New membranes could enhance efficiency of desalination process

Pu Bihong, if successful, will boost water and energy security as nation curbs reliance on fossil fuels

National water agency PUB is crafting new technologies aimed at making use of renewable energy sources to advance desalination technology, which uses energy-intensive processes to convert seawater or brackish water into drinking water.

Two new types of membranes will be tested at Pu Bihong, and the technology could help the country become less dependent on energy-intensive desalination processes.

One is a ceramic membrane, which uses nanoscale material to remove impurities, and the other is a bioceramic membrane, which combines inorganic and biological elements to improve the overall efficiency of the process.

The technology is expected to save energy by 40 per cent compared to conventional methods.

Desalination using membranes is a key technology for water treatment, but it is energy-intensive.

PUB is looking to reduce the energy consumption of desalination by about 40 per cent to reduce its carbon footprint.

This involves using alternative membrane technologies and the following line-up is being tested:

Ceramic membranes

- More robust and resistant to scale formation

- Better energy efficiency

- More cost-effective

- Longer lifespan

- Better resistance to biofouling

- More resistant to chemical degradation

- More resistant to accumulation of organic and inorganic substances

New methods and how they work

The researchers are developing membranes that can be used in a two-stage process.

**Ceramic membranes**

- Made of materials that have high resistance to scale formation

- More energy-efficient

- More cost-effective

- Longer lifespan

- Better resistance to biofouling

- Better resistance to chemical degradation

- More resistant to accumulation of organic and inorganic substances

**Bioceramic membranes**

- A combination of ceramic and biological elements

- More energy-efficient

- More cost-effective

- Longer lifespan

- Better resistance to biofouling

- Better resistance to chemical degradation

- More resistant to accumulation of organic and inorganic substances

**Flat sheet bioceramic membranes**

- truncated

- lengthened

- cross-sectional area

Researchers at Nanyang Technological University (NTU) have developed a new bioceramic membrane that can reduce the energy consumption of desalination plants by about 80 per cent.

**Foto**

**Pu Bihong**, a research team led by NTU Assistant Professor Meng Long, has developed a new bioceramic membrane that can reduce the energy consumption of desalination plants by about 80 per cent.

**Biodiesel efficiency**

As Singapore moves towards including more renewable and clean sources of energy, any reduction in the use of fossil fuels would in turn make the water treatment process more sustainable. The other key goal is to improve the overall energy efficiency of the water treatment process.