the US, the agency responsible for performing environmental inspection especially in urban and industrial areas is the United States Environmental Protection Agency. One of EPA's duties is reviewing the number and distribution of gas stations in urban areas. EPA inspects and provides guidance for construction of gas stations to prevent faults in underground tank installation which could pollute soil and ground water. EPA also offers technical advice on rehabilitation of gasoline contaminated soil.

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