Q SOLAR

AIR HEATERS

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SUMMARY

- The most economical solar heating technology; does not need government subsidies
- Brings substantial environmental and financial benefits
- The difficult Optimised Design is made by the Q Solar engineers
- Simple and inexpensive to make and install with basic tools and workers
- Easy to retro-fit to buildings and to industrial and agriculture applications
- Q Solar offers licenses and technical assistance for manufacturing businesses
- Inexpensive and easy start-up; flexible operations
- The manufacturers can make more than 40% gross margin
- The users can pay less than half for clean solar heat than for fossil fuel heat

THE TECHNOLOGY

- Most of our society's energy is produced by burning fossil fuel to obtain hot gases (hot air).
- The heat of that hot air may subsequently be transformed in other forms of energy.
- Since 2001, we developed solar air heaters which produce hot air like the fossil fuel burners.
- The solar heated air can be used in the same way as burner hot gasses, but it is cleaner
- Also, by pre-heating the air of combustion of burners, their fossil fuel use and expense are reduced, while also diminishing the greenhouse gas emissions and pollution.
- Before us, solar air heating was un-economical because air is thermal insulator, so difficult to heat.
- We conducted extended R&D to obtain more economical solar heaters than the fossil fuel burners
- The result were efficient solar radiation absorbers (SRA), which are the core of the air heaters.
- There are very many applications that need heat, but they have very different requirements.
- Therefore we designed more than 50 new models of solar air heaters adapted to different uses.
- Each model has a few versions for different places of installation and specific conditions.
- Our solar air heaters without concentration of radiation can deliver air of up to 100^0C.
- The efficiency of our solar air heaters depends on the working regime; it may be of up to 87%.
- In 2005 we commissioned our first large scale solar air heater for an industrial client.
- The data acquired over a few years on all our heater models have given us statistical confidence.
- After years of R&D and commercial tests, the Q Solar results have been:

1) Many new & different solar air heaters and their versions adapted for many different applications.
2) Our solar air heaters are optimised to be more economical than fuel burners for that application.
3) The reliability is very high (only the fans are moving parts); warranty is always more than 7 years.
4) The payback time is between a few months and 3 years (usually about 2 years)

- Our experience has shown that there should be two kinds of solar air heaters:

A) Small Q Solar air heaters (up to $3m^2$) which are mass produced and directly or indirectly distributed

B) Larger size Q Solar air heaters which (for good results) must be purpose-designed and sized; most of their manufacturing is done at their place of installation because they are too large to transport.

- Q Solar has developed methods of manufacture that are economical and environmentally friendly
- The key to economical results is the optimisation of the large heaters through our unique know-how
- The complexity of the large size solar air heaters defies economical replication.
- Q Solar technology is protected through patents, restricted know-how, restricted use software and trade secrets (mainly referring to the method of treatment of our solar radiation absorbers)

THE MARKET POTENTIAL

- The heat users need environmentally friendly heaters which also bring them heat cost savings.
- Q Solar has developed many new solutions which optimally adapt to different heat users.
- Applying to fuel burners, solar air heating now applies to most of the heat energy market.
- There are very many users of heat, requiring different types and sizes of heaters for their purposes:
  a) industry: process heaters, air pre-heaters for burners, heating of factories, industry driers, etc.
  b) agriculture: air pre-heaters for burners, driers, heating of barns, warehouses, greenhouses etc
  c) community: heating of hospitals, schools, homes, sports centres and other public buildings
  d) commercial: offices, commercial centres, airports, warehouses, other commercial buildings
- Q Solar has shown that the users of their solar air heaters can pay less than half for solar heat:

Past customers	Industrial	Homeowner	Agro-marine producer
Problem solved	Air preheating	Space heating	Drying algae
Classical heating	LPG	Natural gas	Solar / fuel heater
Issue of interest	Expense	Expense/environment	Time/contamination
Q Solar advantage	Financial	Financial/environment	V. efficient /cleaner
Price paid	\$ 70 / m^2	\$ 150 / m^2	\$ 5,000
Payback	months	2 years	months

- PH is the percentage of heat of certain temperature from the total national heat consumption.
- Solar contribution (SC) is the percentage from total heat that can be provided by Q Solar heaters
- For uses that require low temperature heat, PH=40, and SC=50 [Energy Information Agency, USA]
- For uses that require medium temperature heat, PH=20 and SC=10
- For uses that require high temperature heat, PH=40 and SC=2
- The potential of solar air heating results as about: (40x50+20x10+40x2)/100=23% of total heat
- However, many potential users do not have a large enough sunny area nearby, therefore the practical limitations reduce the Q Solar potential to about 10% of total national heat
- The burners in a country generate more than 10^8GJ per year [Energy Information Agency, USA]
- Therefore the Q Solar technology could in principle deliver about 10^7GJ/year.
- The average price of fossil fuel heat is about \$20/GJ; the price of Q Solar heat is of about \$10/GJ
- Therefore, a national Q Solar air heating market potential may be of about \$100 million/year
- Until implementation is widened, the amount will be smaller, but it can nevertheless be substantial.

THE TECHNOLOGY OFFER

- There is international and national demand and support for clean energy to replace fossil fuels.
- The Q Solar heaters are the single which can deliver half price heat compared to any other heater.
- Q Solar offers expertise on a potentially valuable product without having any real competition.
- The start-up is inexpensive, there is no need of a factory, special personnel, dedicated machinery
- Q Solar air heaters are difficult to optimise economically but easy to manufacture once known how.
- Q Solar does all Optimised Design for manufacturers, who do not need to employ solar engineers.
- The Q Solar air heaters smaller than $3m^2$ (mostly space heaters for homes) have been optimised by Q Solar and can be mass produced and directly or indirectly distributed by their producers.
- For the larger heaters, the Q Solar software does a Preliminary Design (solar and economical estimation); if the customer is interested, the Q Solar engineers make the Optimised Design (OD).
- Only local manufacturers can economically produce and install the large size Q Solar air heaters.
- We provide to the manufacturers of large solar heaters: solar technology introduction, details of tools and materials, marketing instructions and software, Input Data collecting instructions and apparatus, the Optimised Design, manufacturing and installation instructions, technology updates.
- Q Solar has the best and most economical solar air heaters because:

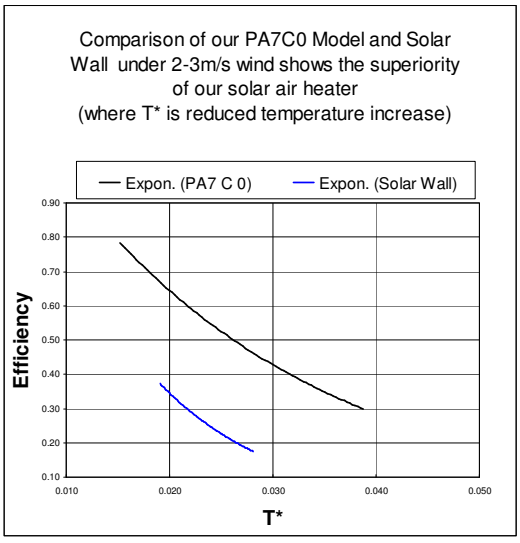
a) We have about 50 models adapted to different uses, while all competition has less than 10 models
b) Q Solar air heaters have higher efficiency and are about 3 times less expensive than competition's
c) Our unique and ever-growing technical database and complex modelling allows by far the best OD.
d) The very low expenses results in economical process and overcomes the competition.
e) Only the Q Solar air heaters can make more than 40% gross margin for their manufacturer
    - Q Solar sells its advanced SRA (specially treated) only to its licensees; therefore the competition is not able to produce very efficient, long-lasting and economical solar air heaters.
    - The Optimised Design provides the most economical and best customization for an application
    - Q Solar does not charge a large license fee, but only a small start-up fee to cover the tuition of the licensee, and the costs of apparatus and software
    - Q Solar does not charge large royalty fees, but it actually works for its Optimised Design fee
    - Keeping the fees to a minimum, Q Solar eases the licensee's start-up, and assures that the manufacturer can make about 40% gross margin, while the user receives half price heat.
    - This financial structure results in un-subsidized solar heat becoming more economical than fuel heat, and allows the large scale implementation of solar thermal energy.

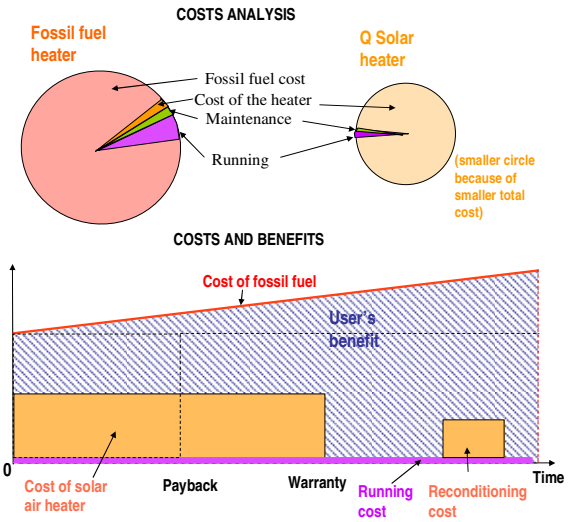
PHOTOS AND DIAGRAMS

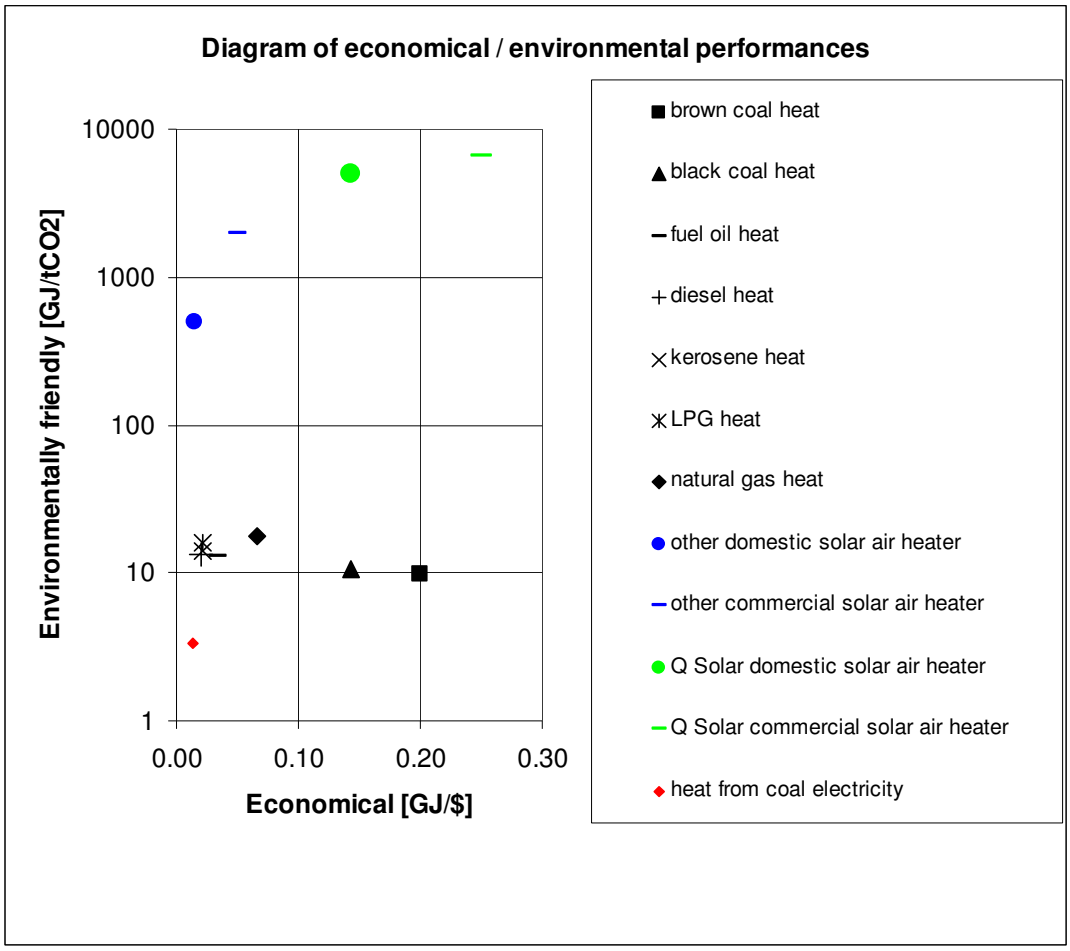
Q Solar air pre-heaters for burners

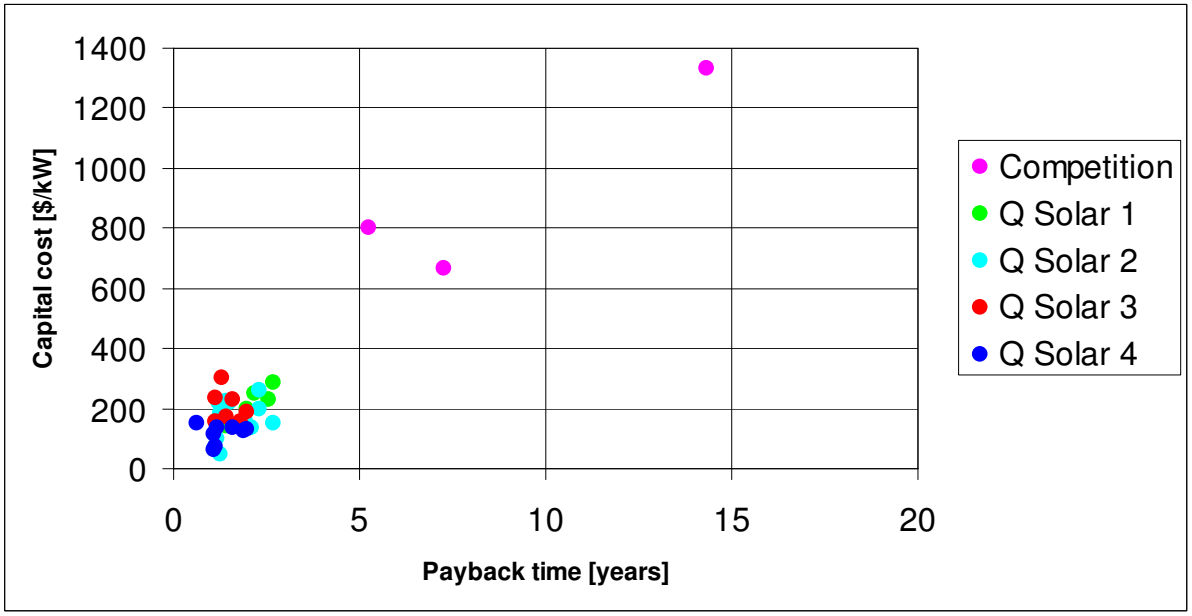
Q Solar driers for industry / agriculture.

Q Solar air heaters for buildings.









More details can be provided upon request.