

Perceptions of Geothermal Energy: *Do you know what the REST of the people think?*

**SMU Geothermal Lab's
*Power Plays: Geothermal Energy in
Oil and Gas Fields***

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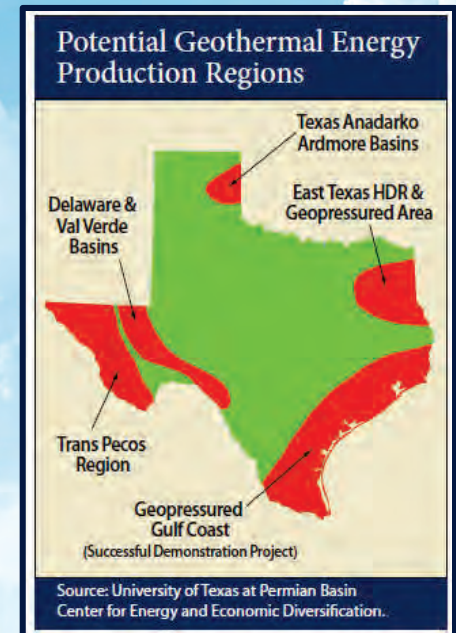
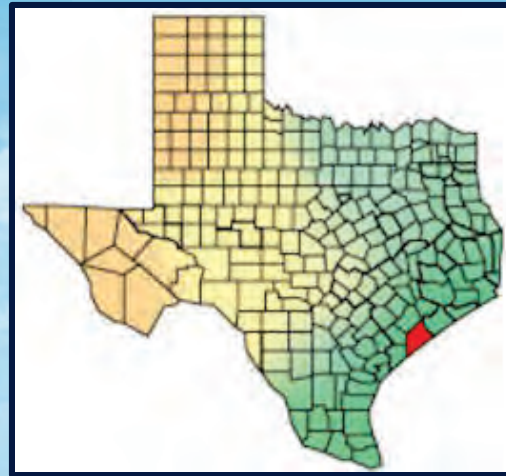
Research Project

- Ph.D. Research Project – **“Low-temperature Geothermal Energy (LTGE) Development in Coastal Texas: Linking Values and Framing Theories in New Energy Development”**
- Texas General Land Office (GLO) funds managed by Houston Advanced Research Center (HARC), under its Coastal Impacts Technology Program (CITP) to develop a methodology of assessing the environmental impacts of technologies on a coastal wetland ecosystem Texas' 18 coastal counties

Matagorda County, Texas

Matagorda County - a coastal county, unique experience with energy development:

- Oil and Gas development for 100 years
- Operating Nuclear Power Plant since 1980s (STP)
- Recent attempt to build coal-fired electric plant which failed due to public opposition



Why is This Research Important?

In order for new technologies to be broadly adopted, they must be:

- Technically Feasible
- Economical
- Environmentally Acceptable

But they must also be...

Barendrecht and CCS

NATURE | Vol 463 | 18 February 2010

NEWS FEATURE



BURIED TROUBLE

Protesters saying “no to CO₂” are just one roadblock facing carbon sequestration — a strategy that could help prevent dangerous climate change. **Richard Van Noorden** investigates.

The idea of injecting 400,000 tonnes of carbon dioxide under a shopping mall was always going to be a tough sell. And so it proved when the Dutch minister of economic affairs, Maria van der Hoeven, came to the small town of Barendrecht in December to explain why the government supported the proposal, made by the petroleum company Shell. At a public meeting in a packed theatre, attendees hurled jeers and threats at van der Hoeven and her colleagues, who were trying to convince the residents that the injection project was safe and environmentally beneficial.

investors are uncertain about its viability at large scales.

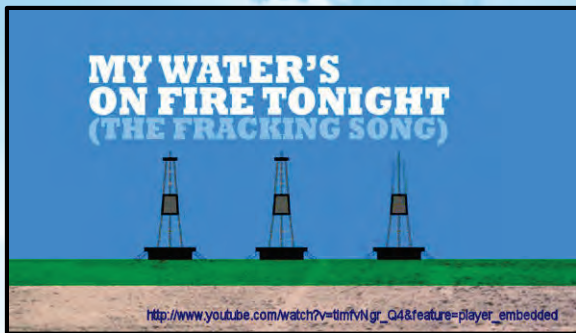
“There is lots of research and lots of talking — lots of recycling of information — but little real progress,” says Heleen de Coninck, who works on climate policy at the Energy research Centre of the Netherlands in Petten.

That slow pace is especially harmful for CCS because the strategy has a limited lifetime. It is viewed as a bridge technology — one that would allow coal-rich nations such as the United States and China to burn fossil fuels guilt-free for a generation or two, until cleaner forms of energy become

PHOTO: HOLLANDE HOOGTE/STYFWE



Marcellus Shale Protests



Matagorda County and White Stallion Coal-Fired Electricity



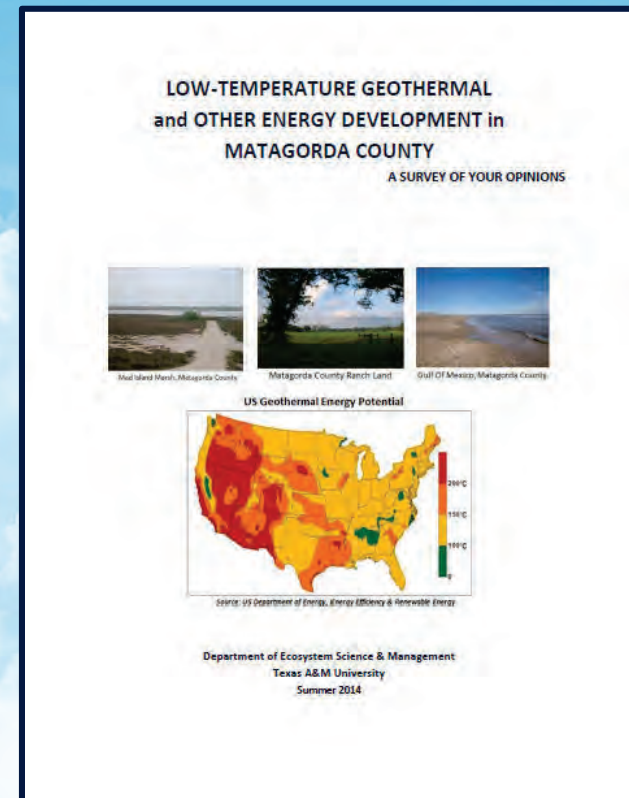
Denton, Texas



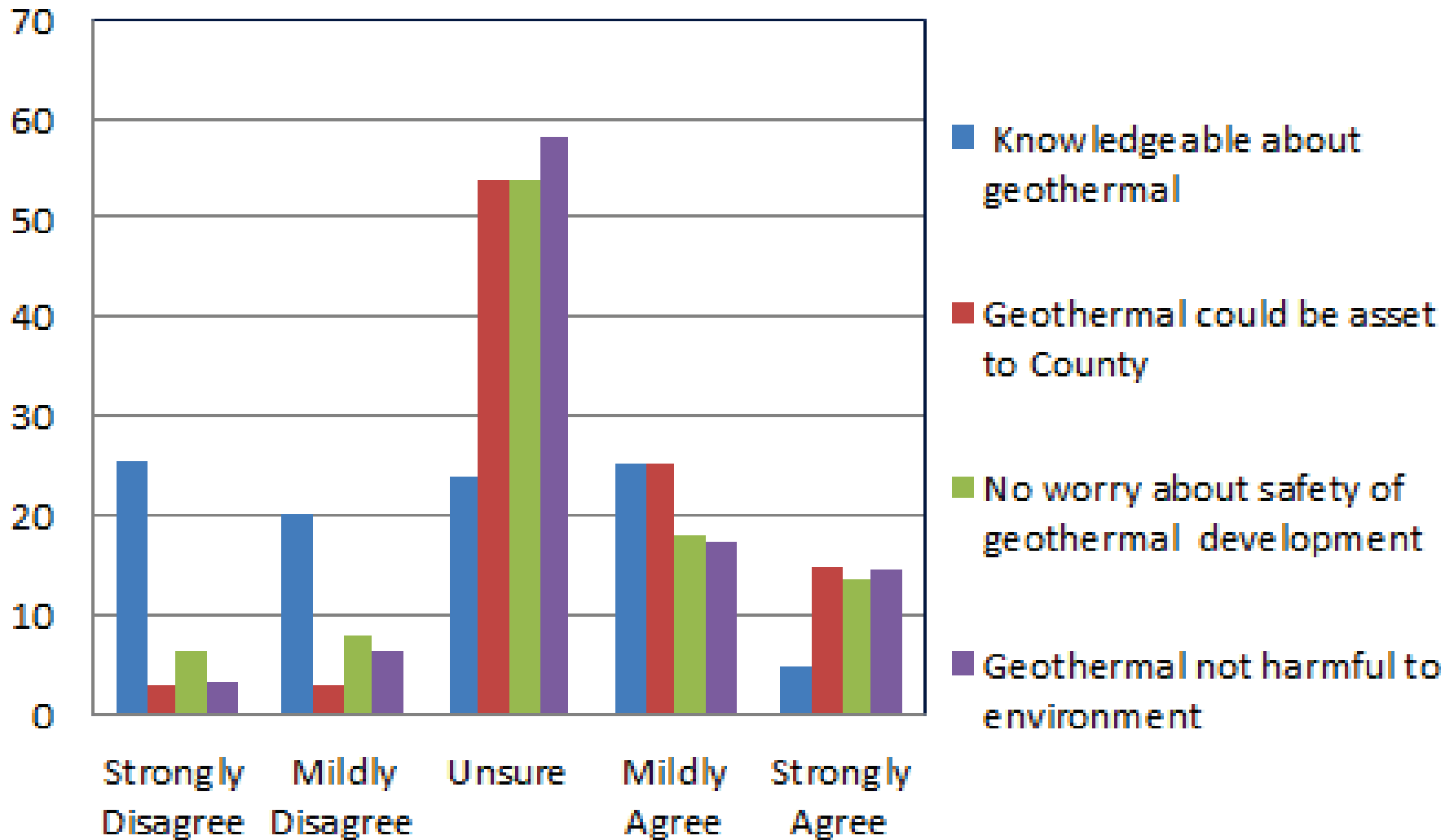
- Denton, TX —Banned Fracing in November 2014
- In May, the Texas legislature (HB 40) overturned the ban

Research Project Methodology

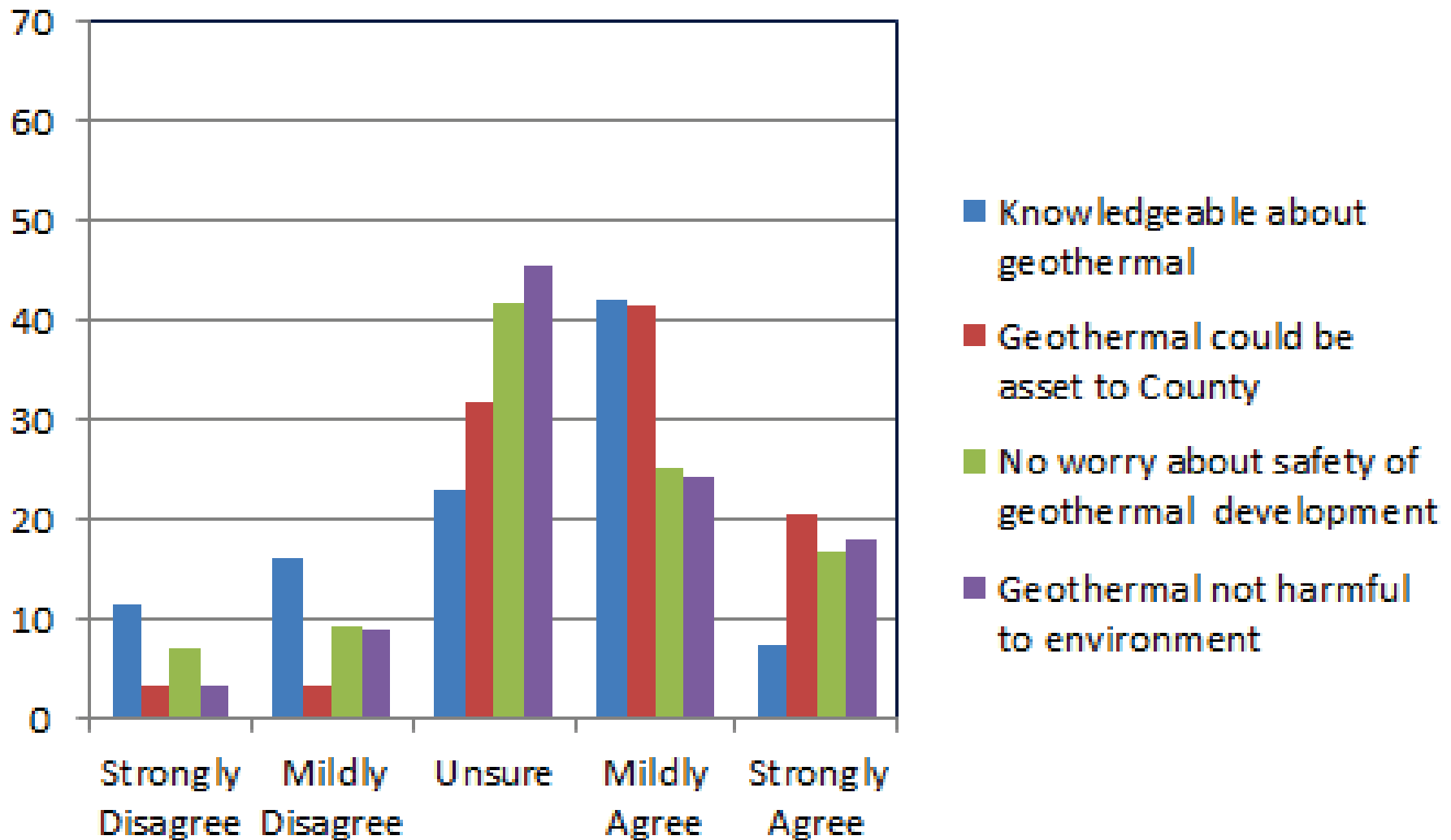
- Began in 2013
- Literature review of community perceptions, energy development, indicators of social acceptance
- Technical Advisors
- Focus Groups
- Sent Questionnaire to Matagorda County – 2014-2015
- Questionnaire results concerning geothermal knowledge, perceptions, concerns



Questionnaire Results – Geothermal Perceptions



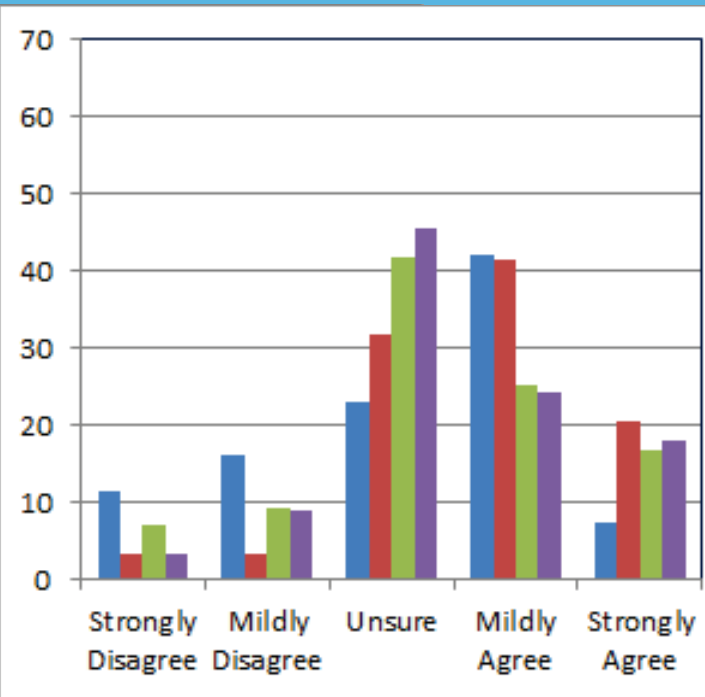
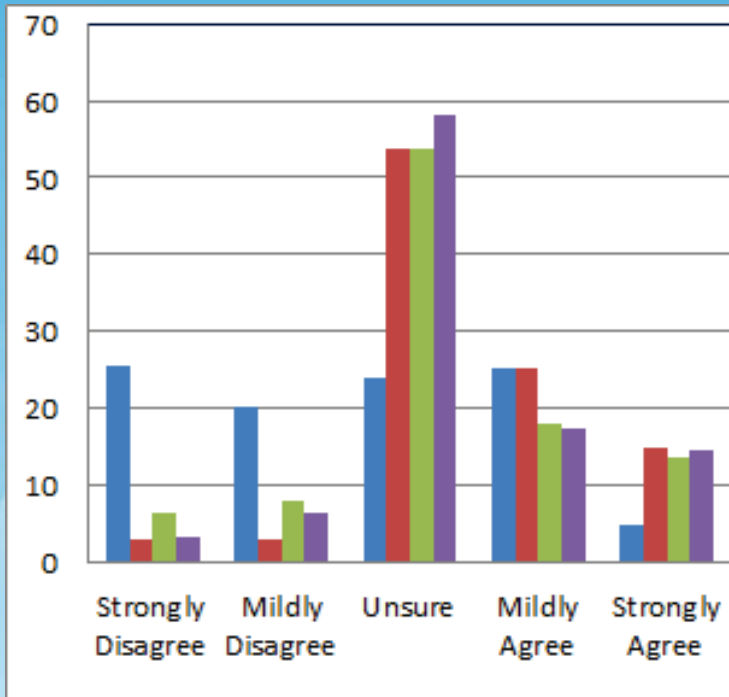
Perceptions of Geothermal Energy *After* Brief Description



Side by Side Comparison

Initial Response

After Description



(Chi-squared test showed change in distribution of responses before and after reading description.)

Learn from Other Industries



Would you like this to become the “face” of geothermal energy?

Are You Ready to Explain This?

“Hydraulic fracturing, informally referred to as “fracking,” is an oil and gas well development process that typically involves injecting water, sand, and chemicals under high pressure into a bedrock formation via the well. This process is intended to create new fractures in the rock as well as increase the size, extent, and connectivity of existing fractures. Hydraulic fracturing is a well-stimulation technique used commonly in low-permeability rocks like tight sandstone, shale, and some coal beds to increase oil and/or gas flow to a well from petroleum-bearing rock formations. A similar technique is used to create improved permeability in underground geothermal reservoirs.”

<http://energy.usgs.gov/OilGas/UnconventionalOilGas/HydraulicFracturing.aspx>

“EGS are man-made reservoirs created by drilling wells thousands of feet below the earth to access hot rock at the earth’s crust. Highly pressurized cold water is pumped through the wells to cause pre-existing fractures of the hot rock to open up, increasing permeability. This enables the water to flow through the cracked rock and pick up heat. The resulting hot water pumps back to the surface where it is depressurized to make steam, which spins a turbine to generate electricity. The water is then cooled and pumped through the wells again, repeating the same process and creating a closed-loop system.”

<http://energy.gov/articles/top-10-things-you-didnt-know-about-enhanced-geothermal-systems>

Can it Happen to the Geothermal Industry?

- ARCIDOSSO, ITALY (August 2013) –
“ 'Clean' geothermal energy plant sparks protest in Italy”
- HAWAII (August 2013)-
“More than 200 geothermal power protesters gather outside HELCO”
- KENYA (July 2014) –
“Maasai Protest Against New Land Concessions For Geothermal Extraction In Kenya”



So What???

As we get closer to having on-site development of geothermal energy in Texas and the Gulf Coast, the time is now – **TODAY** - to begin building community relationships.



It is better to practice **Conflict Avoidance** up front than attempt costly **Conflict Resolution** later on...



Final Phase of Research

Develop guidelines for communities and would-be developers that address the needs of local stakeholders first, and focuses on conflict avoidance



Highlights of Successful Strategies

- 1. Avoid Current Process of “Decide, Announce, and Defend”**
- 2. Involve Local Communities from Onset –**
Bottom-up model
- 3. Small Focus Groups –** Create environment that allows open discussion
- 4. Evaluate “Whole Picture” –** Water, Land, Air – not just Economy – Residents not willing to spend community’s capital solely for economic gains
- 5. Emphasis on Process** rather than Outcome

Much interest in LTGE but not enough knowledge at this point to make any decisions

Some Comments

- *“..if you already have something that's pretty close to paradise, anything you do to change it is gonna make it worse, probably. So I would be in favor of looking at this, but if we do it, very carefully.”*
- *“Geothermal energy is interesting but how many deep holes can we keep punching into the earth?”*
- *“You never addressed freshwater issues. This geothermal sounds like it has all kinds of potential for polluting the groundwater supply and using our limited water supply. Will this impact our freshwater inflow to the bay and our marine resources?”*
- *“Environment effects must be discussed - both good and bad.”*

Thank You! Any Questions?



Make a tree happy – hug one today!!