University of Illinois at Urbana-Champaign
Dept. of Electrical and Computer Engineering

ECE 101: Exploring Digital Technologies for Non-engineers

Fairness

What Exactly is Fair?

Now, let's talk briefly about fairness.

What does "fairness" mean?

Fairness: impartial and just treatment or behavior without favoritism or discrimination

Regulated Energy: One Provider, One Price

Let's start with enforced equity.

Before 1992, US energy (electricity, gas)
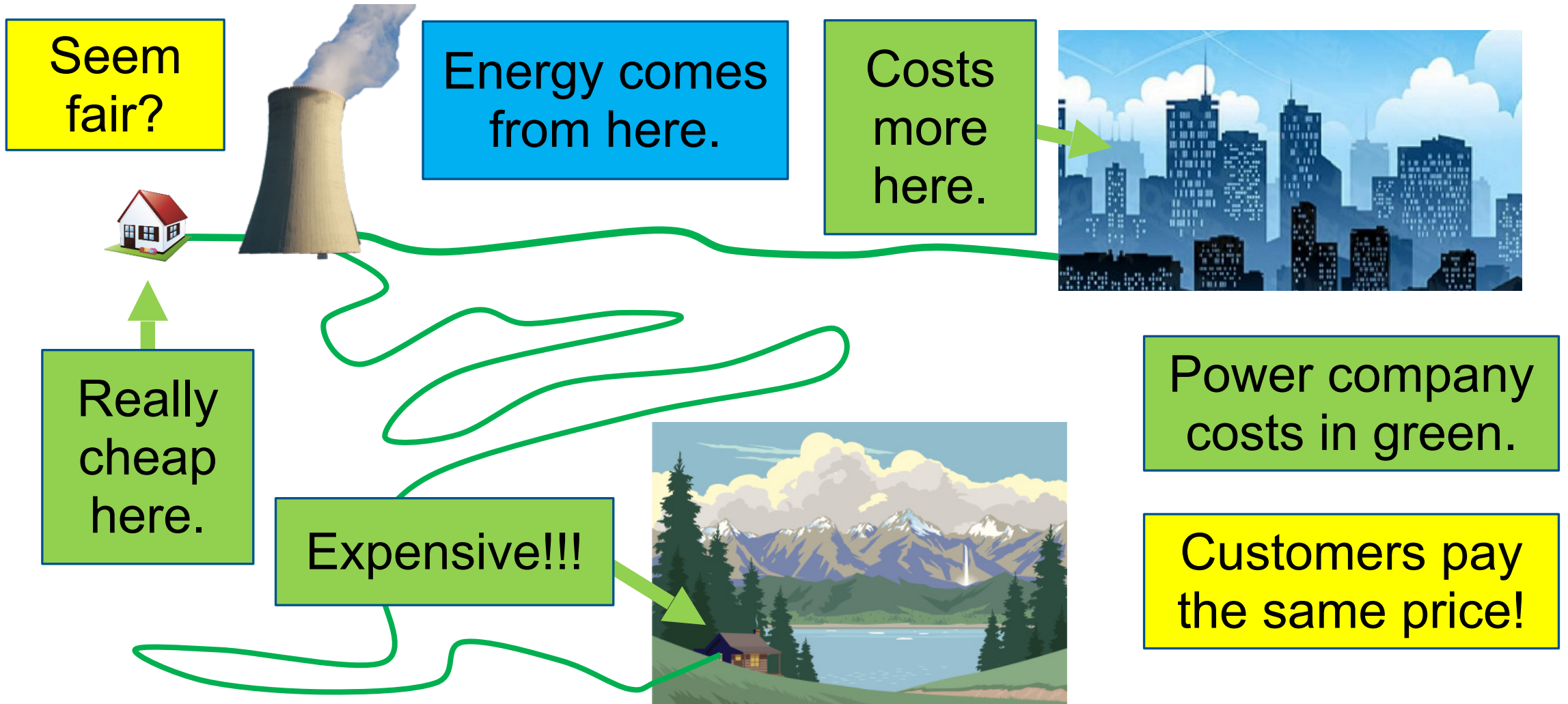providers were strictly regulated:
- any given location (home, office, and so forth)
- had a **single energy provider**.

In return, the government
- required that energy providers
- charge the **same prices**
- **for all customers** in their region,
- regardless of the customer's location.

<div align="center">

Seem fair?

</div>

Is Regulation Fair?

Seem fair?

Energy comes from here.

Costs more here.

Really cheap here.

Expensive!!!

Power company costs in green.

Customers pay the same price!

Energy is No Longer Regulated in Most of the US

Depends how one views the question.

Is energy a basic human right?

Or a commodity in the marketplace?

Keep in mind that **consumers had only one choice of provider**.

Today, energy is de-regulated in most states.

Auto-Insurance Risk Depends on Many Factors

Similar efforts leverage information
with auto-insurance.

For decades, these lowered your rates:
- not having accidents or tickets,
- driving less each day,
- living in a safe city, and
- being the right age.

Now, **you can provide more information** for more discounts.

Should Auto-Insurance Rates be Regulated?

Protected by law: race, gender, age … sort of.

Unprotected: interests, hobbies, friends, email, social networks, choice of video games

…oh, so you like playing car racing games?

Companies can't
- directly **force you** to provide such information,
- **but** they **can** lower your rates if you do,
- and **raise** your **rates if you decline**.

What if you can't afford to decline?

Is that fair?

Do Taxpayers Deserve the Same Services?

Let's talk about Internet access.

Every homeowner and business in a city **pays** the **same** rate of property **tax**.

To put optical fiber in place,
- **a provider needs access and permission**
- to dig up roads **supported by the city**.

Should a provider be allowed to **offer only some** of the citizens **service**?

Is that fair?

Measure Opportunity, or Measure Outcome?

Is fairness based on opportunity or outcome?

Jan and Pat pay the **same amount to the same provider**.

Jan uses the Internet from 1:00 to 5:00 a.m. each day and always **observes huge bandwidths**.

Pat works from home during business hours—after equal sharing with other users, **Pat observes fairly small bandwidths**.

Is that fair?

Per Payment, or Per Person?

Different Jan, different Pat, same price.

Jan has a large family.
Ten people using the Internet.

Pat is single.

**Is bandwidth equal
per person or per home?**

Per Payment, or Per Use?

Different Jan, different Pat, same price.

Jan watches movies on one site to relax.

Pat downloads simultaneously from many.

**Is bandwidth equal
per person or per use?**

(In practice, it's probably a mix.)

How Hard Should a Provider Try?

Different Jan, different Pat, same price
(last one!)

Jan uses a cheap video streaming service
with low bandwidth.

Pat pays a major company
with good bandwidth.

**Should the ISP try to use multiple
routes to make delivered
bandwidth more equal?**

Fairness Not as Easy to Define as We Might Like

The point:

Fairness can be **defined in many ways**, and **from many perspectives**.

A single quantitative definition is **hard to agree on**.