# Water Purification Technology FOR for Calamities and Emergencies





**SOLPA 6600C** 

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## MOVIE





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## Company's Management Principles

## **Management Principles**

The management principles also originate from the wisdom of the "Human" spirit which governs the management of MIJ



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## **1. Background & Objectives**

#### World Disasters





The world is experiencing droughts and floods, and an unusual climate causes many victims. The most important thing for them is water and electricity for survival.

## 1. Background & Objectives

## Refugees

- No minimum water supply for life support
- The minimum amount of water required for survival is 7 liters per day

#### Relief supplies for Rohingya refugees

- Since August 2017, Bangladesh's Rohingya refugees inflow route has reached 700,000 people
- The Bangladesh government does not provide electricity for refugees NGOs purchased electricity and provided . Emergency generator
- Due to lack of water purification facilities, spread of waterborne diseases
   such as acute aqueous diarrhea



- Waterborne disease exposure through contaminated water
- Typhoid fever, cholera and other diarrhea and dehydration symptoms
- Every year 1.8 million children under 5 years of age are infected with waterborne diseases. 1.8 million children under 5 years of age die from waterborne diseases
- The children carry a water bottle for several hours in order to get water.









## 2. Goals & Objectives







#### **Drinking Water& Generating Electricity**

- Supplying pure, safe, and high-quality drinking water to 200~300 village in the region
- Generating electricity using stand-alone photovoltaic system and operating water-purifying equipment

#### **\*** the selection criteria of water-purifying equipment, sunlight, and battery level

- Installation of stand-alone water purification system in the village selected
- Stand-alone photovoltaic system: PV 300W \* 6 total production amount is 1.8 kW/hr
- Battery Charging Capacity is 100A, 12Vdc, 12EA

Model	SOLPA 2K (Carrier Type)	SOLPA 6600C (Container Type)
Spec.	<ul> <li>Body products output : AC(220V),</li> <li>DC(12V) / 2.0Kw~3.0Kw</li> <li>Rechargeable solar cell (100W x 2ea)</li> <li>Battery 1.2Kw(12V, 100AH)</li> <li>120PSi (Water PumP) / 3 Step Filter</li> </ul>	<ul> <li>Stand-alone photovoltaic system: PV 300W * 6</li> <li>: total production amount is 1.8 kW/hr</li> <li>Battery Charging Capacity is 100A, 12Vdc, 12EA</li> </ul>
Capacity of Purifier	<ul> <li>\$ 50~80L / 1hour</li> <li>\$ 1,000L / Day (only Purifier)</li> <li>▷ 1,000,000ml</li> <li>: 2,000 Bottle/500ml</li> </ul>	<ul> <li>♦ 6,600 GPD(24Ton/Day) → 1,000L / 1Hour</li> <li>♦ 24,000L / Day</li> <li>▷ 24,000,000ml</li> <li>: 48,000 Bottle/500ml</li> </ul>
Price	1,800 USD	37,000 USD
Picture		<image/>

#### **SOLPA 2K**

## Inside & Outside of Product





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#### **SOLPA 2K**



## <MIJ water purifier / generator>





#### Product Overview

- Renewable generator.
- Purifying ability : High contaminated water
   1.5liter/min, Low contaminated water 3-5liter/min
- R/O Membrane Filter 1set(4ea), Cleaning Filter 2ea
   can change depending on water condition
- Capable output : AC220V (1.8KW ~3.0KW)
- DIMENSIONS
- Weight : 15Kg
- Size : W 340 x H 560 x L 290mm
- The generated power is only for Purifying, Extra external batteries shall be required for other loads
- Product base configuration (Including Option, Accessories)
  - Body products output: AC(220V), DC(12V)/200W~1.8KgW
- Option #1 : Rechargeable solar cell (100W x 1ea)
- Option #2 : Battery 1.2KW(12V, 100AH) External battery
- Accessories(Consumables) : LED Lamp, LED Cord, Solar Cord, AC Charging jack, Battery cable

#### **SOLPA 2K**

#### **Solar Generator**







## Commercial R/O system – Standard of ChungHo Nais







#### The world's first water-cooled pump applications



Minimize the noise of the high-pressure pump applies to products with low noise

#### Easy filter replacement



Screw type with anyone quickly and easily replace the filter

#### Easy to use



Can only start and stop automatically, press the power switch

#### ► Large capacity



Large capacity water purifier available

### Simple Design



Lightweight and compact

## 4. Description of Activities





In Korea, some of the facilities (water purification facilities, etc.) are produced, packed and transported to the Philippines. Once you arrive in Manila, set up each facility and start piloting with local representatives or residents

local representatives or residents



Field survey (check for existence of wells, check water quality of wells, secure containers for facilities and sites where solar power is possible)

power is possible



The facilities install independent solar power systems and water supply tanks on the container

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### **5. Expected Results**

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#### **Outputs**

Installation of 1 unit of SPS & WPS in a rural area of Philippines is considered as major outputs

#### Outcome

- SPS & WPS will be demonstrated as an option for drinking water and self-generating power system.
- This will exhibit the effectiveness of SPS & WPS to improve the quality of life in rural area of Philippines by providing clean water and energy.

#### Impacts

- Supply of clean drinking water that is always drinkable
- Solar power generation, minimum power can be supplied in addition to clean drinking water even without grid connection
- User perception toward use of new technology will be enhanced

#### The Solar Power System and Water Purification System (SPS & WPS)

## No one left behind (in water sector)



#### Stable Drinking Water Supply

- It is portable and can be supplied anywhere in the purified water.
- Always provide constant purified drinking water.
- Resolving the lack of water for refugees, prevention of waterborne diseases



#### Stable Power Supply

- By generating electricity through photovoltaic power generation, we eliminate concerns about the unstable power supply of refugee camps.
- Even when midnight and power generation are impossible due to the surplus power storage through the charged battery
- Operation of water purifier, securing power supply and emergency power, charging mobile phone, etc.
- Continuous power supply to emergency facilities including medical facilities is possible

#### Improve the quality of life for safe and healthy life

## 6. Operation Flow Chart

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## 7. Raw water primary treatment

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#### Nano micropore generating alumina ceramic air diffuser



Air diffuser produced by patent technology of "Korea Ceramic" uses micr opores of  $0.01 \sim 0.5 \mu m$  size to inject air into itself and to generate a lot of micro air bubbles.

- 1. Technology to float organic matters in the wastewater;
- 2. Technology to supply oxygen for a long time are unique patent technologies held by Korea Ceramic at home and abroad.

#### Air floating process concept by fine air bubble induced bonding and floating of solid particless



<Fine air bubbles>



<Fine air bubbles + Bonding and floating of solid particles>

## 7. Raw water primary treatment

## Nano microspore ceramic (Floatation system)

Membrane air diffuser air bubble generator

Sludge on the top after purification

In 20 minutes









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## 8. System Layout

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Figure 2: System P&ID (Pipe and Instrument Diagram)

Figure 3: System LAYOUT

## 9. Outside/Inside LAYOUT 3D View





Figure 4: Outside LAYOUT 3D VIEW

Figure 5: Inside LAYOUT 3D VIEW

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## **10. Monitoring System(App.)**





The installed system is equipped with data loggers and various sensors (located at the tank's inside, solar water purifier devices and control panel) which will collect data about the water flow, level of solar purifier systems, solar battery charging level with positioning the system(recording the data in every 15- 30 minutes).

Figure 1: Groundwater purification system using stand-alone solar systems with Internet of Things (Process Flow Diagram)

## **11. Characteristics**



Generation and Water Purification Facilities Using Solar Power

## **12. Applications**

#### **SOLPA 2K**

- ► For drinking water Purifying with stream, reservoir, river water in up-countries.
- Purifying water at disaster area, military operations.
- Power for TV, electric fan, laptop computer, lamp, heating mat at camping, outdoor party.
- Power for street vendor.
- ► Backup(Sub) power for The hinterland, country house.
- Emergency lighting for students at unexpected power failures.
- Power for lighting at dark place work.
- ▶ Main power for An island country, A floating home.



#### Actual use in a Floating house







## **Experiences Reliability Serviceability**

#### **Dalian in China**



Supplying Drinking Water

(35 m3/d)

#### **Battambang in Cambodia**



Supplying Drinking Water (40 m3/d)

#### Yangon in Myanmar



Supplying Drinking Water (20 m3/d)



## **Experiences Reliability Serviceability**

#### Luke Kudusa in Ethiopia



Supplying Drinking Water (40 m3/d)



Supplying Cooking Water at Haiphong LG Display (28 & 75m3/d)

#### **Guri in Republic of Korea**



**Emergency Drinking Water (25m3/d)** 



## **13. References**

Year	Site	Desciprtion & Spec.	Remarks	Pic.
2010	Dalian in China	Supplying Drinking Water (35 m³/d)	Completed	
2012	<u>Battambang</u> in Cambodia	Supplying Drinking Water in <u>Battambang</u> University (40 m³/d)	Completed	
2012	Qingdao in China	Supplying Water for living (24 m <sup>3</sup> /d)	Completed	
2012, 2015	Yantai in China	Supplying Water for living (40 m <sup>3</sup> /d)	Completed	

Year	Site	Desciprtion & Spec.	Remarks	Pic.
2012 ~ 2017	Andong Village in Rupublic of Korea	Supplying Drinking Water (13 m³/d ~ 26 m³/d)	Completed	
2014	Sri Lanka Village	Supplying Drinking Water (20 m³/d)	Completed	
2015	Yangon in Republic of the Union of Myanmar	Supplying Drinking Water (20 m³/d)	Completed	

Year	Site	Desciprtion & Spec.	Remarks	Pic.
2016	Gongiu of EX. in Republic of Korea	Supplying Drinking Water (12m3/d)	Completed	
2017	Guri in Republic of Korea	Emergency Drinking Water (25m3/d)	Completed	
2017 ~ 2018	Haiphong In Vietnam	Supplying Cooking Water in LG Display (28~75m3/d)	Completed	
2018	Luke <u>Kudusa Kebele</u> / <u>Silte Woreda</u> / SNNPR in Ethiopia	Supplying Drinking Water (40 m3/d)	Completed	
2018	Equatorial Guinea	Supplying Cooking Water (20 m3/d)	Processing	-
2018	Dangjin in Republic of Korea	Supplying Drinking Water for Domestic Animals in Daily Farming (75 m3/d)	Processing	L.



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## **13. References**(Yen son School Langson Vietnam 1.)















## **13. References**(Yen son School Langson Vietnam 2.)

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## 13. References (YogJakarta/Jakarta, Indonesia)

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Selamat Datang Pemerintah Provinsi Gangwon, Korea Selatan Kunjungan Kerja dan Presentasi Water Purifier Generator & Lactobacillus Welcome Ceremony and Presentation 환영식과 발표 Jokara City Indonesia 8° December 2016





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## 13. References(Nepal)

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### Installed at the Library







**Installed at School** 





## 13. References(Sri Lanka / Director of waterworks)









## **13. References (Video)**





