

## Bio Mass Initiative; Awareness and Practice: Case study, Subang Jaya

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### Abstract

Public awareness and active engagement in environmental programmes are associated with a better quality of life (Kamaruddin et.al. 2016; Mohit 2016). This exploratory study highlights the level of awareness and practice of residents in the bio mass initiative of a case study area. Self reported descriptive responses indicate that having awareness and knowledge regarding waste management does not necessarily result in actual sustainable waste practice. This paradox is consistent with other findings of similar studies (Kamaruddin et.al. 2016). Practical steps are identified to encourage residents and help sustain the bio mass initiative programme implemented by a local authority in Selangor, Malaysia.

**Keywords:** Biomass Program, Community Involvement

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### 1.0 Introduction

Government environmental programs require public awareness and active engagement as these are crucial success factors of most sustainable waste management programs (SWM) (Kamaruddin et al. 2013; Kamaruddin & Omar 2011). Thus, there is a need to evaluate public opinion and practice regarding such programs. Waste composition data from Majlis Perbandaran Subang Jaya (2014) shows that organic waste (37%) is second largest after recyclable material (46%), but most organic waste such as green or food waste are disposed of without being recycled. Majlis Perbandaran Subang Jaya (MPSJ) through its initiative with the Japanese Government undertook the Basic Promotion Plan for Biomass Utilization in which the aim of this program is to promote the Biomass Town Concept. MPSJ launched the Integrated Biomass Centre in 2012. This exploratory study intends to highlight the level of awareness and practice of residents of the case study area regarding bio mass initiatives and propose practical steps to encourage residents towards SWM. With the information gained, more relevant strategies can be implemented to help expand and sustain the program. The researchers of this study interviewed five key stakeholders and obtained self-reported responses using questionnaires from 120 residents of Subang Jaya. Through descriptive analysis, the findings of this case study indicate that having awareness and knowledge regarding biomass waste management does not necessarily result in actual sustainable waste practice. This paradox in knowledge and environmental practice is consistent with other similar studies (Kamaruddin et.al. 2016; Voyer et al. 2015). Some interventions are required, e.g., material and monetary incentives/rewards; more publicity and practical programs that focus on different age groups; involvement of CSR that can be implemented to support SWM.

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### 1.1 Sustainable Waste Management and Development Strategy

The Malaysian National Solid Waste Management Plan and the Rio Declaration of 1992 identify that environmental and sustainable waste management require the active involvement of both authorities and communities. The long-term growth strategic planning serves as a guide and the basis for solid waste policy and practice in Peninsular Malaysia until the year 2020. The purpose of this strategic planning is to provide a framework within which Malaysia can reduce the amount of waste it produces and manage this in more sustainable ways. These strategic plans introduce the concept of federalization and privatization in waste management function and services. Some of the important aspects of this initiative are about an implementation of sustainable waste management through reduction, re-use and recovery and the use of appropriate technologies, facilities, and equipment to provide a sustainable and comprehensive solid waste management service. Inter-government cooperation within federal, state and local government is crucial for this effort to succeed. Public participation is imperative, and a social framework needs to be adopted which comprise making the public aware, understand, partner with others and take actions towards sustainable waste management (Embong et al. 2013; Kamaruddin et al. 2013). To follow the waste hierarchy option, any transformation in current solid waste management practices must have clear objectives and targets. The actions taken must care about strategic aspect (environmental, political, economic, institutional, social, technical and also financial) and the functional elements (collection, transfer, recycling, treatment, and disposal). In response to waste minimization objective, local authorities are encouraged to introduce new initiatives and economic approaches such as incentives and collection fees to reduce the number of household wastes to facilitate the exchange of wastes.

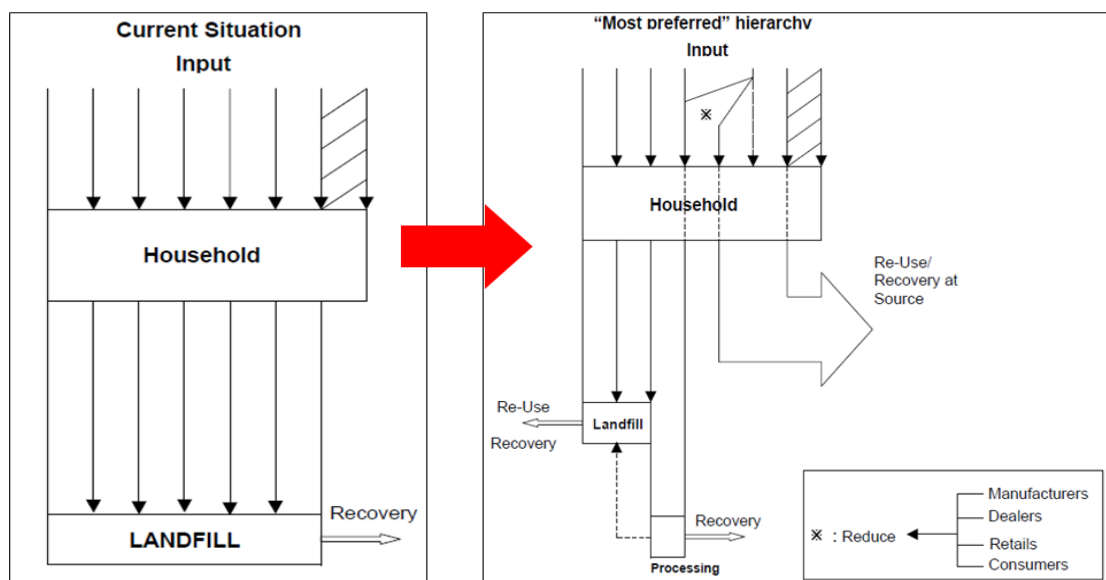


Fig. 1: Implementation of Waste Hierarchy in Waste Stream Flow  
(Source: Department of Local Government MHLG, 2005).

### 1.2 Bio Mass Initiative

According to Sarkanen & Tillman (2013), biomass is the process of conversion of non-recyclable waste materials (or organic materials) into benefit able heat, electricity and fuel through several methods, including anaerobic digestion, combustion, pyrolyzation, gasification and landfill gas (LFG) recovery. This waste to energy process is a transition from conventional energy systems to one based on renewable resources to meet the ever-increasing demand for energy and to address environmental concerns (MPSJ 2014). Biomass also can be interpreted as reuse of biodegradable organic material originating from organic living (such as animals, plants and micro-organisms) including half of the municipal solid waste which comprise of food waste for the purpose of energy production (Sarkanen & Tillman 2013). Currently in Malaysia, waste-to-energy or biomass initiatives are implemented by using agricultural residues as a feedstock. As one of the largest producers and exporters of palm oil in the world, palm oil residues contribute almost 85.5% of biomass resources in Malaysia while 9.5% is sourced from municipal and residual waste from other agricultural industries.

Under the Basic Promotion Plan for Biomass Utilization, the Japan Government introduces East Asia Biomass Town Promotion Project. The goal is to promote the Biomass Town Concept by utilizing regionally based biomass sources comprehensively by local municipality (MPSJ 2014). By announcing 286 local authorities designated as Biomass Town in April 2011, Japan Government try to disseminate Japan's Biomass Town project to selective East Asian Towns. Four countries agreed to involve i.e. Thailand (Loei prefecture NaDuang Village), Vietnam (Ho Chi Minh City-Cu Chi District), Indonesia (South Sumatera Province Palembang City) and Malaysia (Subang Jaya City - Seri Serdang District). MajlisPerbandaranSubang Jaya's (MPSJ) decision to launch the Serdang Biomass Town Project together with MPSJ Bandar Bukit Puchong Integrated Biomass Centre in 2012, showed its commitment to a local government authority (LA) to use biomass initiatives as a strategy to minimize waste generation

Biomass is a new strategy for LAs in Malaysia to reduce waste. Data from the LA's waste composition study in Subang Jaya showed that waste in that municipal consist of 46% recyclable material, 37% organic waste and 17% others waste (MPSJ, 2005). From its total waste recovery rate of 20.16%, 19.94% is from the recovery of recyclable material and 0.22% from the utilization of

organic waste using biomass initiative. A key challenge in recovering municipal solid waste as biomass source is to increase household waste separation activity. Another is to reduce the high expenditure of maintenance. The budget cost in 2012 was RM 65.3 million and increased to RM 65.5 million in 2013. The cost is a quarter of the total revenue of MPSJ thus reduces the budget for other development.

## 2.0 Case Study Area and Methodology

Subang Jaya City covers 161.1 km square that includes four main zones: Subang Jaya Town, Kinrara Town, Puchong Town and Seri Kembangan Town. There are three MPSJ's biomass facilities i.e. Integrated Biomass Centre Bandar Bukit Puchong, Serdang Wet Market Anaerobic Digestion Biogas Plant and Serdang Wet Market Vermicomposting Centre. Projects covered under the MPSJ's biomass initiative are:

- i. Green waste composting project
- ii. Food waste composting project
- iii. Vermicomposting project
- iv. Communal composting project
- v. Anaerobic digestion biogas project
- vi. Used cooking oil biodiesel project; and
- vii. Waste separation project

Subang Jaya Municipal Council (MPSJ) is one of the 12 local authorities under the Selangor state administration. In 2013, MPSJ was awarded as a 5-star local authority under the Malaysian Local Authority Star Rating System, organized by Ministry of Housing, Local Government & Urban Well-Being. MPSJ administration area has a high population of 642, 100 in 2015. There is a total of 92,036 housing units in MPSJ area which comprise of terrace houses, flats, squatter houses, semi-detached houses and bungalows (Table 1). In this study, a questionnaire was designed to obtain data about residents' socio-demographic background, general awareness and involvement in the biomass initiative. The questionnaires were distributed at random to different households in Subang Jaya Town, Kinrara Town, Puchong Town and Seri Kembangan Town. The researcher obtained 120 completed survey forms where 44 respondents or 36% were aged between 40-49 years followed by 40 respondents aged between 30-39 years (33%). 20 respondents were aged 20-29 years (20%) and finally eight respondents for each were aged 11-19 years (7%) and aged 50-59 years (7%). The profile of the respondents is shown in Section 1.4.1.

Other primary data obtained through expert interviews with stakeholders i.e. officials and waste managers views on the challenges of the biomass initiative (Table 6). Secondary data from the local authority are waste composition produced by the household of different income levels (Table 2), data on the volume of green waste for its composting project (Table 3), data for used cooking oil for the biodiesel project (Table 4).

Table 1: Housing Types in MPSJ Area.

Sub-areas	Squatter	Terrace	Flats	Semi-D	Bungalows	Total
Seri Kembangan	1,059	12,647	5,422	488	394	20,010
Kinrara & Puchong	1,084	17,814	12,552	539	579	32,568
Subang Jaya	916	22,459	13,540	1,402	1,141	39,458
Total	3,059	52,920	31,514	2,429	2,114	92,036

Source: Majlis Perbandaran Subang Jaya, 2006.

## 3.0 Analysis and Findings

### 3.1 Respondents Profile

Table 2: Gender of respondents.

Gender	Numbers of Respondent by Area				Total
	Subang Jaya Town	Kinrara Town	Puchong Town	Seri Kembangan Town	
Man	15 (12.5%)	13 (10.8%)	15 (12.5%)	12 (10.0%)	55 (45.8%)
Woman	15 (12.5%)	17 (14.2%)	15 (12.5%)	18 (15.0%)	65 (54.2%)
Total	30 (25.0%)	30 (25.0%)	30 (25.0%)	30 (25.0%)	120 (100%)

The majority of the respondents have completed secondary school with 49 respondents having HSC/Diploma/Certificate/ STPM (40.8%), followed by 28 respondents with Degree holders (23.3%), 23 respondents with SPM (19.2%) and eight respondents with Ph.D. (6.7%).

Table 3: Residence of Respondents

Type of House	Numbers of Respondent by Area				Total
	Subang Jaya Town	Kinrara Town	Puchong Town	Seri Kembangan Town	
College	-	-	-	5 (4.2%)	5 (4.2%)
Terrace	10 (8.3%)	13 (10.8%)	12 (10.0%)	15 (12.5%)	50 (41.7%)
Bungalow	3 (2.5%)	-	-	-	3 (2.5%)
Apartment/Flat	14 (11.7%)	17 (14.2%)	18 (15.0%)	10 (8.3%)	59 (49.2%)
Semi Detached	3 (2.5%)	-	-	-	3 (2.5%)
Total	30 (25.0%)	30 (25.0%)	30 (25.0%)	30 (25.0%)	120 (100.0%)

### 3.2 Food Waste Composting Project

Under the Biomass Town Project, MPSJ collected food waste from various sources such as housing area and food court and processed into bio-compost. In the urban area, household, commercial, industrial and institutional units produce organic wastes such as food waste, green waste and used cooking oil.

A mechanical process (composting machine) is used to process food waste into bio-fertilizer compost product. The secondary data obtained from MPSJ (Table 4) indicate that organic waste is produced by every household regardless of the household income at an average at 48% of the waste composition. Yard waste is highest among the high-income households, i.e., from bungalows or semi-detached houses as compared to the low-income families who prefer to stay in flats.

Table 4: Waste Compositions Based on Income Level of Household in MPSJ Area.

No	Categories	High Income RM8001 and above	Medium Income (RM3001- RM8000)	Low Income (RM3000 and below)	Average
Unit in %					
Organic					
1	Food waste	40.47	48.62	55.02	48.04
2	Bones	1.69	0.52	1.57	1.26
3	Waste papers	16.34	20.09	14.84	17.09
4	Plastics (F)	4.46	5.33	6.25	5.35
5	Plastics (R)	3.53	4.18	3.47	3.73
6	Polystyrene	0.41	0.85	0.47	0.58
7	Textile	0.92	0.92	3.70	1.85
8	Rubber & Leather	4.75	0.25	0.47	1.82
9	Wood	0.09	0.34	0.23	0.22
10	Yard waste	14.20	5.40	0.15	6.58
11	Diapers	6.36	2.06	6.75	5.06
Sub-total for organic		93.19	88.53	92.90	91.57
Inorganic					
12	Glass	3.40	4.33	3.41	3.71
13	Ferrous	1.25	1.81	1.76	1.61
14	Non-ferrous	0.01	0.05	0.00	0.02
15	Aluminium	0.52	0.47	0.13	0.37
16	Batteries	0.00	0.04	0.06	0.03
17	Electrical & Electronics	0.08	0.02	0.43	0.18
18	Others	1.57	4.75	1.32	2.50
Sub-total for inorganic		6.81	11.47	7.11	8.42
TOTAL		100	100	100	100

Source: Majlis Perbandaran Subang Jaya, 2014



Fig. 2: Flow of Food Waste Composting Process  
(Source: Department of Environmental Management of MPSJ, 2014).



Fig. 3: Flow of Vermicomposting Process  
Source: Department of Environmental Management of MPSJ, 2014).

Figure 3 shows that there are three (3) types of organic waste as biomass sources which are; green waste, food waste or market waste and used cooking oil. This type of organic waste can be treated using two concepts of the end product; waste-to-wealth (produce bio-fertilizer compost product) and waste-to-energy (produce biogas and biodiesel for fuel product).

### 3.3 Green Waste Composting Project

Landscape management is part of local council services with the scope of work maintaining the hard and soft scape elements. The local authority's scope of work includes trimming trees which produces green waste as a residual. The conventional composting method treat green waste into bio-fertilizer compost and is simple, easy and cheap. Unfortunately, this manner will take a longer time (60-90 days) because it depends on natural degradation and require a large space. Currently, there is a demand for biofertilizers from the green agriculture sector.

Table 5: Data for Green Waste Composting Project.

Year	Green Waste Processing for Composting Project (ton)
2008-2012	959.0
2013	13.39
2014	34.65

Source: Department of Environmental Management of MPSJ, 2014.



Fig. 4: Flow of Green Waste Composting Process  
Source: Department of Environmental Management of MPSJ 2014

### 3.4 Used Cooking Oil Biodiesel Project

Used cooking oil biodiesel project is another waste-to-energy conceptual project. This project involves the process of collecting used cooking oil from food courts and household area before treatment process to transform into biodiesel. This project runs under a smart partnership program, between MPSJ and a private company (Fat Hopes Energy Sdn. Bhd.). With mutual understanding, the company agrees to invest in operational and capital expenses. Besides that, MPSJ gives permission and space for this company to locate biodiesel machine at MPSJ Integrated Biomass Centre Bandar at Bukit Puchong.

Table 6: Data for Used Cooking Oil Biodiesel Project.

Year	Data for Used Cooking Oil Biodiesel Project (ton)
2010	85.85
2011	17.35
2012	8.8
2013	6.29
2014	40.56

Source: Department of Environmental Management of MPSJ, 2014.



Fig. 5: Flow of Used Cooking Oil Biodiesel Process (Source: Department of Environmental Management of MPSJ, 2014).

### 3.5 Home Composting Project

Home Composting is a green activity and simple mini project of applying the concept of waste-to-wealth among the public. MPSJ encourage residents to run composting activities individually at their home by supplying free composting bin. With that, the public can separate organic waste individually and help minimize the waste generation by practicing home composting. According to Department of Environmental Management of MPSJ (2014), from the year 2010 until 2014, there are more than 750 residents willing to participate and practice composting, and this is a good indicator of public engagement in the Biomass Town Project.





Fig 6: Public Participation for Home Composting Project  
Source: Department of Environmental Management of MPSJ, 2014

### 3.6 Communities opinions related to bio mass town program

The majority of respondents are aware of the Biomass Town Program launched in 2012. (See Table 7). 59.2% or 71 of them had heard and knew about this Subang Jaya Biomass Town initiative conducted by MPSJ. However, 40.8% which is 49 respondents were unaware about this initiative.

Table 7: Status of Public Awareness about Biomass Town Program.

Are you aware about the Biomass Town Program?	Numbers of Respondents by Area					Total
	Subang Town	Jaya	Kinrara Town	Puchong Town	Seri Kembangan Town	
Yes	18 (15.0%)	16 (13.3%)	15 (12.5%)	22 (18.3%)		71 (59.2%)
No	12 (10.0%)	14 (11.7%)	15 (12.5%)	8 (6.7%)		49 (40.8%)
Total	30 (25.0%)	30 (25.0%)	30 (25.0%)	30 (25.0%)		120 (100.0%)

The respondents that were unaware attributed to the 'lack of the publicity given' (57.1%) followed up by 'always being away' at 22.44% and 'new resident' at 20.41%. However, all respondents have gained information about the biomass project from various sources (See Figure 7). It is worth noting that aside from advertisements, neighbours and officemates relay the information. Television is the medium that gave the least information to respondents. Respondent's also suggested that distributing more pamphlets about the Subang Jaya Biomass Town Program (63.3%) could help to raise more awareness while 36.7% answered that getting regular feedback about the program is useful.

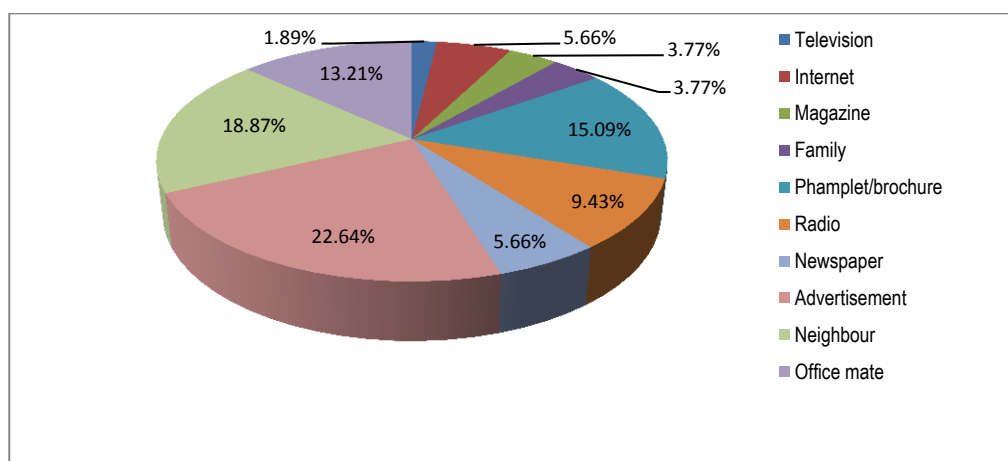


Fig. 7: Sources of Subang Jaya Biomass City Information.

### 3.7 Communities Knowledge of the Bio Mass Program

Table 8 shows respondents' knowledge regarding various statements using a scale of (1) Strongly Disagree, (2) Disagree, (3) Agree and (4) Strongly Agree. Based on the information in Table 7, a total of 75 (62.5%) people understood the concept and only 45 (37.5%) people did not know about the Subang Jaya Biomass Town Program. As for recycling, 105 (87.5%) respondents claimed that they

understood the recycling concept where only 15 (12.5%) of them did not. 110 (91%) people are aware that they need to practice the separation of the organic waste from other waste. Also, 115 (96%) respondents had agreed that recycling could reduce the waste transfer to a landfill and also acknowledge that recycling can reduce the expenditure costs. 115 (96%) respondents agreed that food waste could use to make compost and 74 (62%) of them said that composting is easy while 46 (38%) of them didn't agree

Table 8: Scale of Knowledge and Awareness.

No.	Awareness/Knowledge	(Disagree)		Scale		(Agree)	
		1	2	3	4	3	4
1.	I understand the concept of Green Town/Biomass Town Serdang.	23	22	65	10		
2.	I understand recycle concept.	8	7	71	34		
3.	We do not need to separate the organic waste from another solid waste.	71	35	8	6		
4.	Recycle can reduce the waste to landfill.	0	5	42	73		
5.	Recycle can reduce the expenditure cost.	0	5	69	46		
6.	Food waste can be used to make compost.	0	5	75	40		
7.	Composting is easy to do.	10	36	39	35		
8.	The main compositions to make compost are plastic and paper.	54	61	3	2		
9.	Used cooking oil can be used as fuel (biodiesel).	12	18	58	32		
10.	Repetition using the same cooking oil is not good for our health.	0	8	89	23		

Note:-

1. Strongly Disagree
2. Disagree
3. Agree
4. Strongly Agree

Most respondents (96%) didn't agree that plastics and papers are the main compositions in compost indicating some knowledge on composting. Regarding used cooking oil, 90 (75%) people agree that used cooking oil can process into biodiesel but 30 (25%) people did not agree, suggesting a lack of knowledge. 112 (93%) of them acknowledged that consuming recycled cooking oils is detrimental to one's health.

### 3.8 Communities Knowledge of the Bio Mass Program

Table 9 shows the respondents' household practices. They were given a choice to answer the questions using scale mark given of (1) Strongly Disagree, (2) Disagree, (3) Agree and (4) Strongly Agree.

Table 9: Scale of Practice.

No.	Practice	(Disagree)		Scale		(Agree)	
		1	2	3	4	3	4
1.	After eating, I separate food waste from other waste (plastic, paper, straw) before throw into the garbage.	18	69	20	13		
2.	I separated the wastes generated from home before generator collected the waste.	16	65	25	14		
3.	I did not use recyclable food container because the price is costly compared to polystyrene.	8	43	61	8		
4.	I have encouraged my family to practiced recycle.	10	43	55	12		
5.	I participated in the recycling program in my residential area.	5	59	33	23		
6.	I recycled solid waste to make money.	26	69	19	6		
7.	I often used plastic bag given by the seller.	38	70	12	0		
8.	I threw food waste in the garbage.	12	21	76	11		
9.	I supported composting practice from food waste.	20	15	76	9		
10.	I reused food waste to make compost.	15	79	21	5		
11.	I gave food waste to my pet.	14	70	28	8		
12.	Usually I threw used cooking oil into the sink.	8	31	72	9		
13.	Usually I threw used cooking oil into the drain.	76	28	9	7		
14.	I collected used cooking oil into the bottle before I threw into the garbage.	76	12	27	5		
15.	I collected used cooking oil into the bottle before recycling.	64	21	26	9		
16.	I reused the cooking oil again and again without throwing it away.	69	35	10	6		

Note:-

- 1 - Strongly Disagree; 2 - Disagree; 3 - Agree; 4 - Strongly Agree

From the information in Table 9, only 27 % of the respondents separate their food waste and the rest did not (87 respondents). Currently, separation of food waste is not compulsory. For recycling practice, most of the respondents (69 respondents) did not participate in the recycling program but there are recycling centers in Subang Jaya City. However, 42% of them do recycle. Other studies (Xu et al. 2016) highlight that people feel recycling can be an inconvenience especially when the recycling center is far from their house (Kamaruddin 2010). However, 67 respondents (59%) encouraged their family member to recycle but may not practice recycling. Most of the respondents (69) used recyclable food container compared to polystyrene. This practice is commendable and environmentally friendly. Question number 7 indicates that most of them used the plastic bag given instead of bringing along the



recyclable bag to the shop. This practice may contribute to more generation of plastic waste (Asmuni et al. 2015). Many of the respondents (72%) also throw away the residue of food waste (87 respondents) into the garbage instead of reusing it for other purposes like composting. This practice suggests the lack of knowledge about the composting process and program. From the table, few respondents make money from recycling practices as they are unwilling to send recyclables to the recycle sale center. Related to the respondent's practice in the handling of used cooking oil, most of them (81 respondents or 67%) throw away the used cooking oil into the sink despite having the knowledge that it is processable as biodiesel. This paradox suggests that having knowledge may not transform into practice despite MPSJ's effort to engage a company to collect used cooking oil within the Subang Jaya neighbourhood..

### 3.9 Respondents' Opinion on the success of the Bio Mass Program

Respondents highlight that the project is not very successful but can have an impact in the future. The survey revealed that 89 or 74% thought that the Biomass Town Program is not successful and only 31 or 25% thought positively. Those that were positive about its success believed that the program had encouraged residents to practice separation of waste and recycling practices more. Those that felt the program failed attributed to lack of participation and lack of publicity about the program. However, 105 (88%) of them thinks that the program should continue.

### 3.10 Professional stakeholders' opinions related to biomass town program

Table 10 highlights the interview session with the target group regarding biomass initiative. The table highlights each of the respondents' answers. Notes: N/A – No Answer

.Table 10: Comparison of Stakeholder's Opinion of Subang Jaya Biomass Town Program.

Topic	Stakeholder			
	Local authority (MPSJ)	Federal Government (JPSPN)	Institutional (UCTC, UPM)	Private (Worldwide Holding)
Biomass initiative	<ul style="list-style-type: none"> <li>Very important</li> <li>Waste as a resources for renewable energy</li> </ul>	<ul style="list-style-type: none"> <li>Very important</li> <li>Treat waste to get energy</li> <li>Reduce waste to get longer landfill life span</li> <li>New business opportunity</li> </ul>	<ul style="list-style-type: none"> <li>Totally agreed</li> <li>Need to implement for environmental conservation</li> </ul>	<ul style="list-style-type: none"> <li>Very important</li> <li>Clean development mechanism</li> </ul>
Interest of biomass initiative	<ul style="list-style-type: none"> <li>Method for organic waste reduction</li> </ul>	<ul style="list-style-type: none"> <li>As a tool for waste minimization</li> <li>Important component in waste treatment &amp; processing</li> </ul>	<ul style="list-style-type: none"> <li>Longer landfill life span – save space</li> <li>Reduce disposal cost</li> </ul>	<ul style="list-style-type: none"> <li>To capture methane gas – reduce carbon foot print</li> <li>Renewable energy</li> </ul>
Issues related biomass initiative	<ul style="list-style-type: none"> <li>Selection of location for facilities setup</li> <li>Public awareness – separation at source</li> </ul>	<ul style="list-style-type: none"> <li>Organic waste supply – sustainability</li> <li>Processing cost – return of investment</li> </ul>	<ul style="list-style-type: none"> <li>Waste generation depend on location, activity and population</li> <li>Location for facilities set up – buffer zone, land use, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Technology provided</li> <li>Resource option – palm oil mill, sludge, etc.</li> </ul>
Effectiveness	<ul style="list-style-type: none"> <li>Low impact – only 2% from 20.8% waste minimization rate in Subang Jaya City</li> <li>Problems – no advance technology, lack of human resources, complicated procedure</li> </ul>	<ul style="list-style-type: none"> <li>Not effective but can't be justify as fail program</li> <li>Problems – no collective cooperation, time constraint (still new program)</li> </ul>	<ul style="list-style-type: none"> <li>Small project for big impact – used cooking oil biodiesel project</li> <li>People need to feel the impact</li> </ul>	<ul style="list-style-type: none"> <li>Good project</li> <li>Need backup or incentive from government (fit in tariff, etc.)</li> </ul>
Good urban planning and management solution	<ul style="list-style-type: none"> <li>Waste management need to integrate together with urban planning and management</li> </ul>	<ul style="list-style-type: none"> <li>Waste management is part of urban management</li> <li>Strategic planning</li> </ul>	<ul style="list-style-type: none"> <li>Important of urban planning &amp; management – planning, implementation, assessing</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
Concept of "Waste to Wealth"	<ul style="list-style-type: none"> <li>Agree</li> </ul>	<ul style="list-style-type: none"> <li>Agree</li> </ul>	<ul style="list-style-type: none"> <li>Agree</li> </ul>	<ul style="list-style-type: none"> <li>Agree</li> </ul>
Awareness	<ul style="list-style-type: none"> <li>Using incentive to create awareness</li> </ul>	<ul style="list-style-type: none"> <li>Continuously promotion</li> <li>Direct contact – seeing is believing</li> </ul>	<ul style="list-style-type: none"> <li>Big challenge</li> <li>Continuously repeating</li> <li>Soft approach</li> </ul>	<ul style="list-style-type: none"> <li>Still low – not many people aware</li> </ul>
Improvement strategies	<ul style="list-style-type: none"> <li>Enhancement – man, machine, method, material</li> </ul>	<ul style="list-style-type: none"> <li>Collective responsibility</li> </ul>	<ul style="list-style-type: none"> <li>Public understanding and commitment</li> <li>Enforcement</li> </ul>	<ul style="list-style-type: none"> <li>Local creativity and innovation for biomass technology</li> </ul>
Financial budget	<ul style="list-style-type: none"> <li>Special budget for biomass town program – development, maintenance</li> </ul>	<ul style="list-style-type: none"> <li>Financial backup short term and long term</li> </ul>	<ul style="list-style-type: none"> <li>Financial backup – monitoring &amp; valuing</li> </ul>	<ul style="list-style-type: none"> <li>Financial backup from government (incentive)</li> </ul>

The professional stakeholders believe that the biomass program is beneficial to the urban community and is a part of an integrated waste management. All agencies agreed that its implementation has advantages and can give benefit not only to the environment and community. Most important thing, this initiative will be used as a tool for waste minimization program that can reduce

the cost of waste disposal. At the same time, organic waste will reduce. Biomass Initiative is a green project which can reduce carbon foot print and can help to minimize the impact of greenhouse gasses on the earth.

#### 4.0 Conclusion

Several issues require due consideration. The first is the need to increase awareness using the most practical and preferred medium and method, i.e., encouraging neighbours and colleagues towards more active participation in biomass activities. MPSJ could also periodically monitor and give monetary incentives to the participants of the biomass program and acknowledge neighbourhood communities who successfully implement and sustain the plan. The public needs to be made aware and is relevant for program success. Another issue is the selection of the area for biomass facilities setup where the location must be in the right place, convenient to the public. In addition to ensuring planning standards and buffering is in place (Musthafa et al. 2015) facilities need to be set up in an area that has high waste generation. The third issue is the sustainability of organic waste supply is highly linked to a successful source separation program, and the residents may be unaware or need to be trained with, proper knowledge of this. Most of the respondents agree that this biomass initiative only gives a little impact but has enormous potential in the future. Where it only reduces 2% of waste generation in Subang Jaya City, it is due to stakeholders not collectively cooperating. Although only a small portion of the public is starting to know and practice the biomass activities such as home composting, and waste separation this is understandable since the biomass program was only launched for the last 3-4 years ago.

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