



مدينة زويل للعلوم والتكنولوجيا
Zewail City of Science and Technology

مشروع قطر القوي لتجديد التعليم
Egypt's National Project for Scientific Renaissance

Developing an Off-Grid Model For the Million Feddan Project

Presented By

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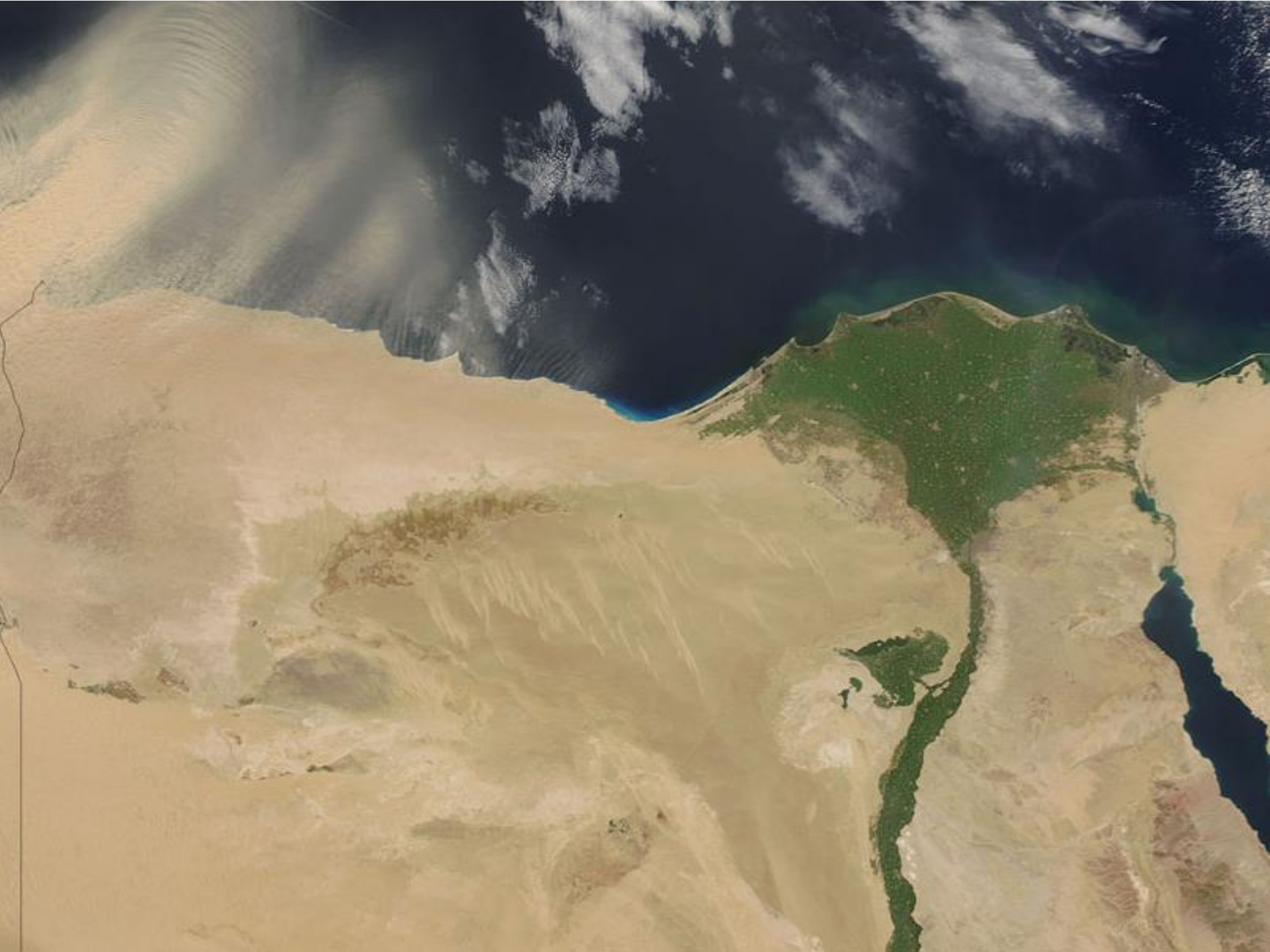
Urban Planning Engineer in GOPP





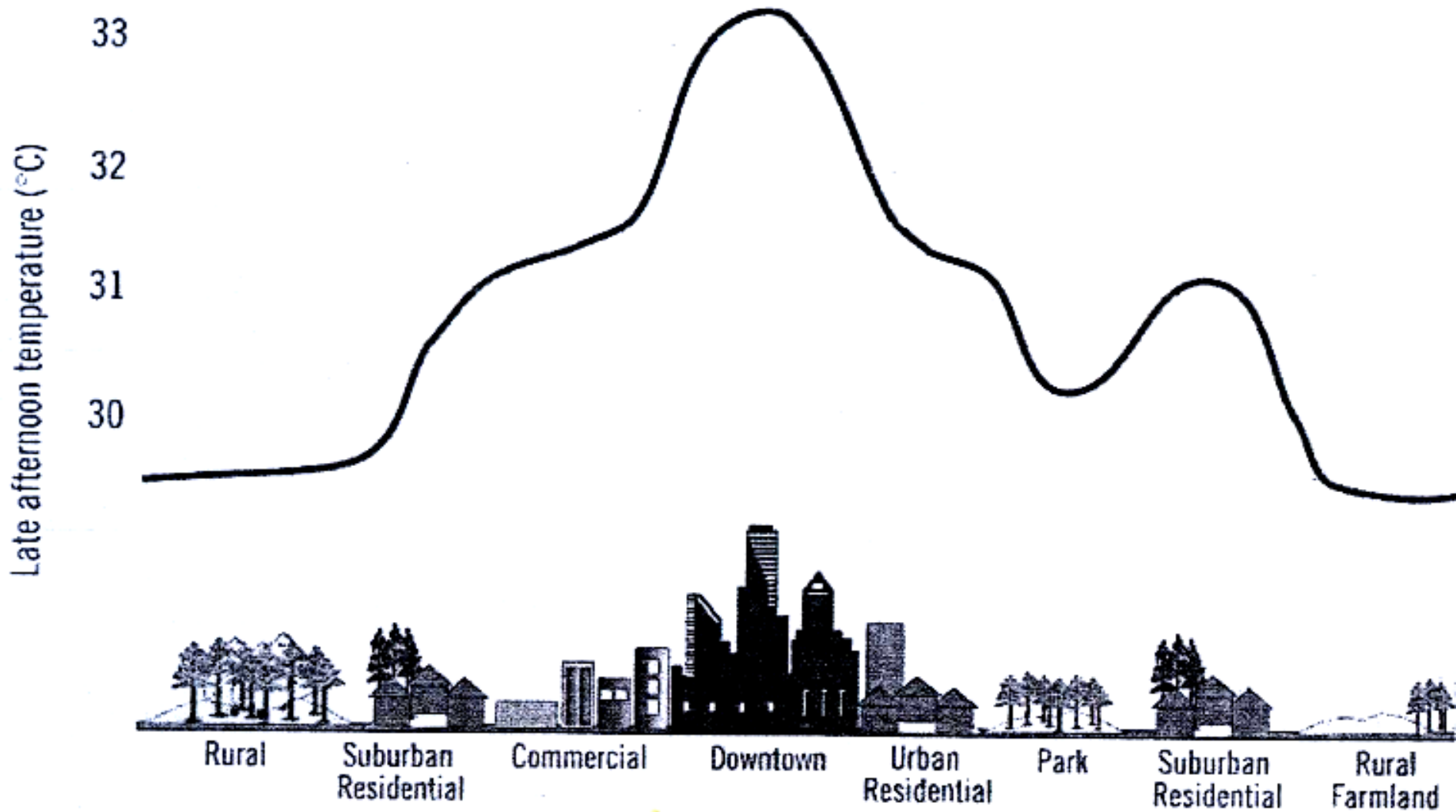








Urban Heat Island



Sketch of an urban heat island profile

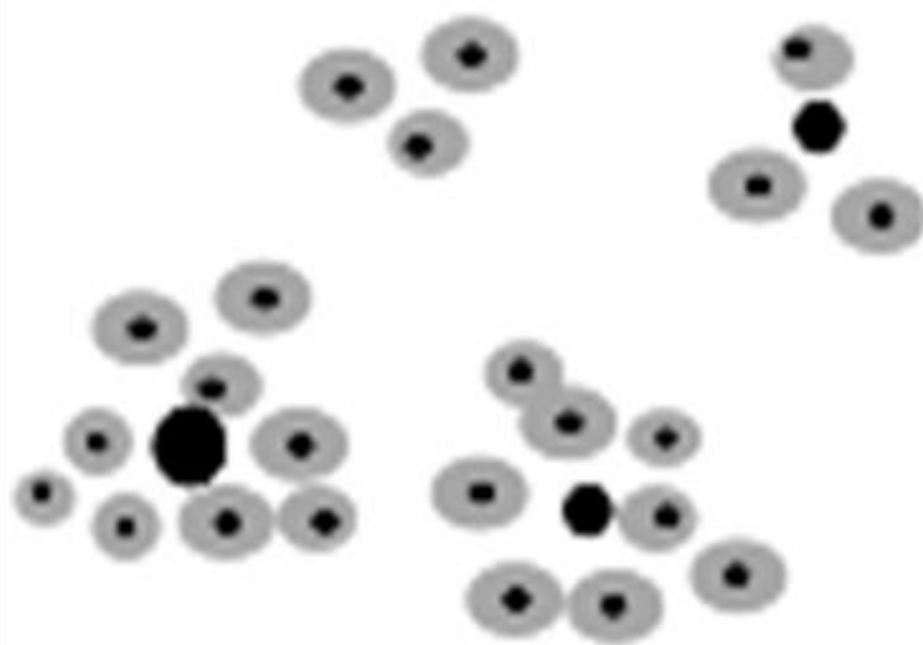
Land Reclamation



Cellular

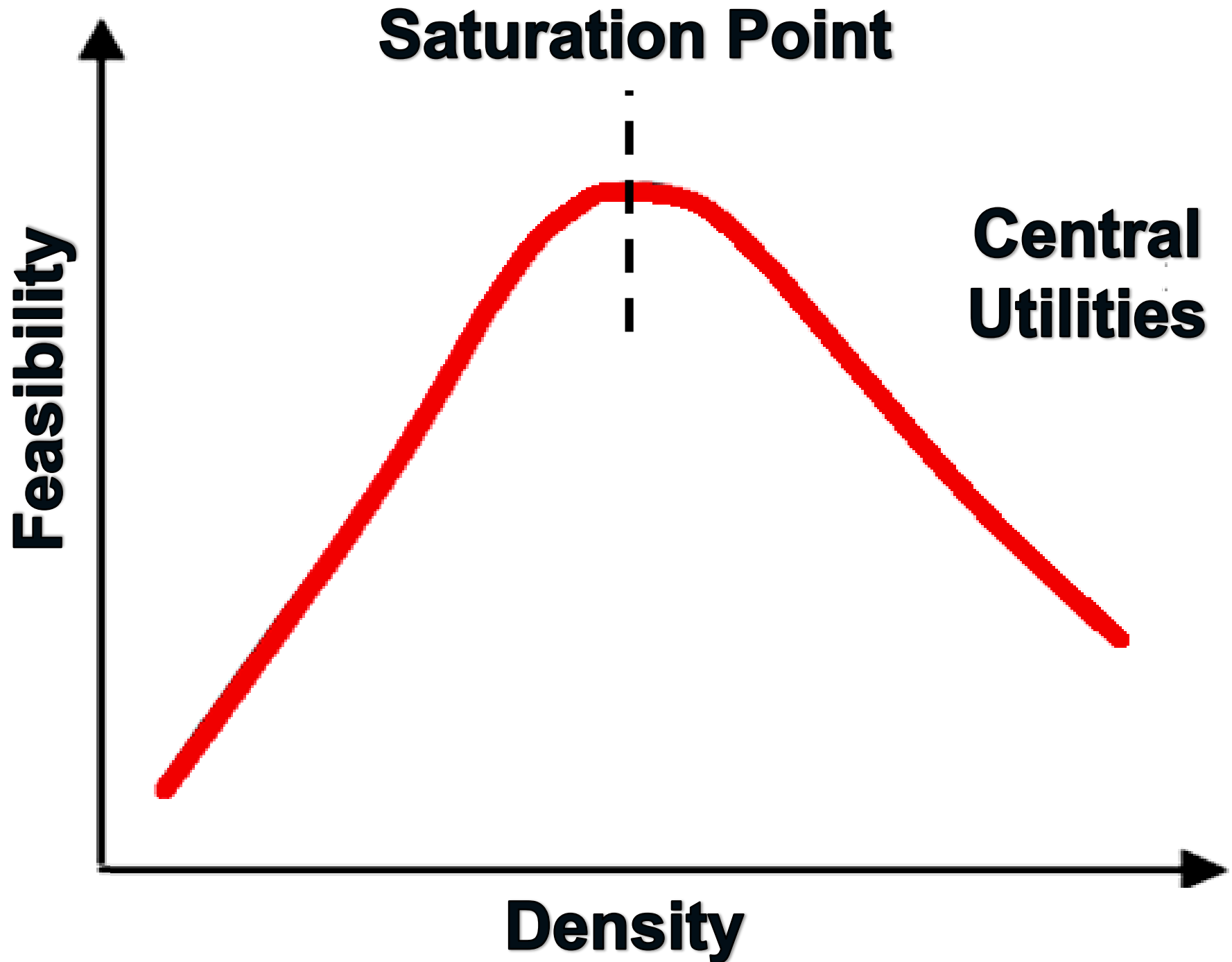


Cell soup



Cellular clusters





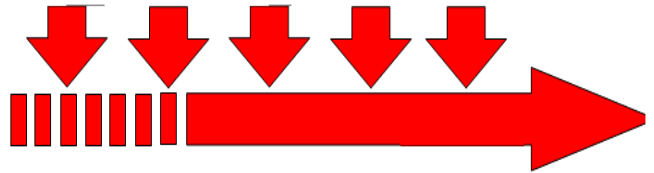
Saturation Point



High
Density

Moderate
Density

Low
Density



High
Feasibility

Moderate
Feasibility

Low
Feasibility

Scattered Houses





Off-Grid

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Goog

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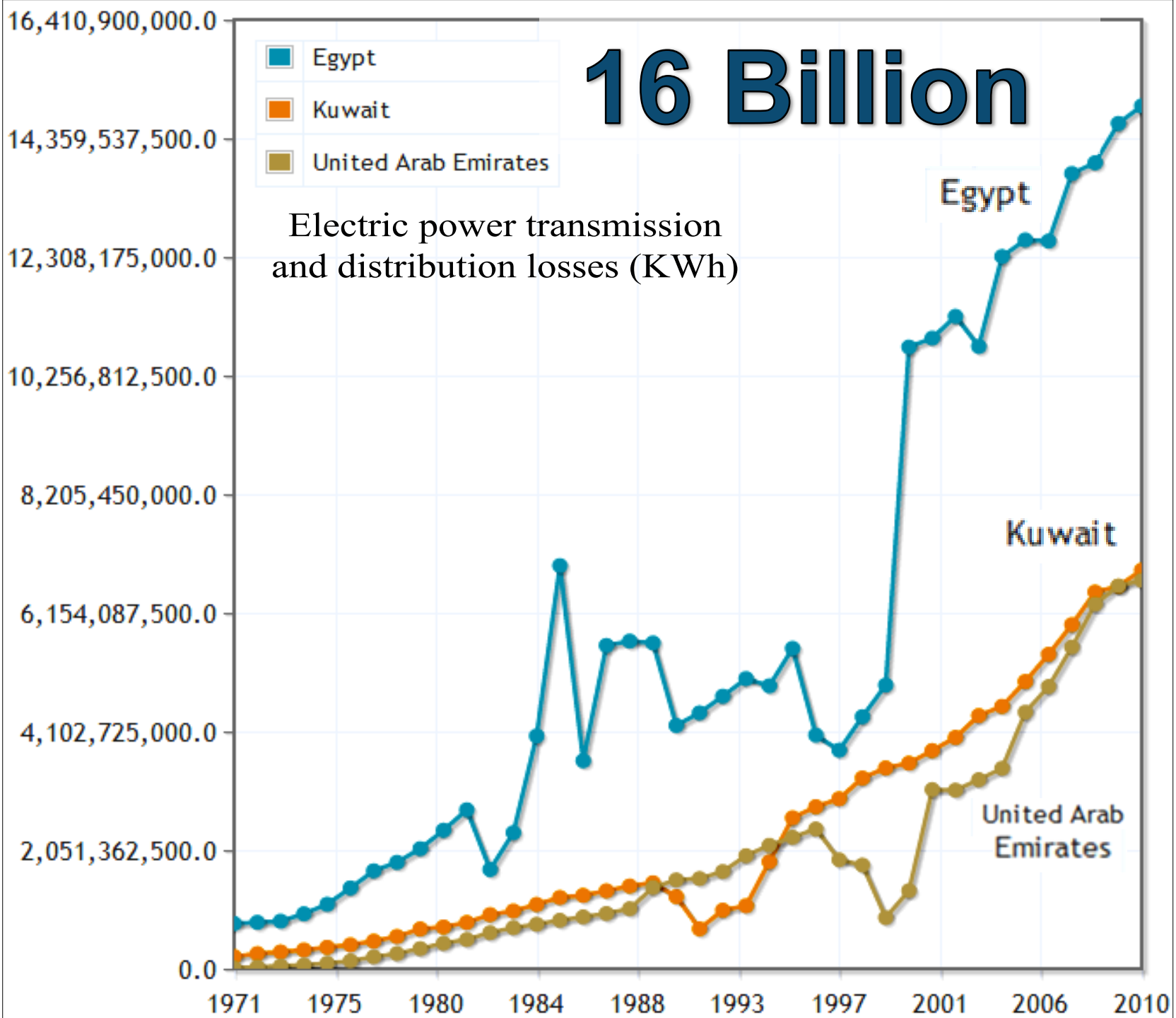
Transmission Losses



16 Billion

Electric power transmission and distribution losses (KWh)

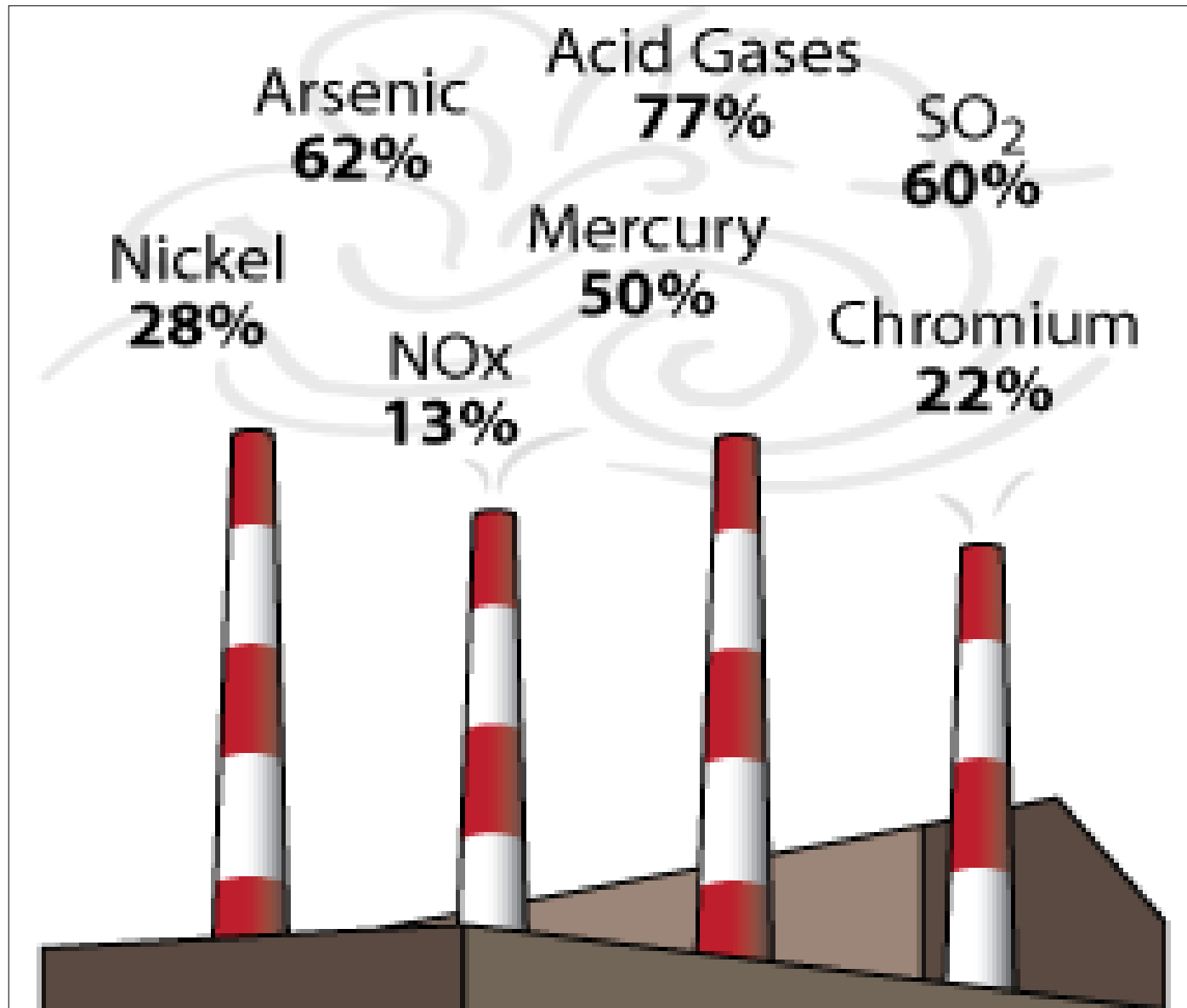
- Egypt
- Kuwait
- United Arab Emirates



HFO



Portion of air pollution that comes from power plants





Thinking
Off-Grid

Thinking
Green

Power substation

High voltage transmission lines

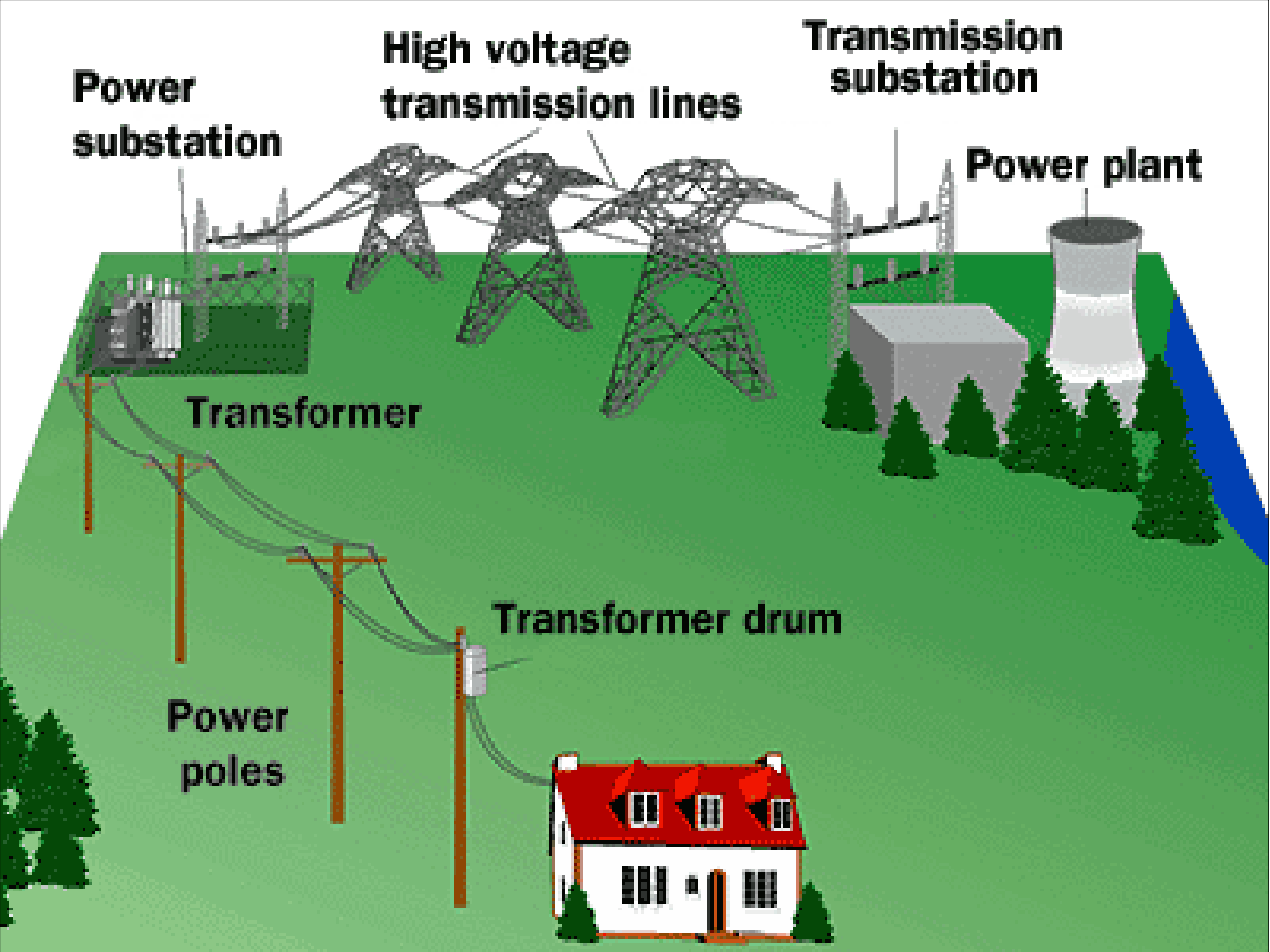
Transmission substation

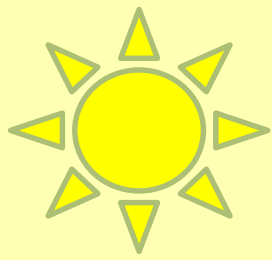
Power plant

Transformer

Transformer drum

Power poles

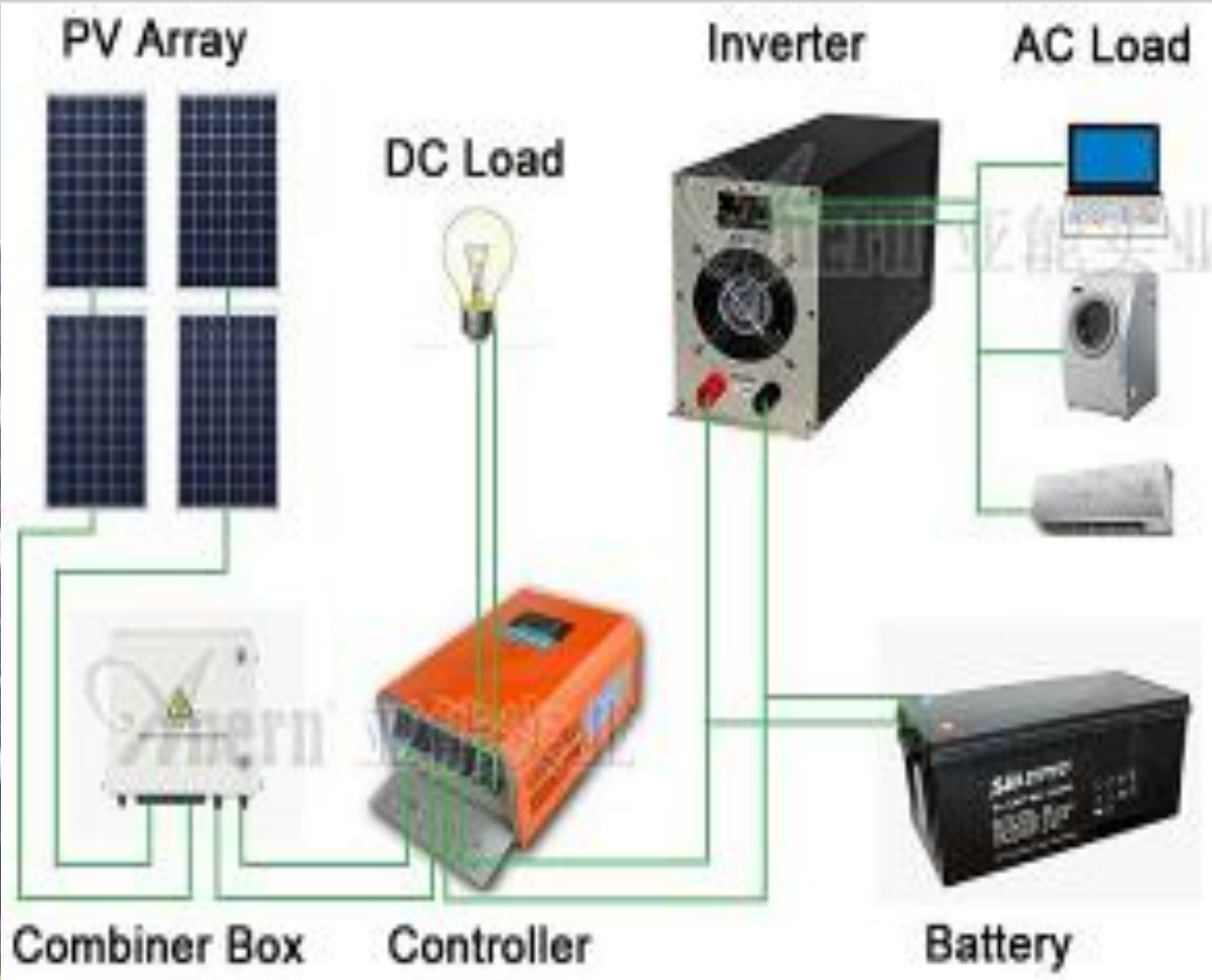




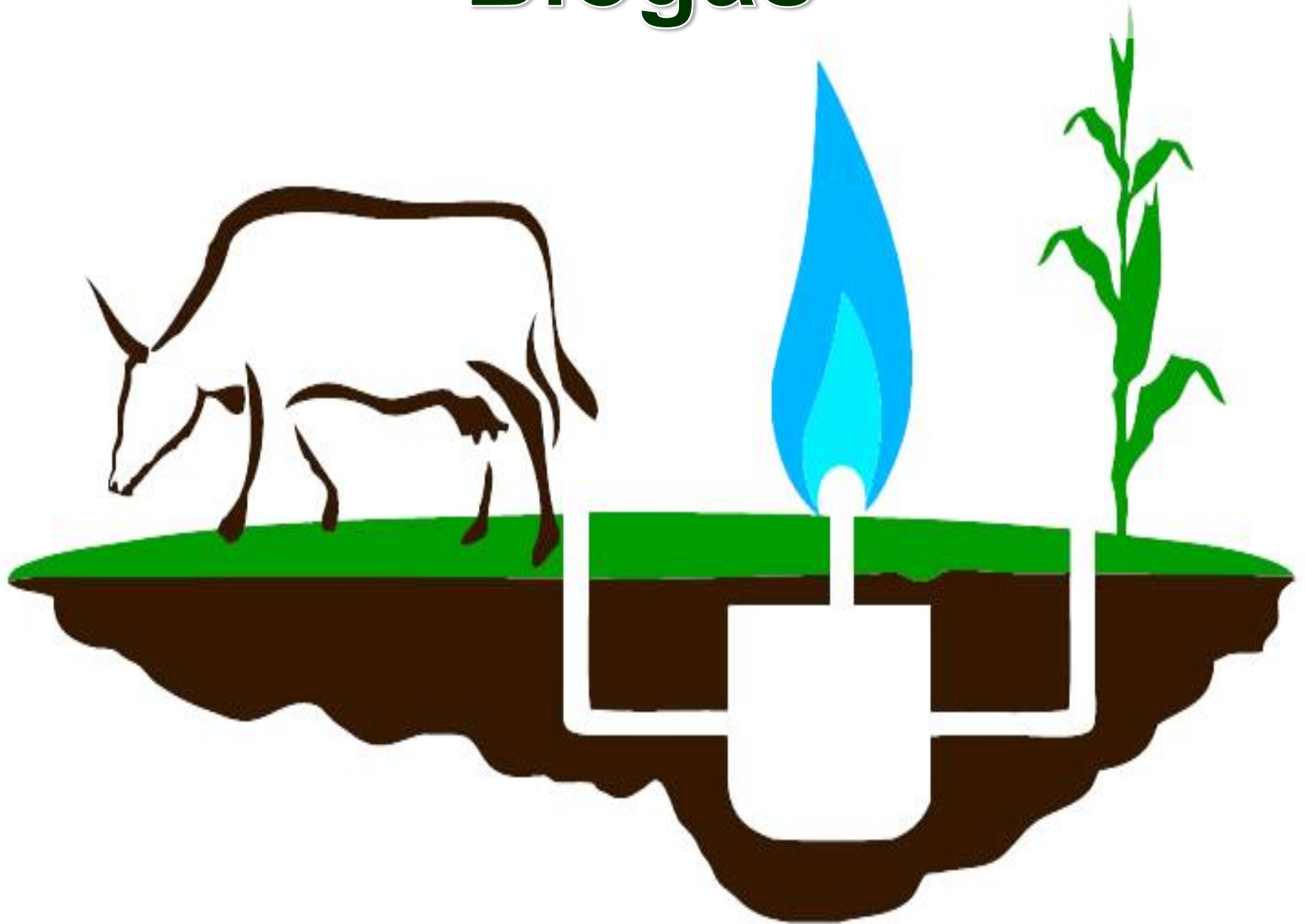
Global Solar Belt



Solar PV Systems



Biogas



Biogas Plant

Inlet

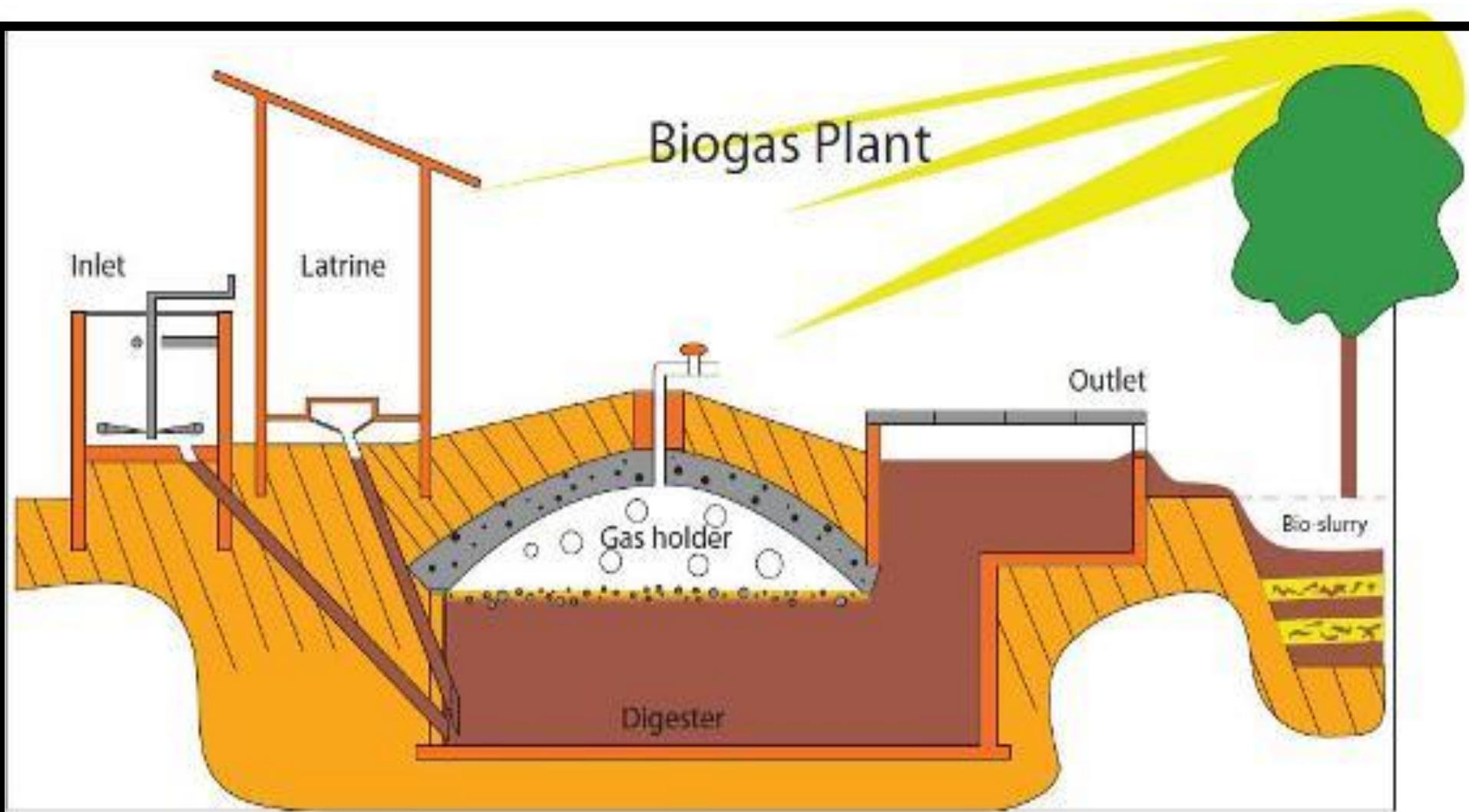
Latrine

Outlet

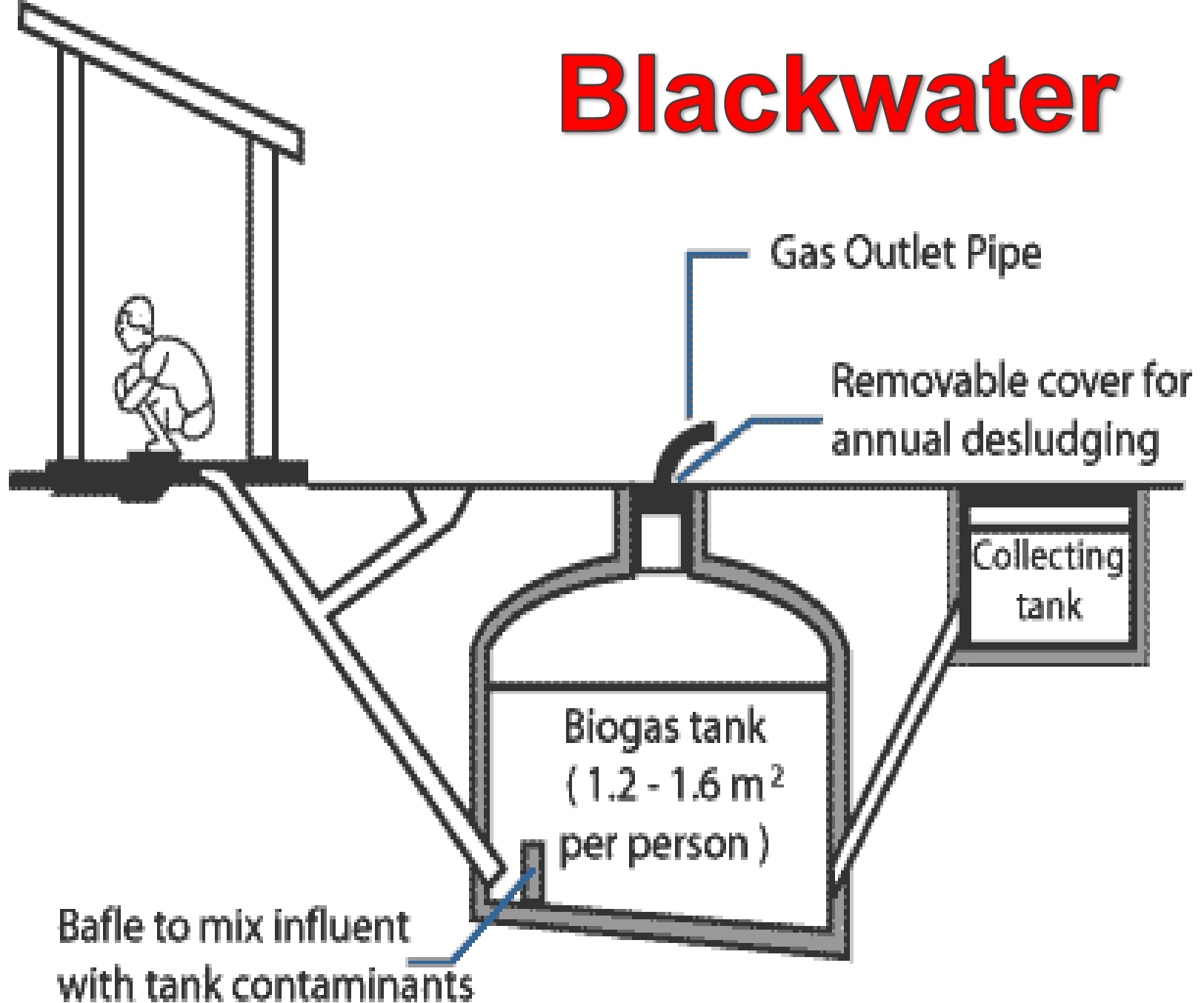
Gas holder

Digester

Bio-slurry



Blackwater







Biogas Generator



Natural Gas

11

kWh

of electricity

160 m³

biogas /month



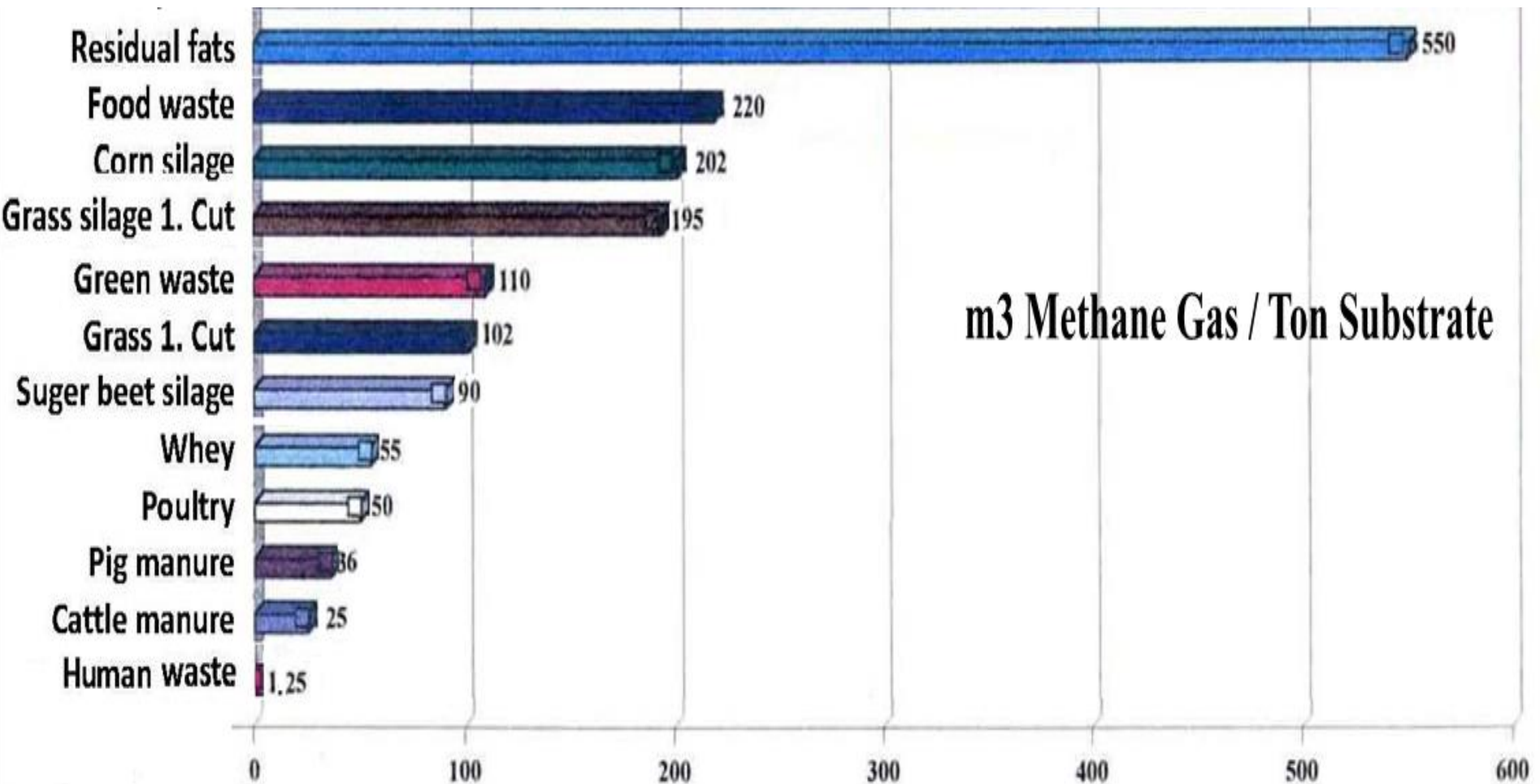
**Not
enough**



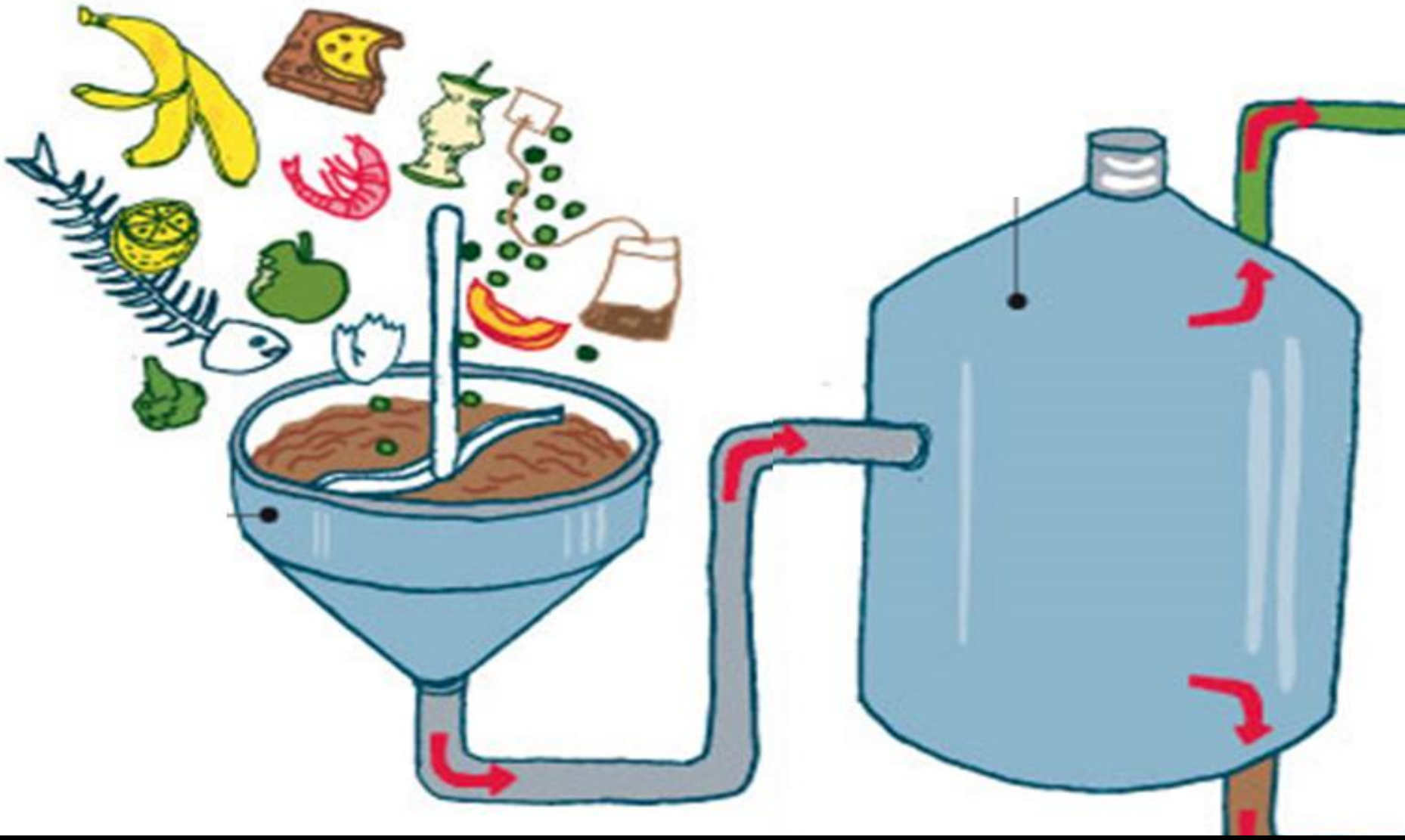
**add
sub-
-strate**



Biomethane Potential from Organic Residuals



Food Waste



Cattle Manure



Chicken Waste



Agricultural Waste





Potentials of Rice Straw in biogas yield

Parameter

Supplementation with rice straw (%)

	0	20	40	60	80	100
Daily biogas yield (l/kg total solids)	176	209	234	253	293	331
Daily methane yield (l/kg total solids)	107	121	136	149	167	195
Methane (% of biogas)	61	58	58	59	58	59
Gas specific yield*	0.44	0.52	0.59	0.63	0.71	0.83

* Gas produced per unit volume of substrate per day (vol/vol/day).

3000

m³

biogas /ton

Potentials of Wheat Straw in biogas yield

Parameter

Supplementation with wheat straw (%)

	0	20	40	60	80	100
Daily biogas yield (l/kg total solids)	178	187	194	174	167	148
Daily methane yield (l/kg total solids)	107	109	113	103	97	87
Methane (% of biogas)	60	58	59	59	58	59
Gas specific yield*	0.44	0.46	0.48	0.43	0.44	0.37

148

m³

biogas /ton



ബീകരിച്ചത്

ചകിരനാശനം ലാഭിക്കാൻ
കുറഞ്ഞ തെളിയിൽ
നശീകരണം തടയാൻ
ജൈവ രാസവസ്തു

പോളിമർ
പോളിമർ P.B.520, തിരുവനന്തപുരം 14.







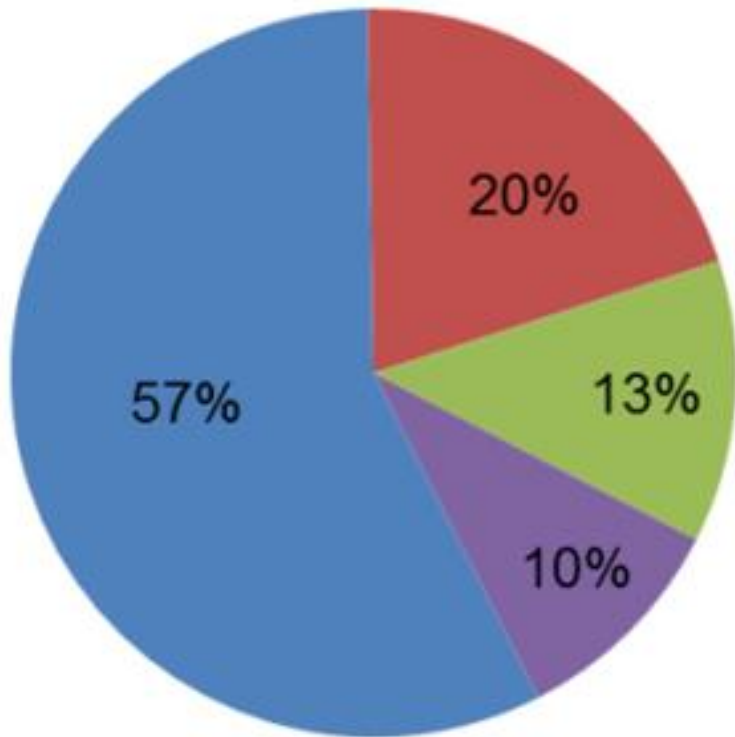


Generated Sludge

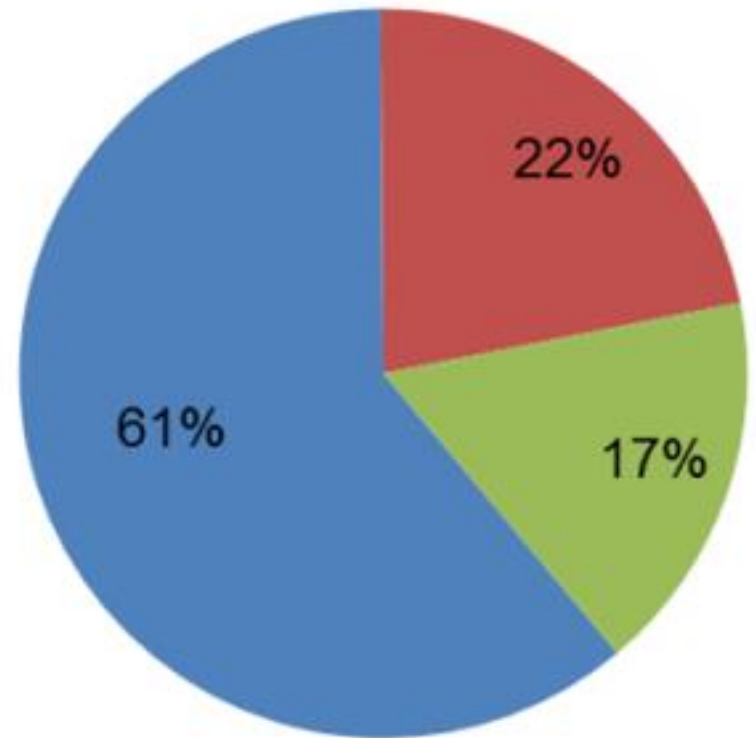


Sludge Use

Europe



North America



■ Land application

■ Incineration

■ Landfilling

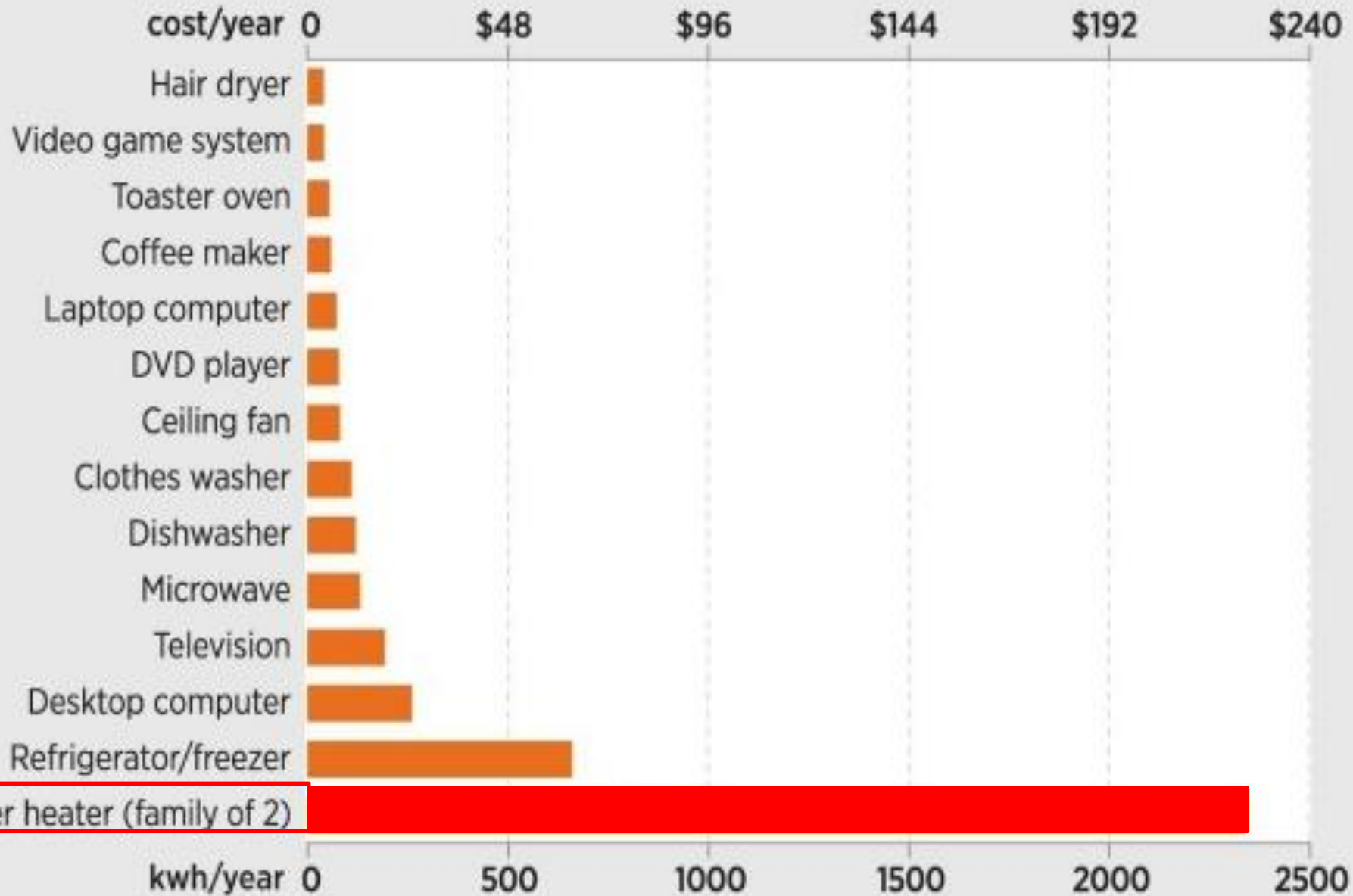
■ Sea disposal

Poor Soil





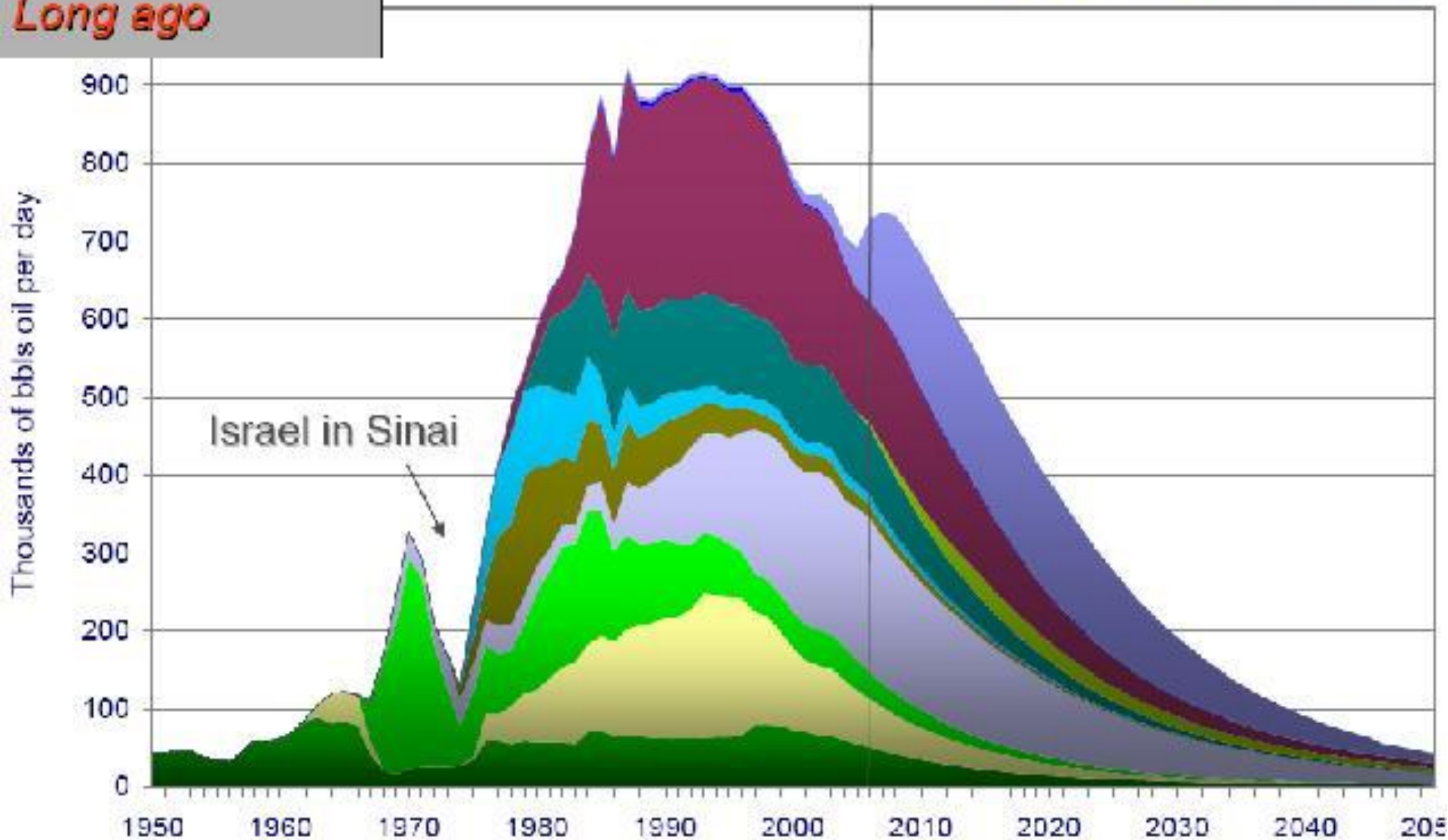
How Much Electricity Do Appliances Use?



Oil Reserves

PEAK:
Long ago

EGYPT: Oil forecast



Air Pollution



No more fires



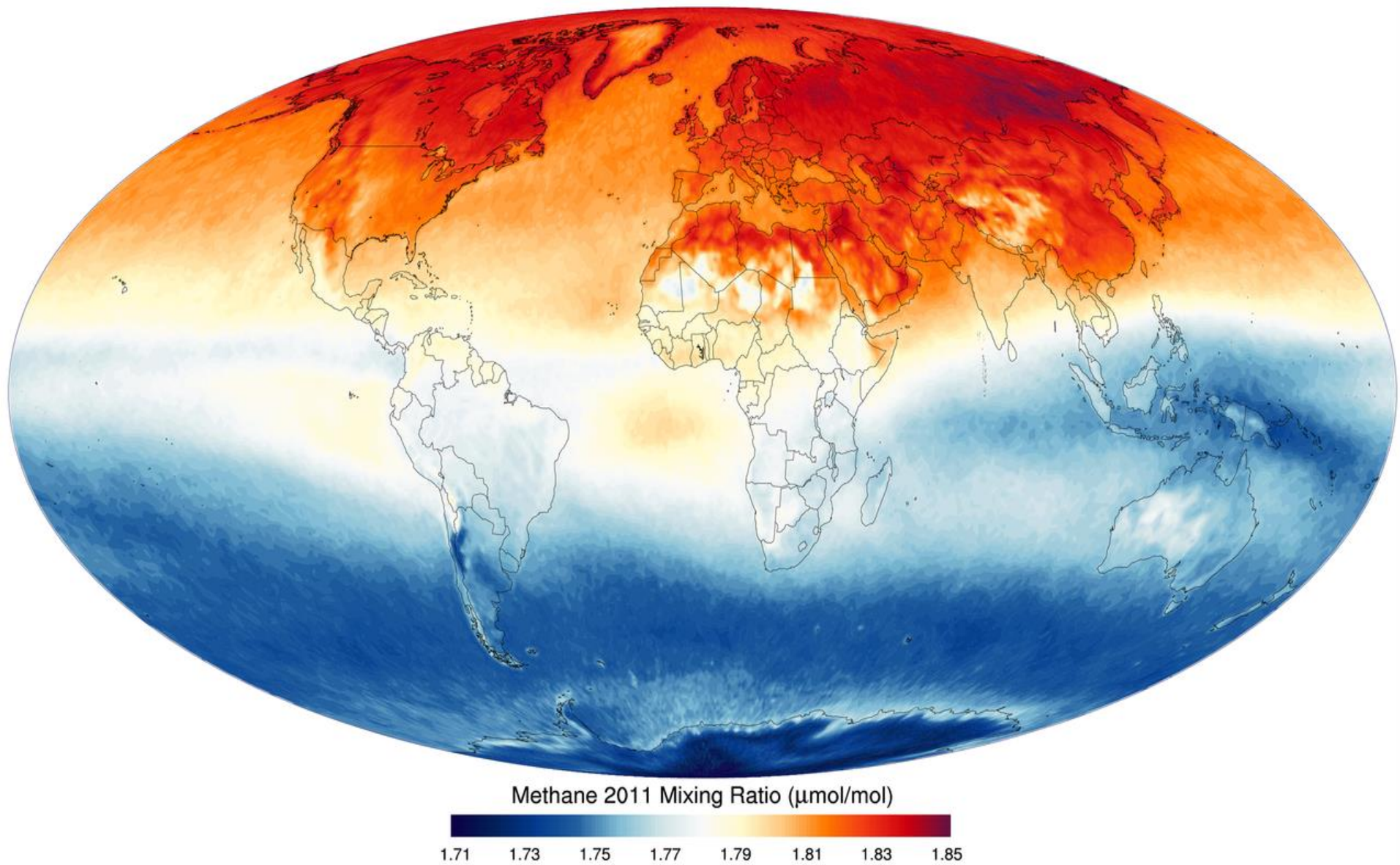


Landfills



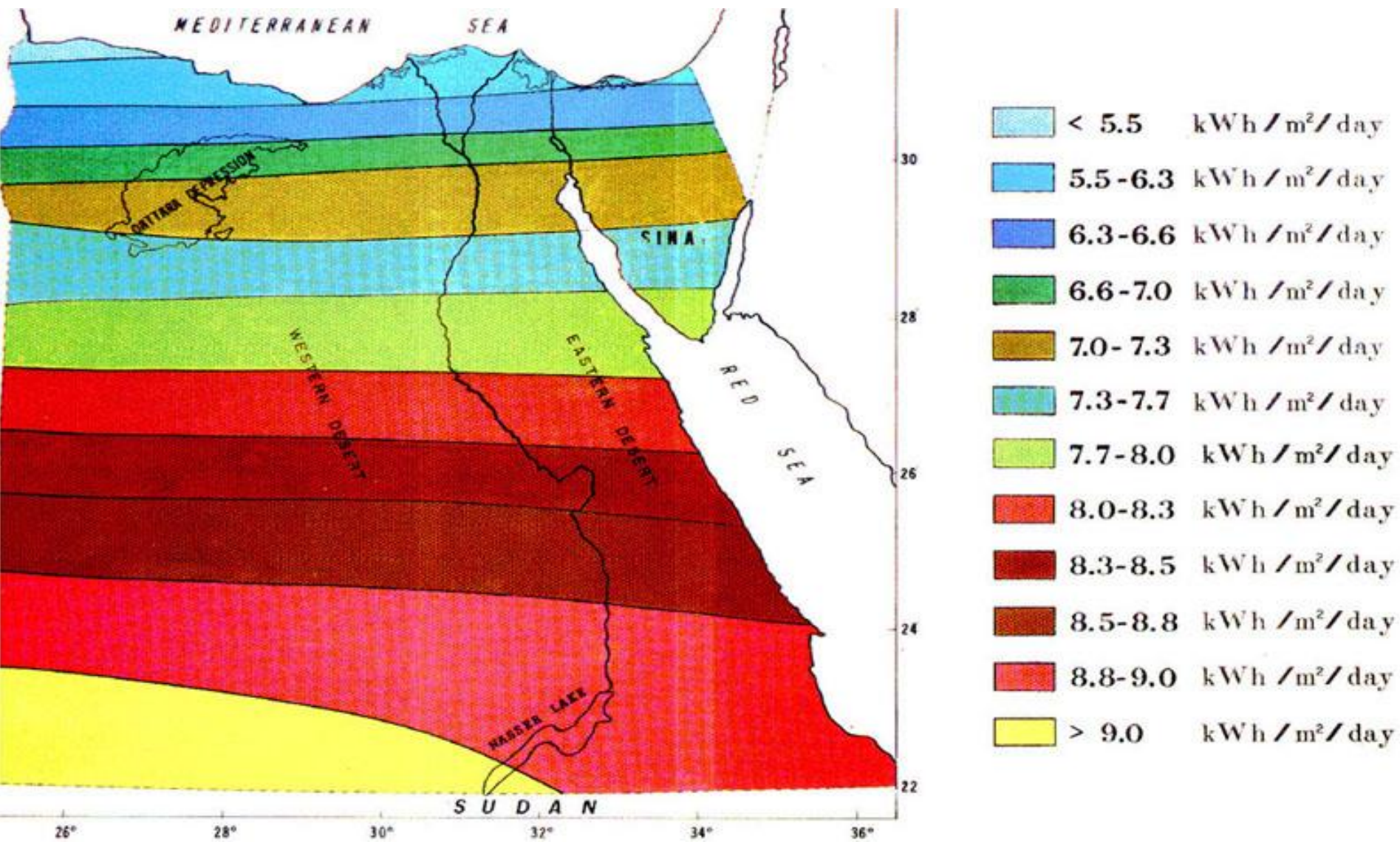
Methane Emissions



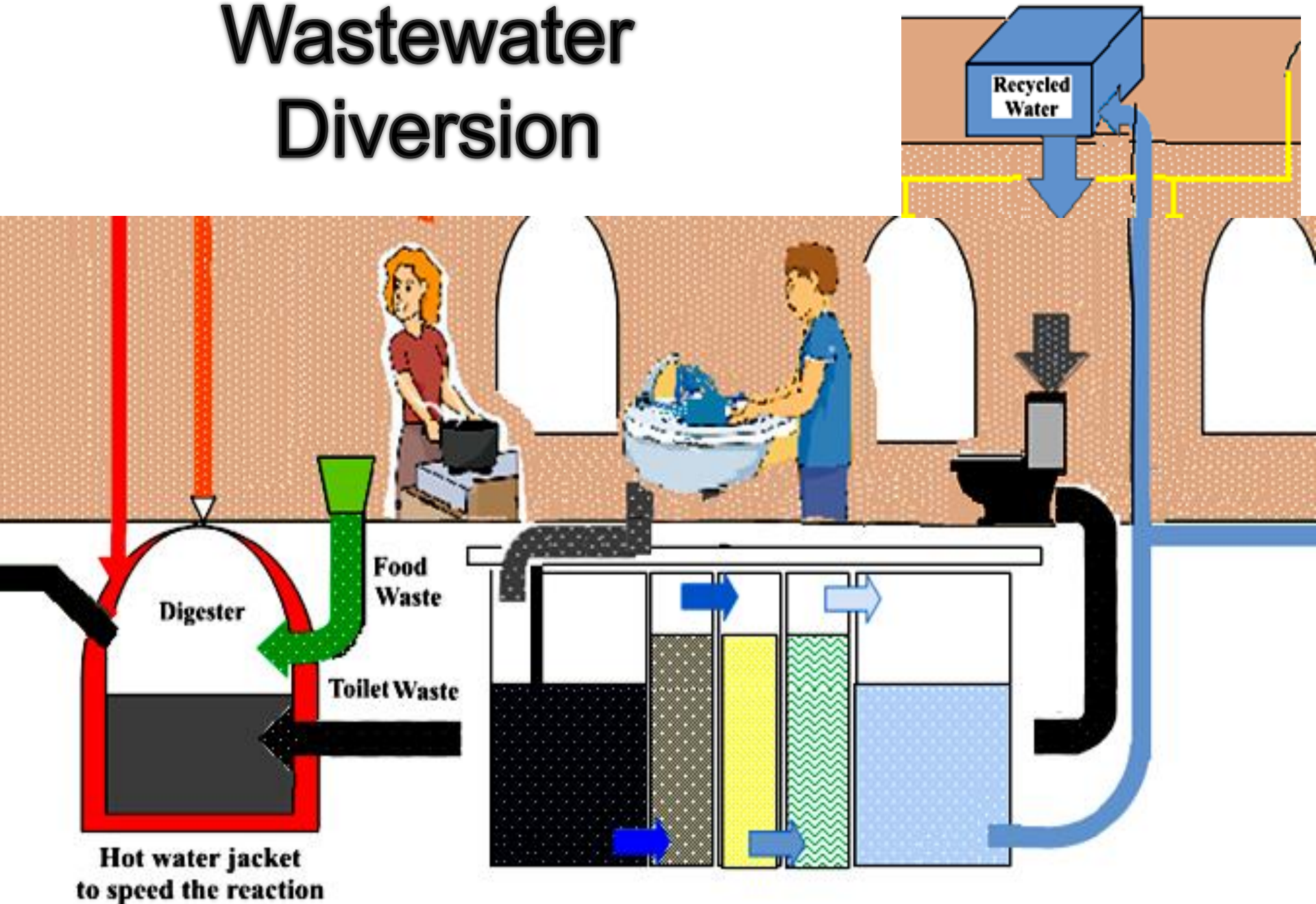


Methane concentration in the upper troposphere measured in 2011

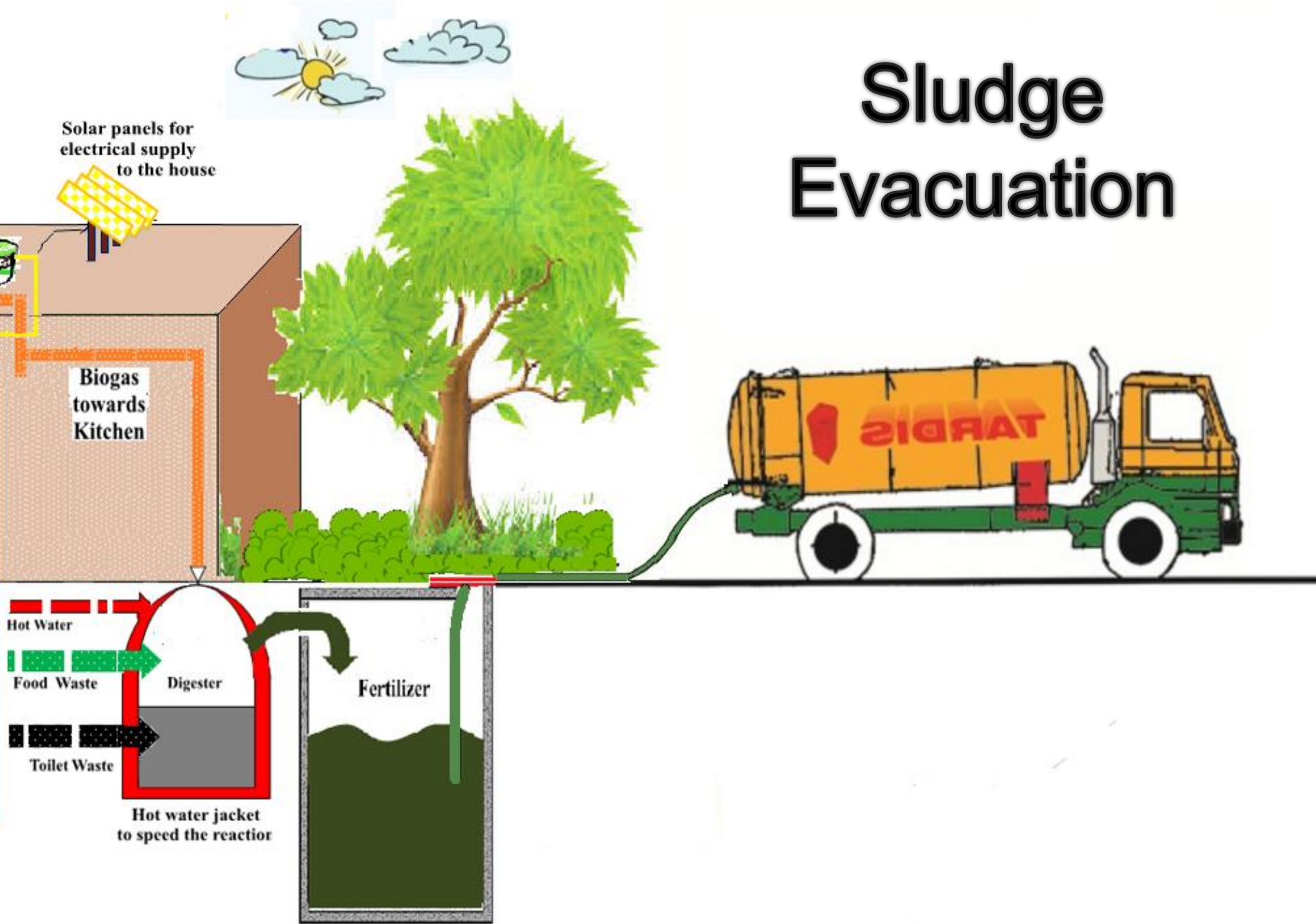
Solar Intensity



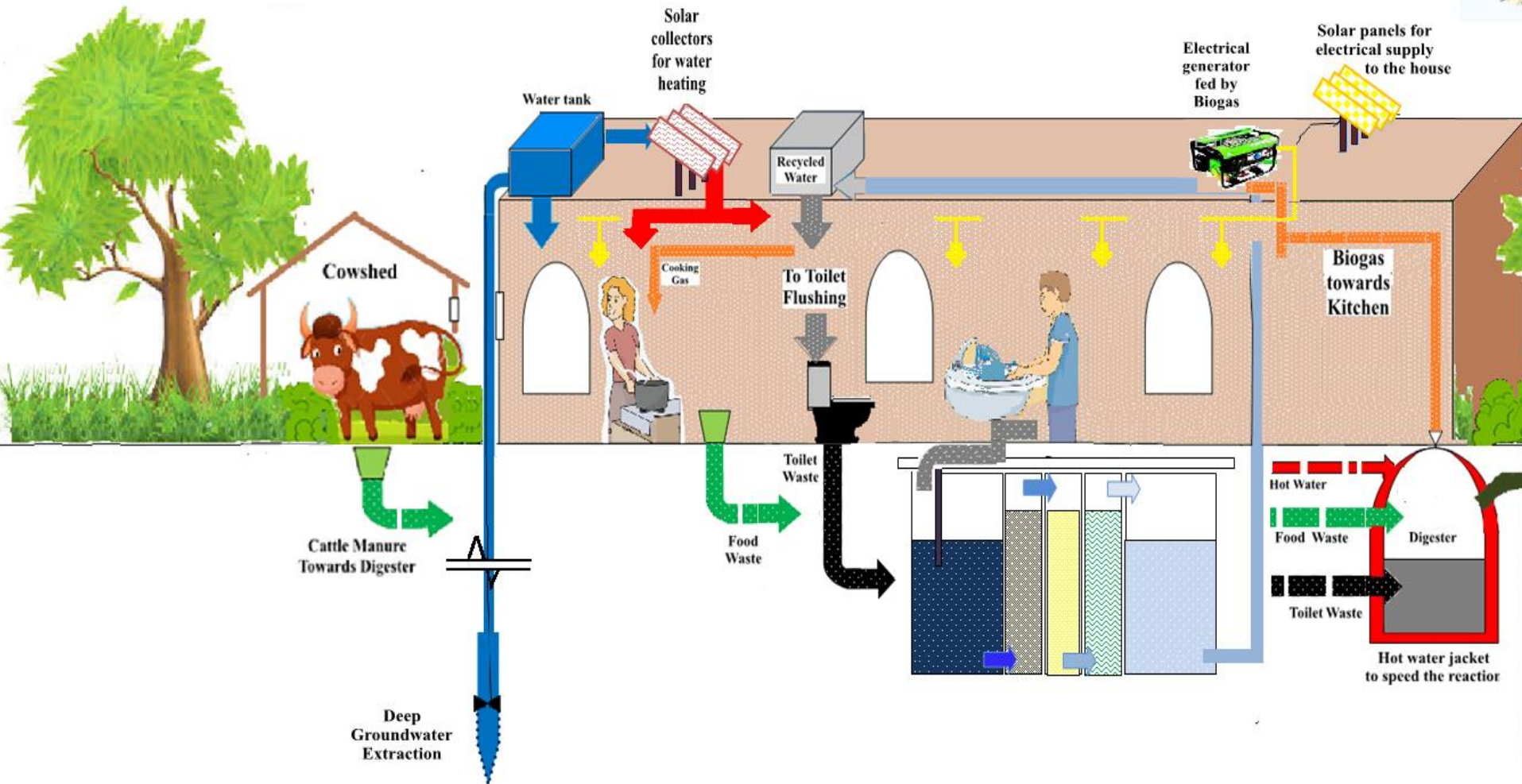
Wastewater Diversion



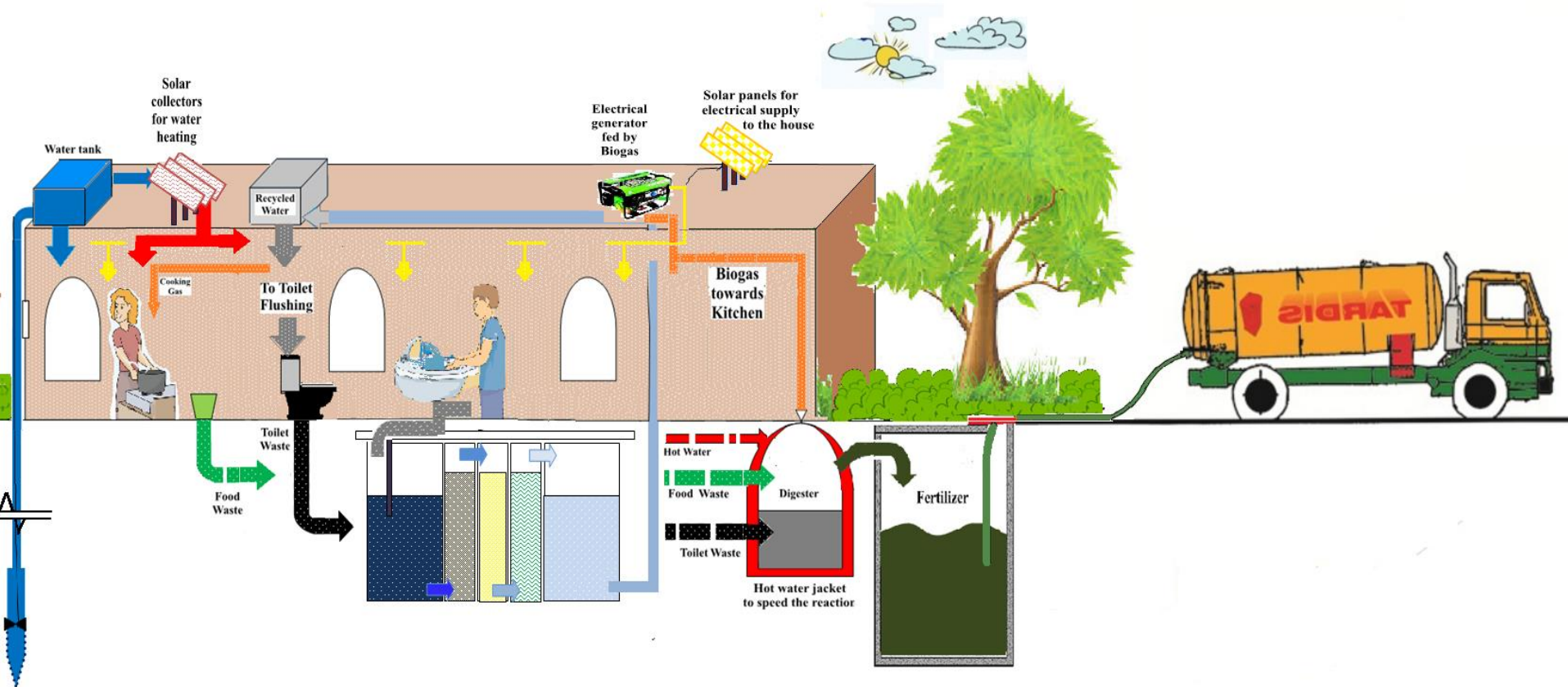
Sludge Evacuation



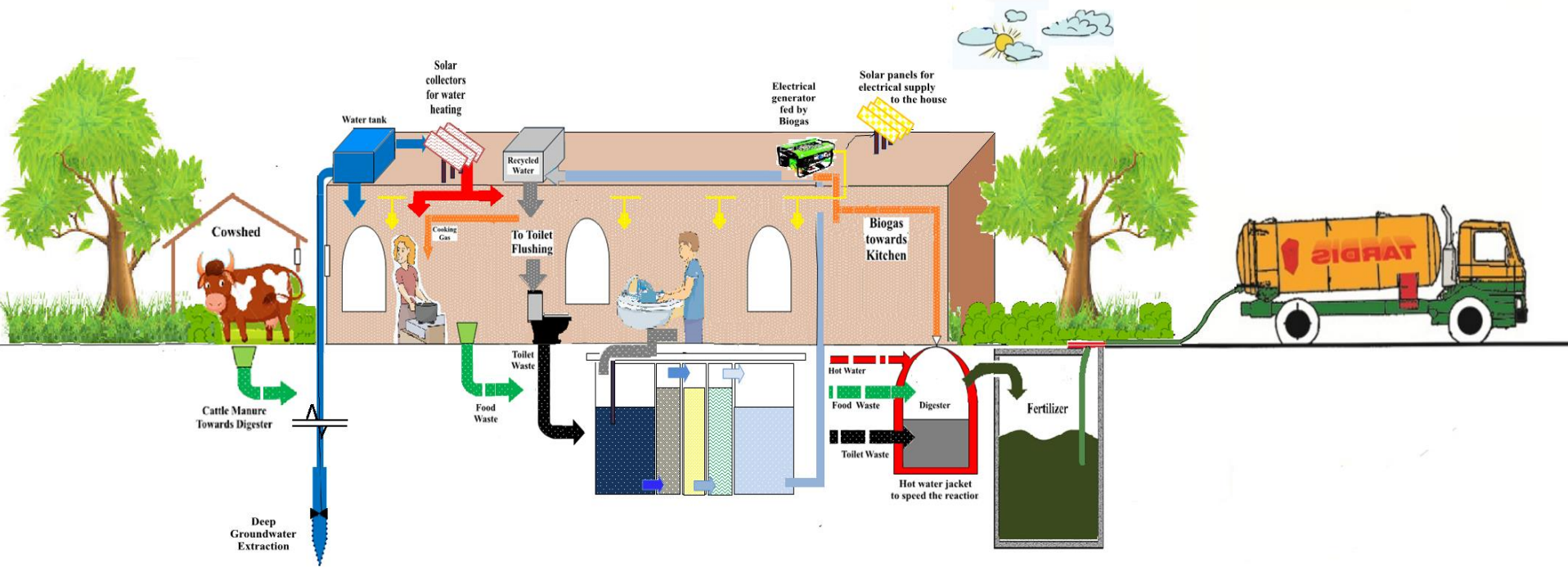
Cattle Breeding

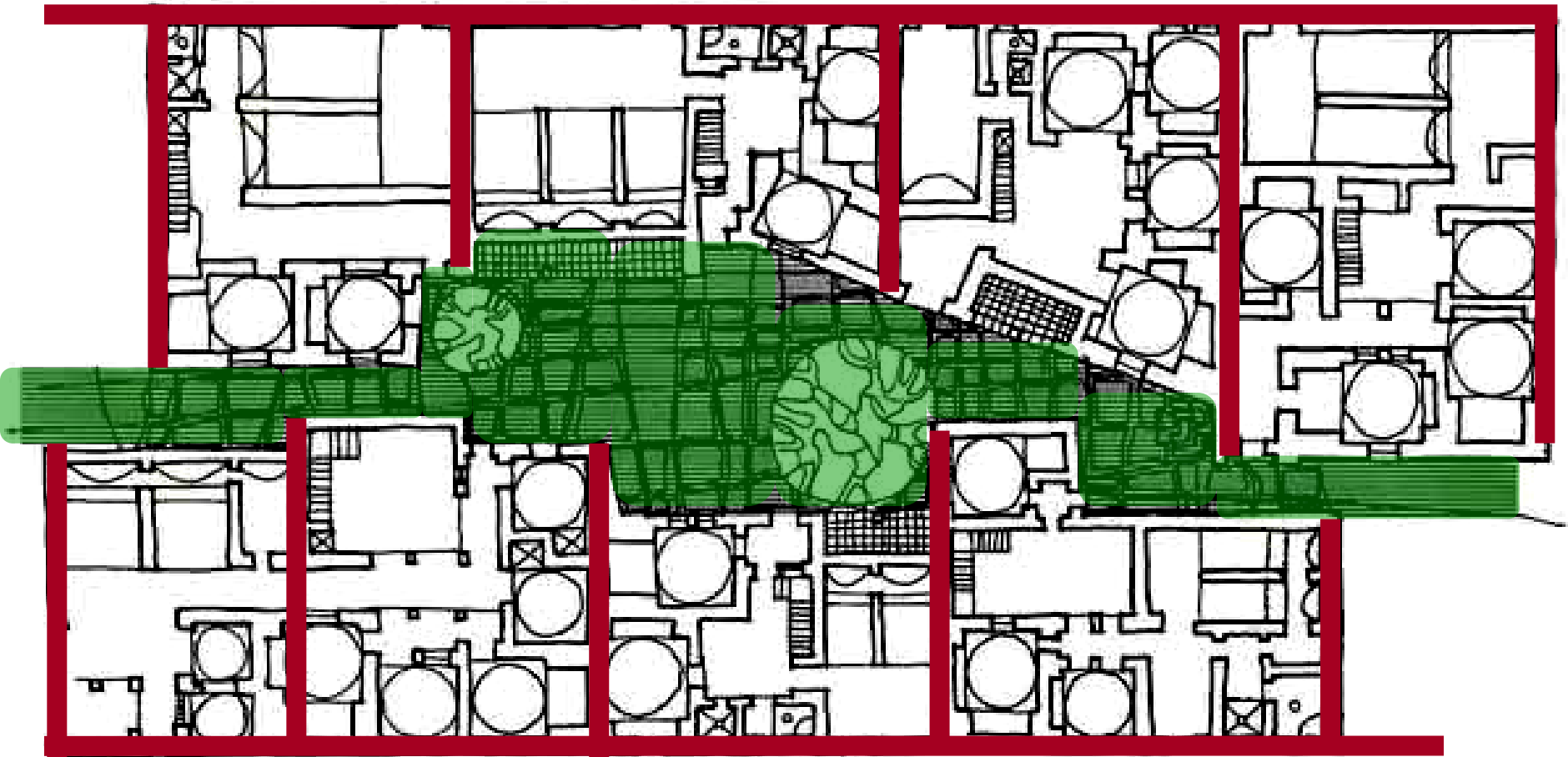


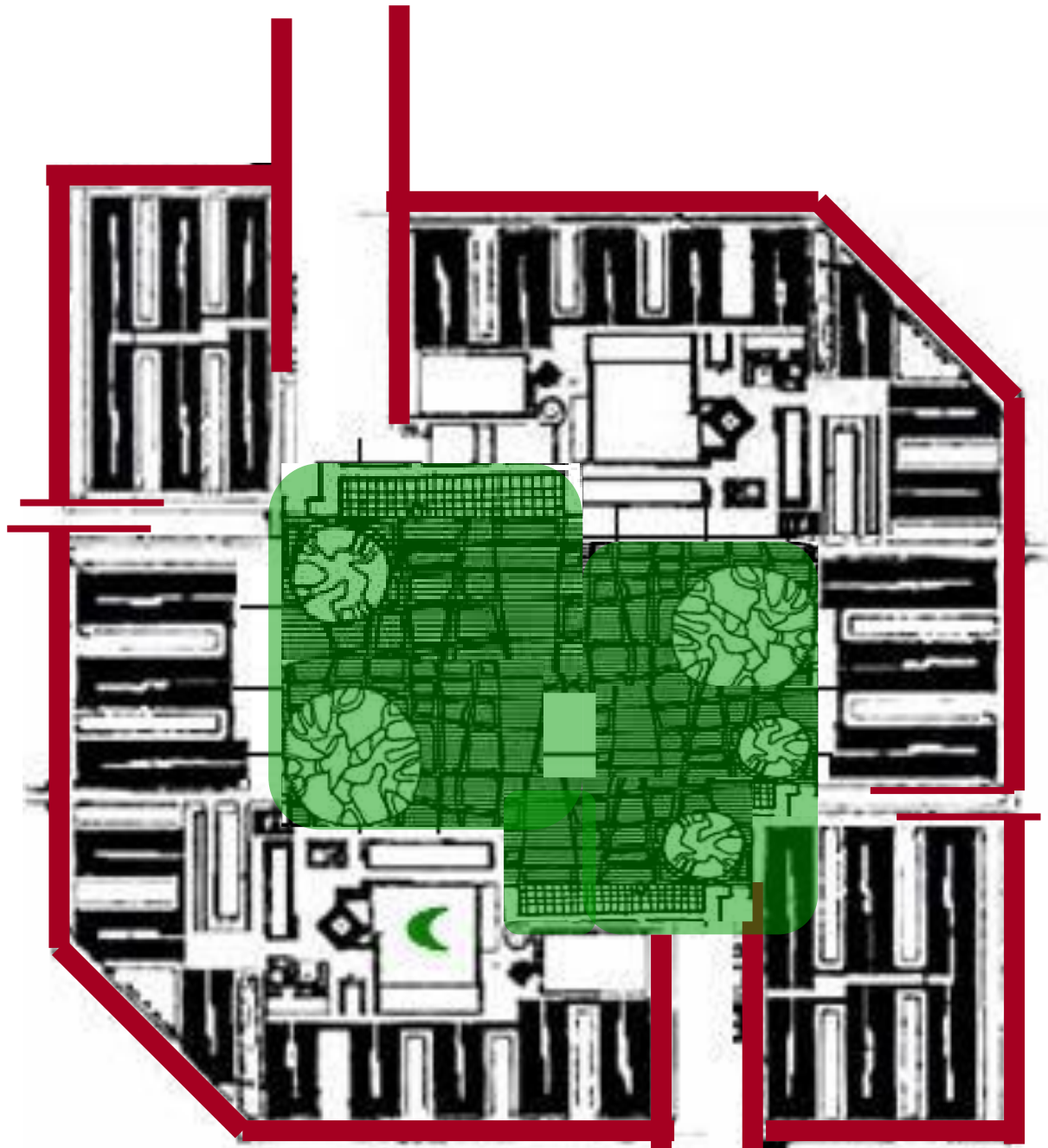
Rural Model

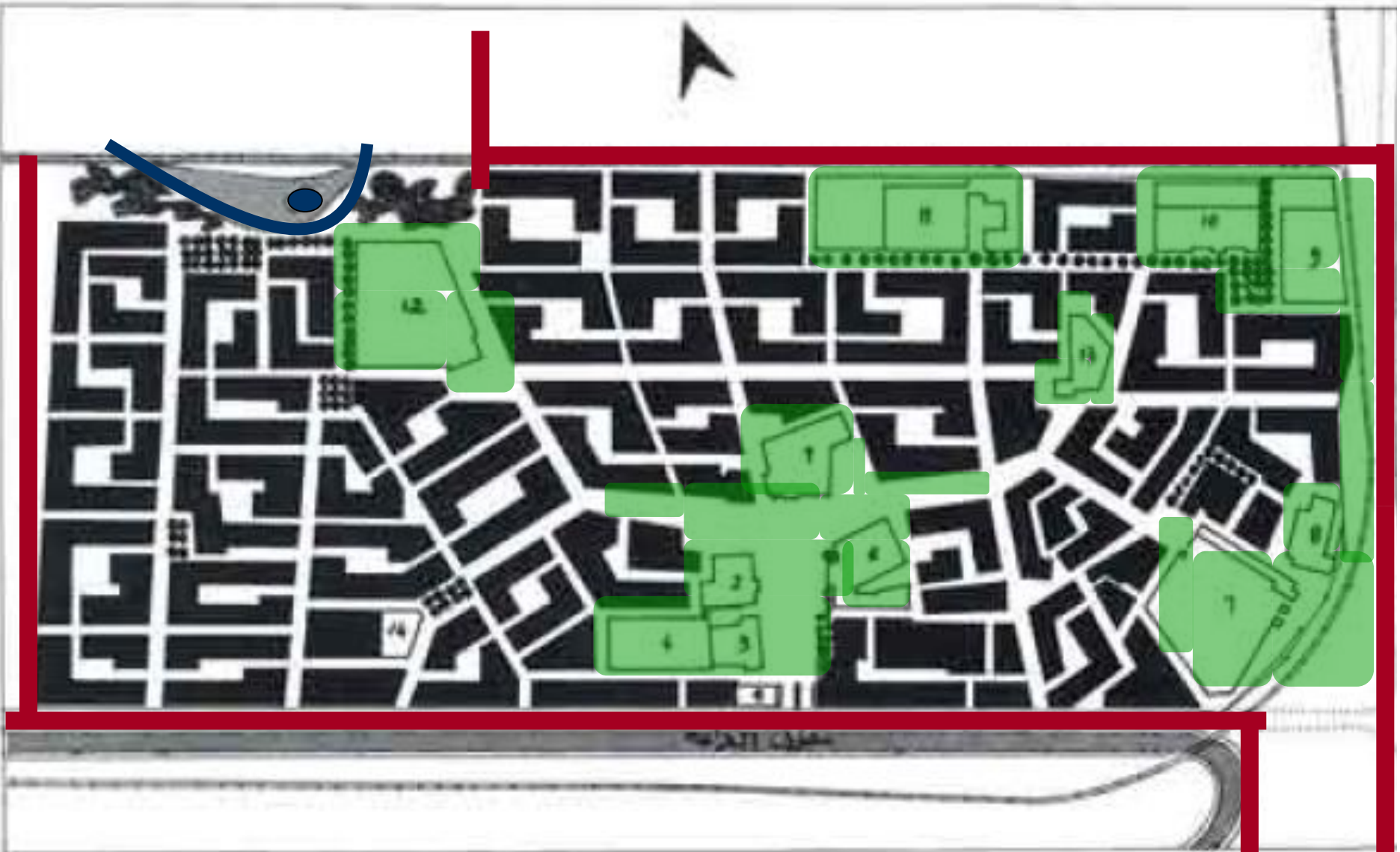


Integrated Rural Model









Egypt

