

Analysis of the Use of Thermal Biomass on Healthcare Centers in Extremadura (Spain)

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Abstract

Hospitals are shown to be suitable facilities for installation of thermal production systems based on biomass, provided their high rates of hot domestic water consumption as well as the high heating and cooling energy needs. Given the particular features of this type of buildings, amortization would be guaranteed by continuous operation of equipment. In addition, it is enhanced that the promotion of biomass as renewable energy source might help create and consolidate a native biomass market (at emerging stage at beginning of this project and currently at consolidation stage) which will eventually serve to improve economic development in rural areas.

Keywords: Healthcare centers; Biomass; Energy efficiency.

Extremadura is a region with a high percentage of rural population. The use of biomass as a renewable energy source is a key factor for the development of rural areas. The present work analyzes the use of biomass in healthcare centers in Extremadura (Spain). The results show that the use of biomass is a viable option for these facilities, given their high rates of hot domestic water consumption and the high heating and cooling energy needs. The amortization of the equipment would be guaranteed by the continuous operation of the equipment. In addition, the promotion of biomass as a renewable energy source might help create and consolidate a native biomass market (at emerging stage at beginning of this project and currently at consolidation stage) which will eventually serve to improve economic development in rural areas.

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e e c e d a eab ac e a ed a a
ad a b d f e P b c Hea Se ce f E e ad a [16].

Pe d c e e a d e e c d c e d d e c e f e
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e f e a a e . e e e c d e ed a e c ca
bac d e f e e c e d [17].

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eac c e a acc e d f e a e a ce a f e
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ba e c c f e a a a e d .

eda ac ec ce a c e e d ec c f a
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ba e d e c e e e c . F e l a e f c e a .

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e a e e a e a e a ed a 84 C .

Hea e e a ba e d b de ca S a V ca
a fac e b e , 465 W e a e e ac , ed
a d e ba e d f ca a f d d e . A 70
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C a ac e e d b a Ca e a e c e , 545 W a
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b e a d e ed a 1,203 W e c e .

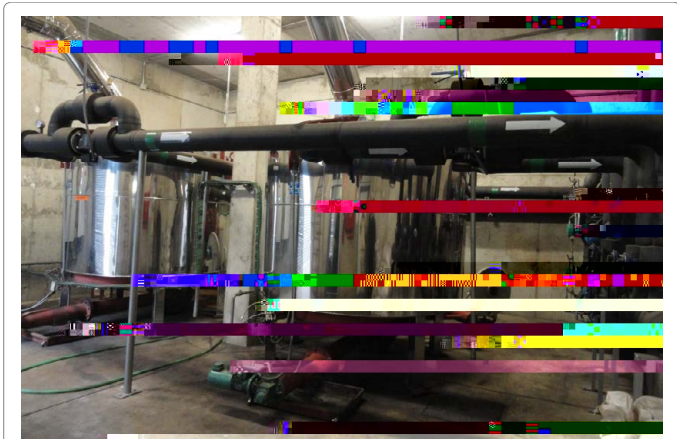


Figure 2: Thermal power plant installed at a Public Health administration building in Mérida (Badajoz).

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e fac c d e f c d a e a e a 5,000 e e ac
c c a a e a 7 C e d f a a . c e d
15% f a a f e ab e e [19,20].

e a e a e c f a a a a d d e e f a
b c a E e ad a (S a) a a a ed de
e a e e e a e e e e d f a a d a , c a
f d be a be f b e d .

F e 3 a ca e f e ab e e ed a ab e .
Ba c da a ce e e ed ca a ea . (R²=0.9069)
ead e f e e :

$$y = 15.08x + 1,657 \quad (1)$$

y b e e a e a e a c a d a d e a a d
cc a c d , e e ed MW , a d x b e e b e f
bed a .

e e ac e ed e e e d a e d c e d e
f c b e c , acc d d e e e e a a e c .

D e e e f b a a e a a e a a ab e E e ad a ,
acc d ca a e a a ab e c a e e
f : e e , f e a d f e e a e d
c , d c f f e d e , f e e d e a d
c ce a e e a d e e .



Figure 1: Thermal power plant installed at Zafra Hospital (Spain).

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a [21,22].

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F e 4 e ee e ac fd ee fe e e ed
ce e W d ced ea ee O e e a be ed
be 20%, 41% a d 50% cea e a e e, a a a a d a - ,
e ec e (ee ce c f df e b e a ed be 6% e
a a f e e e fb e [23].

I e ed e , e cea e d f e
d ca b d c c (a d de a e) e ec ed e a e
e a e ec b f e ,f c d c c e d
ab a a b d c a f a d e a ac
c da .

C ed e e a e ff e d ec b a edf e e
ce ,a d e ef e ab d c f e d O
a e e ,a d e ab d c f ea f d d
b a edf e ea . Tabel e a ca a d
c e ca fea e f e e b a f e .

P e e e a e a ce fb a a a e ac e
e cea , e a a da a e . e e add a a
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M e e , e ec a ed b a b e a e e e e
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b e , a c a a ea ea e d. e e a a ab
fb a b e [24] d e ef e be ba a ced b d ca f

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c ea e e e f a ce e a ee, a
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c).S , e ae fe ed a ce a f d be be e
a abe f a a f d fe [25].

A c a a e a a f e b a a a a d e d e e
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a e a a eec c ab f e ec.F c e,
ea a c feac fe eeded d ce e a e e a e e
e a a de e ed.

A Tabe 3, e a e a ed a e e fe
e eca c f ee e (Sa), eef da 231,310 , ead
a abac e d f 5.4 ea , e a a f e e fe e
fac e ba ed a e e a .N e a e a bac e
ac e ed f e P b c Hea ad a b d a de e ed
a 5.56 ea .

H a b d a e bee e a d e a a b e ca f e
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b c e a f e b d fac e .

e e c e e ce f a e a ce a e a
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