

RESEARCH LINES

FACULTY OF ENGINEERING

UNIVERSIDAD COOPERATIVA DE COLOMBIA



Universidad Cooperativa
de Colombia

UNIVERSIDAD COOPERATIVA DE COLOMBIA (UCC)



The UCC is a private institution of higher education that belongs to the solidarity economy created in 1983, as the successor of the Institute of Social Economy and Cooperative Sector - INDESCO.



- More than 4,000 full-time professors.
- 7 Faculties.
- Over 55,000 students in 18 important cities in Colombia.
- Second largest university student population of Colombia.

Locations: 18 cities in Colombia

Arauca
Barrancabermeja
Bogotá
Bucaramanga
Cali
Cartago
El Espinal
Ibagué
Medellín
Montería
Neiva
Pasto
Pereira
Popayán
Quibdó
Santa Marta
Villavicencio



Locations of the UCC Research Groups in Engineering: 1 Cat. B, 8 Cat. C, 2 Cat. D, 1 Not Recognised

Arauca

Barrancabermeja

Bogotá

Bucaramanga

Cali

Cartago

El Espinal

Ibagué

Medellín

Montería

Neiva

Pasto

Pereira

Popayán

Quibdó

Santa Marta

Villavicencio

- Automatización Industrial

- Ingenio Induspymes

- Neotic

- Giti

- Grupo de Investigación en Ingeniería Aplicada

- Grupo Agua y Desarrollo Sostenible en Ingeniería, AQUA

- Termomec

- SODA

- GRIAUCC

- Eslinga

- Ingeniería Sostenible e inteligente

- GIPIS



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6 NATIONAL RESEARCH LINES IN ENGINEERING

1. Industrial automation
2. Energy, Water and Environment
3. Software Development
4. Information and Communications Technology
5. Structure, Materials and Soil
6. Supply Chain

+ 80 researchers in
Engineering
Nationwide



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Some International Collaboration

Parties

Action details

| | |
|-------------------|------------|
| MoU | 06/13 |
| CSO Approval date | 15/11/2013 |
| Start of Action | 15/05/2014 |
| End of Action | 14/05/2018 |

Participations

| Country | Date | Status |
|------------------|------------|-----------|
| ▶ Austria | 28/01/2014 | Confirmed |
| ▶ Belgium | 05/02/2014 | Confirmed |
| ▶ Bulgaria | 25/02/2014 | Confirmed |
| ▶ Croatia | 17/12/2013 | Confirmed |
| ▶ Cyprus | 27/10/2014 | Confirmed |
| ▶ Czech Republic | 28/04/2014 | Confirmed |
| ▶ Denmark | 19/12/2013 | Confirmed |
| ▶ Finland | 19/12/2013 | Confirmed |
| ▶ France | 13/01/2014 | Confirmed |
| ▶ Germany | 07/01/2014 | Confirmed |
| ▶ Greece | 11/12/2013 | Confirmed |
| ▶ Hungary | 31/07/2014 | Confirmed |
| ▶ Ireland | 30/01/2014 | Confirmed |
| ▶ Israel | 22/01/2014 | Confirmed |
| ▶ Italy | 13/03/2014 | Confirmed |
| ▶ Latvia | 07/10/2014 | Confirmed |
| ▶ Lithuania | 16/04/2014 | Confirmed |
| ▶ Norway | 05/03/2014 | Confirmed |
| ▶ Poland | 28/11/2013 | Confirmed |
| ▶ Portugal | 21/01/2014 | Confirmed |
| ▶ Romania | 05/12/2013 | Confirmed |
| ▶ Serbia | 25/01/2014 | Confirmed |
| ▶ Slovakia | 12/12/2013 | Confirmed |
| ▶ Slovenia | 20/03/2014 | Confirmed |
| ▶ Spain | 18/11/2013 | Confirmed |
| ▶ Sweden | 10/02/2014 | Confirmed |
| ▶ Switzerland | 24/03/2014 | Confirmed |
| ▶ Turkey | 22/01/2014 | Confirmed |
| ▶ United Kingdom | 22/11/2013 | Confirmed |
| Total: 30 | | |

Intentions to participate

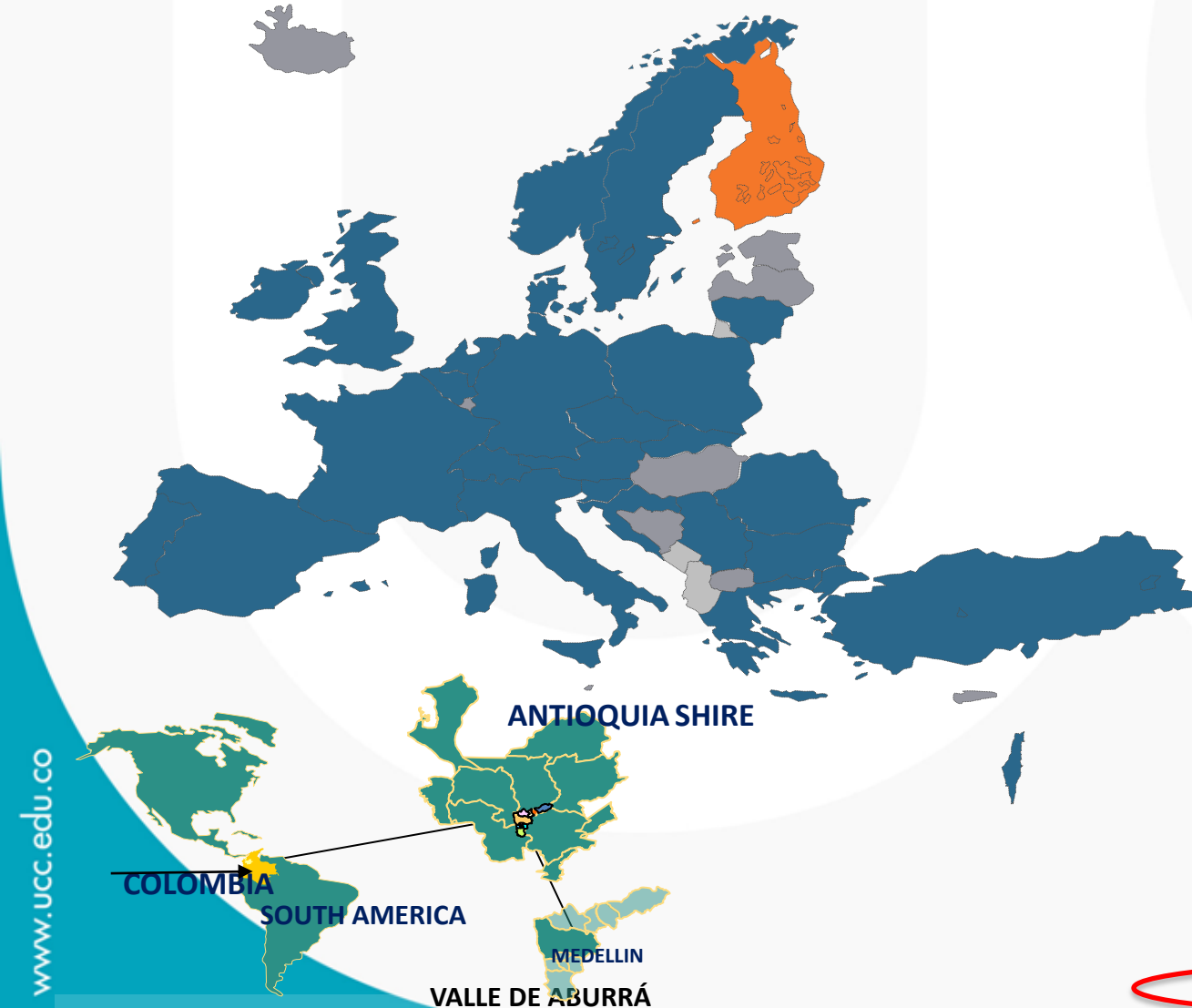
| Country | Date | Status |
|-----------|------|-----------|
| ▶ Estonia | - | Intention |
| Total: 1 | | |

COST International Partner Countries

| Institution Name | Country |
|-------------------------------------|--------------------------|
| Instituto de Materiales de Misiones | Argentina |
| Scion | New Zealand |
| City University of Hong Kong | Hong Kong |
| Universidad Cooperativa de Colombia | Colombia |
| North Carolina State University | United States of America |

COST FPS Action FP1306

Valorisation of lignocellulosic biomass side streams for sustainable production of chemicals, materials & fuels using low environmental impact technologies

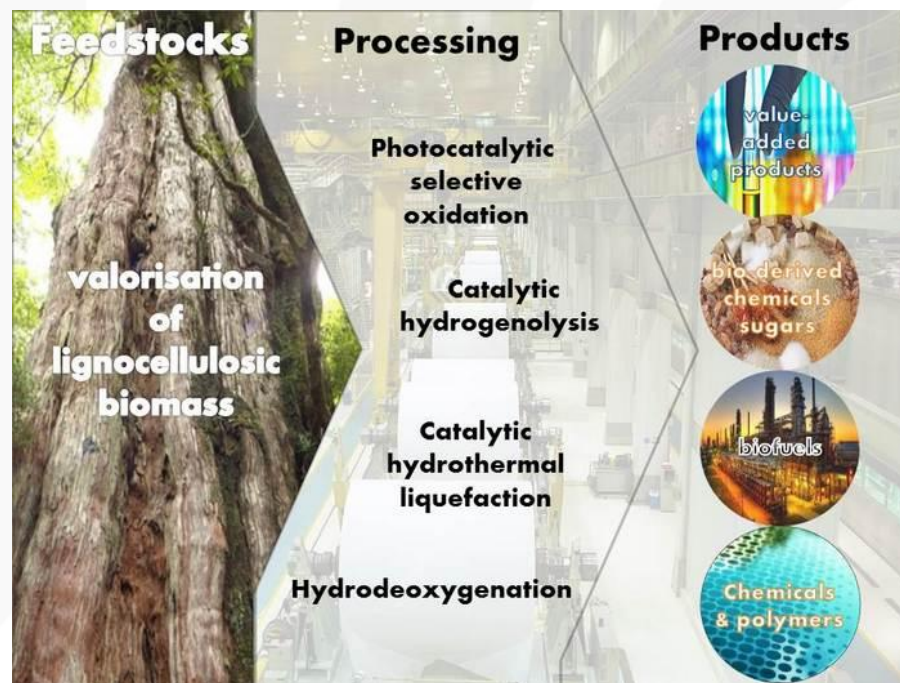
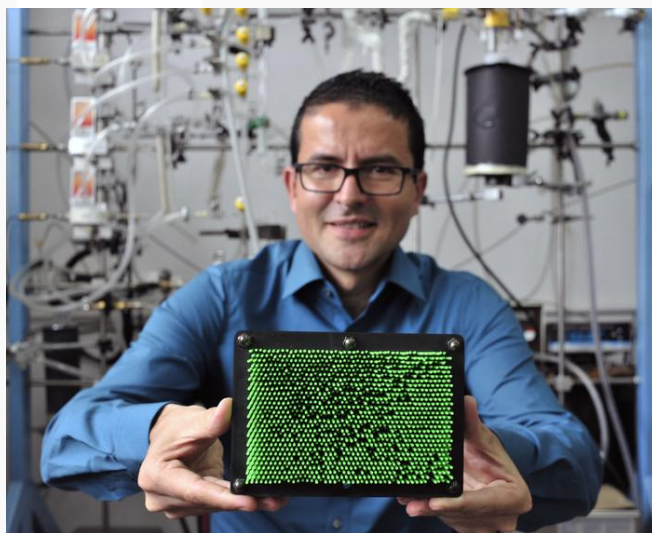


Istituto Motori (IM) of the National Research Council - Italy



IM performs basic and applied research and support to the technological development in the energy conversion and environmental protection areas. Main field of interest is that of thermal engines, in their use as propulsion systems for land, naval and aeronautical applications, as well as in stationary power generation plants.

Catalysis for Sustainable Energy Production and Environmental Protection, Institute of Physical Chemistry – Poland



- Catalytically harvesting of solar energy in the shape of chemical energy.
- Alternative fuels, biomass transformation, catalytic reforming (dry, wet), partial oxidation of light hydrocarbons, CH activation and catalytic oxidative coupling.
- NO_x removal and combined particulate and NO_x removal, among others.

Norwegian Institute of Bioeconomy Research (NIBIO) – Norway



Knowledge for life

Our future well-being depends on sustainable use of our natural resources. NIBIO aims to be at the forefront of the Green Shift, i.e. the transition from oil economy to bioeconomy

Heriot-Watt Energy Academy – United Kingdom



Research excellence ranging from solar energy and energy-focused materials through to energy economics, use, policy and logistics

Some Projects



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Accelerating Marine & Run of River Energy in Colombia: Industry-Academia Partnership Programme – UCC is the leader of the project



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Techno-economic and Environmental Risk Assessments and Optimisation of Micro-cogeneration based on Biomass (Computational FW)



Rural areas

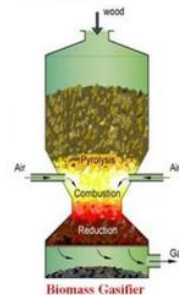
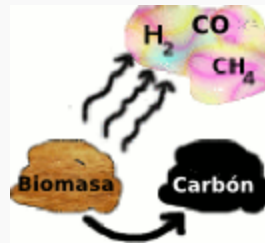


Residential area

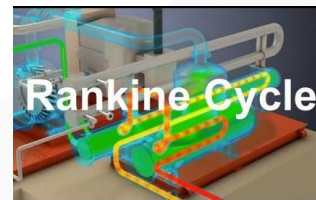
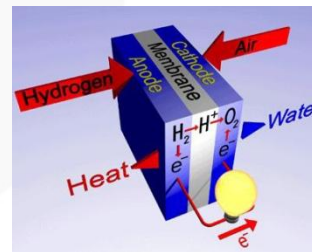
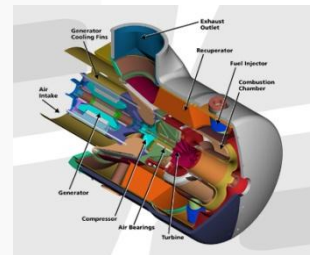


Shopping centres, Industry

Biomass Technology



Conversion Technology



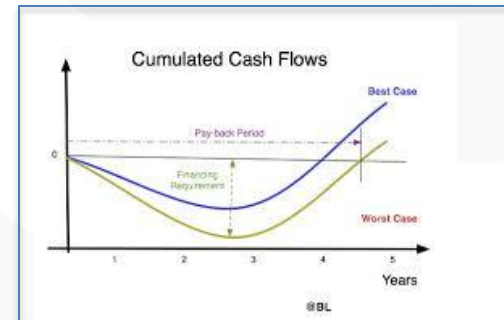
Emissions



Noise



Economy



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Research Team

PhD. Paola Acevedo
PhD. Angélica Santis

Santo Tomas University

SUBSTRATES

Sewage sludge

Organic urban solid waste



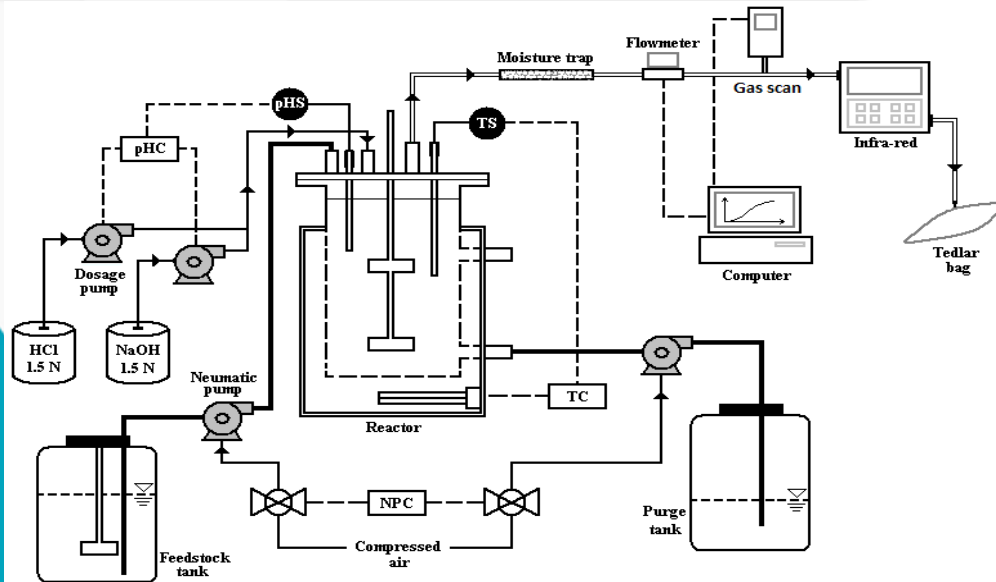
Fruit pulps



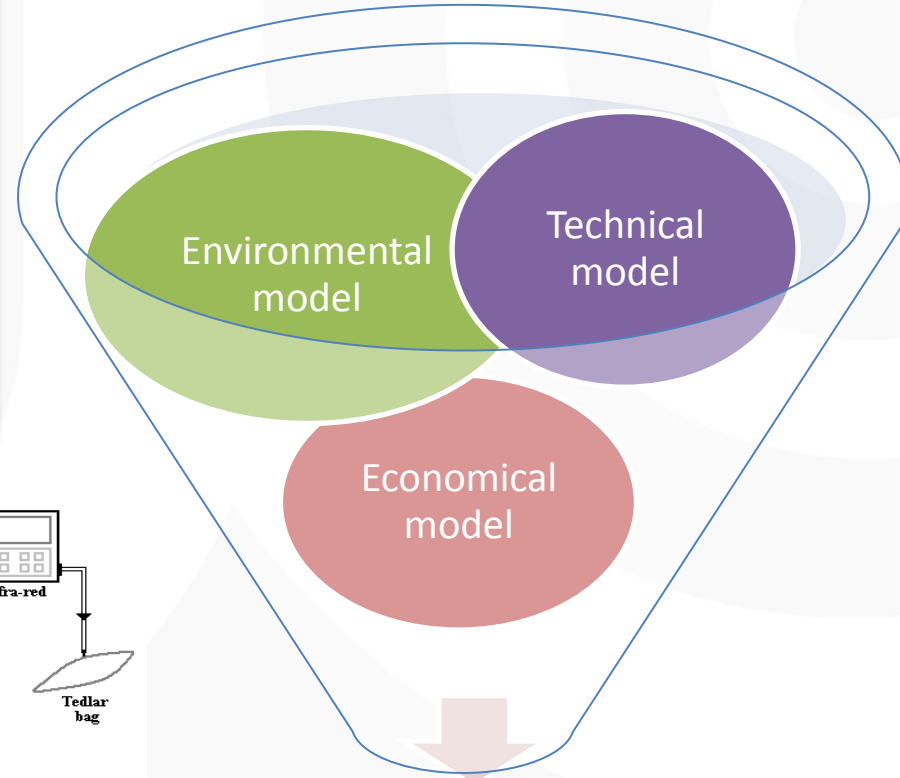
Pig manure



Cocoa Waste



Empirical models to optimise
technical, economic and
environmental performance of
anaerobic co-digestion processes
adjusted to organic wastes in
Colombia



Sustainable
Processess



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The effect of magnetic, electrical and electromagnetic fields on phenology and growing of corn and tomatoes cultures for the agricultural sector in urban areas



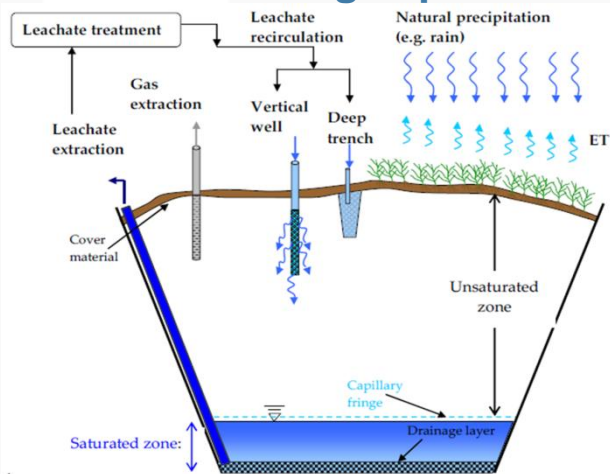
Research Team

PhD. Paola Acevedo
B.E. Janeth Ortiz

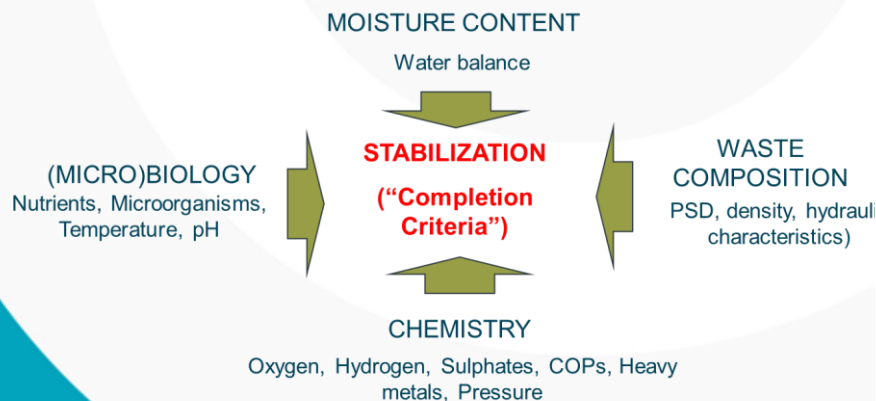
PhD. Angélica Santis
B.E. Pablo Velásquez

Valorisation of Solid Wastes

LANDFILL : bio-gas production



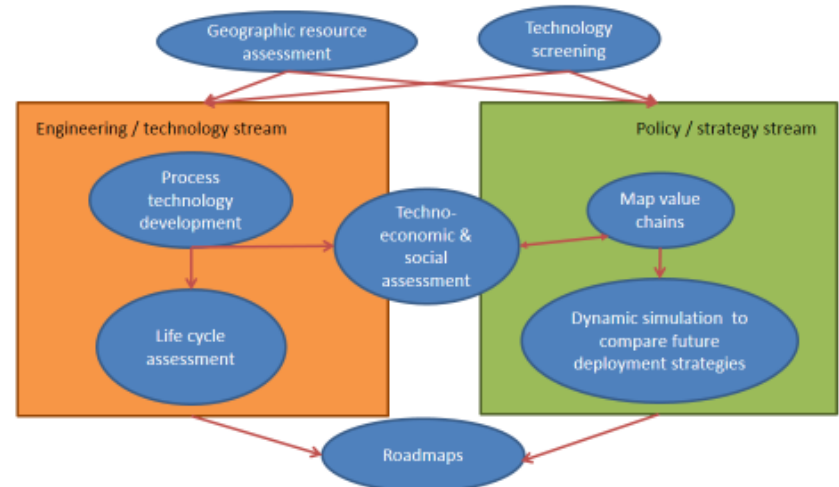
Technologies to accelerate biodegradation processes



Valorisation via Bioenergy

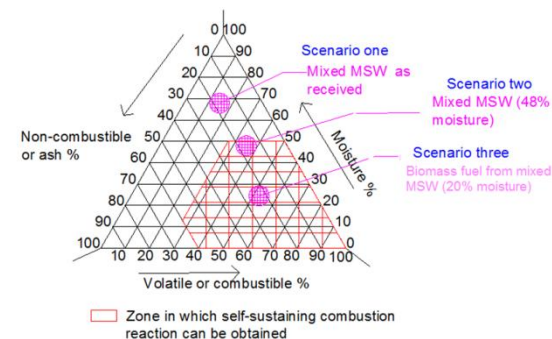
BioWASTE to BioVALUE

1. Biomass residues from rural areas, and 2. MSW from urban centres



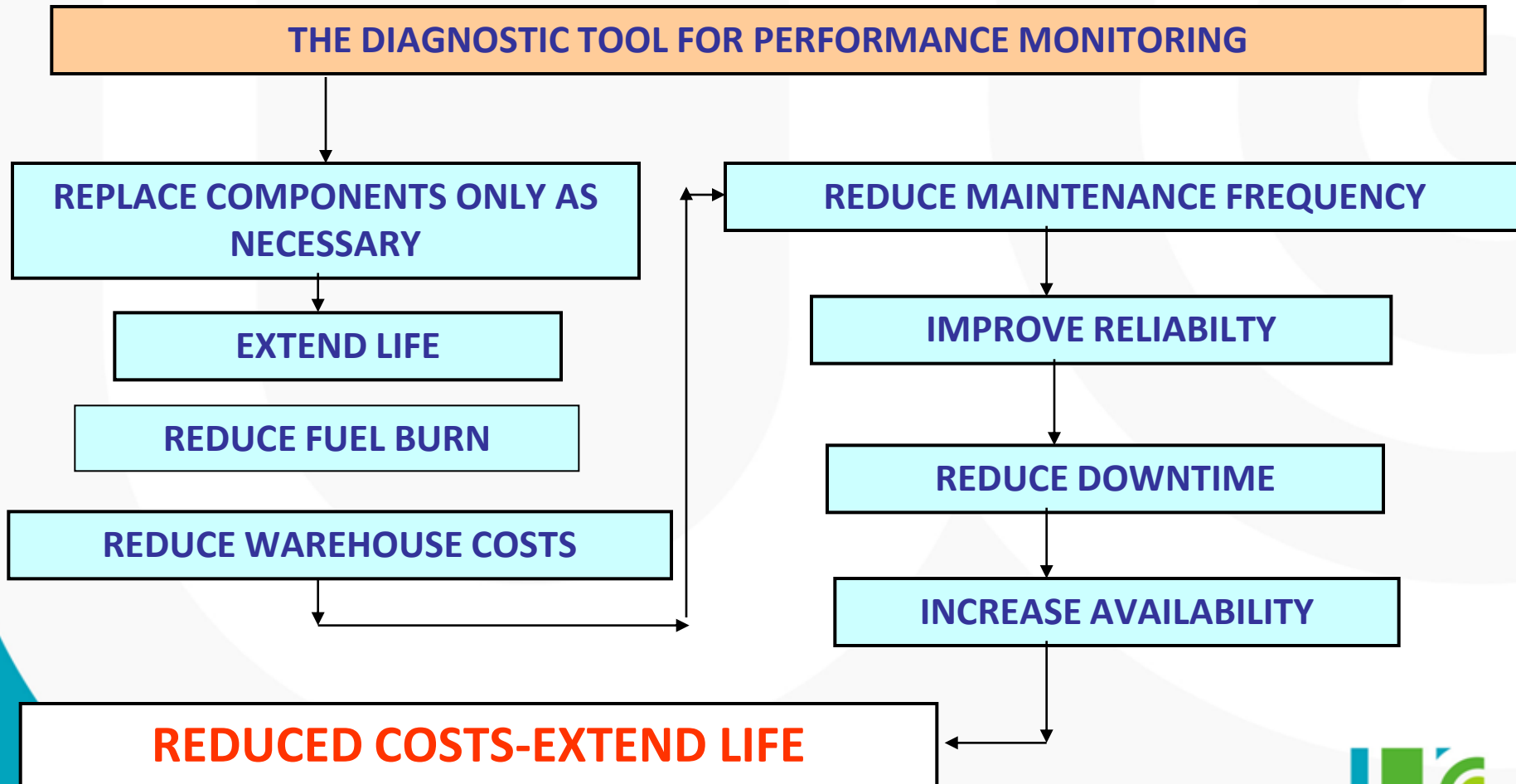
Valorisation via Waste to Energy: Mass and Energy balances for Colombian municipalities

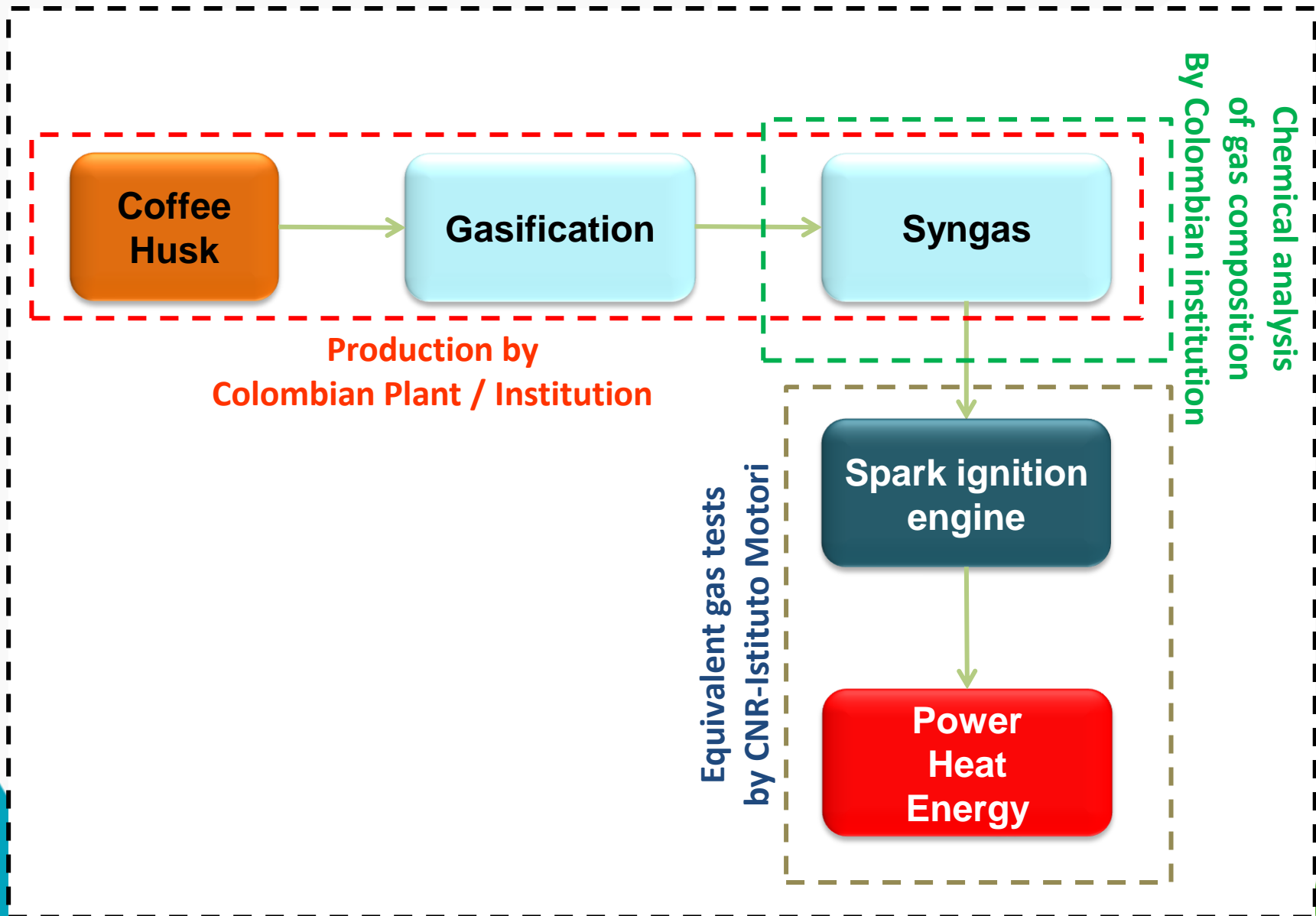
Tanner Triangle



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Optimisation of Operations and Maintenance Actions of a Selected Gas Turbine for Least Cost





Equivalent gas: gas mixture prepared on the basis of chemical analysis

Fernando Colmenares, Prof. Dr.

**National Head of Research in Engineering
Universidad Cooperativa de Colombia**

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