



Promotion of energy efficiency in Tunisia

Orientations, business cases and support programs

RENAC | 21 mai 2019

Agenda

1. Enjeux du secteur de l'énergie en Tunisie - Challenges
2. Programmes d'appui en cours: GIZ - support programs
3. Orientations and business cases
4. Conclusion and recommandations





1. Enjeux du secteur de l'énergie en Tunisie - Challenges

Enjeux - Challenges

- Strong dependence on energy importation;
- Precarious energy supply;
- Energy prices in continuous growth;
- Fragile economic situation;
- Limited energy resources;
- Global Commitment on Climate Change.

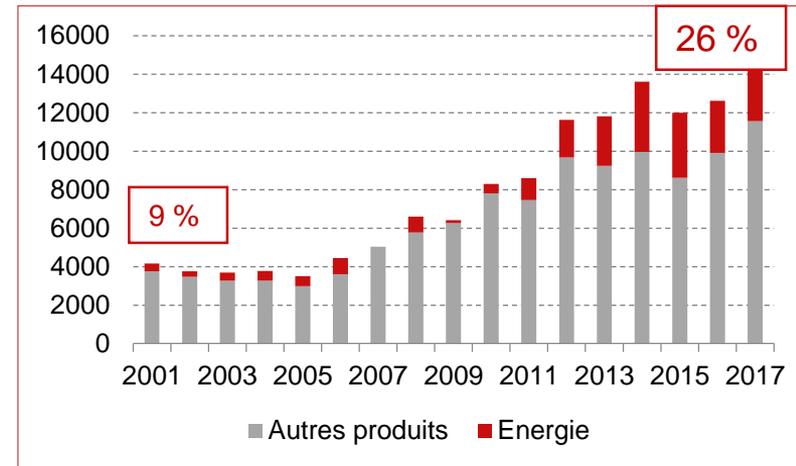
Key figures - energy sector in Tunisia

- Total consumption of primary energy in 2018 : **9552 Ktep – PCI**;
- Energy importation in 2018: **50%** du besoin total;
- NG suppliers for Tunisia: 100% from Algeria;
- RE share in electricity production in 2018: 3%;
- Electricity produced from the NG: 97%;

Key figures - energy sector in Tunisia

- Share of the energy on commercial balance deficit in 2017: **26%**.
- plus que 4 Milliards de dinars ~ 1,2 milliards €.
- Industrie is the second consumer of final energy: around 30%.
- Electricity price MT: 0,75 €/KWh.
- NG price MP: 0,14 €/KWh.

Commercial balance deficit





2. Support programs - GIZ

GIZ intervention in Tunisia – Energy cluster

Energie renouvelable

- Renforcement du Marché Solaire (**RMS**)
- Appui à la mise en œuvre du Plan Solaire Tunisien (**APST**)
- Projet Femme - Energie
- Secrétariat du Partenariat tuniso-allemand de l'énergie (global)

Efficacité Energétique

- Appui à la Promotion de l'Efficacité Energétique en Tunisie (**APEET**)
- Promotion de l'Efficacité Energétique dans les Bâtiments (**PEEB**) (global)

Climat

- Projet de démonstration pour un marché du carbone sectoriel dans l'industrie du ciment en Tunisie
- ER et EE dans le secteur du bâtiment (**NAMA-Facility**)
- Initiative sur l'Acide Nitrique (global)
- Gestion et destruction des SAO (global)



Projet **APEET**

« **A**ppui à la **P**romotion de l'**E**fficacité **E**nergétique en **T**unisie »

Projet APEET – Key information

Project::

Appui à la **P**romotion de l'**E**fficacité **E**nergétique en **T**unisie (APEET)

Period: 12/2017-11/2021

Funder:

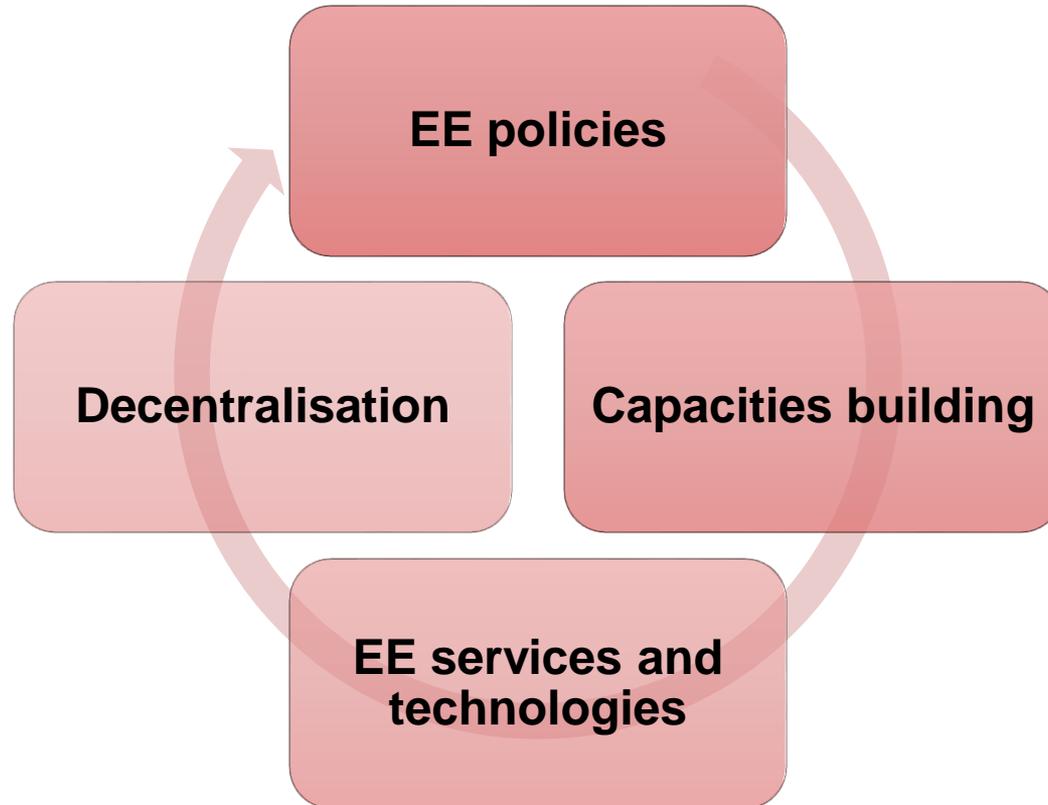
Ministère fédéral de la coopération économique et du développement (BMZ)

Execution partner:

Agence Nationale pour la Maîtrise de l'Energie, ANME



Projet APEET – Axes d'intervention



Projet APEET – Intervention Axes

Services et technologies d'efficacité énergétique

❖ Services:

- ISO 50001;
- Energy monitoring system;
- Specific audit: utilities, lighting, air conditioning...;
- Measuring and verifying of energy saves;
- Centralized utilities distribution / ESCO.

❖ Technologie:

- Smart lighting: Public Lighting: possibility of ESCO or PPP project;
- Organic Ranking Cycle;
- Cooling storage.



3. Orientations and business cases

Energy Management System- ISO 50001

Framework conditions:

- Subvention sur l'accompagnement: 70% de subvention sur toute action d'accompagnement à la mise en place d'un SME, ISO 50001 - plafond 20 K€.
- Objectif national: certification de 250 entreprises jusqu'à 2023.



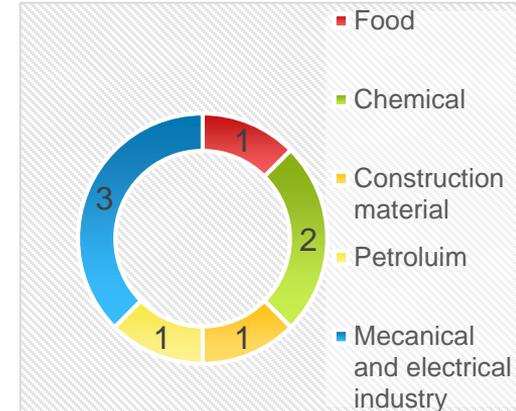
Energy Management System- ISO 50001

Achievement:

- 8 certified companies.
- Completed actions with the support of GIZ:

→ Projet: **DASTII** « Déploiement des Applications d'Effacité Energétique sur des Sites industrielles en Tunisie, phase II » -
Durée: 2015 – 2017.

- ✓ Deux entreprises industrielles de la branche agroalimentaire ont été accompagnées: une certifiée.



Energy Management System- ISO 50001

Achievement:

- Actions réalisées avec l'appui de la GIZ:
 - ✓ 20 experts formés sur la thématique → formations certifiantes.
 - ✓ **CDC des audits énergétiques dans l'industrie a été mise à jour en tenant en compte des exigences de la norme ISO 50001 – dans une approche de facilitation du processus.**



Energy Management System- ISO 50001

Planned actions:

- Projet APEET – GIZ et ANME:
 - ✓ Six (06) entreprises à accompagner: mai 2019 et aout 2020.
 - Target sectors: Industry (02), Building (02), Transport (01) and a municipality (pilot project).
 - ✓ 12 experts to coach « **Learning by doing** ».
 - La création du marché exige un certain nombre d'experts qualifiés.
 - ✓ Un programme de sensibilisation et de communication pour la promotion de l'ISO 50001 à grande échelle en Tunisie.

Energy Management System- ISO 50001

Barriers and challenges:

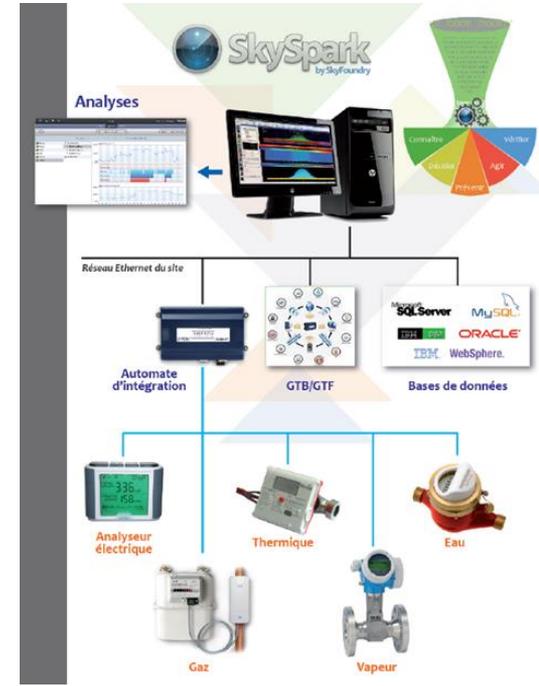
- The number of qualified experts is limited;
- Non-targeted awareness;
- No involvement of the building sector;
- Companies are resistant to change;
- Changing behavior and motivation of employees to be part of the management process is difficult;
- Lack of involvement of companies managers (lack of the leadership approach);
- Lack of reliable energy monitoring systems;
- Lack of data (quality of energy audit reports).

Suivi énergétique centralisé – Monitoring system

Framework conditions:

- Subvention sur les investissements immatériel: 70% - plafond 10 K€
- Subvention sur les investissements matériel: 40% - plafond 30 K€
- L'état tunisien encourage beaucoup ces types de projets.

On ne peut améliorer que ce qu'on peut mesurer



Suivi énergétique centralisé – Monitoring system

Achievement – 2 pilot projects:

→ With the support of GIZ – DASTII.

- Date: 2017 – 2018.
- Entreprises bénéficiaires: Délice DANONE (fabrication des produits laitiers) et SFBT (brasserie).
- Etendu des systèmes: niveau 1 et 2
- Project cost: 80 K€.
- Gain énergétique moyen annuel: 600 Tep per company (10%).
- Payback period: 10 mois – Evaluation faite par les entreprises suite à l'exploitation des systèmes.

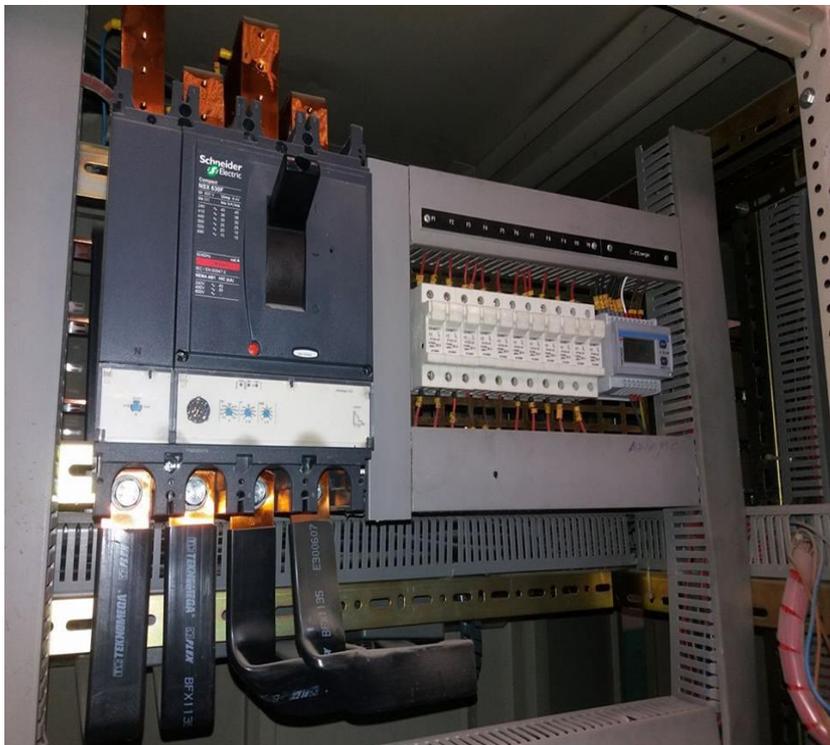
Suivi énergétique centralisé – Monitoring system

Achievement – **2 pilot projects:**



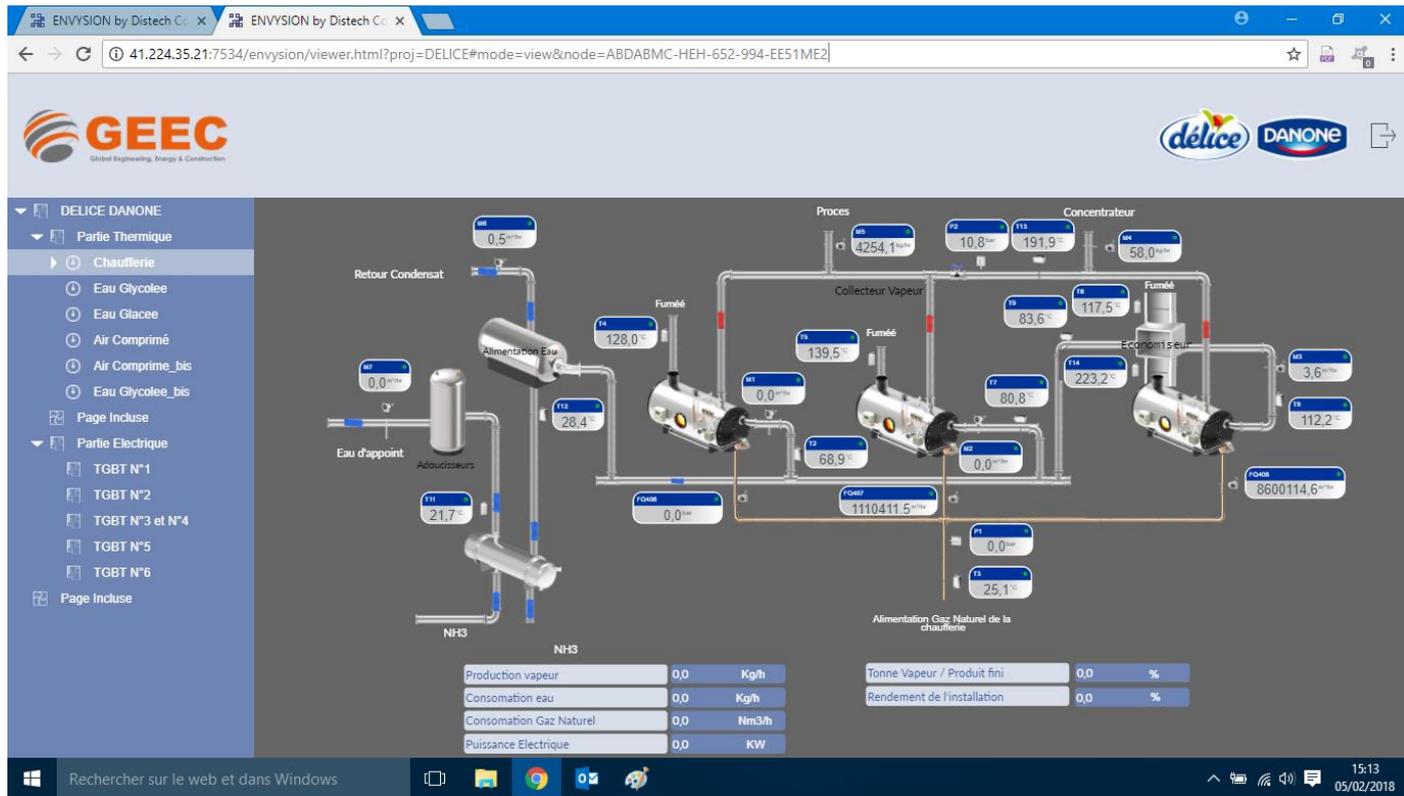
Suivi énergétique centralisé – Monitoring system

Achievement – **2 pilot projects:**



Suivi énergétique centralisé – Monitoring system

Achievement – 2 pilot projects:



Suivi énergétique centralisé – Monitoring system

Achievement – 2 pilot projects:

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SFBT

SYSTEME DE MANAGEMENT DE L'ENERGIE

GEEC
Global Engineering Energy & Construction

- GESTION D'ENERGIE
 - PRODUCTION VAPEUR
 - MEURA
 - LARDET
 - WANSON
 - MINGAZZINI
 - PRODUCTION FROID
 - YORK
 - TRANE
 - STAL
 - PODUCTION AIR COMPRISE
 - SULLAIR
 - ATLAS
 - TRAITEMENT CO2
 - SAISIE MANUELLE
 - COGENERATEUR**
 - VUE ELECTRIQUE
 - EAU

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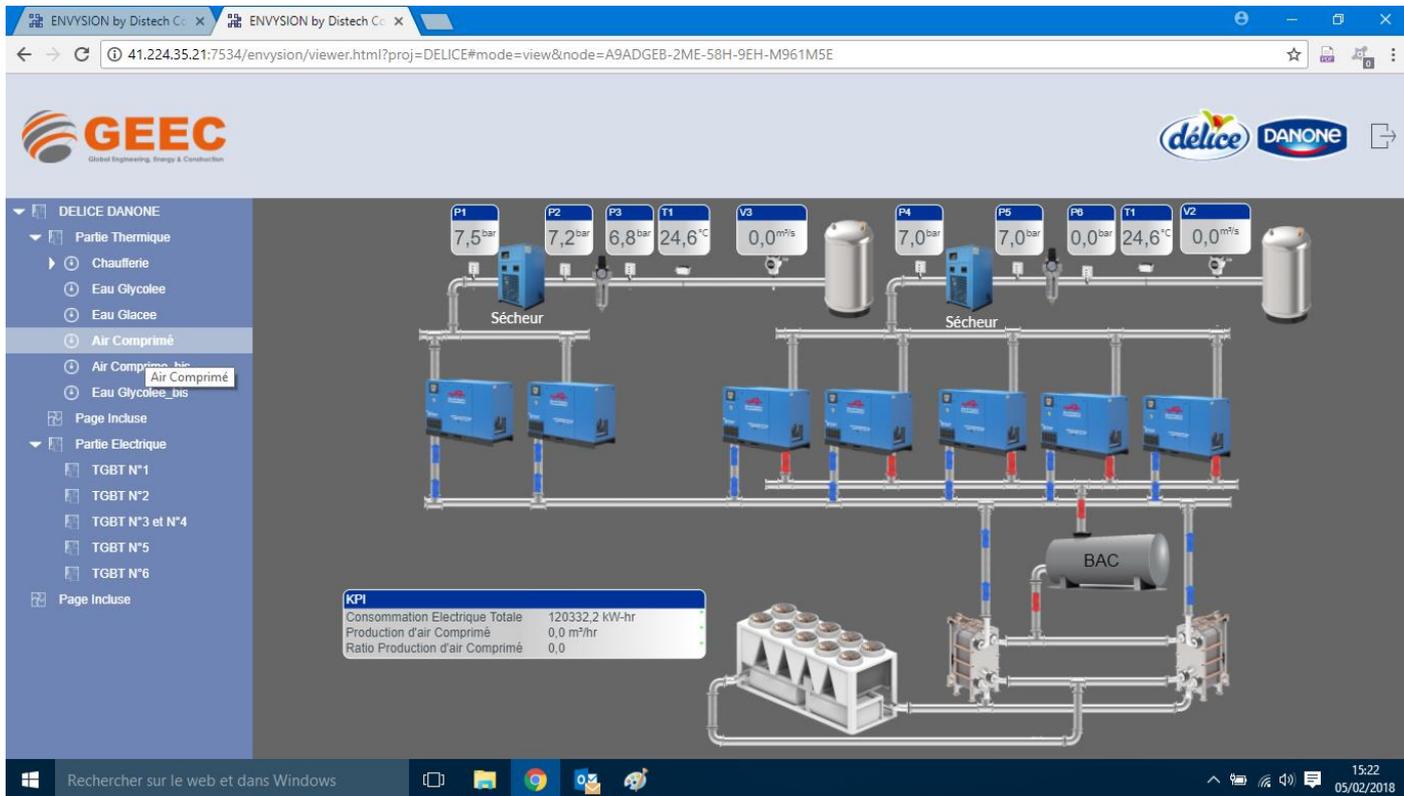
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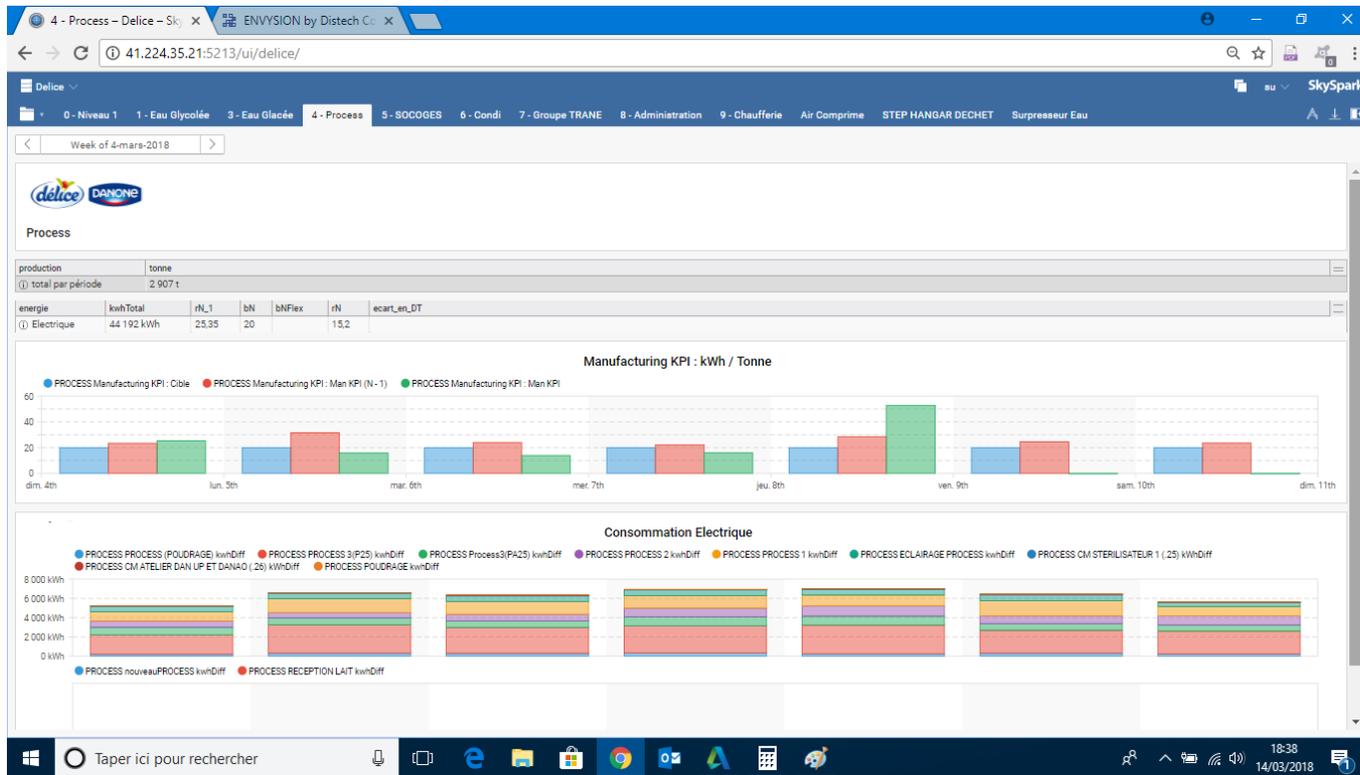
Suivi énergétique centralisé – Monitoring system

Achievement – 2 pilot projects:



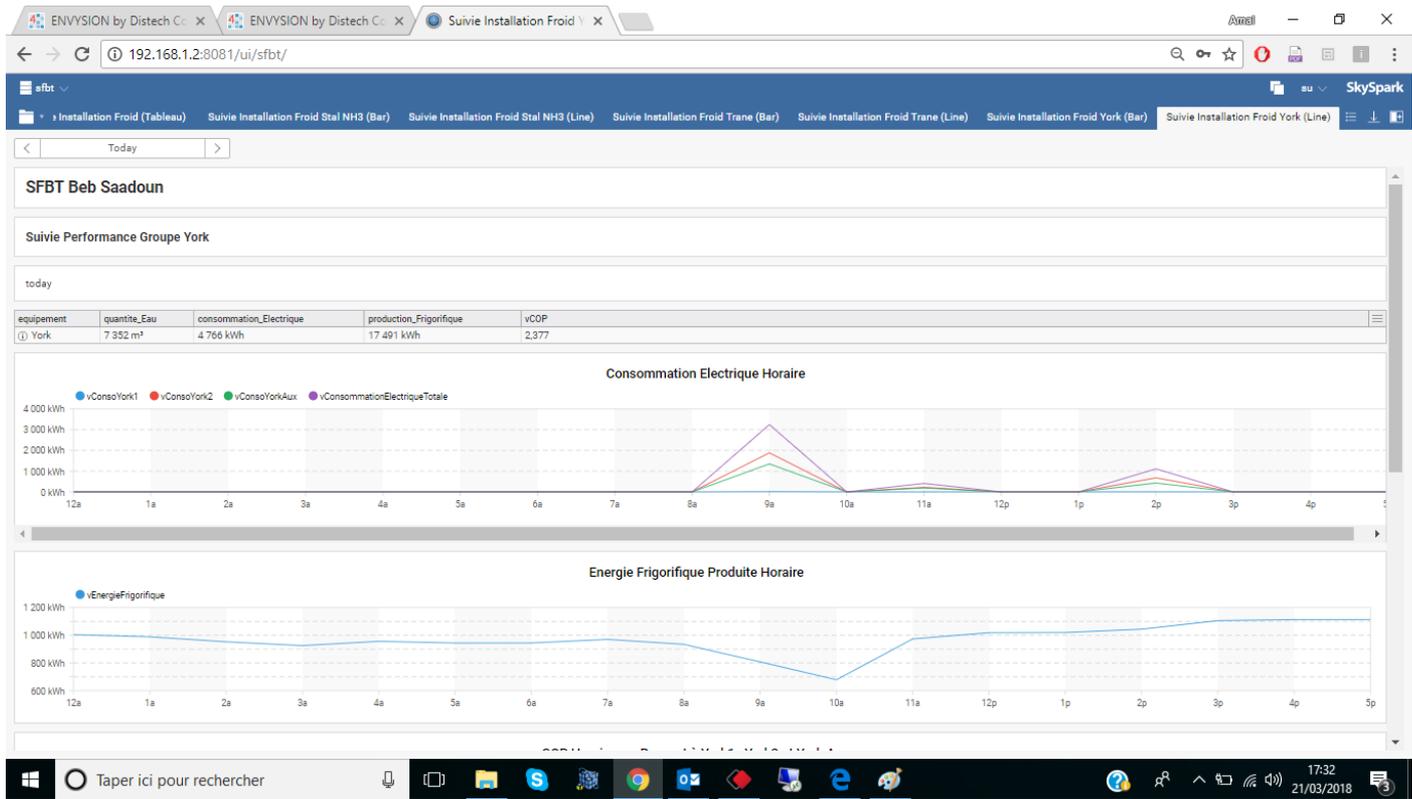
Suivi énergétique centralisé – Monitoring system

Achievement – 2 pilot projects:



Suivi énergétique centralisé – Monitoring system

Achievement – 2 pilot projects:



Suivi énergétique centralisé – Centralized Monitoring system

Barriers and challenges:

- Number of complete solution for energy monitoring system is limited (2 à 3);
- Lack of specialized experts in this field;
- Availability of equipment on the local market: especially thermal measurement equipment;
- Local after-sales services do not have the necessary expertise in setting up and verifying measuring equipment (especially the thermal part).
- International brands such as Siemens do not offer complete solutions (thermal and electrical) specific to Tunisian companies.

Mutualisation des utilités – Centralized distribution of utilities

Possibility ESCO or super ESCO

Regulatory framework

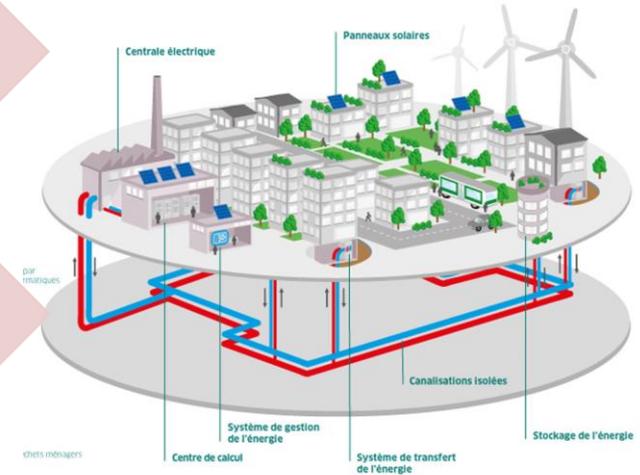
- under development.
- Strategic orientations of the state.

Identification of potential sites

- Industrials areas, tourist areas, zones, group of hospitals

Technico-economic feasibility study

- Zone du Lac Tunis: under development



Smart lighting – Eclairage public

Regulatory framework:

- Feasibility study: Subsidy of 30% - ceiling 8 K€.
- Technical assistance: Subsidy of 30% - ceiling 20 K€.
- Material investment: Subsidy of 20% - ceiling 60 K€.



Smart lighting – Public lighting

Achievement:

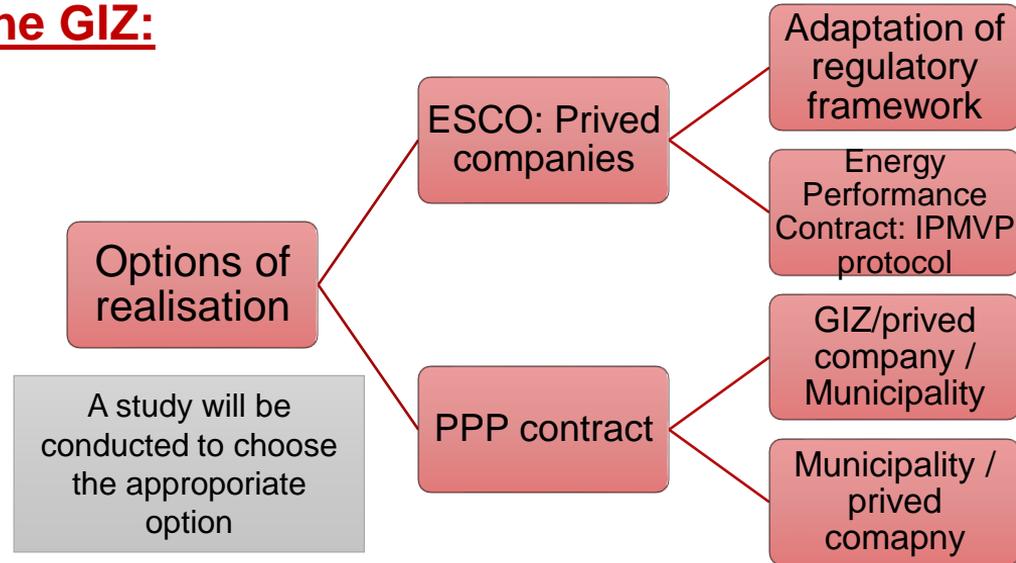
- There is no realized projects until now.
- The tunisian municipalities are very interested by this technology for many reasons:
 - ✓ Continued growth in energy prices.
 - ✓ The share of public lighting on the energy bill of the municipality is around 80%.
 - ✓ The potential of energy consumption reduction which can reach 60%.

Smart lighting – Public lighting

Planned projects:

Pilot project with the support of the GIZ:

- **Project title:** Smart lighting – public lighting
- **Beneficiary:** Municipality (town of Mahdia, Tunisia)
- **Number of light points :** 6000 points
- **Period of realisation:** 2020
- **Potential:** 350 municipalities with an average of 6000 lighting points.



More involvement from international technologies suppliers

Smart lighting – Public lighting

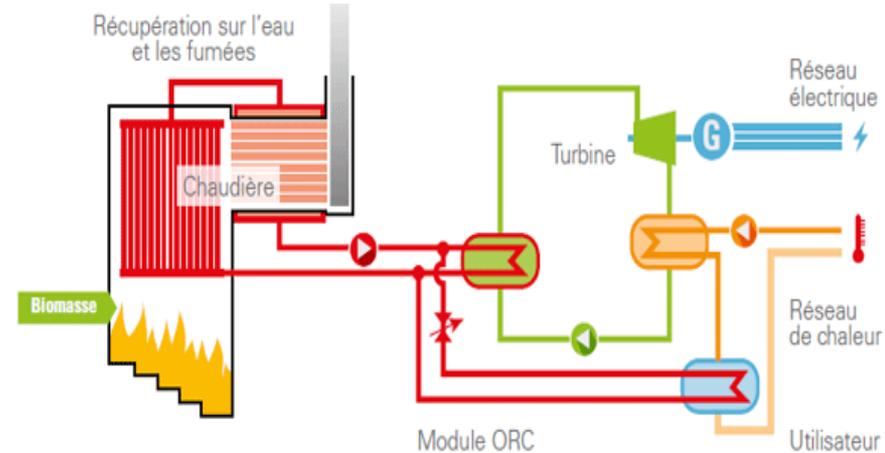
Barriers:

- Technology not available on the local market;
- The municipalities are not familiar with these type of technologies;
- Lack of technical expertise in municipalities;
- Lack of funding sources for innovative projects;
- Regulatory framework is not suitable for these type of projects;
- International lighting suppliers are not active in the tunisian market.

Waste heat recovery

Regulatory framework:

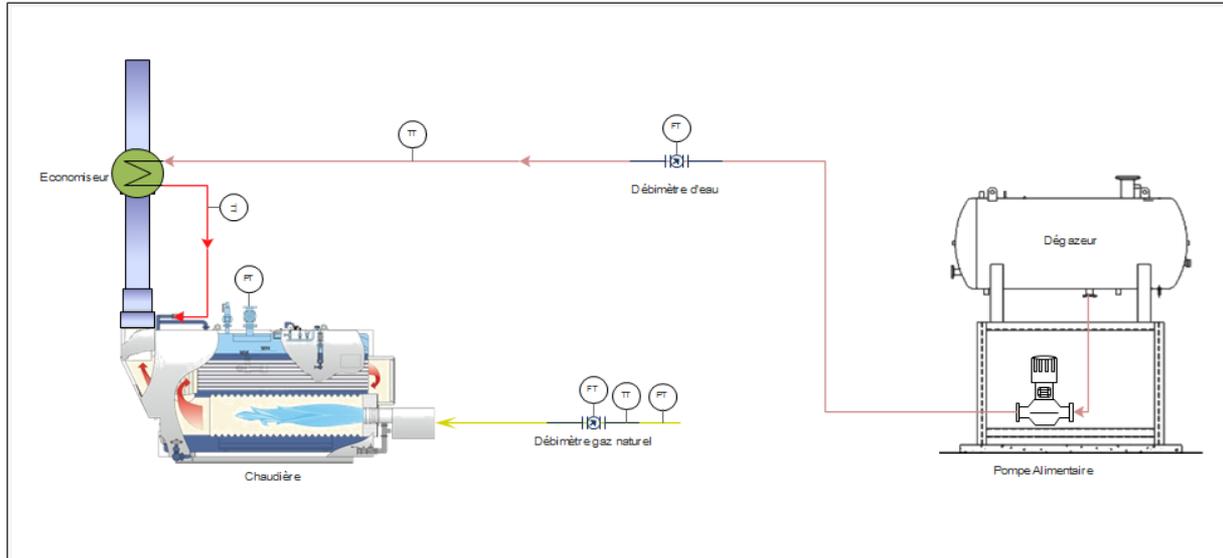
- Feasibility study: Subsidy of 30% - ceiling 8 K€.
- Technical assistance: Subsidy of 30% - ceiling 20 K€.
- Material investment: Subsidy of 20% - ceiling 60 K€.



Waste heat recovery

Realized projects:

- Economizer heat exchanger: Boiler
→ Two projects realised with the support of GIZ



Waste heat recovery

Realized projects:

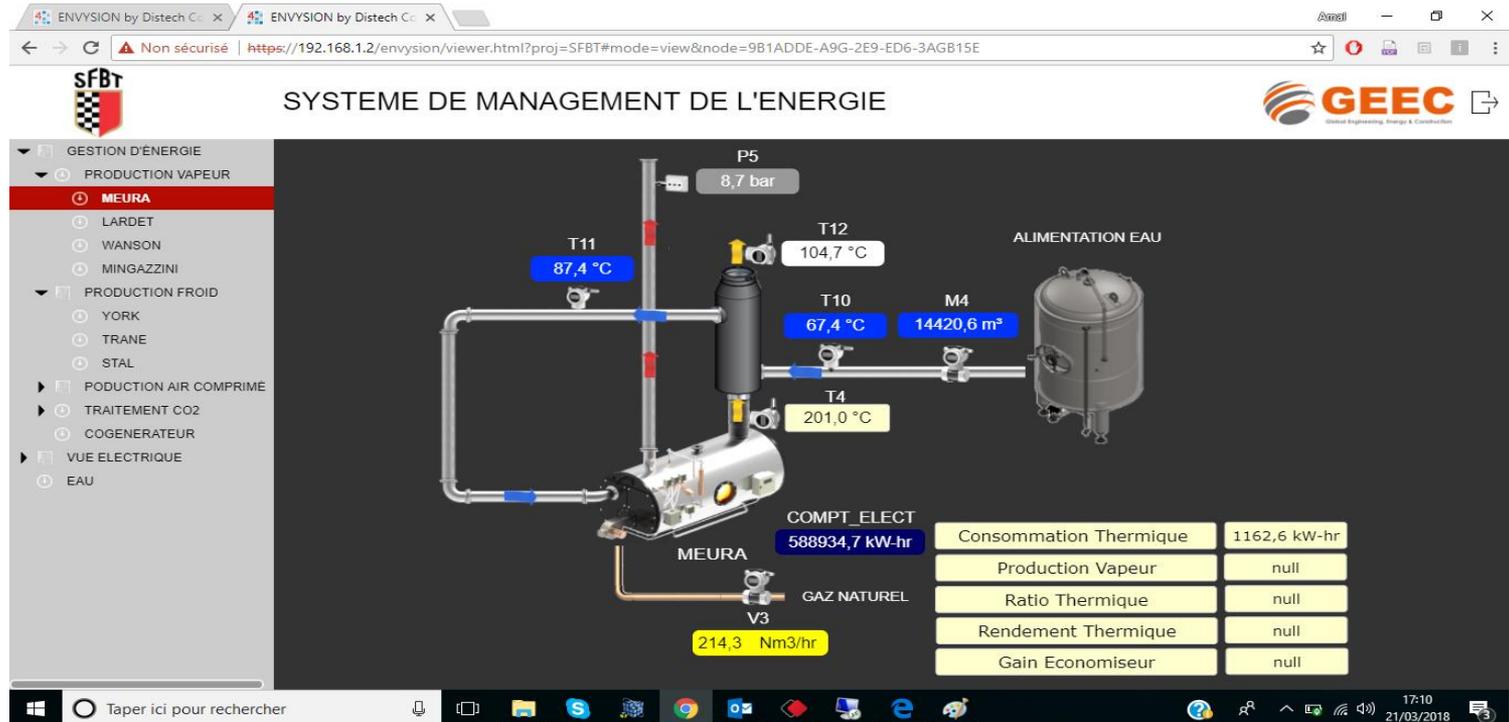
❖ Economizer heat exchanger: Boiler



Waste heat recovery

Realized projects:

❖ Economizer heat exchanger: Boiler



Waste heat recovery

Realized projects:

❖ Economizer heat exchanger: Boiler

	Project 1: Délice DANONE	Project 2: SFBT
Company sector	Dairy products	Brewery
Heat recovery use	Water preheating	Water preheating
Project cost (K€)	23	26
Energy save (%)	8	6
Energy save (TEP)	197	89
Payback period	10 months	2 years

Waste heat recovery

Realized projects:

❖ WHR – Electricity production:



Boilers



Turbine

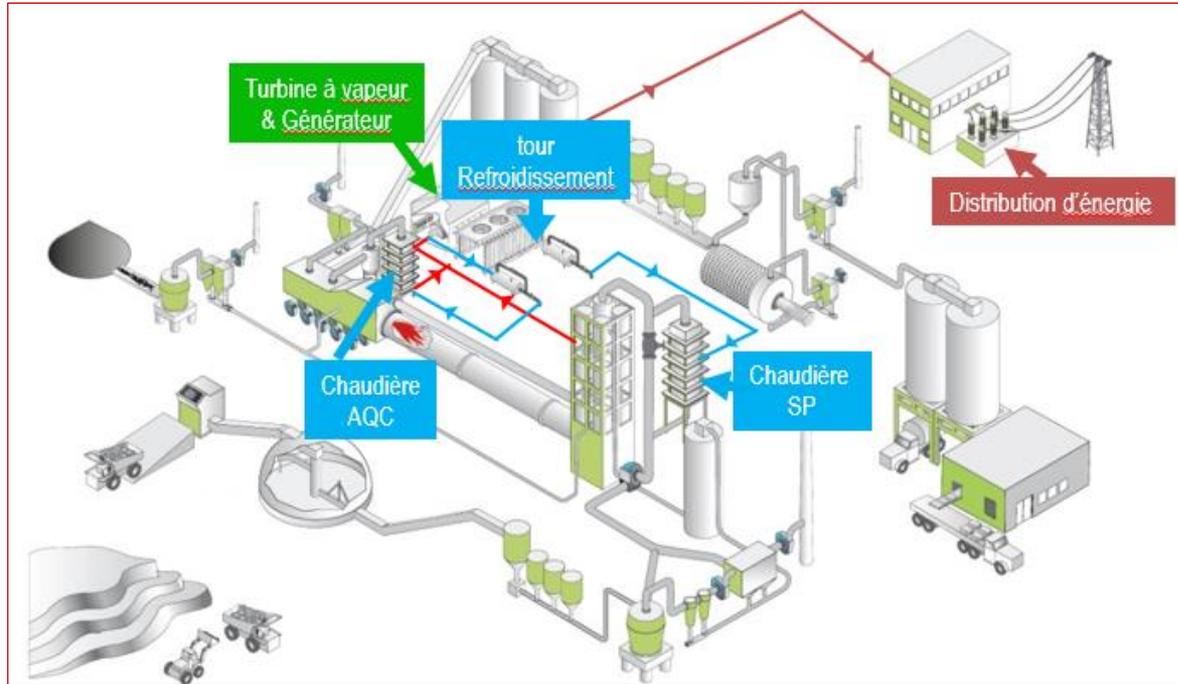


Electrical cabinet

Waste heat recovery

Realized projects:

❖ WHR – Electricity production:



Waste heat recovery

Realized projects:

❖ WHR – Electricity production:

Company	Ciment De Jebal El Ouest
Sector	Cement Production
Energy production	7,5 MWh / year - 30%of electricity need
Project cost	11 millions €
Payback period	Less than 3 years
Realisation period	2015 - 2017
CO2 reduction	30000 tCO2-eq / year

Waste heat recovery

Planified project:

❖ ORC: Organic Rankine Cycle

- Technologie will be promoted with the support of GIZ (APEET project).
- Very important potential: Hôtels and Industrials companies from food sector.
- **Pilot project:**
 - ✓ Period: 2019 - 2020
 - ✓ Sector: Industrial company – Food sector

Waste heat recovery

Barriers:

- Technology not available on the local market;
- Lack of technical expertise on this field;
- Companies are not aware by the importance of these projects;
- Lack of funding sources for innovative projects;
- Regulatory framework is not suitable for these type of projects;
- Projects are very expensive.

Conclusion and recommendations

- Potential energy saving very important in the industry sector.
- New technologies to promote in the Tunisian market: High efficiency electric motors, WHR, Smart lighting, Cogeneration, smart energy monitoring systems ...
- Enhance the adoption energy performance equipment standards: in Tunisia just refrigerators and air conditioners. Now we are working on standards for washing machines and electric motors;
- Introduce new energy services in Tunisia: ESCO, M & V, ISO 50001, specific energy audit...
Specially audit of process production;

Conclusion and recommendations

- Introduce new energy services in Tunisia: ESCO, M & V, ISO 50001, specific energy audit...
Specially audit of production process;
- Provide new avenues and mechanisms for financing EE projects: ESCO, PPP, Specific Credit Lines ...;
- Promote the transfer of know-how between Tunisian experts and international experts;
- Ensure a technological watch for the benefit of industrial companies and policy makers;
- Encourage investment in the local market.

Contact



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