Energising Europe

www.greengrowth.eu

Welcome to our launch event

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- Vision
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- Team

Modern society is addicted to cheap, non-renewable energy

Cost and power output of crude oil = **Cost and power output of human labour**

The average European citizen consumes **16** barrels of crude oil each year

At current oil prices, this works out to a monthly cost of **€72** per citizen

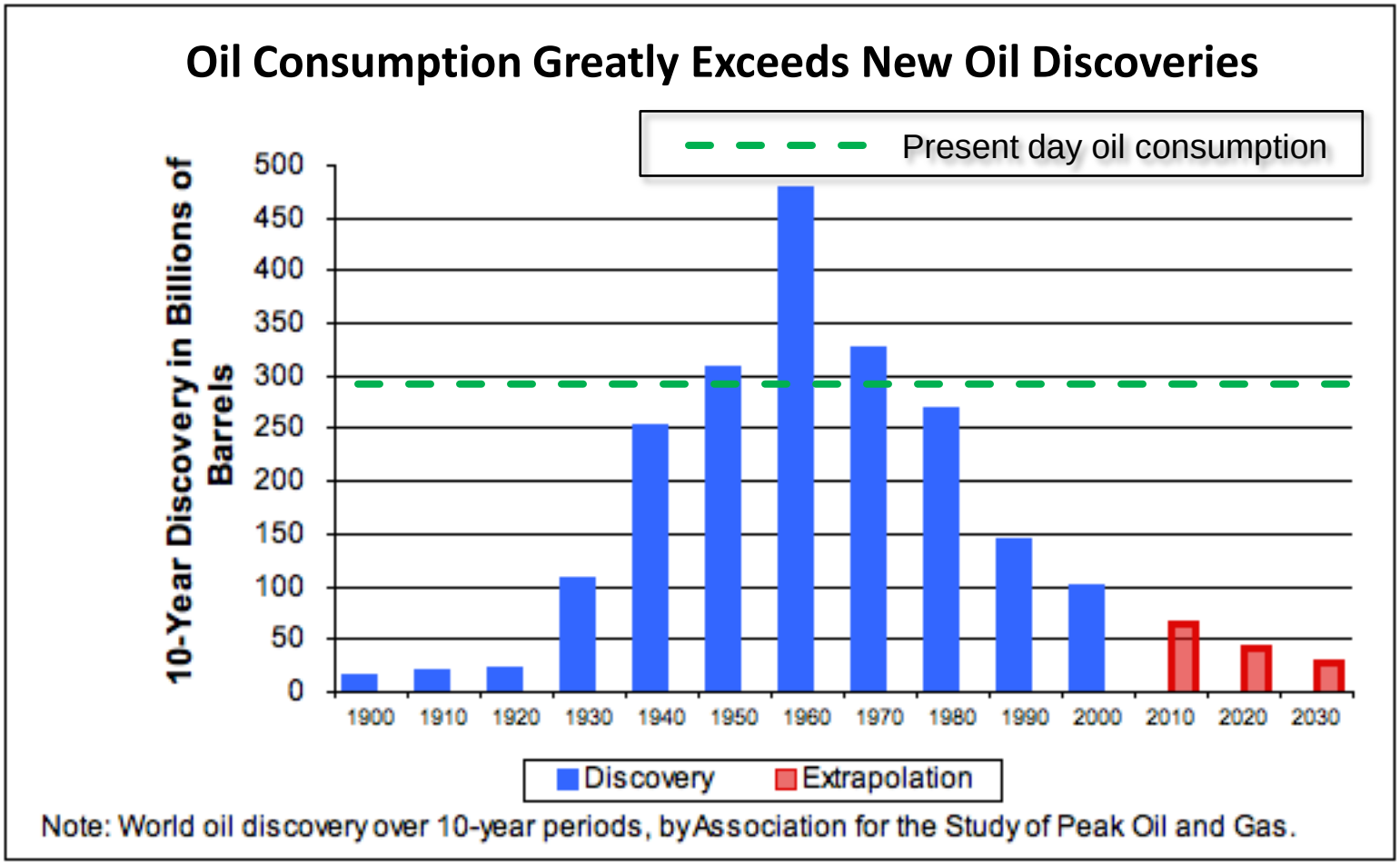
The average sustained power output of 16 barrels of oil burned over the course of a year is **3095W**

The average power output of a human on a 2,500 kcal diet is 120W, of which about **30W** is muscle power

To replace the energy services provided by oil, Europeans would need 3095 / 30 = **103** servants each.

To also match the low cost of crude oil, each servant's salary would not exceed 72/103 = **€0.70** per month

This addiction is not sustainable



Our vision

"Peak oil" and carbon emissions limits to growth are here and now. They threaten to reverse the economic growth that has been underpinning stability and democracy for decades.

Thus, the most important priorities of the 21st century will likely be the twin efforts to increase renewable energy and energy efficiency. Obsolete capital stock, such as fossil-fuel based power plants and buildings that waste energy, will have to be converted or replaced. The task and challenge that lies ahead is unprecedented.

Green Growth Energy Services offer professional energy consultancy services to all who are committed to making the transition to renewable energy and energy efficiency.

Our services

Energy Audits

Energy Performance Certification

Energy Project Management

Energy Project Finance Advisory Services

Advisory services for Energy Efficiency of buildings

Feasibility Studies for Energy Projects

Sustainable Technologies

- Free or passive cooling
- Rainwater recovery
- Maximisation of natural daylight
- Natural and mixed mode ventilation
- Variable speed drives
- Combined heat and power
- Renewable energy sources
- Low energy lighting solutions
- Natural refrigerants
- Photovoltaics
- Heat recovery

Green Growth Energy Services

In Focus:
Energy Audits?

An **energy audit** tracks the energy flows and energy usage patterns in a building.

Typically, the first stage of an energy audit is a walk-through review which highlights potential problems as well as options for resolving them.

The second stage is a full energy audit. Using specialized tools and techniques, the energy flows through the building are mapped out, and its energy performance assessed.

The third stage is the production of a report detailing the findings, and its delivery to the key decision makers. The report is designed to be informative and also to lay out options for efficiency improvements together with the estimated cost and pay-back.

Our partners

At Green Growth, we are proud to collaborate with **Troup Bywaters + Anders**, a leading U.K. consulting engineering firm with long experience in the field of energy efficiency.

TB+A's team of specialist thermal modellers, SAP, BREEAM and Code accredited assessors take a holistic approach to sustainable design. Energy efficiency is addressed from Day One, in order to reduce the need for costly and complex engineering solutions.

Thermal modelling techniques, simulation tools and benchmarking against best practices and standards are applied at every TB+A project.

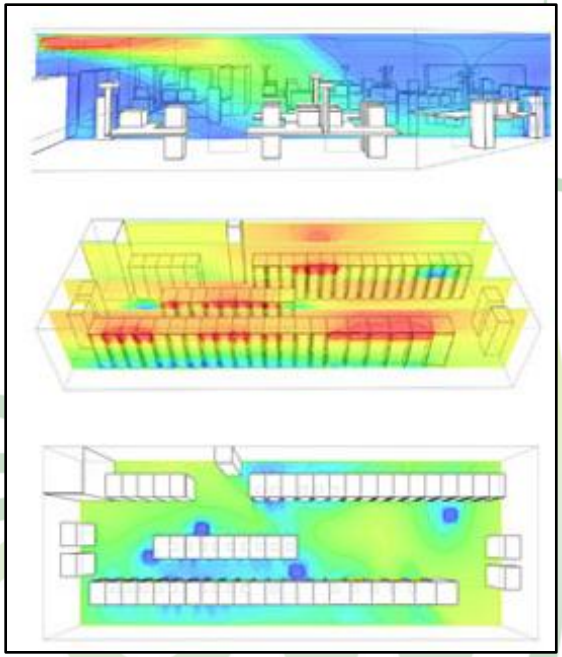
TROUP BYWATERS + ANDERS
Bringing buildings to life

Green Growth
Energy Services

In Focus:
Thermal Modelling

In order to analyse energy saving potential we employ TB+A's dynamic thermal modelling techniques throughout the design phase to aid the energy and environmental engineering of the project. Some of these models are shown here.

These types of simulation tools are used to evaluate options for building facade, solar heat gains, day lighting analysis, prediction of energy use and carbon dioxide emissions over the life of the building. They are also used for evaluating system and component performance to best match the requirements of the building.



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Summary Objectives

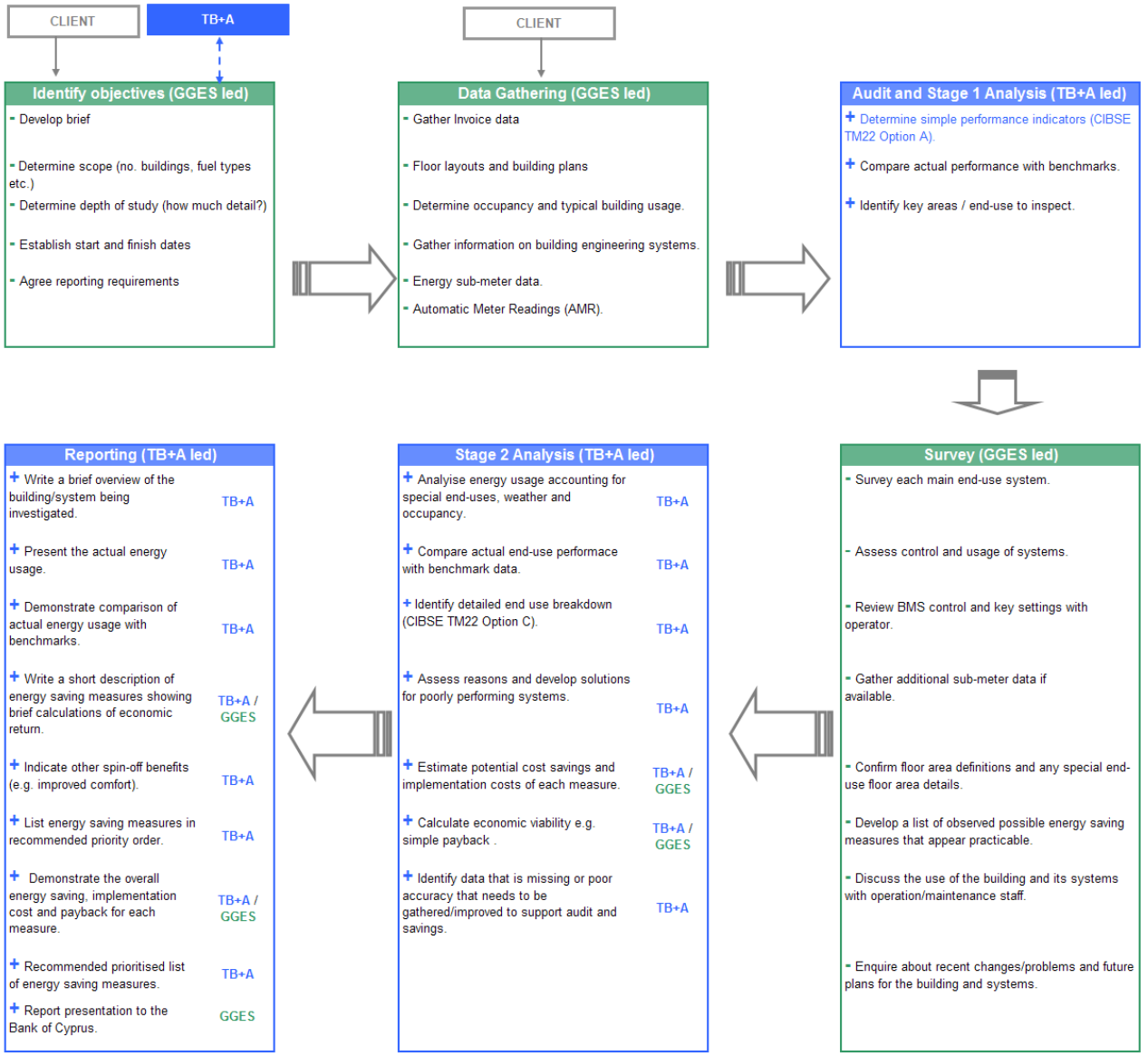
Increasing scope of audit → increasing level of detail of survey

	ENERGY AUDIT			SURVEY	
	SIMPLE	DESIGN	FULL	CONCISE	COMPREHENSIVE
How much energy are we using?	■	■	■		
How much is our energy costing?	■	■	■		
Where is our energy being used?		■	■		
When is our energy being used?			■		
How do we compare with others?	■	■	■		
Where can we save energy?				■	■
How much energy will we save?				■	■
What do we need to do?				■	■
How much will it cost us?				■	■
What are our energy management proceedures?					■
How can we improve our energy management proceedures?					■

Summary Scope

	ENERGY AUDIT			SURVEY	
	SIMPLE	DESIGN	FULL	CONCISE	COMPREHENSIVE
Calculate building energy/fuel usage	■	■	■		
Identify likely energy end-uses (system / departments)		■	■		
Analysis / Evaluation of energy profiles (time varying)			■		
Design checks of appropriateness of plant and distribution systems sizes			■		
Visual inpsection of key end-uses				■	■
Walk around of floor areas to review occupancy densities, furniture layouts, departmental use etc.				■	■
Identify main end-use controls and associated devices.				■	■
Identify BMS operation (control set points)				■	■
Visual inspection an inspection of key parameters of the building thermal envelople				■	■
Energy measurement (clip on meters, light meters, thermographic measurement etc)					■
Inspect plant condition / age					■
Inspect plant maintenace (filters clean, coils blocked? Etc)					■
Review on-site energy management proceedures/records					■

Action Plan


CLIENT
TB+A
Identify objectives (GGES led)
- Develop brief
- Determine scope (no. buildings, fuel types etc.)
- Determine depth of study (how much detail?)
- Establish start and finish dates
- Agree reporting requirements
CLIENT
Data Gathering (GGES led)
- Gather Invoice data
- Floor layouts and building plans
- Determine occupancy and typical building usage.
- Gather information on building engineering systems.
- Energy sub-meter data.
- Automatic Meter Readings (AMR).
Audit and Stage 1 Analysis (TB+A led)
+ Determine simple performance indicators (CIBSE TM22 Option A).
+ Compare actual performance with benchmarks.
+ Identify key areas / end-use to inspect.
Survey (GGES led)
- Survey each main end-use system.
- Assess control and usage of systems.
- Review BMS control and key settings with operator.
- Gather additional sub-meter data if available.
- Confirm floor area definitions and any special end-use floor area details.
- Develop a list of observed possible energy saving measures that appear practicable.
- Discuss the use of the building and its systems with operation/maintenance staff.
- Enquire about recent changes/problems and future plans for the building and systems.
Stage 2 Analysis (TB+A led)
+ Analyise energy usage accounting for special end-uses, weather and occupancy. TB+A
+ Compare actual end-use performace with benchmark data. TB+A
+ Identify detailed end use breakdown (CIBSE TM22 Option C). TB+A
+ Assess reasons and develop solutions for poorly performing systems. TB+A
+ Estimate potential cost savings and implementation costs of each measure. TB+A / GGES
+ Calculate economic viability e.g. simple payback . TB+A / GGES
+ Identify data that is missing or poor accuracy that needs to be gathered/improved to support audit and savings. TB+A
Reporting (TB+A led)
+ Write a brief overview of the building/system being investigated. TB+A
+ Present the actual energy usage. TB+A
+ Demonstrate comparison of actual energy usage with benchmarks. TB+A
+ Write a short description of energy saving measures showing brief calculations of economic return. TB+A / GGES
+ Indicate other spin-off benefits (e.g. improved comfort). TB+A
+ List energy saving measures in recommended priority order. TB+A
+ Demonstrate the overall energy saving, implementation cost and payback for each measure. TB+A / GGES
+ Recommended prioritised list of energy saving measures. TB+A
+ Report presentation to the Bank of Cyprus. GGES

Our team

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