# Re: Nuclear PBMR district heating

***Source:*** http://sci.tech−archive.net/Archive/sci.energy/2006−02/msg00012.html

- *From*: "Alex Terrell" <alexterrell@xxxxxxxxx>
- *Date*: 2 Feb 2006 03:10:18 −0800

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Giuseppe wrote:

> "Alex Terrell" <alexterrell@xxxxxxxxx> ha scritto nel messaggio
> news:1138826047.524911.307490@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
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> >>Giuseppe wrote:
> >> I read something about these small "pebble bed" modular reactors to be
> >> built
> >> in South Africa.They are high temperature nuclear reactors,graphite
> >> moderated and helium cooled.The core heats up helium from 500 to 900
> >> °C,after that is discharged at 140 °C. Could it be possible to heat up
> >> water
> >> at temperatures high enough for district heating or district cooling in
> >> the
> >> hot months?
> >Probably, but at 140 degrees you'd want to drive a steam turbine and
> >generate more electricity.
>
> Of course,I was refering only to district heating,not electric generation
>
> >>Unless of course you have lots of reactors
> >>and need to do something with surplus night time thermal energy.
> >> Have you got any estimate about max water temperature achievable
> >> with helium at 140 °C?
> >Close to 140 C, but that would be inefficient. You'd probably want to
> >heat the water to 80−90 degrees or so.
>
> Only 80−90 °C?It's not so much....I'd like to read an accurate number about
> this
> You know,nuclear plants are not located near big town centers and usually
> loses in district heating network are about 1 degree per km or something
> higher.So,if we want to have a 40 km long DH network we must have at least
> a 120 °C/60 °C  feed/back water temperature.I suppose that nuclear thermal
> plants are no more 10 km far from cities (so we early loose 10 degrees there
> and back) and water temperature in the houses is at least 70 °C.
> Questions and/or comments are welcome

Does the 1 degree per km refer to branch lines from a municipal power
station?So guessing a bit, this would have about 100MW of heat coming
out in about 5 branch lines, so 20 MW each.

A nuclear reactor on the other hand, would need to send 1GW of heat
along a major "artery", to a city Centre branch distribution point.
This would use a pipe some 50 times bigger, so with perhaps 7 times the
surface area, giving a heat loss of 1C/7km.

Also, on this artery, it would be viable to have expensive insulation,
e.g vacuum.
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