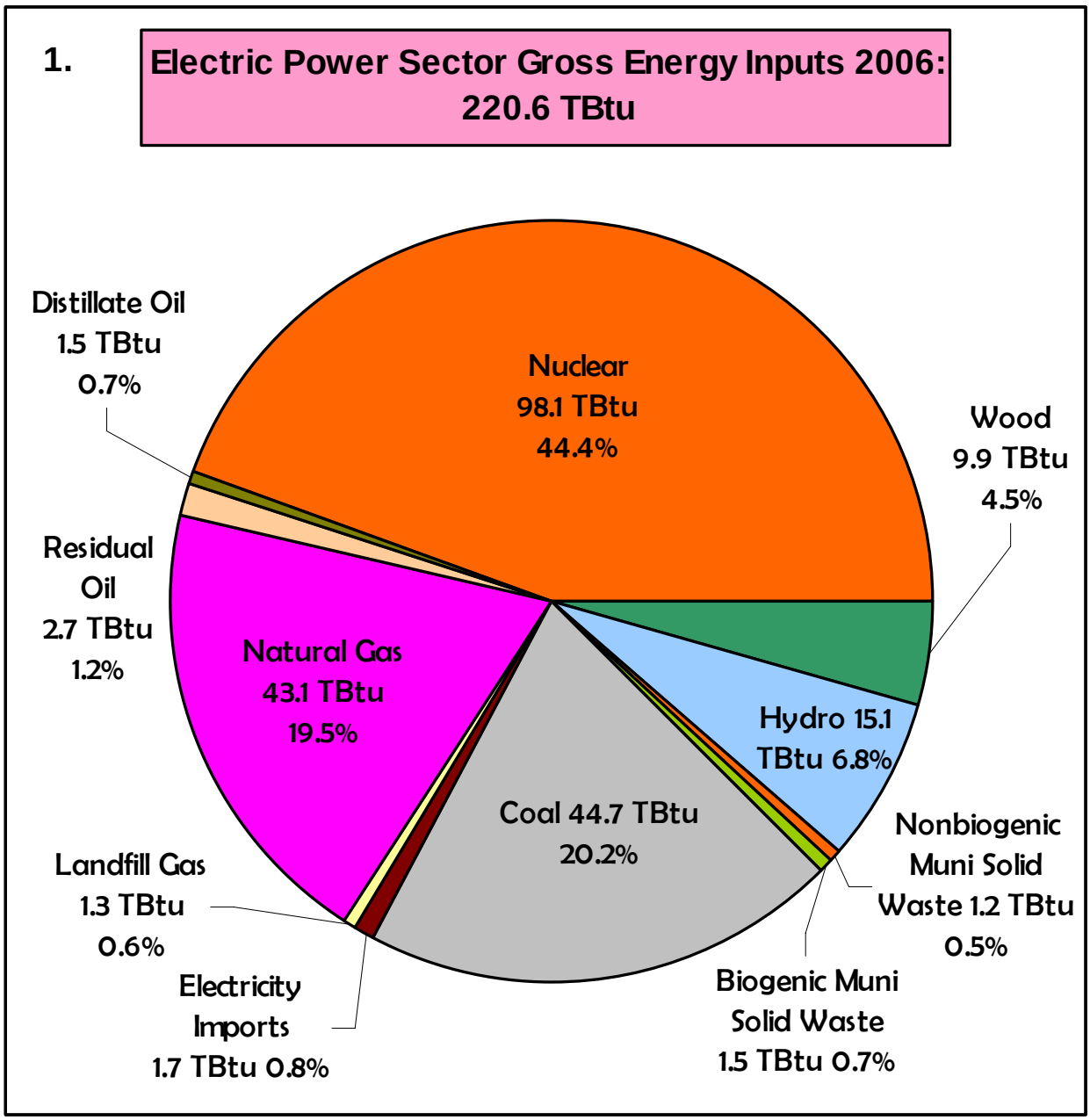
New Hampshire Energy Facts 2006: Electric Power Sector

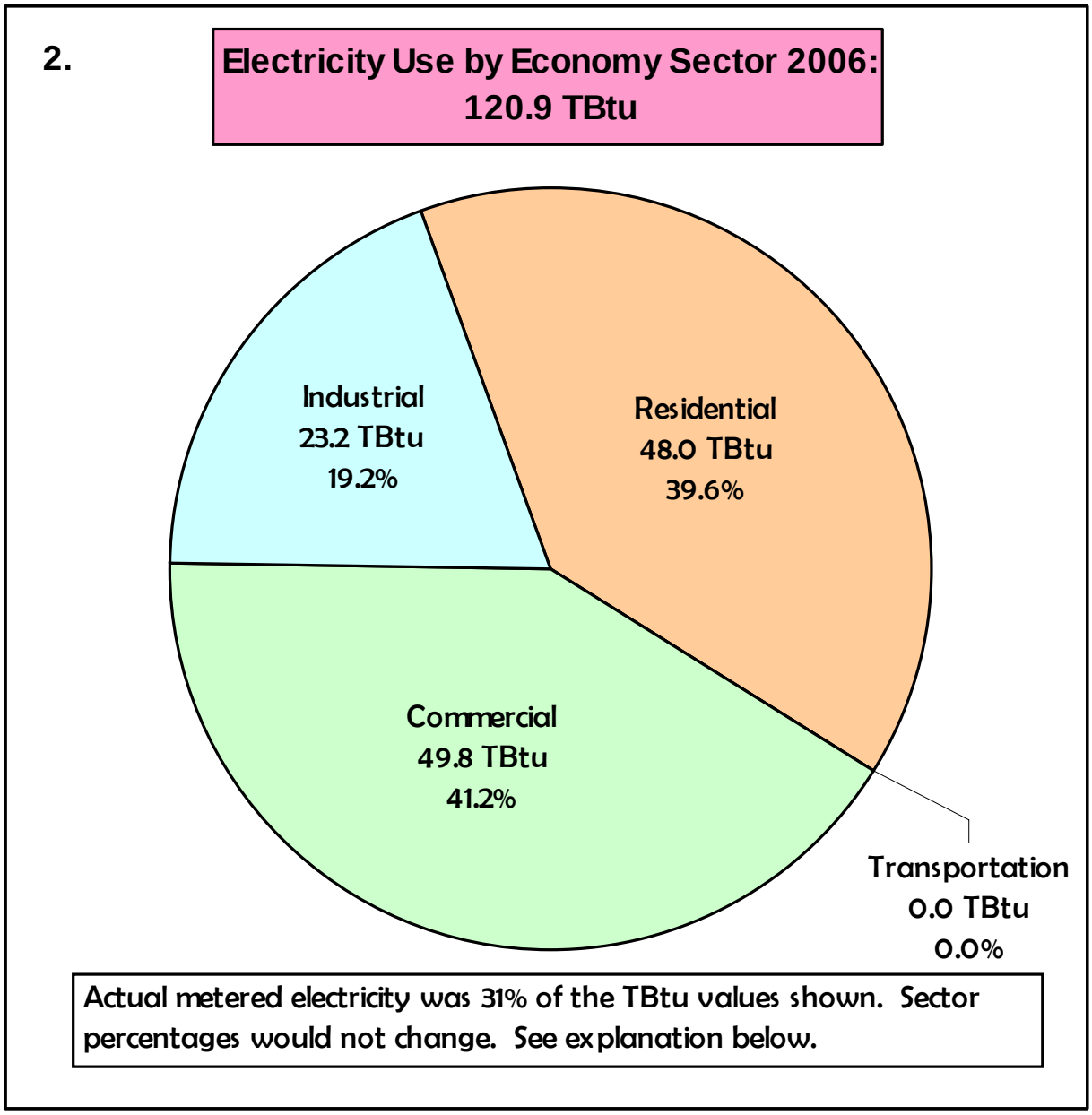
ENERGY INPUTS

- **Gross** energy inputs: 220.6 TBtu, or 53.3% of the State's total gross energy inputs.
- **Net** energy inputs: 120.9 TBtu, or 38.5% of the State's total net energy use.

The difference between Gross and Net is the 99.7 TBtu (45.2% of the total 220.6 TBtu) energy inputs used to generate the electricity that was exported from New Hampshire. The Net energy input (120.9 TBtu) represents the energy required to generate the metered electricity consumed by in-State end users. Unlike the Commercial, Industrial and Residential sectors, there is no "Net energy use" category here because the Electric Power sector uses comparatively little electricity as an end user itself.



ELECTRIC ENERGY USE BY ECONOMY SECTOR



ELECTRIC ENERGY NOTES

- **EFFICIENCY: 31%**
  - The overall efficiency for the entire electric power industry nationwide, from primary energy source (water power, coal, uranium, etc.) to final user is estimated by US DOE to be 31%, which means the end user has access to about one-third of the energy that was used to generate the electricity.
  - Therefore, Chart 2 shows the Electric Power sector's gross energy INPUT allocated to each sector, not the amount of energy actually received at the end users' meters. For example, the Commercial sector's electricity consumption of 49.8 TBtu represents approximately 31% usable electricity and 69% unavoidable energy "losses" incurred in generation and in subsequent "line losses". Thus, the actual energy used by the Commercial sector, on their side of the electric meters, is 15.6 TBtu. However, they could not receive those 15.6 TBtu unless 49.8 TBtu of energy was put into generation and transmission in the first place.

- The US Department of Energy (DOE), main data source for New Hampshire Energy Facts, allocates these "losses" not to the electric power sector but to the end-user sectors in proportion to the electricity consumed. This seemingly counterintuitive approach is consistent with economic analyses across the economy, where production costs are included in final retail prices.

- MEASUREMENT: MegaWatts *vs* MegaWatt-hours
  - The capability to generate electricity - measured in megaWatts (MW) - is not the same parameter as the actual amount of electricity generated - which is measured as megaWatt-hours (MWh). A simple analogy: A car's engine has the capability to produce a maximum amount of power at any given moment. This is the engine's horsepower rating, analogous to the MW rating for an electricity generating facility. However, the total amount of a car's power output (analogous to MWh) in a year depends not only on the horsepower, but also on how much the car was driven, and under what conditions (acceleration, idling, cruising). This is also the case with electricity generating facilities.
  - Electricity generating facilities do not always operate at their rated capability (MW), nor do they operate all the time: Market conditions and maintenance requirements influence operating patterns and schedules. Therefore, the amount of electricity generated (MWh) by each kind of energy input (coal, wood, etc.) is not necessarily proportional to that energy type's percentage of the total generation capability mix: A given hydroelectric power plant may operate a greater or lesser number of hours than a coal-fired power plant in a particular year, for example.
- MEASUREMENT: Avoiding counting the energy in electricity twice
  - Including retail electricity sales (electricity end use) in NH **total** energy consumption would count the energy twice: first as energy inputs for generation by the Electric Power sector, and then again at final use in the other economy sectors, such as Residential. To avoid artificially inflating the State's **total** energy use, this fact must be considered in analyzing total energy consumption. Therefore, electricity *end use* is not included in ***Gross** energy inputs*; see the summary table at the link below.
  - At the same time, electricity consumption is important to include **at the end user level** in order to obtain a true picture of each economy sector's total energy needs, which must be met regardless of the energy's origins. For example, if the Residential sector reduced its use of electricity for heating water, then another energy source - such as natural gas - would be required to replace the energy no longer provided by electricity. Accordingly, each economy sector's electricity use – including the associated energy losses from generation through delivery to end user - is included in the charts that show their **total** energy use.
- MEASUREMENT: Why and how to include "lost" energy in the economy sectors' **total** energy use
  - As noted above, counting the energy unavoidably "lost" in generating, transmitting and distributing electricity to end users is logical, in that the end-user's demand for electricity led the Electric Power sector to generate the electricity in the first place. Thus, Residential electricity consumption led indirectly to the "loss" of some energy along the way from generation to final delivery.
  - The losses are allocated among the economy sectors in proportion to their electricity consumption because the amount of "lost" energy is directly proportional to the amount of electricity consumed. The different sectors consumed different amounts of electricity; therefore, their use of electricity led, indirectly, to different amounts of "lost" energy.

Definitions and Technical Notes

For more energy source and consumption information, see Summary of 2006 NH Energy Consumption by Source and Economy Sector.