SUPPLEMENTARY MATERIALS

Table S1. Kinematic parameter definitions. Measurement units are enclosed in parentheses.

Protraction length* (m)	The paw's maximum forward excursion distance, measured from the ground directly beneath the top of the scapula (withers)
Protraction angle (deg)	The angle from the paw at maximum forward excursion to the ground directly beneath the withers
Retraction length* (m)	The paw's maximum backward excursion distance, measured from the ground directly beneath the hip
Retraction angle (deg)	The angle from the paw at maximum backward excursion to the ground directly beneath the hip
Stride duration (s)	The length of time between two consecutive touchdowns of the same limb
Swing phase duration (s)	The length of time between the limb lifting off and touching down again
Stance phase duration (*i.e.* contact time, t_c) (s)	The length of time that the limb is in contact with the ground
Head angle (deg)	The obtuse angle of the dog's head relative to its back topline (hip to withers)
Hip angle (deg)	The obtuse angle from dog's withers to the hip's iliac crest to the hindlimb hock
Vertical displacement (cm)	The maximum vertical distance covered by the dog's back, as measured from the withers

* indicates linear measurement normalized by fore or hindlimb length of individual dog for direct comparison

Table S2. Overground stride mechanics for all breeds examined across three distinct gaits.

	Walk			Trot			Gallop		
	Northern	Hound	Retriever	Northern	Hound	Retriever	Northern	Hound	Retriever
Speed ($m \cdot s^{-1}$)	1.27 ± 0.04^{A}	1.28 ± 0.05^{A}	1.23 ± 0.05^{A}	2.7 ± 0.06^{AB}	2.51 ± 0.09^{B}	2.8 ± 0.07^{A}	4.96 ± 0.11^{A}	4.9 ± 0.2^{A}	5.94 ± 0.14^{B}
Stride frequency ($strides \cdot s^{-1}$)	1.5 ± 0.04^{AB}	1.57 ± 0.05^{A}	1.38 ± 0.05^{B}	2.1 ± 0.03^{AB}	2.2 ± 0.04^{A}	2.07 ± 0.03^{B}	2.61 ± 0.03^{A}	2.6 ± 0.06^{A}	2.64 ± 0.04^{A}
Stride length (m)	0.84 ± 0.02^{AB}	0.82 ± 0.02^{B}	0.9 ± 0.02^{A}	1.26 ± 0.02^{A}	1.13 ± 0.03^{B}	1.36 ± 0.02^{C}	1.91 ± 0.04^{A}	1.91 ± 0.1^{A}	2.26 ± 0.04^{B}

Data are mean ± s.e.m.
Intergroup means not connected by a common letter differ statistically ($p<0.05$).

Table S3. Estimates and 95% confidence intervals for 3-parameter exponential decay models of dog breed mass-specific total (COT_{TOT}) and locomotor (COT_{NET}) costs of transport ($J \cdot kg^{-1} \cdot m^{-1}$) as a function of animal speed. The asymptote of each model reflects the minimum transport cost (COT_{MIN}) for each breed group.

		Northern		Hound		Retriever	
		COT_{TOT}	COT_{NET}	COT_{TOT}	COT_{NET}	COT_{TOT}	COT_{NET}
Asymptote	Lower 95%	2.69	1.97	3.57	2.8	3.38	2.75
	Estimate	3.01^{A}	2.1^{A}	4.17^{B}	3.35^{B}	3.81^{B}	2.96^{B}
	Upper 95%	3.34	2.23	4.76	3.91	4.23	3.17
Scale	Lower 95%	10.51	-4.05e8	13.67	-8.67	4.5	-3214.8
	Estimate	20.36^{A}	$4.3e6^{A}$	22.14^{A}	36.3^{A}	16.46^{A}	389.1^{A}
	Upper 95%	30.21	4.13e8	30.61	81.19	28.43	3993.1
Decay Rate	Lower 95%	-3.63	-244.7	-1.43	-6.53	-4.49	-33.11
	Estimate	-2.71^{A}	-31.94^{A}	-0.84^{B}	-4.16^{A}	-3.06^{A}	-12.6^{A}
	Upper 95%	-1.78	180.8	-0.25	-1.8	-1.63	7.92
AIC_c		217.2	119.2	85.6	97.7	125.5	96.8
R^2		0.69	0.58	0.90	0.62	0.65	0.24

Intergroup means that are not connected by a common letter differ statistically ($p<0.05$).

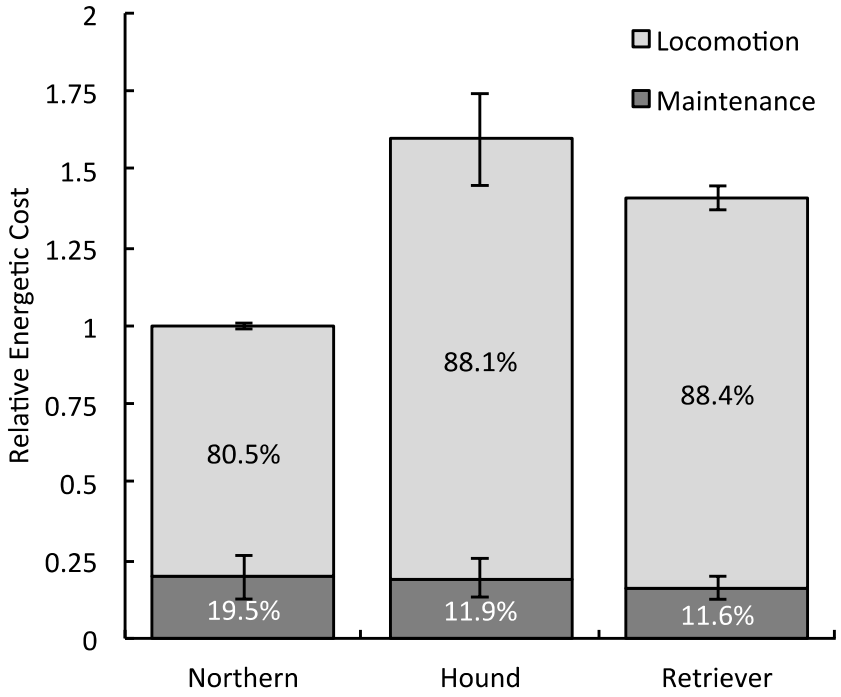

Figure S1. Relative mass-specific energetic demands (mean ± s.e.m. error bars) associated with locomotion (scaled from $COT_{NET,}$ $J \cdot kg^{-1} \cdot m^{-1}$) and maintenance costs (scaled from RMR, ml $O_2 \cdot kg^{-1} \cdot min^{-1}$) for northern breed (n = 9), hound (n = 7), and retriever (n = 7) dogs. Overall relative metabolic costs associated with both maintenance and locomotion were lowest for northern breeds as mass-specific resting costs were similar (approx. 6-8 ml $O_2 \cdot kg^{-1} \cdot min^{-1}$) across breed groups.