

WORKSHOP  
CLEAN ENERGY IN VIETNAM AFTER COP21

# REPORT

**USE OF INDUSTRIAL WASTES (IW) AS ALTERNATIVE FUELS (AF)  
IN VIETNAM CEMENT INDUSTRY CORPORATION (VICEM)**

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# 1. INTRODUCTION

## 1. Necessary of research

- Vietnam has from 6 to 7.5 million tons IW and up to 2020 will be from 9 to 13.5 million tons
- IW processing cost from 300 to 600 US dollars/Ton. IW causes environmental pollution and adversely affects the life of communities
- Vietnam Cement Industry Corporation (Vicem) take 34% of the cement market in Vietnam, uses 3 million tons of coal per annum, accounts for about 20–25% of the production cost and now its demand(s) of AF from IW is very big, can substitute 15% conventional fuels

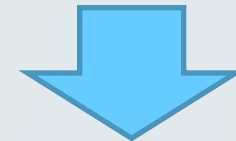


Necessary of research

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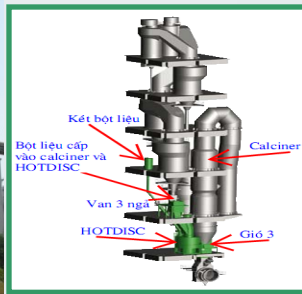
## 2. Scientific and practical meanings

- *Building data on IW used as AF aiming at efficient energy use and sustainable development of Vicem*
- *Contributing to Vicem's benefits on economy-society-environment in cement production, especially on energy and environment*



**Scientific and practical meanings**

## Vicem's Cement Plants Demand of energy



## Industrial wastes Demand of IW treatment



✓ Using a big amount of fossil fuels (oils, coals, gas, electricity)

✓ Big quantity

✓ Having ability of IW as AF (Co-processing IW in kilns)

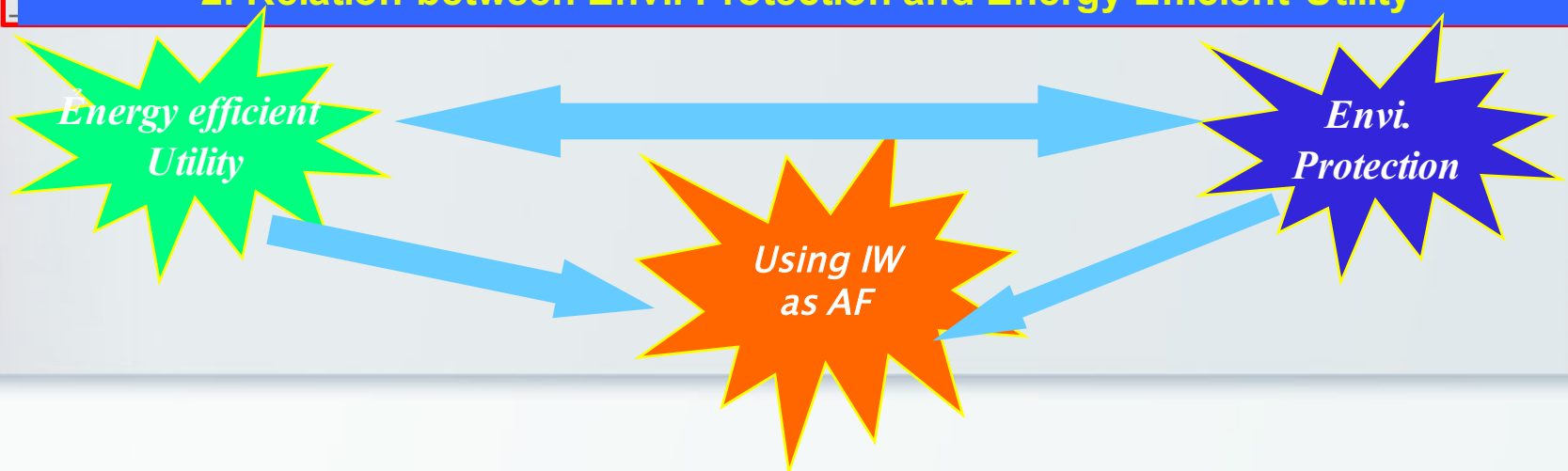
✓ High treatment costs, wasting IW

✓ Can use IW as AF to substitute 15% fuels or more

✓ Causing envi. pollution

✓ Needs to be used as AF

## 2. Relation between Envi. Protection and Energy Efficient Utility



## 2. Advantages in IW use as AF in cement kilns

- ***For Cement kilns:***

Cement kilns have a number of characteristics which make them ideal installations in which IW can be completely destroyed and burnt in safety:

High temperature from 1,350 to 1,450°C and long residence time from 5 to 10 seconds in kiln and more 3 seconds in precalciner can destroyed 99,99% IW including persistent organic pollutants.

Alkaline environment: IW composition contains the compounds of chlorine or sulphur, hydrogen chloride and sulphur dioxide are also disposed, they are absorbed and neutralised by the freshly formed lime and other alkaline.

- ***For IW resources used as AF:***

Vietnam have now from 6 to 7.5 million tons IW and up to 2020 will have from 9 to 13.5 million tons IW per year. In which, 30% amount of IW can be AF for cement production .

AF ash can provide important constituents building the clinker phases.

AF are generally cheaper than the fossil fuels because most of the AF are generated from wastes.

Limit pollution.

The Vietnam MoRE issued Vietnam National Technical Regulation 41/2011/BTNMT for co-processing of hazardous.

### 3. Disadvantages in IW use as AF in cement kilns

- IW is usually not same on dimension and unsorted. Therefore, it needs to be sorted and pretreated before using them .
- IW is collected from factory in industrial zones or in factories far away from the cement plants, mainly focused in the North and South economic regions of Vietnam.
- The burning systems in cement plants are installed for using conventional fuels such as oils, coal (Fossil fuels). So, for using IW, those systems must be upgrades in conformity with IW usage.
- IW contains both hazardous and nonhazardous wastes. As Vietnam environmental laws, the hazardous wastes must be controlled pursuant to the Circular No. 36/2015/TT-BTNMT issued by The Ministry of Natural Resource and Environment, dated 30 June 2015 on hazardous wastes management.

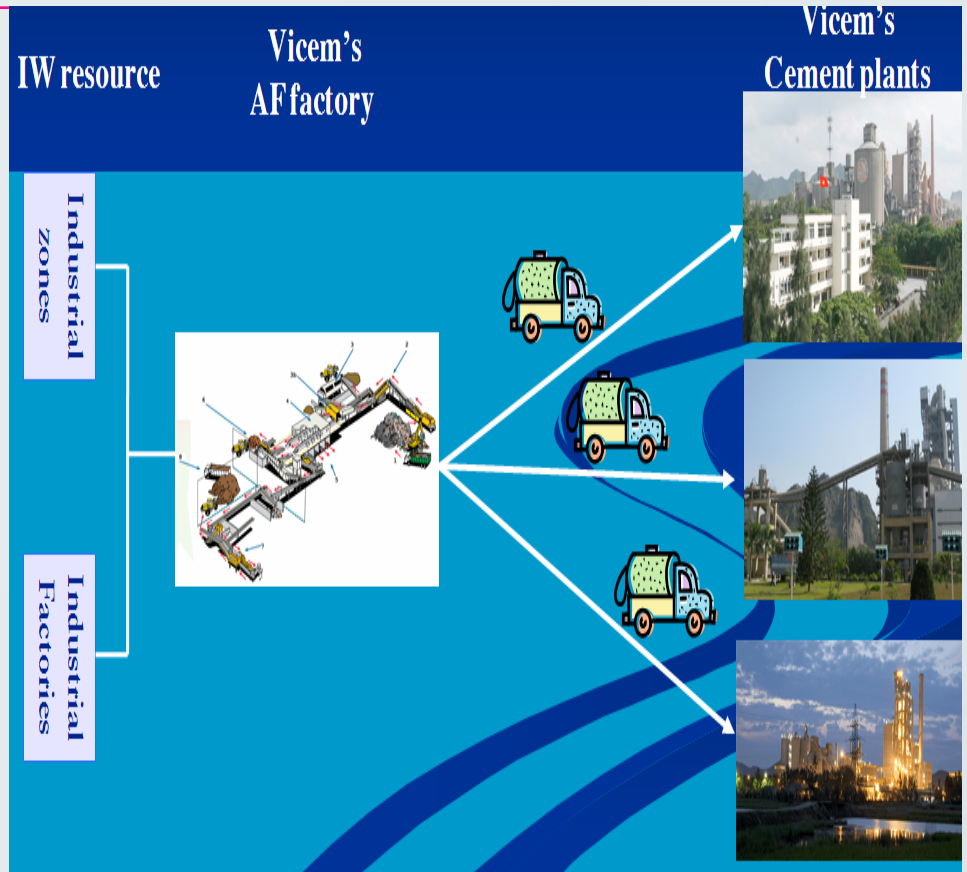
## 4. Alternative fuels from IW

IW groups	Humidity (%)	Ash content (%)	Calorific value (kcal/kg)
✓ <i>Waste leathers, Waste rubbers</i>	2-12	4-20	3,610-4.725
✓ <i>Waste woods, sawdusts</i>	5-20	0,6-4	4100-4700
✓ <i>Packaging, cartons</i>	2-8	3-6	3300-4200
✓ <i>Waste lubrication and oil, waste organic solvents *</i>	1-5	>2	8,600-13,400
✓ <i>Waste plastics</i>	-	4-20	6500-8800

➔ **30% amount of IW can be AF for cement production**

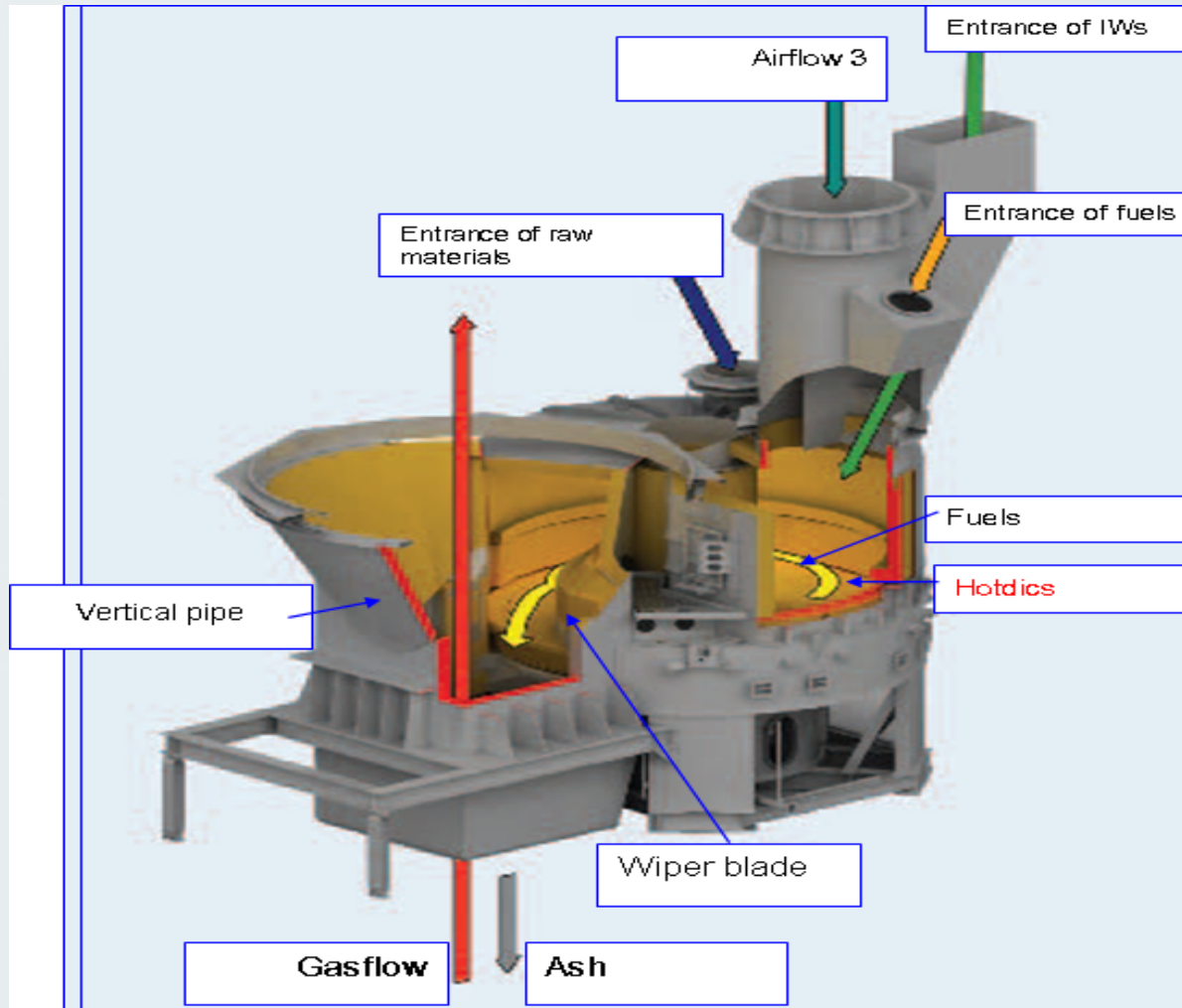
## 5. Model of IW use in Vicem

- Model of IW use in Vicem is based on aspects such as IW collection capacity, demands of AF use at plants, IW distribution ability to Vicem's plants
- Vicem will establish an AF

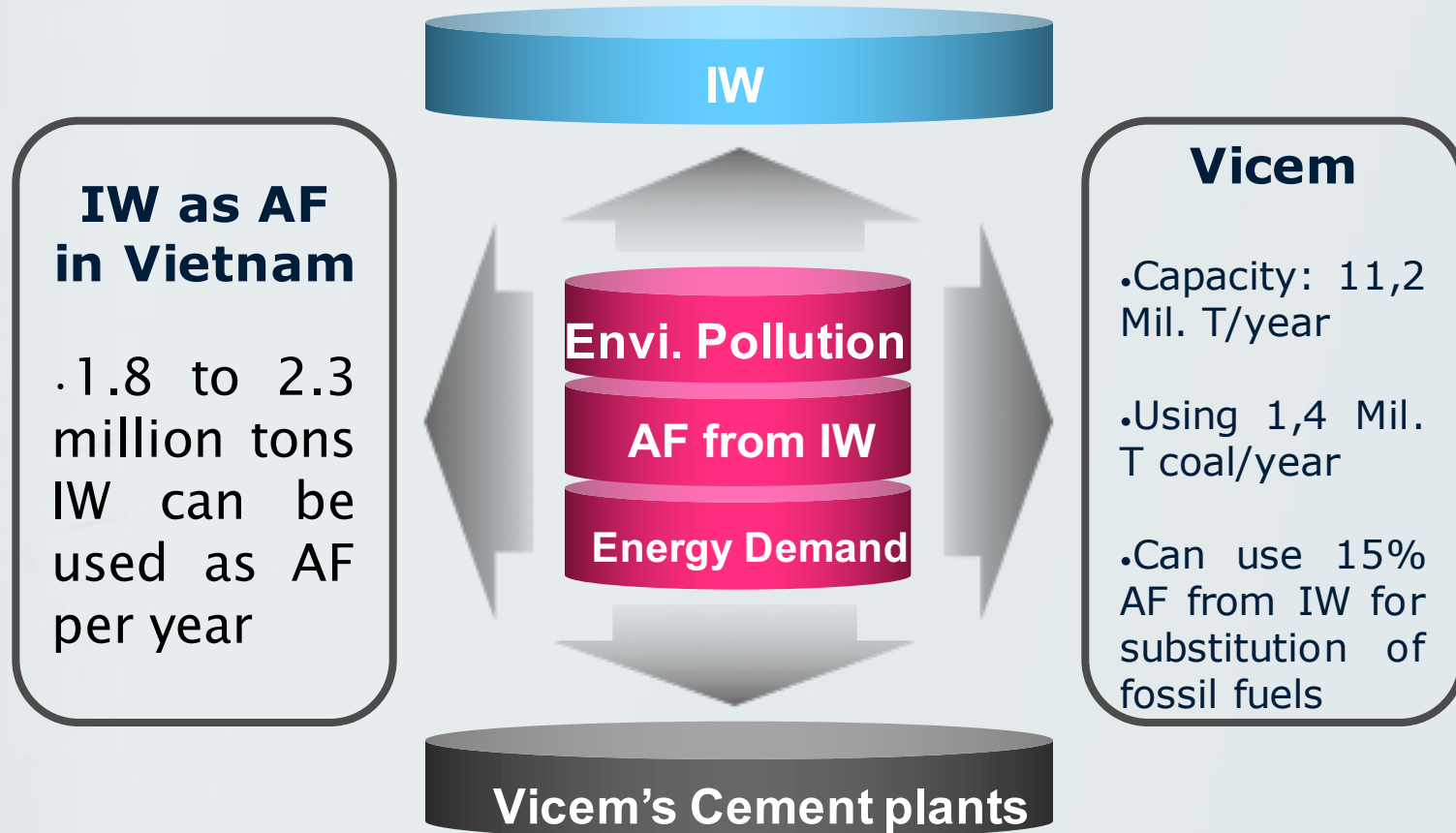




## 6. Tech. diagram of using IW in cement kiln



## 7. Economic benefits of the IW use as AF



## 8. Socio - Environmental Benefits of the IW Use as AF

- Minimize environmental disputes in society IW pollution;
- Saving non-renewable resources as coal, oil;
- Limit emissions of greenhouse gases (GHG) and ozone depleting gases (ODS);
- Suitable to orientation for environmental protection and sustainable development of Vietnam and the international conventions to which Vietnam has acceded to or ratified (UNFCCC 1992 (towards COP21 in Paris), Montreal Protocol 1987, Vienna Convention 1985 ...etc).

# CONCLUSION



- *The research process of IW use as AF has selected out 9 groups IW, which have the ability to use as AF for the cement industry, especially for Vicem*

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- *Helps for the Vietnam industry such as cost saving in production and in IW treatment, taking advantage of alternative energy resources*

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- *Reducing greenhouse gas emissions, protecting the environment*

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- *This really is a great potential, opening up opportunities in green growth and sustainable development for Vicem*

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A spiral-bound notebook with a silver pen resting on it. The notebook is light blue and the pen is silver with a blue nib. The text 'THANK YOU!' is written in large, bold, blue letters in the center of the page.

# THANK YOU!

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